Bord na Móna

Killeglan Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2023

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

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Killeglan 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.*

Killeglan Bog was drained in the 1980s and was never fully put into industrial peat production.

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

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

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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 Killeglan Bogs Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Killeglan Bog, located in Co. Roscommon in 2023.
- Killeglan Bog comprises seven sub-sites which are named in accordance with the main townlands as listed below:
    - Camlagh
    - Cregganycarna
    - Cuckoo Hill
    - Goats Lough North
    - Goats Lough South
    - Nacreeva
    - Porteen
- Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- Killeglan was drained in the past to allow peat production, however it was never put into peat production, and the surface vegetation remains intact across the high bog. The margins of Killeglan have been subject to turbary/turf-cutting in the past and extensive cutover habitat occurs along the margins.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, Reedbeds, fen habitat and *Sphagnum*-rich embryonic bog communities. 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.
- The development of a range of habitats in Killeglan 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.
- A large portion of Killeglan Bog still retains deeper residual peat and 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.
- Six of the raised bog sub-sites were ditched (drained) in early 1980's (1981-84) but were never developed as milled peat production areas. Bog restoration measures were carried out on various parts of Killeglan Bog between 2011-2018. The first area to undergo these measures was Cuckoo Hill in 2011.Bog restoration was initially carried out in 2011 at Cuckoo Hill. Rehabilitation was carried out five of the other sub-sites between 2016 and 2018.
- However, some of the bog still has functional drainage and targeted measures are required to reinstate identified failed drain blocks, block flow paths and to further maximise the extent of active raised bog conditions. Measures proposed for Killeglan Bog include additional targeted drain blocking on high bog and cell bunding on marginal cutover to raise water levels to the surface of the peat.

- 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 Blackwater (Derryfadda subgroup) bog group (Ref. P0502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Killeglan Bog is part of the Blackwater (Derryfadda subgroup) Bog Group (see Appendix II for details of the bog areas within the Blackwater (Derryfadda subgroup) bog group). Killeglan Bog is located in Co. Roscommon.

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

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

Note: This plan should be read in conjunction with the accompanying Map book. In addition, all rehabilitation measures are described in the overall PCAS Methodology Paper[1].

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

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

[1] Bord na Móna (2022). Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study. Nov 2022 Version 19. Bord na Móna, Leabeg, Co. Offaly.

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:

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

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

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

Killeglan Bog is proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken. Six of the raised bog sub-sites were ditched (drained) in early 1980's (1981-84) but were never developed as milled peat production areas. This has meant that the site has retained many of its natural raised bog features and has significant potential for raised bog restoration. Raised bog restoration has taken place at Killeglan between 2011 and 2018.

1.1 Constraints and Limitations

This document covers the area of **Killeglan Bog**. Killeglan Bog comprises drained raised bog (PB1) that has never been harvested for industrial peat extraction despite the high bog having been ditched/drained in the early 1980's. However, much of the periphery of the bogs within Killeglan Bog has been harvested for domestic turf.

Rehabilitation outcomes of particular sites are constrained by the environmental characteristics and bog condition. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained and

degraded). At other sites, the majority of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status) and there will therefore be different habitat outcomes (wetlands, fen heathland, grassland and Birch woodland). In the case of Killeglan Bog which was only drained and never put into peat production, many of its natural raised bog features have been maintained. Raised bog restoration has been carried out at Killeglan between 2011 and 2018.

Parts of Killeglan Bog are in third-party ownership and have been identified as constraints on the rehab plan. Some marginal areas of Killeglan Bog are currently used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

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

Rehabilitation may also be constrained due to other property issues or as rights of way. Parts of Killeglan are known to support breeding Curlew which will be protected where required from disturbance.

The presence of ecologically sensitive species may affect the extent or timing of the rehabilitation measures. Some sensitive ecological receptors if present may require protection through the provision of Environmental Restriction Zones (or ERZ's). Parts of Killeglan are known to support breeding Curlew which will be protected where required from disturbance. Killeglan partially overlaps with the designated sites River Suck Callows SPA (004097) and Suck River Callows NHA (000222). An Appropriate Assessment of the Rehabilitation Plan is carried out by BNM as a Public Authority..

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 **published** guidance issued by the EPA – *Guidance on the process of preparing and implementing a bog rehabilitation plan* (EPA, 2020).

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2012 to 2023 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

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

- Blackwater (Derryfadda) Integrated Pollution Control Licence;
- Blackwater (Derryfadda) 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, Killeglan Bog was surveyed in February of 2010. Additional ecological walk-over surveys and visits have taken place at Killeglan Bog between 2012-2023. Habitat maps have been updated, where required or where up to date information is available. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits undertaken in 2023, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). Habitats were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Ecotope mapping has also been undertaken at Cuckoo Hill bog (the largest eastern portion) in the past. This survey also aimed to further describe in detail the vegetation occurring on the adjoining cutover bog, as some of this vegetation was a secondary habitat that was well developed. Some areas were also noted to be *Sphagnum* rich while others were likely to be natural or semi natural rich fen (PF1).

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

3. SITE DESCRIPTION

Killeglan Bog is located in west Co. Roscommon, on the Galway/Roscommon border approximately 8km north of Ballinasloe (Grid reference: ITM 184691; 240324). It is part of the Blackwater (Derryfadda subgroup) bog group (Ref. P0502-01).

Killeglan Bog is divided into seven subsites. Refer to figure titled *BNM-DR-24-11-01: Bog Site Location* in the accompanying map book for respective subsite locations. Goats Lough North and Goats Lough South Bog are the most westerly subsites at Killeglan. The River Suck flows along the western boundary of these Bogs. A local road separates Goats Lough North and Goats Lough South Bog from the remaining bogs to the east. Nacreeva Bog is Immediately east of Goats Lough South and is separated from Cregganycarna Bog to the south by the Killeglan Tributary North River. Porteen Bog is located in the centre of the site, to the north-east of Nacreeva Bog and is sub divided by the Killeglan Tributary North River. The bog furthest to the east is Cuckoo Hill Bog. Killeglan River separates this bog from Camlagh Bog to the south.

Six of the seven raised bog sub-sites were ditched (drained) in early 1980's (1981-84) but were never developed as milled peat production bogs. These six formerly drained subsites have already undergone rehabilitation works in the form of drain blocking. A summary of the subsites and the years rehabilitation took place is provided in Table 3.1 below. Please refer to figure titled *BNM-24-11-32: Killeglan Bog Previous Rehabilitation* in the accompanying map book to see the previous extent of rehabilitation measures carried out at Killeglan Bog, which equates to approximately 311.92ha.

Table 3-1 Summary of rehabilitation at Killeglan Bog

Killeglan Subsite*	Total (Ha)	Previous Rehab (Ha)	Rehab Year
Camlagh	19.69	0.00	N/A
Cregganycarna	33.97	17.74	2016-2018
Cuckoo Hill	124.42	50.13	2011
Goats Lough North	203.26	134.50	2016-2018
Goats Lough South	73.10	38.17	2016-2018
Nacreeva	92.78	63.05	2016-2018
Porteen	39.54	8.33	2016-2018
Total	**586.76**	**311.92**	

**Note: For the avoidance of doubt, the sub-sites above have also been previously described as 5 raised bogs (NPWS, 2016), however we defer to the BNM convention regarding 7 subsites.*

Areas of restoration potential within the respective subsites have been modelled (2023) and a summary provided in Table 3.2 below. These figures exclude areas modelled that overlap constraints. The hydrological model predicts that up to **108.6 ha** of raised bog has potential to become Active Raised Bog (ARB) see figure BNM-DR-24-11-33. Proposed ecotope surveys will determine the actual extent of active bog currently at Killeglan.

Table 3-2 Summary of potential ARB at Killeglan Bog

Subsite	Modelled Area of DRB/potential ARB
Cuckoo Hill	20.1
Cregganycarna	7
Nacreeva	18.7
Goats Lough South	21.2
Goats Lough North	41
Porteen	0.6
Total	**108.6**

Killeglan forms part of the Upper Shannon Catchment (Catchment ID: 26D) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Suck_SC_090 sub-catchment. Killeglan Bog has a gravity-based drainage system. Killeglan Bog discharges via adjacent drains to Killeglan Tributary North which flows from the north east through the site to meet the Killeglan River which flows from the south east through the southern section of the site towards the River Suck.

See figure titled *BNM-DR-24-11-01: Site Location Map* in the accompanying map book, along with *BNM-DR-24-11-24: Bog Group Map* for reference.

3.1 Status and Situation

3.1.1 Site history

Killeglan bog was ditched (drained) in the early 1980's (1981-84) but was never industrially harvested for peat and the surface vegetation remained largely intact and the bog has retained many of its natural raised bog features, although there has also been significant degradation. Six of the seven raised bog sub-sites were drained and these six formerly drained subsites have already undergone rehabilitation works in the form of drain blocking between 2011 and 2018 (refer to Table 3.1 above).

The main topographical features across the two larger bog areas of Goat Lough and Nacreeva Bog are the remains of historical lakes which are now forming complex soak systems, in some cases transition mire and quaking bog (PF3) (Goats Lough). These lakes are visible on the 2nd edition SI six inch maps as Goat Lough in the Goat Lough Bog to the north-west and Loughmore and Lough Nacreeva (both marked as seasonal) and Goats Lough in Nacreeva Bog to the east, see Drawing no. *BNM-DR-24-11-12 Killeglan Bog Former Topography* for reference.

Private peat-cutting is relatively extensive around some of the margins of the high bog and this has also had a significant negative impact on the quality of the high bog. Some of the high bog has also been burnt in the past.

The Killeglan group includes several undeveloped sections around the margin of the high bog area (non-peatland) that have been designated as part of a nature conservation site (River Suck Callows SPA and Suck River Callows NHA).

3.1.2 Current land-use

The Killeglan group includes several undeveloped sections around the margin of the high bog area (non-peatland) that have been designated as part of a nature conservation site (River Suck Callows SPA and NHA). There has been on-going consultation between Bord na Móna and the National Parks and Wildlife Service regarding the potential conservation value of these bogs. NPWS have also previously identified the Killeglan bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014).

Private peat-cutting is relatively extensive around some of the margins of the high bog. In addition, there are a number of plots of farmland and third-party lands within the boundary of Killeglan Bog. These areas have been mapped as constraints, see figure *BNM-DR-24-11-25 Killeglan Bog Constraints Map* for reference.

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.

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. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

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

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

GSI data indicates that the Killeglan Bog is underlain entirely by Visean Limestones. The unit is classified as a regionally important aquifer as it is subject to karstification (conduit). Geological Survey of Ireland (GSI) mapping identifies several karst features including springs, swallow holes, enclosed depressions, a turlough and superficial solution features within 1km of the bog. No data exists concerning depth to bedrock, however, there is a small area of bedrock in close proximity to the bog.

Quaternary Sediment maps show Killeglan underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone which occurs around most of the bog including to the east, north and south of the bog, with alluvium along the western boundary of the bog along the River Suck.

Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution; however, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for the surrounding areas is generally moderate to high, with some areas of extreme vulnerability mapped in areas where bedrock outcrop occurs.

3.2.2 *Peat type and depths*

Published bedrock and Quaternary geological maps only present the shallowest deposits encountered and fail to present in information on the buried peat substrate. Coring carried out by RPS in 2022 across Killeglan provided some insight into the deposits underlying the site, albeit the coring records are limited.

The majority of the bog appears to be underlain by lacustrine deposits including clay and marl, with small pockets of glacial till present. The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs. An indicative sub-peat substrate map has been prepared based on this data, presented in Drawing no. *BNM-DR-24-11-29: Indicative Sub-peat Substrate Map*.

Data used in compilation of the sub-peat map suggest that majority of the bog is underlain by lacustrine deposits including clay and marl with only small pockets of glacial deposits. Studies completed at Clara Bog, Co. Offaly indicate that glacial till derived from limestone material has a higher hydraulic conductivity than the lower lying (and younger) lacustrine deposits. Overall, limited data is available on peat depth across the bog, but coring indicates peat depth >6m in some areas.

3.3 Key Biodiversity Features of Interest

Overall, Killeglan Bog comprises drained raised bog (PB1) that has never been harvested for industrial peat extraction despite the high bog having been ditched in the early 1980's. A representative sample of the study area was subject to ground truthing in July 2023, in order to provide updated descriptive text of the typical raised bog communities present at Killeglan. In general terms, all sites visited comprise of typical raised bog species including Ling (*Calluna vulgaris*), Cross Leaved Heath (*Erica tetralix*), Common Cottongrass (*Eriophorum angustifolium*) and a good diversity of *Sphagnum* mosses. Brown Beak-sedge (*Rhynchospora fusca*) has been recorded at a number of locations within Killeglan bog including Lough Nacreeva Bog.

