Delichon Ecology

Cutaway Bog Decommissioning and Rehabilitation Plan

Screening for Appropriate Assessment

Mostrim, Co. Longford

Prepared For[1]

Bord na Móna

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1 INTRODUCTION

Bord na Móna have in recent years permanently ceased industrial peat production on a significant area of bog. In line with Bord na Móna's accelerated decarbonization strategy, the company has also committed to ambitious enhanced peatland decommissioning and rehabilitation improvements.

This strategy has been developed to optimise benefits of peatland rehabilitation and restoration for climate action. In addition, it will also have benefits for biodiversity, water (catchment management) and other ecosystem services. These improvements are in line with the Government Climate Action agenda, and will bring with it significant natural capital benefits. It will also create a stable natural landscape for the benefit of neighbours and local communities in former peat production areas.

Bord na Móna operates under an IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. P0504-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Mostrim bog is part of the Mount Dillion bog group and is located in Co. Longford and Co. Westmeath.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations 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.

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

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

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

These measures are designed to encourage or enhance further the development/footprint of peat forming habitats 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. Mostrim Bog is proposed to be part of this Scheme (PCAS).

This Screening for Appropriate Assessment Report has been prepared by Delichon Ecology on behalf of Bord na Móna, and contains sufficient objective scientific information to facilitate Bord na Móna to determine whether the decommissioning and rehabilitation outlined in the plan referenced above requires Appropriate Assessment, or whether the potential for likely significant effects on any designated European Site can be excluded. Should a Natura Impact Statement be required, the impact of the project on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

The preparation of this Screening for Appropriate Assessment Report has had regard to;

- EU Habitats Directive (92/43/EEC)**,**
- EU Birds Directive (Council Directive (2009/147/EC),
- European Communities (Birds and Natural Habitats) Regulations 2011-2021,
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001,
- Assessment of Plans and Projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission (2021);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010),
- Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC, European Commission, 2018,
- Office of the Planning Regulator (OPR) (2021) Practice Note PN01 - Appropriate Assessment Screening for Development Management,
- EC (2021) Assessment of Plans and Projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- *Mostrom Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2023* as prepared by BnM – see **Appendix B** of this document.

1.1 Appropriate Assessment Process

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment of the implications of any plan or project on a European Site is required before a project is approved/adopted. This must include all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect the conservation objectives of that European Site, in the light of the best scientific knowledge in the field. The competent national authorities are to authorise a plan, project or activity only if they have made certain that it will not adversely affect the integrity of any European Site.

This current document comprises a Screening for Appropriate Assessment to determine whether Appropriate Assessment is required. The Screening must identify whether the project, alone or in combination with other plans and projects, is likely to have significant effects on any European Site in view of the qualifying interests and conservation objectives of these sites; or whether the potential for such significant effects can be excluded. This test is completed with cognisance of emerging case law. For the avoidance of doubt, within Screening for Appropriate Assessment process, no reliance is made on existing mitigation measures which form part of current or previous industrial peat production. The scope of this appraisal refers to the proposed decommissioning and rehabilitation only, as described in the Plan included as **Appendix B**.

This report is conducted in line with the requirements of Article 6(3) of the EU Habitats Directive (92/43/EEC) and the National Parks and Wildlife Service (NPWS) Guidance for Planning Authorities (2009, rev 2010) and the Office of the Planning Regulator (OPR) (2021) Practice Note PN01 - Appropriate Assessment Screening for Development Management. It is intended that the information contained within this document will form the basis for the Article 6(3) Appropriate Assessment process completed by the Competent Authority.

1.1.1 Stages of the Appropriate Assessment Process

Appropriate Assessment involves a number of steps and tests that are applied using a stage-by-stage approach. Each step or stage in the assessment process precedes and provides a basis for other steps. The four stages in an Appropriate Assessment (AA), are further described below.

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2009). These guidance documents identify a staged approach to conducting an AA, as shown in **Image 1**.

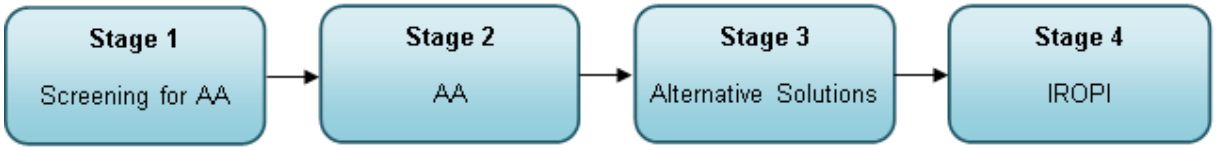


Image 1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009, rev 2010).

Stage 1 - Screening for AA

This stage examines the likely effects of a project either alone or in combination with other projects upon a European site and considers whether it can be objectively concluded that these effects will not be significant.

Stage 2 – Appropriate Assessment

In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

Stage 3 - Alternative Solutions

Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts. For the avoidance of doubt, no reliance is placed on Stage 3.

Stage 4 - IROPI

Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory

measures will or will not effectively offset the damage to the European site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass. In any event, the proponent does not purport to place any reliance on Stage 4.

1.1.2 Statement of Authority

Eamonn Delaney BSc, MSc, MCIEEM, CECOL prepared this Screening for Appropriate Assessment report. Eamonn has sixteen years consultancy experience and has prepared Screening for Appropriate Assessment and Natura Impact Statements for various projects, including residential, amenity, renewable energy and transport developments in addition to strategic policy and planning proposals. Eamonn conducted field visits at the Mostrim Bog site in February and March 2023. Eamonn's initial years in ecological consultancy involved botanical and habitat surveys for the purposes of EIA, EcIA and large scale habitat surveys for local authorities. This included plant species identification and habitat classification in a wide range of rural, urban and peri-urban environments. Eamonn is a member of the Botanical Society of Britain and Ireland (BSBI) and regularly attends local and regional BSBI field meetings in addition to carrying out recording for the proposed BSBI 2020 Atlas, in north Co. Galway and south Co. Mayo.

Eamonn has extensive experience in the Ecological Clerk of Works (ECoW) role for Flood Relief Schemes, roads and pipeline developments which requires weekly site visits, monitoring of mitigation measures, reviewing contactors method statements in addition to ongoing liaison with site operational staff and the design team. Eamonn has also been involved in the preparation and review of numerous Screening for Appropriate Assessment reports, Natura Impact Statements, Ecological Impact Assessments and Invasive Species Management Plans for a range of project types including roads, water infrastructure, solar farms, wind farms and peatland rehabilitation works. Through his involvement in all of these projects, Eamonn has honed his skills in field based assessments and the subsequent reporting and interpretation of information yielded from desk and field based resources.