Killeglan bog supports the EU Habitats Directive '*degraded raised bogs still capable of natural regeneration*' (7120). Hydrological modelling indicates that there is up to 108.6 ha of potential Annex I degraded raised bog (DRB) habitat across the bog, some of which as the potential to develop as Annex I '*active raised bog' (7110)* in the future following rewetting (See table 3-2). See Figure *BNM-DR-24-11-33 titled Killeglan Bog: Potential Active Raised Bog* in the accompanying map book.

The site also supports a small area of the priority Annex I habitat type; '*active raised bog*' (7110) at Cuckoo Hill sub-site recorded in the 2013 ecotope survey, following previous rehabilitation. Proposed ecotope surveys to be carried out in 2023 will determine the current extent of active bog currently at Killeglan Bog which may differ from the above cited figure.

3.3.1 Current habitats

The most common vegetation communities present include (Categories in brackets refer to Heritage Council habitat classification or Fossitt Code) (2000)):

- Raised bog (PB1) (Codes refer to Heritage Council habitat classification, (Fossitt 2000), See Appendix II.)
- Cutover Bog (PB4)
- Scrub (WS1) (on old cutover bog)
- Depositing Rivers (FW2) (River Suck, Killeglan River and a tributary of the Killeglan River))
- Birch woodland (WN7) (on old cutover bog)
- Poor fen and flush (PF2) (part of the high bog)
- Transition mire and quaking bog (PF3) (Former lake sites on Lough Nacreeva Bog)
- Reed and large sedge swamps (FS1) (in River Suck channel)
- Dry heath (HH1) (part of high bog on some mounds and on some sections of old cutover bog)
- Wet grassland (GS4) (reclaimed cutover bog and along the river banks)
- Improved grassland (GA1) along margins of site)
- Oak-Ash-Hazel woodland (WN2)
- Dense Bracken (HD1)
- Drainage ditches (FW4)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)

A brief description of the habitats within the individual bog sub-sites that will be subject to rehabilitation measures is provided below (including Goat Lough Bog North, Goat Lough Bog South, Nacreeva Bog (Goats Loughs, Loughmore and Lough Nacreeva Bog), Cregganycarna Bog, Porteen Bog, Cuckoo Hill Bog and Camlagh Bog).

Goat Lough Bog North (203.26 ha)

Goat Lough Bog is the most westerly and largest single area of raised bog (PB1) in the Killeglan Bog group. The majority of this raised bog (totalling 134.50 ha) has been subject to previous rehabilitation. There are some small relic pool areas with *Sphagnum*-rich communities still present, and the bog is sub-quaking in places (potential active bog). A former lough (Goat Lough – *note there is another 'Goat's Lough' in Nacreeva Bog*) was previously drained but has now developed interesting flushed vegetation, mainly poor fen and flush (PF2) and bog woodland. A single stand of *Rhododendron ponticum* was recorded at the remnant Goats Lough.

The River Suck forms this sub-sites western boundary and is designated as the River Suck Callows SPA and the Suck River Callows NHA. The riparian zone along this river is particularly well developed and quite diverse with typical callows wet grassland. There is a distinctive transitional/lagg zone on the high bog along the western margin close to the River Suck, with Purple Moor-grass and Bog Myrtle both prominent.

Goat Lough Bog South (73.10 ha)

This section of raised bog (PB1) lies south of Goat lough North, with its western boundary also formed by the River Suck. The Killeglan River flows along its southern boundary. An area of 38.17 ha of raised bog in this sub-site has been subject to previous rehabilitation.

There is a distinctive transitional/lagg zone on the high bog along the western margin with the River Suck with Purple Moor-grass and Bog Myrtle both prominent. The riparian zone along this section of bog contains more frequent scattered Willow, which occasionally form small patches of Riparian woodland (WN5). Further south,

some of the grassland along the river is managed for agriculture. A small pocket of dry poorly developed Birch woodland is located at the southern end of this bog.

Nacreeva Bog (92.78 ha)

This bog is situated towards the centre of the site, immediately east of Goat Lough Bog South. The Killeglan River forms a boundary to its east and south.

The majority of the site comprises raised bog (PB1), with 63.05 ha that has been subjected to previous rehabilitation. Several mounds and ridges are present in this bog. The main topographical features of this sub-site are three former small lakes (towards the northern half of the site) namely Loughmore and Lough Nacreeva (both marked as seasonal) and Goats Lough. These lakes had previously been mapped on the 2nd edition SI six-inch maps as containing open water and some islands. These lakes were subject to drainage in the 80s and have now terrestrialised to various degrees, with no significant open water left.

These former lakes are now classified as transition mire and quaking bog (PF3), although they are likely to form a complex soak system. During the ecological surveys carried out in 2016 Goats Lough East was noted as having infilled with a floating mat of *sphagnum,* and all three lakes were very wet and quaking.

Cregganycarna Bog (33.97 ha)

This small sub-section section of bog is located to the south of Lough Nacreeva Bog south of the Killeglan River, which flows along its northern boundary. This bog consists of raised bog that had been drained extensively and has since undergone rehabilitation (totalling 17.74 ha). This bog was previously subject to more than the usual amount of drains, with extra drains having been installed that criss-crossed the parallel drains. Heather is the dominant component of the vegetation. The margins of the bog presently consist of old cutover bog that now support marginal habitats such as Scrub (WS1) and Birch Woodland (WN7).

Porteen Bog (39.54 ha)

This section of bog is located on the northern edge, nestled between Nacreeva and Cuckoo Hill sub-sites. The Killeglan River flows through the bog, dissecting it into east and west sections.

The western section is mainly comprised of a mixture of old and new cutover with some small sections of remnant raised bog (PB1). The older cutover bog areas are mostly made up of scrub, dry heath and Purple Moor-grass-dominated grassland. Some sections are still used for domestic turf cutting.

The eastern side of this section contains some areas of very old cutover around the edges of the bog but the majority of the bog is classed as raised bog (PB1), 8.33 ha of which has been subject to rehabilitation.

Cuckoo Hill Bog (124 ha)

This is the most easterly sub-site, with a tributary of the Killeglan River separating this bog from Camlagh Bog to the south. The majority of this sub-site is classified as raised bog (PB1), that had been drained extensively and has been since subject to rehabilitation (high bog areas only) in 2011 (totalling 50.13 ha). The restoration immediately raised water levels. Ongoing monitoring showed that *Sphagnum* cover increased across several permanent quadrats after re-wetting. The high bog at Cuckoo Hill was subject to an ecotope survey in 2013, see figure *BNM-DR-24-11-31: Killeglan Ecotope Survey 2013.* The majority of the high bog was mapped as non-active and was dominated by marginal and sub-marginal ecotopes with only a small area of (active) sub-central ecotope. Although now out of date, it is considered likely that this still has the potential to be improved further with rehabilitation of cutover areas and some adjacent, extant, unrestored high bog.

The majority of the bog's margins have been subjected to domestic turf cutting in the past, but this has ceased. As a result, the cutover areas have become re-vegetated with a diverse mosaic of habitats such as scrub (WS1), fen (PF1/2) and heath (HH1/3) becoming established throughout. This sub-site also contains a mineral island vegetated with Oak-Ash-Hazel woodland as well as other ridges containing diverse calcareous grassland.

Areas of Rich fen (PF1) were recorded (in July 2023) within both the northern and southern margins of Cuckoo Hill bog (in July 2023), see Plate 3.4. These areas contained significant cover of Black bog rush (*Schoenus nigricans*), Bog myrtle (*Myrica gale*) and some Common reed (*Phragmites australis*), indicating an element of nutrient enrichment in these areas. In addition, brown mosses such as *Scorpidium cossonii* were also recorded. These areas have had some historic peat extraction but have revegetated. One species of particular note was the presence of Mountain Everlasting (*Antennaria dioica*) within rich fen habitat on the southern side of Cuckoo Hill bog in July 2023. There are no works proposed within areas of rich fen habitat, with contour bunds on cutover bog being modified to avoid rich fen. There are no works proposed in the area where Mountain Everlasting has been recorded.

Camlagh Bog (19.69 ha)

This small sub-site is located to the south of Cuckoo Hill Bog, with the Killeglan River dividing the two sub-sites. Camlagh bog is classified as Cutover Bog (PB4) and has not been subject to previous rehabilitation. This entire area of bog has been cutover for domestic turf cutting in the past and is dominated by heather with extensive Gorse scrub.

Plate 3.1 Raised bog habitat to the north west of Killeglan Bog showing some former drain blocking.

Plate 3.2 Remnant of Goats Lough (Nacreeva) categorised as Transition mire and quaking bog.

Plate 3.3 Drone photo of Goats Lough Bog north with former drains blocked in this area. Some additional targeted drain blocking has been identified to increase the extent and resilience of former drain blocking.

Plate 3.4 Example of Rich fen and Transition mire occurring at Porteen. This area has been subject to some historic domestic turf cutting. Areas of rich fen have been identified as sensitive habitats and avoided.

See Drawing number *BNM-DR-24-11-17: Killeglan Bog: Current Habitat Map*, included in the accompanying Mapbook, which illustrates the habitats at this Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Killeglan 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 Badger (*Meles meles*), European Otter (*Lutra lutra*), Fallow Deer (*Dama dama*), Red Fox (*Vulpes vulpes*), Pine Marten (*Martes martes*) and the invasive species American Mink (*Mustela vison*)

Numerous bird species are known to use the both raised and cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Birdwatch Ireland have records of Eurasian Curlew (*Numenius arquata*) at Killeglan Bog. In 2016 a pair were recorded on Goat Lough Bog with a hatched chich which was subsequently found to be predated. A second pare were recorded at Nacreeva with a single chick observed. In 2018, one pair with a male holding territory were recorded at Killeglan south, with a second pair (one male holding territory) at Goat Lough bog. Breeding wader surveys commenced at Killeglan on the 27th April 2023. During this initial visit, a minimum of 5 individual Curlew (three separate breeding territories) were recorded within the site. Further breeding wader and breeding bird (CBS) surveys continued at Killeglan Bog throughout spring and summer 2023. No evidence of breeding success i.e. records of fledged chicks were recorded. However, successful breeding cannot be excluded. Across the study period the overall estimate is 2-3 breeding pairs in 2023.This demonstrates the importance of this group of bogs (referred to here generally as Killeglan bog) for breeding Curlew in the region.

BOCCI red-listed[2] species Skylark (*Alauda arvensis*), Meadow pipit (*Anthus pratensis*) and Common Snipe (*Gallinago gallinago*) have also been recorded breeding at the site.

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

Species of conservation interest have also been recorded on Killeglan Bog during previous surveys (2010) carried out by BNM ecologists: Peregrine Falcon (*Falco peregrinus*) and 45 Whooper Swans were observed on privately owned low-lying agricultural land adjacent to the site (and Killeglan River).

3.3.3 Invasive species

A single stand of *Rhododendron ponticum* was recorded in association with the remnant Goats Lough to the north west of 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

The River Suck Callows SPA (Site Code 004097) overlaps the western boundary of Killeglan Bog. The site is a Special Protection Area (SPA) under the EU Birds Directive, of special conservation interest. The site is also an NHA, the Suck River Callows NHA (Site code 000222). This SPA is designated for Whooper Swan (*Cygnus cygnus*), Wigeon (*Anas Penelope*), Golden Plover (*Pluvialis apricaria*), Lapwing (*Vanellus vanellus*), Greenland White-fronted Goose (*Anser albifrons flavirostris*) and Wetlands.

Killeglan Grassland SAC (Site code 002214) is located approximately 800m north of the Killeglan Bog, and is designated for Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210].

Castlesampson Esker SAC (Site code 001625) is located approximately 3.5 km to the east of Killeglan Bog. Castlesampson Esker is a complex site with esker, turlough and raised bog all found.

Annaghbeg Bog NHA (Site code 002344) is located approximately 2.5 km to the south west of Killeglan Bog.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar Sites in the local vicinity of the Killeglan Bog (i.e. within 3km). The closest Ramsar Sites to the Killeglan Bog is Mongan bog (Ramsar site no 416) approximately 16 km south east of Killeglan Bog.

3.5 Hydrology and Hydrogeology

Killeglan forms part of the Upper Shannon Catchment (Catchment ID: 26D) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Suck_SC_090 sub-catchment. The bog is located approximately 15km West of Athlone, in County Roscommon. The bog contains several drainage pathways and discharge locations, with the majority of the bog discharging to the Suck to the west of the bog. Killeglan Bog has a gravity-based drainage systems.

GSI data indicates that the Killeglan Bog is underlain entirely by Visean Limestones. The unit is classified as a regionally important aquifer as it is subject to karstification (conduit). Geological Survey of Ireland (GSI) mapping identifies several karst features including springs, swallow holes, enclosed depressions, a turlough and superficial solution features within 1km of the bog. No data exists concerning depth to bedrock, however, there is a small area of bedrock in close proximity to the bog.

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

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

The 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 Killeglan 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 water-courses

Killeglan bog was never in active commercial peat extraction and as such did not require the installation of silt control measures. The main surface water outlets discharge to the Killeglan River (IE_SH_26K040200 KILLEGLAN_010 & IE_SH_26K080460 KILLEGAN TRIB NORTH_010) and the River Suck (IE_SH_26S071200 SUCK_130) and these are being assessed for rationalisation opportunities and an associated water quality monitoring programme.

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 (LAWPRO), amongst a range of stakeholders.

Peat extraction was identified as pressure in the Killeglan River, in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation. However, while peat extraction never took place on the main bog itself, there are other private turf cutting activities in the river catchment which might account for these pressures.

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

One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for silt control measures. These bogs are already largely vegetated. Re-

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

Water quality discharging 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 Killeglan Bog post completion of rehabilitation. 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 watercourse receptors, the Killeglan River and the River Suck, and is expected to support the future status of the waterbodies as being of Good Status.

Rehabilitation Programme Water Quality Monitoring.

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

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

As Killeglan did not have any active peat extraction, there is no silt control infrastructure. However, several sampling outlets are being included in the monitoring programme to try and capture the main bog catchments to be rehabilitated.

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

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

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

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

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

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

3.7 Fugitive Emissions to air

The bog has been drained but has never been in industrial peat production. The high bog still retains its surface vegetation, however domestic turf cutting has taken place around the margins and there are extensive areas of cutover which are now predominantly revegetated. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, re-wetting and re-vegetating of these cutover areas 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 Killeglan Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this site is expected to develop a typical raised bog habitat and associated vegetation on deep peat areas, with embryonic bog and fen habitats occurring on the rehabilitated cutover bog. Birch woodland is expected to develop on the drier mounds and drier marginal habitats.

3.9 Current ecological rating

A small area of Killeglan overlaps the River Suck Callows SPA and this area is deemed to be of ***International Importance***[3]*.*

The majority of the bog can be considered of ***National importance*** as it is a raised bog with a small viable area of active raised bog (7110), a priority Annex I habitat of the EU Habitats Directive, and also supports the Annex I habitat 'degraded raised bog still capable of natural regeneration (7120)'. Raised bog has undergone restoration in the past. Several sub-sites in Killeglan Bog are also listed in NPWS (2014) and were reviewed as part of their potential for inclusion in the raised bog NHA network and may to be considered for NHA designation in the future.

In addition, Killeglan Bog is known to be of importance for breeding Curlew in the region.

In addition, a number of ecologically rich habitats have developed at Killeglan Bog, including transition mire and quaking bog and fen habitats in the former drained lakes. Semi-natural habitats including bog woodland and rich fen and flush habitats occur on the peripheral margins of the high bog in places and are deemed to be of high local importance (higher value). Other habitats of similar value include Oak-Ash-Hazel Woodland (WN2).

[3] Following NRA (2009) Evaluation Criteria

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 Blackwater (Derryfadda) group bogs including Killeglan Bog with various stakeholders in relation to:

- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017). Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

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

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

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 Killeglan Bogs – these are summarised below.

4.2.1 Assessments of rehabilitation

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

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

4.2.2 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI relating to the finalisation of several bog rehab plans in 2021 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 Monitoring

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

4.2.4 Flooding and drainage

The IFA, The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehab plans in 2021 arising from the proposed re-wetting associated with the rehabilitation 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.

4.2.5 Future management

The IFA expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.6 Other issues

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

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit.

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 ongoing consultation has part of the process of developing the rehabilitation plan for Killeglan Bog. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website has been developed to make information available. This will be continually updated. It is expected that some PCAS Bogs will become 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 Killeglan Bogs. Where required, Natura Impact Statements 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 we 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 reports of stray finds that may arise during rehabilitation works.

4.3.3 Restoration scope

As part of the 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.

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.

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

4.3.6 Amenity

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

4.3.7 Water quality

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

4.3.8 Future management

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

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

4.3.9 Other issues

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

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

4.3.10 Concluding statement.

- Much of Killeglan Bog comprises of revegetated and drained raised bog, much of which has been subject to previous drain blocking measures. This will not be radically changed.
- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Several 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.
- No changes were required to the rehabilitation plan to enable any future potential amenity.

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 water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of active bog on raised bog habitats and embryonic *Sphagnum*-rich vegetation communities on deep residual peat on cutover habitats at the bog margins, where possible.
- Optimising hydrological conditions for the protection of any exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands formerly drained for industrial peat production at the bog (but never brought into production) 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 across the entirety of the Killeglan Bog. This will happen over a longer timeframe than the implementation of this restoration 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.
- Previous rehabilitation works in the form of drain blocking has been carried out at six of the subsites between 2011 and 2018, and this work has already resulted in an improvement in the bogs hydrology. The proposed rehabilitation measures will further enhance the hydrological regime and the resilience of the previous measures and thus expediating the development and extent of Sphagnum rich vegetation and active bog conditions at Killeglan.
- A small area of Killeglan already bog supports the EU Habitats Directive habitat Active raised bog (7110) with a larger area of Annex I 'degraded raised bogs still capable of natural regeneration' (7120) also likely present. Hydrological modelling indicates that there is up to 108.6 ha of Annex I degraded raised bog (DRB) habitat across the site, some of which has the potential to develop as Annex I 'active raised bog' (7110) in the future following rewetting. It is expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, a large proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will

improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

6. SCOPE OF REHABILITATION

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

- The area of Killeglan Bog.
- EPA IPC Licence - P0502-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Killeglan Bog is part of the Blackwater (Derryfadda subgroup) bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Killeglan Bog, in particular, optimising **climate action benefits**. Killeglan Bog comprises a cluster of seven separate bog subsites (Cuckoo Hill, Camlagh, Nacreeva, Porteen, Cregganycarna, Goats Lough North and Goats Lough South). 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 Killeglan Bog mean that raised bog restoration and deep peat measures on cutaway are the most suitable rehabilitation approach for this site. Killeglan Bog has a gravity-based drainage system.
- Previous rehabilitation works in the form of drain blocking has been carried out at six of the subsites between 2011 and 2018, and this work has resulted in a significant improvement in the bogs hydrology.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Killeglan Bog as environmental stabilisation of the site via optimising climate action benefits, where possible. Due to peat production never being carried out on Killeglan Bog, remaining deep peat reserves and previous rehabilitation that has already been carried out, the bog for the most part is already on a trajectory towards the development of active raised bog. Re-wetting measures will aim to maximise the potential of this site to return to a high priority *Sphagnum*-rich peat forming habitat.
- Rehabilitation of Killeglan Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at Killeglan where there has not been 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).

- **Current/future land-use.** A key future land-use is amenity. Any proposed enhancement measures (i.e. targeted drain-blocking) will be positively aligned with future planned land-uses and will look to facilitate amenity, where possible. Re-wetting will be planned as to not to rule out potential future amenity.
- **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 Killeglan 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 are known rights of way around the margins of Killeglan Bog. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Turbary/turf cutting.** Areas of active turbary/turf cutting 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 Killeglan Bog.
- **Sensitive habitats or species and designated sites**. The presence of ecologically sensitive species may affect the extent or timing of the rehabilitation measures. Some sensitive ecological receptors if present may require protection through the provision of Environmental Restriction Zones (or ERZ's). This may be relevant at Killeglan given the proximity to the River Suck and the partial overlap with the designated sites River Suck Callows SPA (004097) and Suck River Callows NHA (000222). An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the rehabilitation plan for Killeglan Bog screened out at the Stage I.)

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Killeglan 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 Killeglan 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 enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the bog.

Rehabilitation is generally defined by Bord na Móna as

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

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

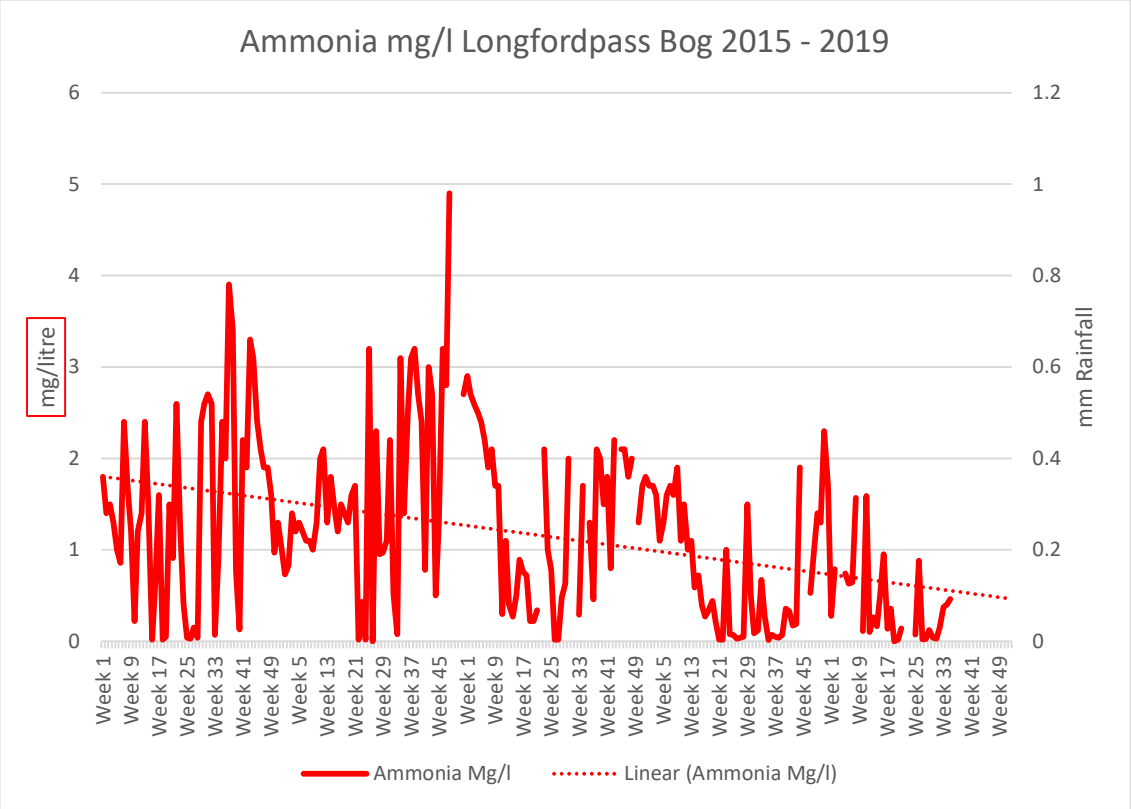
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

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

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

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

Following commencement, and as the monthly monitoring program at Killeglan continues in 2024 during the rehabilitation works and data from the 2023 monitoring program is compiled, further trending will be produced to verify any ongoing trends.