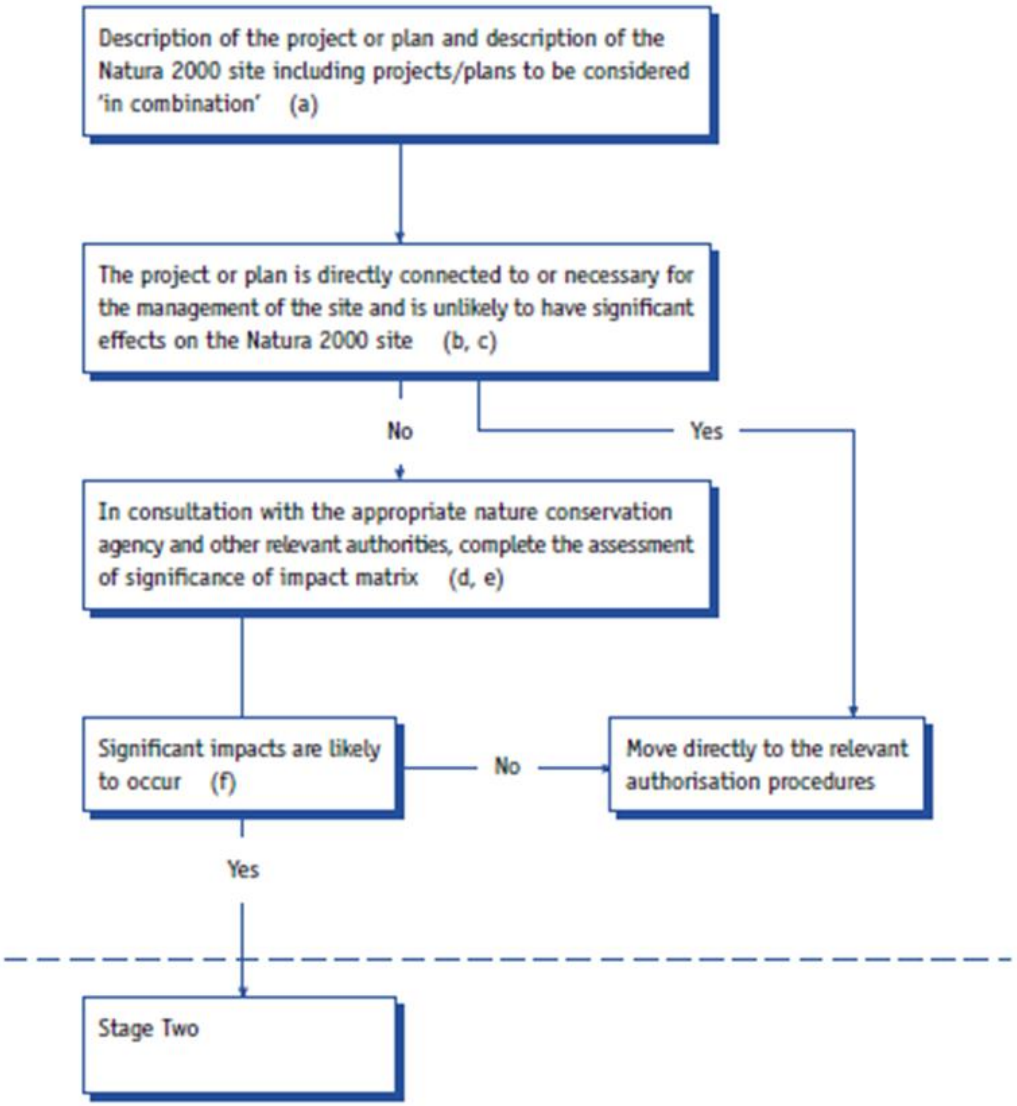
Eamonn routinely drafts, reviews and completes AA's for numerous projects. As the project design is developed, Eamonn seeks to influence the project design and refine the AA process to avoid and reduce potential impacts to the habitats and species for which the potentially impacted European site is designated. The outcome ensures that the finalised AA has been developed through an iterative process where the findings of the AA inform and are being informed by the project design throughout.

2 Stage 1: Screening

2.1 Screening Evaluation Process

The Screening process examines the likely effects of the proposed Mostrim Bog decommissioning and rehabilitation, as described in the appended 'plan' (**Appendix B**), either alone or in combination with other projects or plans, upon any European Site and considers whether it can be objectively concluded that these effects will not be significant. The below figure outlines the assessment pathways and considerations held in the Stage One Screening for Appropriate Assessment process.

Stage One: Screening



2.2 Overview of Mostrim Bog Decommissioning and Rehabilitation

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon Bog group (Mostrim sub-group) (Ref. PO-504-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. This regulatory requirement is the main driver of the development of this rehabilitation plan.

A document titled '*Mostrim Bog Cutaway Bog Decommissioning and Rehabilitation 2023'* has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Mostrim Bog and is appended to this document as **Appendix B**.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) on peatlands previously used for energy production. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation – including Mostrim Bog. This proposed Scheme will significantly go beyond what is required to meet rehabilitation obligations under existing EPA IPC licence conditions.