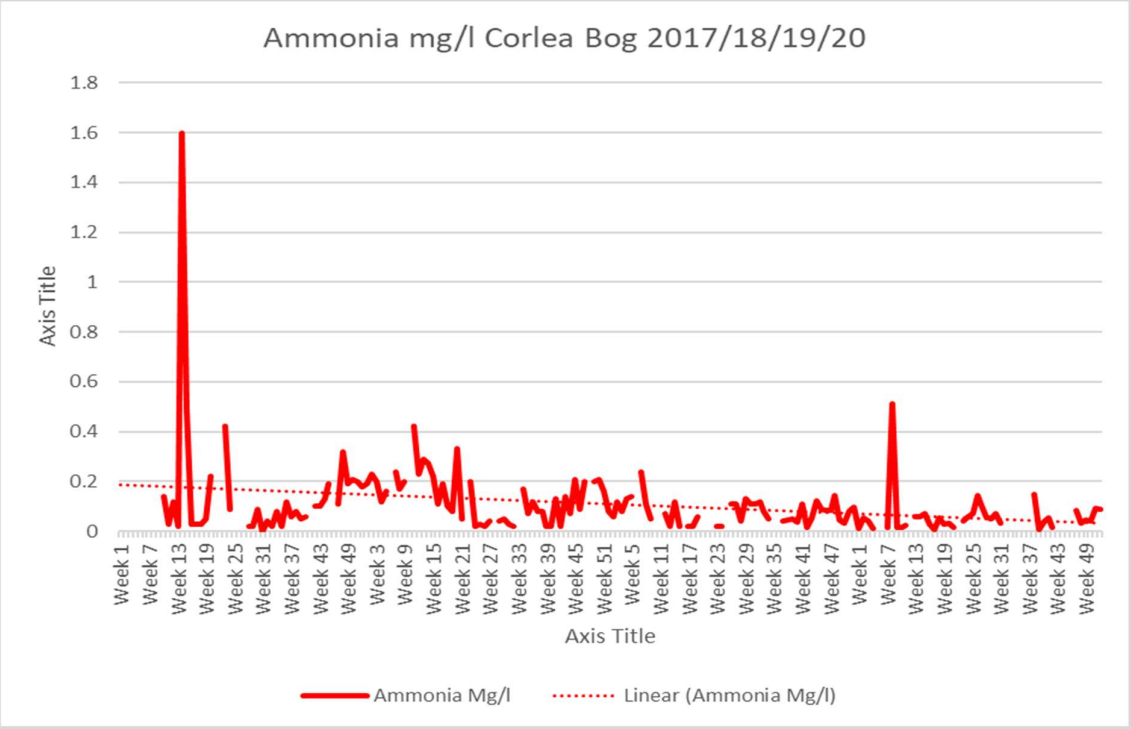


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/part carbon sink. This will be measured through ecotope mapping on high bog and the development of cutaway bog condition assessment. 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 after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Aiding the site in its trajectory towards establishment of a mosaic of compatible habitats including active *Sphagnum*-rich peat forming communities on the high bog (and embryonic Sphagnum rich peat forming communities in some areas of former cutover bog at the margins), as well as fen, wet woodland, scrub and Birch woodland, where conditions are suitable at the bog margins. The progression of habitats will be demonstrated and measured via aerial photography, habitat mapping and ecotope/ cutaway habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of 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.
- It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Table Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former drained raised bog and marginal cutover habitats.	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2023-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2023-2024
IPC validation	Reducing emissions to the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

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

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when

industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

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

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

BNM-DR-24-11-22 titled **Killeglan Bog: Aerial Imagery 2020**

BNM-DR-24-11-04 titled **Killeglan Bog: Peat Depths**

BNM-DR-24-11-03 titled **Killeglan Bog: LiDAR Map**

BNM-DR-24-11-09 titled **Killeglan 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-24-11-05: **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 enhanced rehabilitation measures).

Previous rehabilitation works in the form of drain blocking carried out between 2011 and 2018 have resulted in an improvement in the hydrology of the site. However, some of the bog still has functional drainage and targeted measures are required to reinstate identified failed drain blocks, block flow paths and to further maximise the extent of active raised bog conditions. In addition, a number of drains were left unblocked in some areas. It is proposed to enhance areas that have undergone previous drain blocking with additional drain targeted drain blocking where required.

Enhanced measures for Killeglan Bog will include (see Table 8.1):

- Additional drain blocking measures which will further enhance the hydrological regime and the resilience of the previous measures and thus expediating the development and extent of *Sphagnum* rich vegetation and active bog conditions at Killeglan.
- Deep Peat measures by targeted and intensive drain-blocking (7 per 100m) on drained high bog resulting in the creation of suitable conditions for the development of *Sphagnum* rich vegetation;
- Contour bunding and targeted drain blocking on former cutover bog to further enhance the development of *Sphagnum* rich embryonic bog.

Table 8.1: Types of and areas for enhanced rehabilitation measures at Killeglan Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

Type	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Additional work – Benefiting lands	AW1	No work required	3.82
Additional work – Targeted drain blocking	AW2	Targeted drain blocking with excavator (1/100m)	225.65
Constrained areas	Constraint and Archaeology	No work required	222.49
Deep residual peat (Raised Bog)	DPT2	More intensive drain blocking (max 7/100), modify outfalls and Sphagnum inoculation	13.9
Cutover bog – Cell Contour bunding	DPT4c	Contour bunding and targeted drain blocking to optimise the hydrological regime.	48.4
Marginal areas - No measures proposed	MLT1	No work required	72.1
Marginal areas – Targeted drain blocking	MLT2	Targeted drain blocking with excavator (3/100m)	0.4
Total			**586.6**

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Killeglan Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See Figure *BNM-24-11-05 Enhanced Rehabilitation Measures* for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures has been carried out, any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been carried out. The results of this assessment have been 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 has been carried out. There is some known turbary on this bog.

- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan is to be carried out.
- Track implementation and enforcement of the relevant IPC Licence conditions, and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking and contour bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- Phase 2 actions may be carried out in targeted areas to accelerate re-vegetation and colonisation of target species if required. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum* on cutover bog.
- Submit an ex post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.3 Long-term (>3 years)

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

8.4 Timeframe

- **2023-2024**: Short-term planning actions.
- **2024**: Short-term practical actions.
- **2024-2027**: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

8.4 Budget and costing

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

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration

towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

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

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been be allocated to the site based on the area of different cutaway types across the site (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, 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 on cutover habitats 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 will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for

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

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

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

- Vegetation and habitat monitoring after rehabilitation is completed using ecotope mapping. This assessment will include assessment of 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. Cutover bog habitats will also be assessed using similar criteria.
- The condition of the bog can be assessed using the ecotope survey, condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al*., 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

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

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

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

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

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KILLEGLAN BOG DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater (Derryfadda subgroup) bog group (Ref. P0502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Killeglan Bog is located along the Roscommon-Galway border, approx. 6 km north of Ballinasloe on the east side of the River Suck.

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

Appropriate Assessment Reporting findings

An Appropriate Assessment Report[4] was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Killeglan Bog have the potential to result in Likely Significant Effects on European Sites. The concluding statement of this report reads as follows:

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

Therefore, following the completion of the screening report, and 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] ROD (2023). Killeglan Bog Decommissioning and Rehabilitation Plan 2023: Screening for Appropriate Assessment (September 2023).

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

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

This proposed standard peatland rehabilitation plan is outlined here to **estimate potential costs**. Bord na Móna will still be expected to cover the costs that would have accrued from standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration and the benefits that flow from these measures and interventions/improvements will be eligible for funding by government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

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

Scope of rehabilitation

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

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

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Killeglan Bog is environmental stabilisation of the site via raised bog restoration. This is defined as:

- Additional works to support previous rehabilitation that has been undertaken at the bog.
- 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 raised bog habitats and revegetation of cutover bog.

Criteria for successful rehabilitation:

- Rewetting of deep peat on high bog to offset potential run off of suspended solids and to optimise the hydrology of the high bog and to encourage development of *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-wet raised bog. This will be demonstrated by water quality monitoring results.

Rehabilitation measures:

- Drain blocking on raised bog.
- No measures are planned for the other surrounding marginal peatland habitats.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.

Timeframe:

- 2022. 1st phase of rehabilitation. Drain blocking.
- 2022. 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.
- 2024-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Rehab Code	Rehabilitation Measure	Extent (Ha)
Additional work – Benefiting lands	AW1	No work required	229.5
Constrained areas	Constraint	No work required	222.5
Deep residual peat (Raised Bog)	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	62.3
Marginal areas - No measures proposed	MLT1	No work required	72.5
Total			**586.8**

See Drawing number BNM-DR-24-11-20 titled **Killeglan 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, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

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

APPENDIX II. BOG GROUP CONTEXT

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

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

A number (6) of bogs were initially drained but have never been used for industrial peat production (three former development bogs (Kellysgrove, Killeglan and Newtown-Loughgore), Clonboley, Killeglan and Derrydoo-Woodlough). The latter three bogs are classed as restored raised bogs, still contain active bog habitat (that qualifies as the Annex I EU Habitats Directive habitat) and now form the core of the Bord na Móna Raised Bog Restoration Project due to their high biodiversity value and bog restoration potential. NPWS have identified the Clonboley bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014[5]).

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

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

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

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Attymon	336	Cutover Bog Industrial peat production commenced at Attymon Bog in 1941 and ceased in	Attymon Bog formerly supplied fuel sod peat.	2109	Finalised 2018

[5] http://www.npws.ie/peatlandsturf-cutting/nationalraisedbogsacmanagementplan/

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		2019. Attymon is a deep peat cutover bog.	Coillte have developed a portion of the former production area for conifer forestry. Rehabilitation ongoing		
Cloonkeen	252	Cutover Bog Industrial peat production commenced at Cloonkeen Bog in 1953 and ceased in 2019. Cloonkeen Bog is a deep peat cutover bog.	Cloonkeen Bog formerly supplied fuel sod peat. Coillte have developed a portion of the former production area for conifer forestry. Rehabilitation ongoing	2019	Finalised 2018
Derrydoo-Woodlough	452	Development Bog Derrydoo-Woodlough Bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (bog restoration) now complete.	N/A	Finalised 2012
Tirrur-Derrymore	422	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	This bog has significant raised bog restoration potential. Section leased to NPWS as a SAC turf-cutting relocation site.	N/A	Updated 2023
Newtown-Loughgore	448	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Some sod turf production Bog restoration was carried out in 2019-2020 Rehabilitation (bog restoration) nearly complete.	2020	Finalised 2018
Killeglan	581	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	N/A	Updated 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Cloonboley 1	675	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place on the main section.	A small sub-section has been used for sod turf production. Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	2020	Finalised 2014
Cloonboley2	203	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	N/A	Finalised 2016

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballaghhurt	597	Cutaway Bog Industrial peat production commenced at Ballaghhurt Bog in 1981. The majority of the site is cutaway with some residual deeper peat	Ballaghhurt Bog formerly supplied a range of commercial functions including horticultural peat and fuel peat. Pioneer cutaway vegetation communities are naturally developing on some cutaway areas.	2020	Updated 2023
Belmont	316	Cutaway Bog Industrial peat production commenced at Belmont Bog during the 1950's. The majority of the site is cutaway.	There are some areas of pioneer cutaway vegetation communities naturally colonising cutaway sections. Coilte have developed a portion of the bog for forestry.	2020	Finalised 2021
Blackwater	2,303	Cutaway Bog Industrial peat production commenced at Blackwater Bog during the 1950's. The	Bloomhill Bog formerly supplied milled horticultural peat and fuel peat. There is extensive development of emergent cutaway vegetation	2020	Updated 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		majority of the site is cutaway.	communities across the former production area. The site has been used for experimental forestry (BOGFOR) and other conifer plantations. Part of the site was rehabilitated with lake and wetland creation. An ash facility took ash from Shannonbridge Power station		
Bloomhill	883	Cutover Bog Industrial peat production commenced at Bloomhill Bog during 1981. The majority of the site still has relatively deep residual peat.	Bloomhill Bog formerly supplied milled horticultural peat and fuel peat. Much of the former peat production area is bare peat.	2020	Finalised 2021
Bunahinly-Kilgarvan	389	Cutover Bog Industrial peat production commenced at Bunahinly-Kilgarvan Bog during the 1990's. Residual Deep peat remains on these bogs.	Bunahinly-Kilgarvan formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Part of Bunihinly has been re-wetted.	2020	Finalised 2021
Glebe	132	Cutover Bog Industrial peat production commenced at Glebe Bog during the 1990's. Residual deep peat remains on these bogs.	Glebe Bog formerly supplied milled; horticultural peat and fuel peat. Glebe bog is still listed as a pNHA. Much of the former production area is bare peat.	2020	Finalised 2022
Clooniff	523	Cutover & cutaway Bog Industrial peat production commenced at Clooniff Bog during the 1970's. A mosaic of variable peat depths remains on this bog.	Clooniff Bog formerly milled fuel peat. Much of the former production area is bare peat or wetland. Some emergent vegetation communities are naturally colonising cutaway areas. Reduced pumping has created a large wetland in one area.	2020	Finalised 2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Cornafulla	460	Cutover Bog Industrial peat production commenced at Cornafulla Bog in 1987. This bog still retains relatively deep residual peat.	Cornafulla Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area or cutaway is bare peat.	2020	Draft 2017
Cornaveagh	492	Cutover Bog Industrial peat production commenced at Cornaveagh Bog in 1970's and ceased in 2020. This bog still retains relatively deep residual peat.	Cornaveagh Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat.	2020	Draft 2017
Culliaghmore	442	Cutover Bog Industrial peat production commenced at Culliaghmore Bog in 1960's and ceased in 2020. Much of this bog is cutaway, with some pockets of deeper residual peat.	Culliaghmore Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2017
Garryduff	970	Cutaway Bog Industrial peat production commenced at Garryduff Bog in 1960's. The majority of this bog is cutaway.	Much of the former production area footprint or cutaway is bare peat. Extensive natural development of pioneer cutaway vegetation communities is present on cutaway areas. Rehabilitation measures have commenced at Garryduff in 2021.	2020	Finalised 2021
Kellysgrove	201	Development Bog Kellysgrove Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place.	The site retains degraded raised bog vegetation. Kellysgrove Bog retains significant raised bog restoration potential.	2020	Finalised 2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			A way-marked walking trail is positioned along the old Ballinasloe Canal. Rehabilitation measures have been completed at Kellysgrove in 2021.		
Kilmacshane	1,294	Cutaway Bog Industrial peat production commenced at Kilmacshane Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Kilmacshane Bog formerly supplied milled horticultural peat and fuel peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas and water levels have risen as pumping reduced, creating wetlands. Rehabilitation measures have commenced at Kilmacshane in 2021.	2014	Finalised 2021
Lismanny	449	Cutaway Bog Industrial peat production commenced at Lismanny Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Lismanny Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2021

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryfadda	610	Cutover bog Industrial peat production commenced at Derryfadda Bog in 1980's. This bog still retains residual deep peat.	Derryfadda Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Finalised 2022

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

See Drawing number *BNM-DR-24-11-24 titled Blackwater (Derryfadda subgroup) Bog Group*, included in the accompanying Mapbook which illustrates the location of Killeglan Bog and the Blackwater (Derryfadda subgroup) Bog Group in context to the surrounding area.

APPENDIX III. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Bog Name:	**Killeglan**	**Area (ha):**	585 ha
Works Name:	Derryfadda	**County:**	Roscommon
Recorder(s):	MMC & DF	**Survey Date(s):**	25/02/2010

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)
- Scrub (WS1) (on old cutover bog)
- Depositing Rivers (FW2) (River Suck, Killeglan River and a tributary of the Killeglan River))
- Birch woodland (WN7) (on old cutover bog)
- Poor fen and flush (PF2) (part of the high bog)
- Transition mire and quaking bog (PF3) (Former lake sites on Lough Nacreeva Bog)
- Reed and large sedge swamps (FS1) (in River Suck channel)
- Dry heath (HH1) (part of high bog on some mounds and on some sections of old cutover bog)
- Wet grassland (GS4) (reclaimed cutover bog and along the river banks)
- Improved grassland (GA1) along margins of site)
- Oak-Ash-Hazel woodland (WN2)
- Dense Bracken (HD1)
- Drainage ditches (FW4)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)

Description of site

Killeglan Bog is located along the Roscommon-Galway border, 6 km north of Ballinasloe. The bog is situated along the east side of the River Suck. Castlegar Bog of the Derryfadda complex is located adjacent to the bog across the river in Co. Galway and Killeglan is located to the north east of this site. The Bord na Móna Killeglan property is spread over several different bogs, which are divided by local roads and by several water-courses.

This site was ditched in early 1980's (1981-84) but has never been developed as a production area. This has meant that the site has retained many of its natural raised bog features, although there has also been significant degradation. Private peat-cutting is relatively extensive around the some of margins of the high bog and this has also had a significant negative impact on the quality of the high bog. Some of the high bog has also been burnt in the recent past. The site has a typical Intermediate Western raised bog topography. Sections have significant slopes and there are also several low raised mounds with much drier Dry Heath-type vegetation.

The surrounding cutover bog is quite typical and reflects length of time since peat was cut. Some active cutover is vegetated with Purple Moor-grass and other grasses and bare peat is prominent. Other cutover bog has been abandoned for some time and is developing scrub and woodland with Birch, Willow, Gorse, Bramble and Bracken are prominent.

The various bogs are labelled as sub-sites according to the main townlands (See Map).

Goat Lough Bog

This section is the most westerly section of Bog in this group. It is the largest section of bog and a minor road separates it from the other bogs in the Killeglan Bog group. The River Suck forms a boundary with the site along its western side while the Killeglan River is located immediately to the south. Agricultural land and public roads form boundaries along its northern and eastern sides. This bog can be divided into two main sections (north and south) that are connected by a narrow area of mainly cutover bog.

The northern section is that largest single area of raised bog (PB1) in the Killeglan group. The majority of this raised bog is in relatively poor condition and the drains are active and not infilling. The bog is relatively firm. The northern section has been damaged by a fire in the recent past, although there has been a good recovery of vegetation cover. There are some naturally occurring mounds around the high bog that are dominated by Heather and in some cases also have Gorse and Birch.

A former wet hummock-pools complex with inter-connecting pools was located in the north-east section. However, this area has significantly deteriorated. Some pools and drains are filled with water and there is partial typical *Sphagnum* cover with *S. cuspidatum* and lawns of *S. magellanicum*, S. *papillosum* and *S. capillifolium*. Only a very small area could be considered of sufficient quality to be considered 'active' raised bog (10 m x 10 m). Many pools also contain algae or rotting *Sphagnum* and some of the pools have infilled with Carnation Sedge and Bog Asphodel. Drains were infilling in this area, but overall it is not extensive.

One of the main topological features in this bog is the former Goat Lough (a seasonal lough). The OSI 2nd edition 6 inch maps (prepared in the (1910-1920s) shows that this lough with some open water. However, it is now infilled and terrestrialized and is classified as a Poor flush (PF2). This area was ditched in the past with deep drains, although some of the drains have infilled with Purple Moor-grass. Birch and some Willow have spread over the site of the former lough and in the surrounding flushed area. Pine and Spruce are also present. Small patches of denser scrub/Birch woodland are developing. The actual area or influence of the flush is much greater than the size of the former lough. The vegetation is dominated by Purple Moor-grass and flushed leggy Heather, and other typical species of flushes are present including hummocks of *Polytrichum* sp, Bog Myrtle, Bilberry, Bracken, and Bramble. A single Rhododendron bush was recorded in the flush. A small basin is still present and the lowest section still has a quaking area with abundant *Sphagnum* cover. However, the extent of this 'active' area is quite small and the majority of the flush is categorised as an inactive flush.

The raised bog to the south of the flush is still wet in sections and contains some very large hummocks and mounds. This area has the appearance of being flushed but is dominated by Heather and has large hummocks of *Sphagnum* and other bryophytes. Other flush indicators such as Crowberry and more abundant Cranberry are present. There are still some wet pools in this section with abundant *Sphagnum* cover including lawns of *S. magellanicum* and S. *papillosum* and pools infilled with *S. cuspidatum*. However, these pools have the appearance of having subsided or sunken. The inter-pool sections are generally quite firm, although some of the larger hummocks are spongy. Some of the drains within this area have partially infilled. Parts of this section could still be considered 'active raised bog'.

A significant area of Birch woodland has developed on the high bog at the northern end of this section. This woodland is un-ditched. This woodland is dominated by Birch and also contains some Willow, Pine, Alder, Holly and Hawthorn. Gorse and Broom scattered around the edges. The woodland may have developed on an old flush and there is flushed Heather around the edges in association with frequent *Sphagnum* cover including *S. palustre*. The ground cover of the majority of the woodland is dry and dominated by Bramble, Ivy, Broad-Buckler Fern and mosses. Other species present include Bilberry,

Creeping bent-grass, Crowberry and Hard Fern. However there are hollows around the margins where there is some cover of *S. cuspidatum*, hummocks of *S. palustre* and other *Sphagnum* spp.

The riparian zone along the River Suck is particularly well-developed along part of the bog. There is a largely undisturbed transition of natural vegetation communities from the river channel to the high bog. The western section of BnM property is particularly well-developed and not grazed by livestock. There is a significant height difference from the high bog down to the river channel (several metres). Riparian woodland dominated by Willow is found along the edge of the river in small unsubstantial pockets. Reedbeds (FS1) and wet grassland communities (GS4) form a complex mosaic along the lower channel. There is a distinguishable transition to a community dominated by Tufted hair-grass and higher up on the bank where there is increased acidic influence from the development of peat; the vegetation is dominated by Purple Moor-grass. Bracken and Gorse scrub dominate along the edge of the bog and there is a distinctive transitional/lagg type raised bog community along the edge of the bog with prominent Purple Moor-grass that sometimes extends into the bog as a flush-like feature.

11th June 2010

Goat's Lough transitional mire/soak

Goats Lough had dried out considerably sine the last ecological survey took place, therefore making it easier to gain access. This area is dominated by Sphagnum cover, mainly *S. cuspidatum* and *S. capillifolium.* Other species include Bog Bean, Bog Cotton (*E. vaginatum* and *E. angustifolium*), Round Leaved Sundew, Cross Leaved Heath, Heather, Cranberry, *Aulacomnium palustre*. The drier edges contained Narrow Buckler Fern, Bog rosemary, Bilberry, Bottle Sedge, Cranberry, tall Heather and Soft Rush.

An island on Goat's Lough was mainly scrubby Birch along with Heather, Bilberry (all of which were abundant) with Honeysuckle, Royal Fern, Bog Cotton, Purple Moor Grass, Sweet Vernal Grass, Soft Rush, Rowan, Sphagnum palustre, *Cladonia portentosa*, Broad Buckler Fern, Round Leaved Sundew, *Hylocomium splendens*, Cranberry, Bog Bean, Bog Rosemary and Ivy. The island was dry and contained large hummocks that were dominated by *Hylocomium splendens and Polytrichum sp.* The largest of the Birch trees on the island contained a corvid nest with nestlings present in June 2010.

The soak had no areas of open water contained within it, although it was quaking. Hummocks of *Sphagnum capillifolium* and *Aulacomnium palustre* were to be found within the soak area.

Loughmore transitional mire/soak

Further east an area of transitional mire (PF3) was located. On the 2nd edition six inch maps this area was identified as two distinct Loughs, however in 2010 it is difficult to identify two wet areas on the ground, instead one area has been marked as transitional mire/soak. This area appeared to be subject to periodic, fluctuating water levels and only a small area of open water remained.

This area in general was variable from wet areas to drier areas. Hummocks of *Sphagnum palustre, S. capillifolium* and *S. papillosum* with *Hylocomium splendens, Dicranum scoparium* on the drier hummock tops were found throughout the mire. *Sphagnum imbricatum* appeared to be forming new hummocks.

The wettest sections of the mire were dominated by extensive *Sphagnum* carpets including *S. fallax*. Bog Bean was occasionally to frequent throughout the mire while in general species composition would be similar to that of Goat's Lough soak.

Goat Lough (south)

This section of high bog is mainly raised bog (PB1). It is in bad condition as it has been burnt within the last year and most of the vegetation has been removed from the bog's surface. The drains are active, dry and not infilling. Several low mounds covered with Heather are found at the southern end of this bog. There is a distinctive transitional/lagg zone on the high

bog along the western margin with the River Suck with Purple Moor-grass and Bog Myrtle both prominent. The riparian zone along this section of bog contains more frequent scattered Willow, which occasionally form small patches of Riparian woodland (WN5). Further south, some of the grassland along the river is managed for agriculture. A small pocket of dry poorly developed Birch woodland is located at the southern end of this bog.

Lough Nacreeva Bog

This bog is situated towards the centre of the site. Agricultural land and public roads form boundaries along its northern and western sides while the Killeglan River forms a boundary to its east and south. A small bog road (un-tarred) separates this site from Porteen and Ballyrevagh Bog to the north east.

The majority of the site comprises raised bog (PB1) that has been subjected to drainage. Consequently it has dried out and was dominated by tall leggy Heather for the most part. Several mounds and ridges are present in this bog. The main topographical features of this bog are three small lakes had been present on this section as indicated on the 2nd edition SI six inch maps (Loughmore and Lough Nacreeva both marked as seasonal and Goats Lough). All these loughs were marked as containing open water and some islands. The remains of these lakes are still visible on the ground but they have been changed considerably. These areas (towards the northern half of the site) are now classified as transition mire and quaking bog (PF3), although they could be a complex soak system. The vegetation of these areas is comprised of *Sphagnum sp*. Heather, Purple Moor-grass, Bog Myrtle, and Soft Rush.

The northern lough (Goats) is still very wet and treacherous. The lake basin is totally infilled with *S. cuspidatum* and Common Bog Cotton and is similar in appearance to the soak system of Clara Bog (Shanley's Lough), although it does not have similar diverse vegetation. The lough contains a small island vegetated with Birch scrub. The surrounding bog is very wet and quaking and has a very high *Sphagnum* spp. cover with large hummocks. This part of the bog would be considered 'active' raised bog. The adjacent former lough to the south is more terrestrialized and the former basin contains large hummocks of *Sphagnum* and is somewhat flushed with tall leggy Heather and the presence of Crowberry. This area is spongy but not as wet. A similar area to the west of Goats Lough is also somewhat flushed with some very wet sections. A drainage ditch connected these areas together before flowing eastwards.