Decommissioning seeks to address condition 10.1 of license Ref. PO504-01, which 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.

Decommissioning must take place at each bog prior to or concurrent with rehabilitation – the scale of decommissioning per bog varies dependant on the items/ infrastructure previously in place to facilitate prior peat extraction.

Enhanced decommissioning as part of the PCAS will enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit.

Rehabilitation seeks to address the requirements of Condition 10.2 of IPC License Ref. PO504-01, and is based on a reference document prepared by BNM per Bog for which the IPC license is applicable. See the following extract from IPC License Ref. PO504-01:

"*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 plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence."*

Mostrim Bog was drained and developed for industrial peat production in from the 1980's. Industrial peat production ceased in 2018. The main goal and outcome of this plan is the successful rehabilitation (**environmental stabilisation**) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

Enhanced Rehabilitation interventions supported by the above referenced 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.

2.3 Screening Evaluation: Is the Project Directly Connected to or Necessary for Management of a European Site?

For a project or plan to be 'directly connected with or necessary to the management of the site', the 'management' component must refer to management measures that are for conservation purposes, and the 'directly' element refers to measures that are solely conceived for the conservation management of a site and not direct or indirect consequences of other activities.

Finding: **No, the proposed Mostrim Bog Decommissioning and Rehabilitation is not directly connected to or necessary for the management of a European Site.**

2.4 Description of the proposed Decommissioning and Rehabilitation

2.4.1 Location, Size, Scale, Landcover

2.4.1.1 Location

Mostrim bog is located 3km north-east of Edgeworthstown and overlaps the Longford and Westmeath county boundary (grid reference: N 30430 74492). The majority of the bog occurs within Co. Longford while the eastern section of the bog extends into Co. Westmeath. It is part of the Mount Dillon Group (Mostrim sub-group) of bogs. The bog covers an area of 439.39ha.

See **Figure 1: Site Location of Mostrim Bog** (over)**.**

Figure 2: Aerial photo of Mostrim Bog (over).

Figure 3: Water Quality Map for Mostrim Bog (over).

2.4.1.2 Size, Scale, Landcover

Size and Scale: Mostrim Bog comprises 439.39Ha in total.

Mostrim Bog is a raised bog. Like some of the other bogs in the Mostrim group the majority of the site was ditched originally in the 1980s and the Bog has been re-ditched (drained) more recently. Part of the bog (14%) was managed for the production of commercial sod-peat up until 2018. In this section vegetation was stripped away, there was more intensive drainage work, and sod moss was removed, creating wide trenches. These sections of bog still retain their raised bog characteristics, apart from the impacts of the drainage. Industrial peat extraction has now ceased at Mostrim. The bog has also been subject to restoration work in part.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, and other bogs, many owned and managed by Bord na Móna. Ardngullion Bog SAC is located to the north of Mostrim bog is separated from it by a band of conifer forestry. Clonwhelan Bog lies approximately 500m south-west of Mostrim Bog.

The total area of Mostrim Bog is 439. 39Ha of which 384.91ha or 87.60% of the present Landcover (2023) has been assigned enhanced rehabilitation prescriptions.

Landcover

Existing:

About 50% of the western section was managed for production of commercial sod moss. Cutting of sod-moss ceased March 2018, while drying of the sod-moss blocks (splitting and walling) continued until Summer 2020. The former sod moss production area is mainly concentrated along the western and southern margins. The vegetation within this production area has been stripped away in places and the ground cover is dominated by bare peat. The northern section contains a relatively intact (undrained) section of raised bog (PB1) with limited drainage features concentrated around the margins. This area supports the priority EU Annex I listed habitat 'active raised bog (7110)'. This area comprises the best quality raised bog habitat onsite and is characterised by an extensive pool-hummock-hollow complex. Much of this area comprises active raised bog supporting sub-central ecotope community complexes. This section is cut off from the main site by a regional road (R395). The Longford-Westmeath county boundary occurs along the eastern side of this section. The majority of the high bog in this section was drained in the past but was not utilised for sod moss production. Only a few small areas around the margins left un-ditched (it should be noted that not all this peatland is within the Bord na Móna property boundary). This part of the bog was relatively dry and comprises raised bog (PB1) of marginal and facebank ecotope quality. BNM ecotope surveys completed in summer 2023 also found submarginal and a small area of central ecotope in this area of the bog The vegetation is dominated

by *Calluna vulgaris* in association with *Narthecium ossifragum*. This section has been restored and the drains have been blocked (2019-2021). Water levels are now being maintained close to the peat surface.

A number of silt ponds are located along the outer margins of the high bog and cutover bog areas. A map showing existing habitats at Mostrim Bog is presented in **Figure 4**.

Extent of Landcover requiring Decommissioning: Decommissioning will be applicable across all of Mostrim Bog, where relevant.

Extent of Landcover requiring Rehabilitation: The total area of Mostrim Bog is 439.39Ha of which 175.44ha has been allocated enhanced rehabilitation measures (Deep Peat DP2, DP3, DP4, DP6 & TCT1).

Future Landcover: Following decommissioning and rehab, future landcover of habitats currently evaluated as not requiring Rehab (i.e. Access Tracks and rights of way, marginal lands such as agricultural land, and marginal areas (e.g. high bog) around the edges of Mostrim Bog) will remain in line with existing baseline trends for these habitats, albeit without any waste or materials which would have been left in situ in the absence of decommissioning.

The majority of the rehabilitated bog will develop as raised bog habitat. A key expected habitat is **raised bog habitat** on deeper residual peat. This will be the dominant habitat within the site. Mostrim has excellent potential for raised bog restoration. Hydrological modelling indicates that 44 ha of Annex I habitat '*Degraded Raised Bog Capable of Regeneration (7120)'* occurs on the bog. This has the potential to become Annex I *'Active Raised Bog (7110)'* following the implementation of rehabilitation measures and rewetting of the deep peat. A small area (4.5 ha) of relic Annex I 'active' raised bog (7110) already occurs in the undrained section occurs at the northern end of Mostrim. The rehabilitation measures will lead to an improvement in the condition of this existing active raised bog habitat by restoring the hydrology of the surrounding bog to optimal levels. Degraded raised bog within the site will improve in overall habitat condition. It is expected that rehabilitation measures will set the high bog on an accelerated trajectory towards developing active raised bog habitat (ARB), where possible, with the re-development of *Sphagnum*-rich vegetation on the high bog and wetter conditions across the high bog in general. Drain-blocking of the remaining supporting raised bog habitat will improve the hydrological condition of this habitat. Assuming that the proposed measures are effective, there is potential for 363.48 ha of raised bog (total high bog area) to be restored at Mostrim with an improvement in its overall condition. In the former cutaway areas along the margins where cell contour bunding will be formed, **regenerating wet deep peat vegetation is expected to develop.** This will likely be dominated by *Sphagnum* and contain typical raised bog and other peatland species but will not have the complete species assemblage or have the natural topography of active raised bog. It is expected that the vegetation will develop as a mosaic with less acidic poor fen (characterised by Bog Cotton, Rushes and poor fen mosses). These areas will still include areas that are likely to remain dry and develop Birch woodland and other drier habitats.

The proposed rehabilitation will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other positive quality effects particularly for climate action will be accrued.

In general, the key rehabilitation objective is to optimise the area of suitable hydrological conditions for climate action benefits. This is defined as:

- Carrying out intensive rehabilitation with the application of enhanced rehabilitation measures (including drain-blocking, re-profiling, cell-bunding, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum*).
- Modifying outfalls and management of water levels with overflow pipes and blocking of internal outfalls, blocking former trench drains, contour bunding, removal of conifer forestry from the high bog (tree felling and removal, stump flipping, bog surface reprofiling), removal of feral self-sown conifer trees from the high bog.