The Killeglan river forms a boundary along much of its eastern border. This river (approximately 1 to 2m wide) has been canalised in the past but despite this it has retained some natural features such as riffles and pool. Between the river and the bog, significant areas of wet Grassland (GS4) and scrub (WS1) are present. The area of wet grassland is grazed while some of the scrub had recently been cleared. Riparian vegetation consisted of Bulrush, Meadowsweet, Yellow Flag, Gorse, Bentgrass, Rose-bay Willowherb, Floating Sweet-grass and Fool's Watercress. Occasional trees include Oak, Grey Willow and Ash. Indications of Otter were abundant along the river while there were also indications of Fox.

The area of scrub to the south east of the bog was made up of Willow, Gorse and Birch.

A further area of wet grassland was located in the south eastern corner of the site and a section of old cutover bog (PB4) was located along the southern boundary of the bog. The western side of the bog consisted of Cutover Bog and Scrub.

Cregganycarna Bog

This small section of bog is located to the south of Lough Nacreeva Bog across the Killeglan River. The river flows along its northern boundary while agricultural land surrounds the majority of the bog. Access to this bog is gained via a bridge over the Killeglan River or via a narrow strip of land that extends southward to a public road from the bog. This bog consists of raised bog that has been drained extensively and is therefore dry and degraded. No infilling of drains is occurring and this bog appeared to contain more than the usual amount of drains, with extra drains having been installed that criss-crossed the parallel drains. Heather is the dominant part of the vegetation. The margins of the bog presently consist of old cutover bog that now support habitats such as Scrub (WS1) and Birch woodland (WN7).

Porteen Bog

This section of Bog is located between Lough Nacreeva and Cuckoo Hill bogs. Agricultural land borders the site to the north and south while the Killeglan River flows through the bog, dissecting it into east and west sections.

The western section is mainly comprised of a mixture of old and new cutover with some small sections of remnant raised bog (PB1). The older cutover bog areas are mostly made up of scrub, dry heath and Purple Moor-grass-dominated grassland. Some sections are still used for domestic turf cutting.

The eastern side of this section contains some areas of very old cutover around the edges of the bog but the majority of the bog is classed as raised bog (PB1) that has become dry and degraded due to drainage works that have been carried out, as a result the high bog is dominated by tall leggy Heather. The high bog was showing no signs of regeneration and the drainage ditches were functioning.

Cuckoo Hill Bog

This bog is the most easterly bog, with a tributary of the Killeglan River separating this bog from Camlough Bog to the south. For the most part this bog is bounded by agricultural land.

This large section of the bog is, for the most part, classified as raised bog (PB1) and has been subjected to ditching in the early 1980's. The high bog is dry and degraded with little infilling of drains occurring. The majority of the bog's margins have been subjected to domestic turf cutting in the past but there was no evidence that this bog has been used for this purpose in the past few years. As a result the cutover areas contained no areas of bare peat and had become revegetated with a mosaic of habitats such as scrub (WS1), wet grassland (GS4) and dry heath (HH1) becoming established throughout. Some of the wet grassland sections are quite diverse. Some sections of the old cutover especially in the north western corner had begun to regenerate naturally with *Sphagnum palustre*. Other areas contained Black Bog-rush on the old cutover areas indicating that there was an element of enrichment in these areas, possibly leading to the formation of areas of rich fen and flush (PF1) sometime in the future.

A tributary of the Killeglan River flows along the southern boundary of this section of the site. This small river had been canalised in the past but had begun to develop into a more natural habitat with pools and graded river banks in places. Otter tracks were observed here. The riparian zones on either side of the river had been cutover in the past and now contained species such as *Sphagnum palustre,* Common Reed, Purple Moor-grass, Bog Myrtle, Bilberry and Black Bog-rush. This latter species is one of the indicators of the potential for this area to develop in to a rich fen and flush.

The north east corner of the site contains two prominent hills (mineral islands) that are of a calcareous nature. Both of these hills contain Oak-Ash-Hazel Woodland (WN2), although the most northerly woodland is quite small. The largest woodland is mature and contains the following trees, Oak, Ash, Birch, Hazel, Holly, Yew and Hawthorn. Some of the Oak trees were large specimens possible exceeding 150 years in age. The ground flora was relatively impoverished due to grazing and contained Bramble, Ivy, Herb Robert, Primrose and *Hypnum sp.* Faunal species of conservation interest that are using this woodland are Red Squirrel and Peregrine Falcon. Badger, Fallow Deer, Fox and Wood Mouse are also present. To the north of this woodland is another raised area with a small area of Oak-Ash-Hazel Woodland and wet grassland. The areas surrounding these hills have been burned within the past five years and this practice poses a threat to the woodlands that are present.

<u>11 June 2010</u>

This section was surveyed again in June 2010 at a time that was more suitable for conduction an ecological survey. The following species were recorded; The north-western corner of the site contained a small area of dry calcareous and neutral grassland (GS1) that runs along side the access road. This habitat contained Early Marsh Orchid, Quaking Grass, Tormentil, Buttercup, cock's Foot Grass, Violet, Yarrow, Devil's Bit-scabious, Knapweed, Red Clover, False Oat Grass, Timothy, Bird's Foot-trefoil, Yorkshire Fog, Black Bog Rush, Spear Moss, Heather, black sedge, Plantain, Bent-grass, Glacious Sedge,

Hawthorn, Thyme, Cowslip, Bog Thistle, Primrose, crested Dog's Tail, Ragged Robin and heath Spotted Orchid. Between the calcarious grassland and the old face bank lies an area that contains mainly Acid Grassland (GS3), however a small section of potential rich fen is located along an old stream/ditch that flows through this section of the site. This section is approximately two metres wide and meanders through the site. The species lists for both habitats are located below.

GS3 – Black Bog Rush, Heather, Bottle Sedge, Purple Moor Grass, Knapweed, Butterwort, Birch, Willow, Common Reed, Tormentil, Bog Bean, Bog Thistle, Yellow Sedge, Cladonia, Early Marsh Orchid, Brown Moss, Ragged Robin, Bent Grass, Yarrow, Stonewort, Scorpidium scorpioides, Cross-leaved Heath, Horsetail, Cotton Grass, Royal Fern, Quaking Grass, Carnation Sedge and Red Fescue.

Rich fen and flush (PF1) - Black Bog Rush, Heather, Bottle Sedge, Purple Moor Grass, Knapweed, Butterwort, Birch, Willow, Common Reed, Tormentil, Bog Bean, Bog Thistle, Mint, Heath Wood-Rush, Yellow Sedge, Cladonia, Early Marsh Orchid, Brown Moss, Ragged Robin, Bent Grass, Yarrow, Stonewort, Scorpidium scorpioides, Cross-leaved Heath, Sweet Vernal Grass, Reedmace, Horsetail, Cotton Grass, Royal Fern, Quaking Grass, Carnation Sedge, Red Fescue, Yellow Iris, Marsh Stitchwort, *Ranunculus sp*., Myotis arvensis, Cuckoo Flower, Marsh Bedstraw, Marsh, Rough Meadow Grass, Spear Moss, Lousewort, Heath Spotted Orchid, Sundew and Hard Fern.

Another area of potential rich fen was located immediately to the east of the first section. This area had possibly been burned in the past and contained Brown Mosses, Black Bog Rush, Sphagnum subnitens, S. Palustre, S. capillifolium, Cotton Grass, Round Leaved Sundew, Bog Thistle, ragged Robin, Heather, Purple Moor Grass, Bottle Sedge, Willow, Early Marsh Orchid, Scorpidium scorpioides (frequent to abundant), Glacocous Sedge, Horsetail, Star Sedge, Bog Rosemary, Tormentil, Bog Bean, Devil's Bit-scabious and Polytrichum sp.

The area of woodland known as Cuckoo Hill was also surveyed in the field season and the following species were observed; Oak, hazel, Ash, Aspen, Hawthorn, Cherry, Bramble, Wood Anomonae, Herb Robert, Primrose, Birch, Honeysuckle, Ivy, Holly, Sycamore, *Hypnum cupressiforme*, Glacious Sedge, *Thuidium tamariscinum*, Rose, Lords and Ladies, Blackthorn, Broad Buckler Fern, *Eurhynchium striatum*, Royal fern, Bracken and Yew. A band of Birch woodland (WN7) is to be found around the edges of this woodland and contains; Aspen, Purple Moor-Grass, Rowan, Blackthorn, Bramble, *Isothecium myosuroides*, Broad Buckler Fern and Bilberry.

During the previous survey of this woodland a Peregrine Falcon was observed, perching in one of the Oak trees. Small trees on areas of open bog close by had pellets beneath them indicating that a raptor uses the surrounding bogs for hunting.

Camlagh Bog

This small bog is located to the south of Cuckoo Hill Bog. A public road is located to its south, a tributary of the Killeglan river to its north and agricultural lands to the east and west of this bog.

This entire area of bog has been cutover for domestic turf cutting in the past and at the time of the ecological survey was dominated by heather with areas of Gorse scrub becoming widespread also. Some patches of wet grassland were also within the Bord na Mona boundary and were actively managed as farmland. The riparian zone to the north was similar in species composition as the opposite side of the river already described in the south of Cuckoo Hill Bog.

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

Suck River Callows NHA (NPWS site code 000222) and SPA (NPWS site code 0004097)

The western boundary of the production bog adjoins this long designated area that follows the path of the river. This site has been designated for its importance to wintering wildfowl and species of conservation importance such as Greenland White-fronted Geese and Whooper Swan.

There are several sections along the western boundary where the BnM boundary overlaps with the NHA/SPA. The river channel was being used by wildfowl including Mallard and Wigeon. These overlapping sections generally contain wet callows-type grassland (some of which is grazed by livestock and or cut for forage). There is a significant area of semi-natural wet grassland including several communities with natural transitions to Reedbeds (FS1), riparian woodland (WN5) and scrub (WS1) and natural transitions to marginal high bog communities (PB1). (These areas are not managed by Bord na Móna). This intact transitional succession is of ecological interest. The total area within the NHA/SPA is 48.8 ha.

The Area of Scientific Interest report for Co. Roscommon (An Foras Forthbartha 1972) mentions a series of bogs along the River Suck valley as a potential site of interest. Some of these bogs were provisionally included as ASIs. Some of the bogs at Killeglan were visited during this survey however, none were designated as NHAs. Particular note was made of transitional acid/alkaline habitat to the north of Killeglan (Cartonkilly) and the development of some fen type habitat on exposed marl. (http://www.npws.ie/en/media/NPWS/Publications/ASI/Media,5135,en.PDF Pages 101-102)

Adjacent habitats and land-use

Habitats around the margins of the site include:

- Typical marginal peatland habitats including remnant high bog (PB1), cutover bog (PB4), scrub (WS1) and Birch woodland (WN7). Some of the peatland is not in Bord na Móna ownership.
- Agricultural grasslands (both improved –GA1 and wet grasslands –GS4) are located all around the site. These lands are used mainly for grazing and for the production of winter fodder for animals in the form of hay and silage.
- Some small sections of commercial conifer plantations are also located in a couple of locations along the sites boundary.
- Two large industrial peat production bogs (Bord na Móna – Derryfadda and Castlegar) are located across the River Suck in Co. Galway.

Watercourses (major water features on/off site)

Killeglan Bog is located within the Shannon catchment. The main watercourses are listed below while a number of smaller streams and drainage ditches from the bog drain directly into the River Suck or Killegan River or their tributaries.

- The River Suck forms a boundary with Goat Lough Bog to the west.
- The Killeglan River flows through Porteen and Ballyrevagh Bog before passing to the east of Lough Nacreeva Bog.
- A tributary of the Killeglan River separates Camlough Bog and Cuckoo Hill Bogs. Flowing west this river also separates Lough Nacreeva and Cregganycarna bogs before entering the River Suck further west.

Fauna biodiversity

Several bird species were noted on the site during the survey. (2010)

- Meadow Pipit (7)
- Dunnock (4)
- Reed Bunting (8)
- Geese droppings
- Peregrine Falcon (observed using the Oak-Ash-Hazel woodland). Raptor pellets also recorded on the high bog at pecking posts possibly also from Peregrine Falcon

- Raven (2) (over-flying site)
- A single Woodcock was flushed from Goat Lough Bog.
- A flock of Lesser Redpoll were using the cutover and high bog at Goat Lough Bog.
- Several Snipe were flushed from the wet grassland within the riparian zone along River Suck. Reed Bunting was also present. Mallard and Wigeon (30 wildfowl in total) were also using the main channel. A pair of Mute Swan was also present. Two Heron and 3 Cormorant were also recoded along the river.
- Other more common bird species included Rook, Hooded Crow, Wood Pigeon, Blackbird, Robin and Wren.
- It is worth noting that 45 Whooper Swans were observed on privately owned low-lying agricultural land adjacent to the site (and Killeglan River).
- Although no Kingfisher were observed during the ecological survey of the site it is likely that this species are using the Killeglan River as suitable habitat exists along its length.

Mammals on site included

- Signs of Hare along access routes on Goat Lough Bog.
- Indications of Otter along the Killeglan River
- Deer tracks throughout.
- Badger tracks throughout
- Indications of Wood Mouse in the Oak-Ash-Hazel woodland
- Indications of Fox were widespread.

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 Practise measures around the prevention and spread of Crayfish plague[6] will be adhered with throughout all rehabilitation measures and activities.

Rhododendron has been identified at one location in Killeglan Bog and suitable measures in line with Best Practice will be implemented under the site EMP.

[6] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX VI. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, Bord na Móna is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

Bord na Móna is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by Bord na Móna. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater (Derryfadda subgroup) bog group (Ref. PO-502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Blackwater (Derryfadda subgroup) bog group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

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

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

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

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

3 National and EU Climate and Biodiversity Policy

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

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

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

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

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

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

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

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

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

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

A new National Biodiversity Action Plan is currently being developed.

7 National conservation designations

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

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

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

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

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

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

11 National Archaeology Code of Practice

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

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

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

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

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

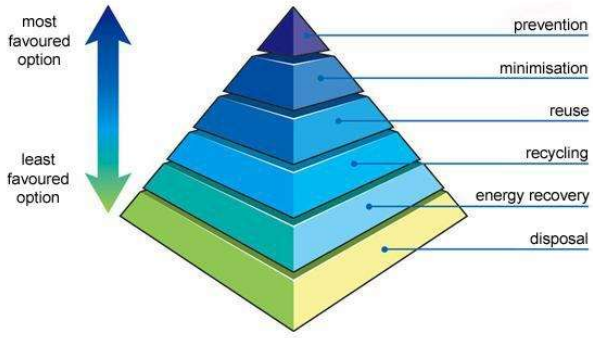
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



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

2. Enhanced Decommissioning.

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

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

APPENDIX VIII. GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

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

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

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

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

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

2.0 P0502-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

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

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

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

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

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

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

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

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

Classification in accordance Annex II.

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Blackwater IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

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

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Killeglan	Department of Housing, Local Government and Heritage NPWS	Multiple Staff Members	24/08/2023	Email		
Killeglan	National Museum of Ireland	Multiple Staff Members	24/08/2023	Email		
Killeglan	Department of Housing, Local Government and Heritage	General Email Contact	24/08/2023	Email		
Killeglan	Dept of Agriculture Food & the Marine	General Email Contact	24/08/2023	Email		
Killeglan	Department of Environment, Climate and Communications	Multiple Staff Members	24/08/2023	Email		
Killeglan	Dept of Rural and Community Development	General Email Contact	24/08/2023	Email		
Killeglan	Department of the Housing Local Government and Heritage	General Email Contact	24/08/2023	Email		
Killeglan	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	24/08/2023	Email		
Killeglan	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)	24/08/2023	Email		
Killeglan	Oireachtas	Danielle McDonnell (Minister Malcolm Noonan Secretary)	24/08/2023	Email	04/09/2023	Email
Killeglan	An Taisce	General Email Contact	24/08/2023	Email		

Killeglan	Environmental Protection Agency	Multiple Staff Members	24/08/2023	Email		
Killeglan	Inland Fisheries Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Local Authority Waters Programme	Multiple Staff Members	24/08/2023	Email		
Killeglan	Teagasc	General Email Contact	24/08/2023	Email		
Killeglan	The Heritage Council	General Email Contact	24/08/2023	Email		
Killeglan	Waterways Ireland	General Email Contact	24/08/2023	Email		
Killeglan	An Forum Uisce (The Water Forum)	General Email Contact	24/08/2023	Email		
Killeglan	Coillte	Multiple Staff Members	24/08/2023	Email		
Killeglan	Uisce Éireann	General Email Contact	24/08/2023	Email	22/09/2023	Email
Killeglan	Office of Public Works (OPW)	Multiple Staff Members	24/08/2023	Email	18/09/2013	Email
Killeglan	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	24/08/2023	Email		
Killeglan	Bat Conservation Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Birdwatch Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Butterfly Conservation Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Eastern and Midland Regional Assembly	General Email Contact	24/08/2023	Email		
Killeglan	Fisheries Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Friends of the Earth	General Email Contact	24/08/2023	Email		
Killeglan	Irish Environmental Network (IEN)	General Email Contact	24/08/2023	Email		

Killeglan	Friends of the Irish Environment	General Email Contact	24/08/2023	Email		
Killeglan	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact	24/08/2023	Email		
Killeglan	ICSA (Irish Cattle and Sheep Farmers Association	General Email Contact	24/08/2023	Email		
Killeglan	Irish Farmers Association	General Email Contact	24/08/2023	Email		
Killeglan	Irish Peatlands Conservation Council	General Email Contact	24/08/2023	Email		
Killeglan	Irish Raptor Study Group	General Email Contact	24/08/2023	Email		
Killeglan	Irish Rural Link (Community Wetlands Forum)	General Email Contact	24/08/2023	Email		
Killeglan	Irish Rural Link	General Email Contact	24/08/2023	Email		
Killeglan	Irish Wildlife Trust	General Email Contact	24/08/2023	Email	31/08/2023	Email
Killeglan	Inland Waterways Association of Ireland (IWAI)	Dara O Cionnaith	24/08/2023	Email		
Killeglan	National Association of Regional Game Councils	General Email Contact	24/08/2023	Email		
Killeglan	NPWS Rangers North Midlands	General Email Contact	24/08/2023	Email		
Killeglan	University of Galway (Peatlands and People)	General Email Contact	24/08/2023	Email		
Killeglan	PPN Roscommon Public Participation Network	General Email Contact	24/08/2023	Email		
Killeglan	Ranger Association Committee	General Email Contact	24/08/2023	Email		
Killeglan	Sustainable Water Action Network (SWAN)	General Email Contact	24/08/2023	Email		
Killeglan	Trinity College Dublin	General Email Contact	24/08/2023	Email		

Killeglan	Turf Cutters and Contractors Association	General Email Contact	24/08/2023	Email		
Killeglan	UCD / Irish Rural Link	General Email Contact	24/08/2023	Email		
Killeglan	University College Dublin	General Email Contact	24/08/2023	Email		
Killeglan	Waterways Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Woodlands of Ireland	General Email Contact	24/08/2023	Email		
Killeglan	Galway County Council	General Email Contact	24/08/2023	Email		
Killeglan	Director of Services	Liam Hanrahan	24/08/2023	Email		
Killeglan	Director of Services Infrastructure & Operations	Eileen Ruane	24/08/2023	Email		
Killeglan	Director of Services for Planning	Michael Owens	24/08/2023	Email		
Killeglan	Galway Co Co general address	Galway County Council - General email address	24/08/2023	Email		
Killeglan	Chief Executive Galway County Council	Jim Cullen	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Tim Broderick	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Dermot Connolly	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Michael Connolly	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Declan Geraghty	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Peter Keaveney	24/08/2023	Email		
Killeglan	Galway County Council - Ballinasloe area	Cllr Dr Evelyn Francis parsons	24/08/2023	Email		
Killeglan			24/08/2023	Email		

Killeglan	Galway County Council	Trevor Coleman	24/08/2023	Email		
Killeglan	Galway County Council	Marie Mannion	24/08/2023	Email		
Killeglan	TDS	Michael Fitzmaurice TD	24/08/2023	Email		
Killeglan	TDS	Denis Naughton TD	24/08/2023	Email		
Killeglan	TDS	Claire Kerrane TD	24/08/2023	Email	24/08/2023	Email
Killeglan	All Land- owners in vicinity of bog		20/08/2023	Letter drop		
Killeglan	Private landowner A					Phone call
Killeglan	Private landowner B					Phone call
Killeglan	Private landowner C					Phone call

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Irish Wildlife Trust	We do not have the staff capacity to respond to this consultation at the moment, but we will endeavour to respond if possible.	NA
Uisce Éireann	Uisce Éireann are supportive of the key objective of achieving environmental stabilisation of the bog and stabilising/improving key emissions to water. Uisce Éireann understand that restored peatlands are generally beneficial for drinking water sources downstream by improving water quality and by creating water retention and slowing the flow from the site. We are therefore in support of the Cutaway Bog Decommissioning and Rehabilitation Plan and believe that itcould help to achieve to improvements the quality of drinking water sources downstream in terms of suspended sediment, colour, ammonia and dissolved organic carbon. Suggestions in relation to water quality monitoring timescales and welcome the inclusion of DOC in BnM's scope. Considerations around silt pond maintenance during the rehabilitation. Potential benefits from cumulative effects of peatland restoration.	BnM responded acknowledging the submission.
Office of Public Work (OPW)	The Killeglan Bog, does not overlap with any OPW Arterial Drainage Scheme. The drainage from the bog discharges mainly to the Suck Drainage District Channels. In general the OPW supports the BnM bog rehabilitation and rewetting as a Nature Based Catchment Management measure in managing flood flows in the Upper Shannon River Catchment and Suck River Catchment and the many other environmental co-benefits from developing this project. The rewetting of this bog which is drained by the River Suck and is located upstream of Ballinasloe Town has the potential to reduce the flood risk in Ballinasloe Town, where a Flood Relief Scheme is currently being planned.	BnM responded acknowledging the submission.
Claire Kerrane TD	Acknowledged response of receipt of email.	NA

Private landowner A	Has land joining BnM boundary. General queries about the project.	BnM responded acknowledging the submission. Consultation is ongoing.
Private landowner B	Has land joining BnM boundary. General queries about the project and raised queries about BnM boundaries in relation to his land.	BnM responded acknowledging the submission. Consultation is ongoing.
Private landowner C	Has land joining BnM boundary. General queries about the project and raised queries about BnM boundaries in relation to his land.	BnM responded acknowledging the submission. Consultation 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

Code of Practice

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

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

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

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

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

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

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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1			
2			

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Killeglan Bog, Co. Roscommon

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 at Killeglan Bog, Co. Roscommon 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 Killeglan Bog will include:

- Additional drain blocking measures which will further enhance the hydrological regime and the resilience of the previous measures and thus expediating the development and extent of Sphagnum rich vegetation and active bog conditions at Killeglan.
- Deep Peat measures by targeted and intensive drain-blocking (7 per 100m) on drained high bog resulting in the creation of suitable conditions for the development of Sphagnum rich vegetation;
- Contour bunding and targeted drain blocking on former cutover bog to further enhance the development of Sphagnum rich embryonic bog.

Killeglan Bog is located c.5.2km south-east of Ballyforan town and west of the R357 road (see Fig 1). The bog rehabilitation area occupies the townlands of Breeole West, Camlagh, Cloonkeen, Coolfree, Creggancarna, Derrycahill, Feevagh More, Glenmore, Killeglan, Porteen and Ballyrevagh West OS 6-inch sheets Roscommon No 50.

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 Killeglan 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.

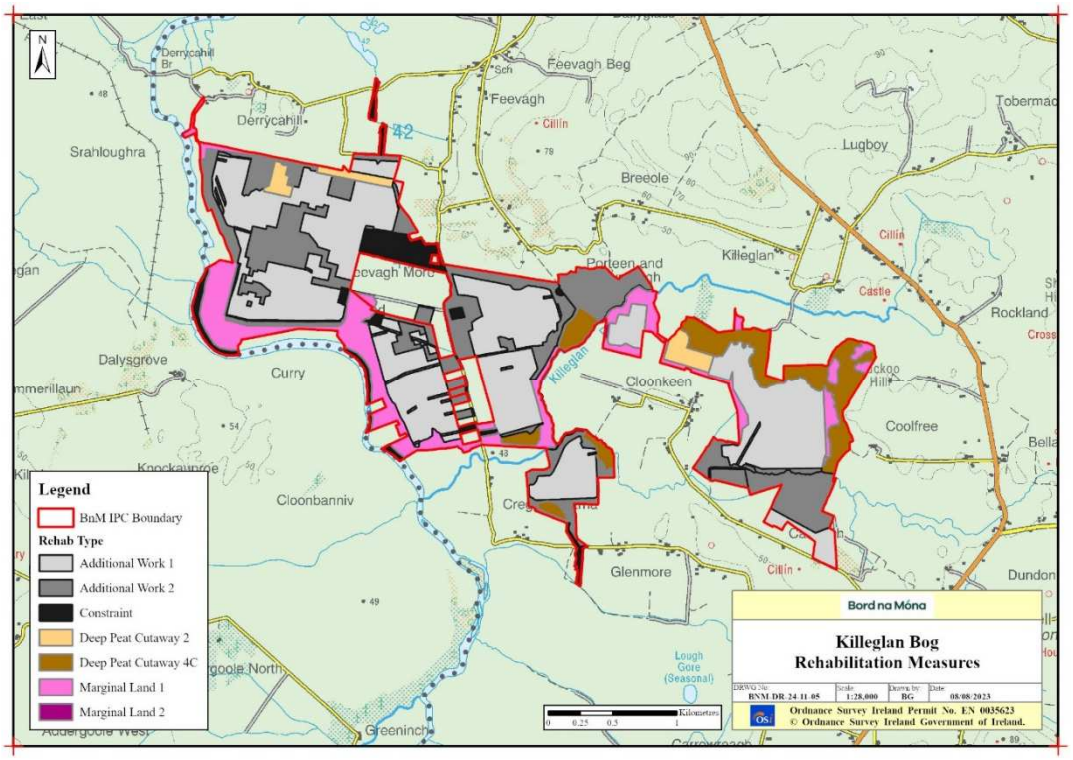

Fig. 1. Killeglan Bog, Co. Roscommon, the proposed rehabilitation measures.