- Optimising hydrological conditions for raised bog restoration on deep peat..
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities in suitable conditions.
- Stabilisation or reduction in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Setting the site on an appropriate trajectory to develop naturally functioning peatland habitats over time. It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Nevertheless, re-wetting across the entire bog, as part of the proposed Scheme, will improve habitat conditions of the whole bog, making the overall bog wetter. Other peatland habitats such as embryonic *Sphagnum*-rich vegetation, fen and associated Reed swamp will develop in a wider mosaic that reflects underlying conditions. It will take some time for stable naturally functioning habitats to fully develop at Mostrim Bog.
- Mostrim contains a relatively intact (undrained) section of high bog in the north of the site which already supports the priority EU Annex I listed habitat 'active raised bogs (7110)' deemed to be of international importance. Re-wetting across the entire bog, as part of the scheme, will further improve the condition of this active raised bog.
- Mostrim Bog has the potential to further develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). However, only a proportion of the bog has potential to develop Annex I active raised bog (approximately 44 ha based on hydrological modelling) in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the scheme, will improve habitat conditions of the whole bog.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

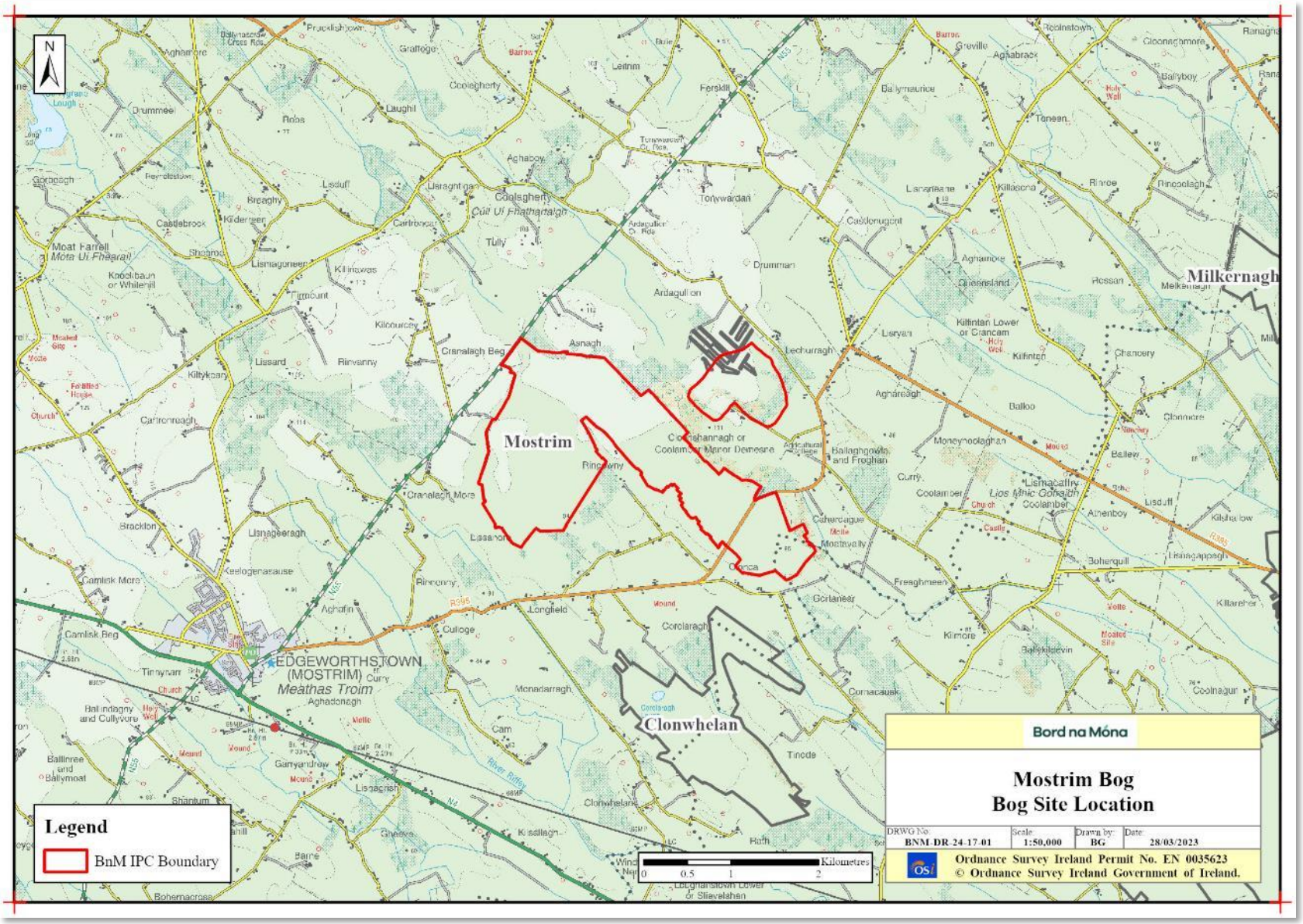