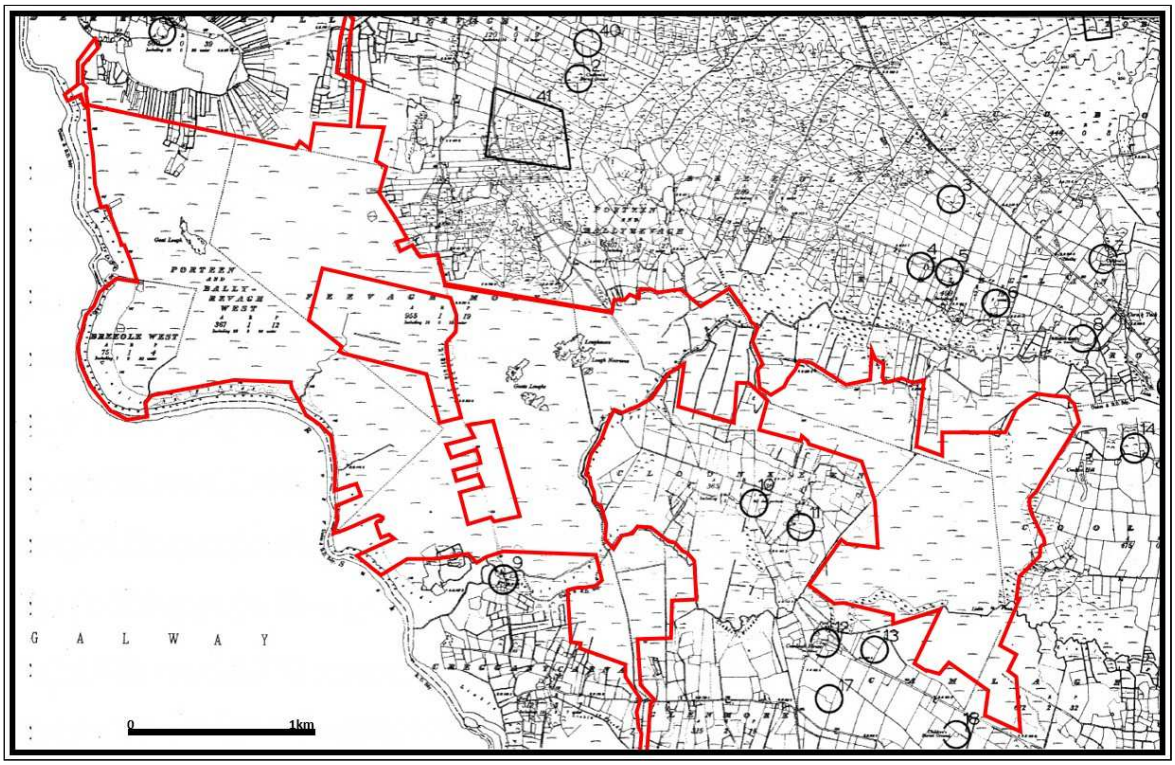

Fig. 2. Killeglan Bog, Co. Roscommon, detail of the Record of Monuments and Places map sheet Roscommon No. 50. The proposed rehabilitation area is outlined with the red line.

Desktop assessment

Peatland survey

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

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Roscommon which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1998). These records were published by the Minister in 1998 and include sites and monuments that were known in Killeglan Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 2).

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 16th of August 2023. This review established that there is one SMR RO050-045--- located in the proposed rehabilitation area (see Table 1, Fig. 3 and plate 12).

The monument extends through the townlands of Feevagh More and Porteen and Ballyrevagh West. The track is believed to be known locally as the 'Nun's Path' and is visible in section within the bog with a width of 3m and a depth of 0.2-0.5m. The SMR file records that it has a visible length of 360m in length. However, the aerial photographic coverage suggests an overall length of c. 1.3km, aligned west-northwest-east-southeast. Fifty-one Coordinates for the monument were generated from a 2020 Google Earth orthophotograph and are provided in Table 1.

A redundant record (RO050-043) is listed in the northern section of the bog, to the north-northeast. This is the trackway RO050-045--- marked in the wrong location.

SMR No.	Class	Townland	ITM Easting	ITM Northing
RO050-043----	Redundant record	Derrycahill, Feevagh More, Porteen And Ballyrevagh	584217	741690
RO050-045----	Road - gravel/stone trackway - peatland	Feevagh More, Porteen And Ballyrevagh West	584130	740918
"	"	"	583656.96	740555.80
"	"	"	583672.84	740567.96
"	"	"	583688.72	740580.12
"	"	"	583704.60	740592.28
"	"	"	583720.48	740604.44
"	"	"	583736.36	740616.60
"	"	"	583752.23	740628.76
"	"	"	583768.11	740640.93
"	"	"	583783.99	740653.09
"	"	"	583799.87	740665.25
"	"	"	583815.75	740677.41
"	"	"	583831.63	740689.57
"	"	"	583847.50	740701.73

“	“	“	583863.38	740713.89
“	“	“	583879.26	740726.05
“	“	“	583895.14	740738.21
“	“	“	583911.02	740750.37
“	“	“	583926.90	740762.53
“	“	“	583942.77	740774.69
“	“	“	583958.65	740786.85
“	“	“	583974.53	740799.01
“	“	“	583990.41	740811.17
“	“	“	584006.29	740823.33
“	“	“	584022.56	740834.96
“	“	“	584038.93	740846.44
“	“	“	584055.31	740857.93
“	“	“	584071.68	740869.41
“	“	“	584088.06	740880.89
“	“	“	584104.43	740892.38
“	“	“	584120.81	740903.86
“	“	“	584137.18	740915.34
“	“	“	584153.56	740926.82
“	“	“	584169.93	740938.31
“	“	“	584186.31	740949.79
“	“	“	584202.68	740961.27
“	“	“	584219.06	740972.76
“	“	“	584235.43	740984.24
“	“	“	584251.81	740995.72
“	“	“	584268.18	741007.21
“	“	“	584284.56	741018.69
“	“	“	584300.93	741030.17
“	“	“	584317.31	741041.65
“	“	“	584333.68	741053.14
“	“	“	584350.06	741064.62
“	“	“	584366.43	741076.10
“	“	“	584382.81	741087.59
“	“	“	584399.18	741099.07
“	“	“	584415.56	741110.55
“	“	“	584432.24	741121.56
“	“	“	584449.30	741132.01
“	“	“	584466.35	741142.46
“	“	“	584477.74	741149.45
“	“	“		
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“	“	“		
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“	“	“		

Table 1. SMRs in the rehabilitation area of Killeglan Bog.

Plate 1. Google earth orthophoto taken in 2020 with the bog road RO050-045---- indicated with arrows.

Archaeological Excavations

The Excavations Bulletin at excavations.ie was checked for reports of licenced excavations carried out in the rehabilitation area on the 16th of August 2023. There have been no licenced excavations carried out in the rehabilitation area.

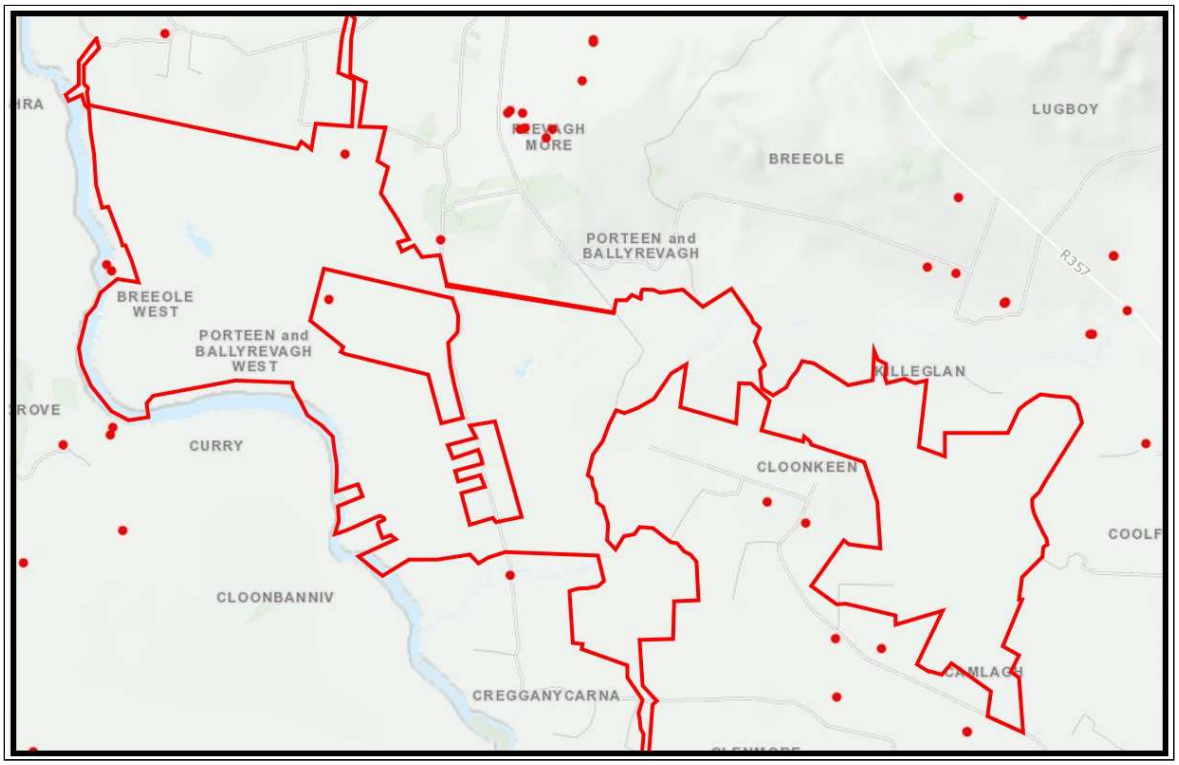

Fig. 3. Killeglan Bog, Co. Roscommon, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

Killeglan Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0502-01. The assessment noted a linear feature that may represent the remains of a trackway located in the townland of Feevagh More in the central part of the bog. The assessment notes that this is aligned roughly east-west and has a possible length of c. 200m. There are no coordinates provided for this feature in the EIAR report and no reference provided to indicate which aerial image it appeared on (see Table 2 and Plate 1). Requests to the EIAR author for more information were unanswered. The 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 Killeglan Bog.

SMR No.	Class	Townland	ITM Easting	ITM Northing
-	Possible togher	Feevagh More	-	-

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0502-01 contains a complete list of known archaeological objects from Killeglan Bog reported to the National Museum of Ireland up to 2018 (see Table 2).

Townland	Museum No./ catalogue No.	Description
Derrycahill	1967:219	Copper alloy ring
Clonkeen	1958:21	Stone axehead

Table 2. List of archaeological finds from Killeglan Bog reported to the National Museum of Ireland.

Impact assessment

There is one known archaeological monument RO050-045--- known in the rehabilitation area and one potential unlocated monument. There are two archaeological objects known from the bog that have been removed to the National Museum (see Table 2).

Recommendations

There is one known archaeological monument RO050-045--- known in the rehabilitation area and one potential unlocated monument. The entire extent of RO050-045--- should be preserved within a 20m buffer zone. The coordinates of the monument are provided in Table 1. There are two 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 is one known archaeological monument RO050-045--- known in the rehabilitation area and one potential unlocated monument. The entire extent of RO050-045--- should be preserved within a 20m buffer zone. The coordinates of the monument are provided in Table 1. There are two 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 1998. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Roscommon.

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
21 August 2023