Figure 1: Site Location of Mostrim Bog

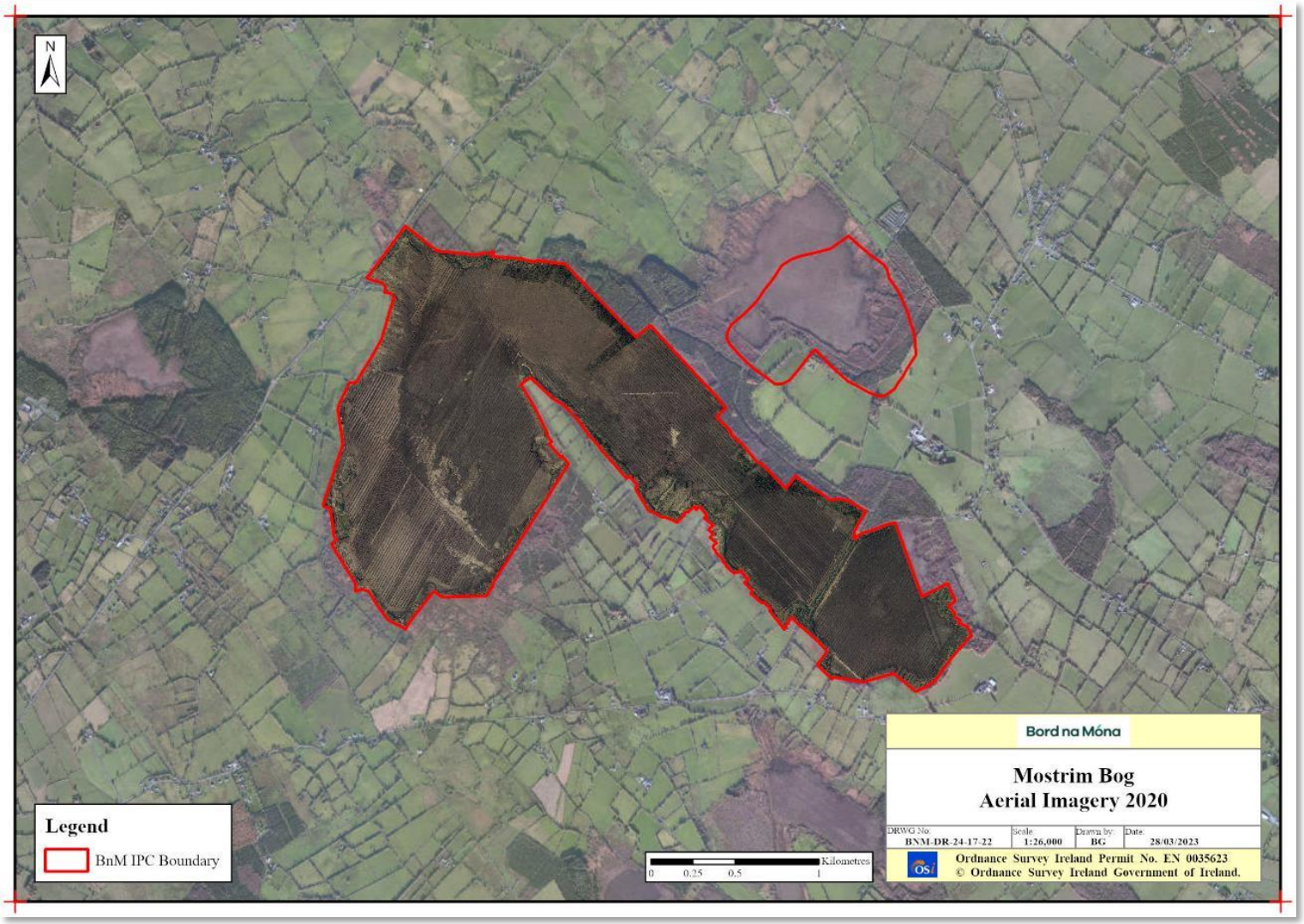


Figure 2: Aerial photo of Mostrim Bog[2]

[2] The area in red shown overlapping Ardagullion Bog SAC is not included in the current rehabilitation and enhancement proposals.

2.5 Description of the Receiving Environment

Like some of the other bogs in the Mostrim group, the majority of the site was ditched originally in the 1980s and the Bog has been re-ditched (drained) more recently. Part of the bog (14%) was managed for the production of commercial sod-peat up until 2018. In this section vegetation was stripped away, there was more intensive drainage work, and sod moss was removed, creating wide trenches. These sections of bog still retain their raised bog characteristics, apart from the impacts of the drainage. Industrial peat extraction has now ceased at Mostrim. The bog has also been subject to restoration work in part and supports a localised area of remnant high bog habitat near the northern boundary. Mostrim Bog lies in the Shannon (Upper) catchment (Catchment ID: 26F/26C), as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog falls into the Inny [Shannon]_SC_050 (catchment id: 26F_8), while the northern bog margins fall into the Camlin_SC_010 (catchment id: 26C). The eastern extent of the bog falls into the Inny [Shannon]_SC_020 (catchment id: 26F_7) and the Inny [Shannon]_SC_030 (catchment id: 26F).

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

2.5.1 Desk Based Assessments

2.5.1.1 National Biodiversity Data Centre & National Parks & Wildlife Service Data Request

A search was undertaken on the National Biodiversity Data Centre[3] for Protected and Invasive Species presence in the vicinity of the proposed decommissioning and rehabilitation works. Mostrim Bog is located within hectads N27 & N37[4]. Furthermore, a rare and protected species data request was issued to the National Parks & Wildlife Service. The protected and invasive species records available for these hectads are presented in **Appendix E**.

2.5.1.2 Baseline Water Quality Data for Mostrim Bog

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

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

Mostrim Bog has 5 treated surface water outlets, all to tributaries of the Inny [Shannon]. The Inny [Shannon] River was not listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle which is currently out for consultation.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map.

[3] Available at https://www.biodiversityireland.ie/. Accessed in May 2023

[4] 10x10km Irish Grid Square

See Drawing number BNM-DR-24-17-02 titled Mostrim Bog: Structures and Sampling, along with Drawing number BNM-DR-24-17-WQ01 titled Mostrim Bog: Water Quality Map included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Mostrim Bog.

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn et al., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva et al., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLHG, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

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

Details of the internal drainage network and surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the attached Water Quality Map (See **Figure 3**).

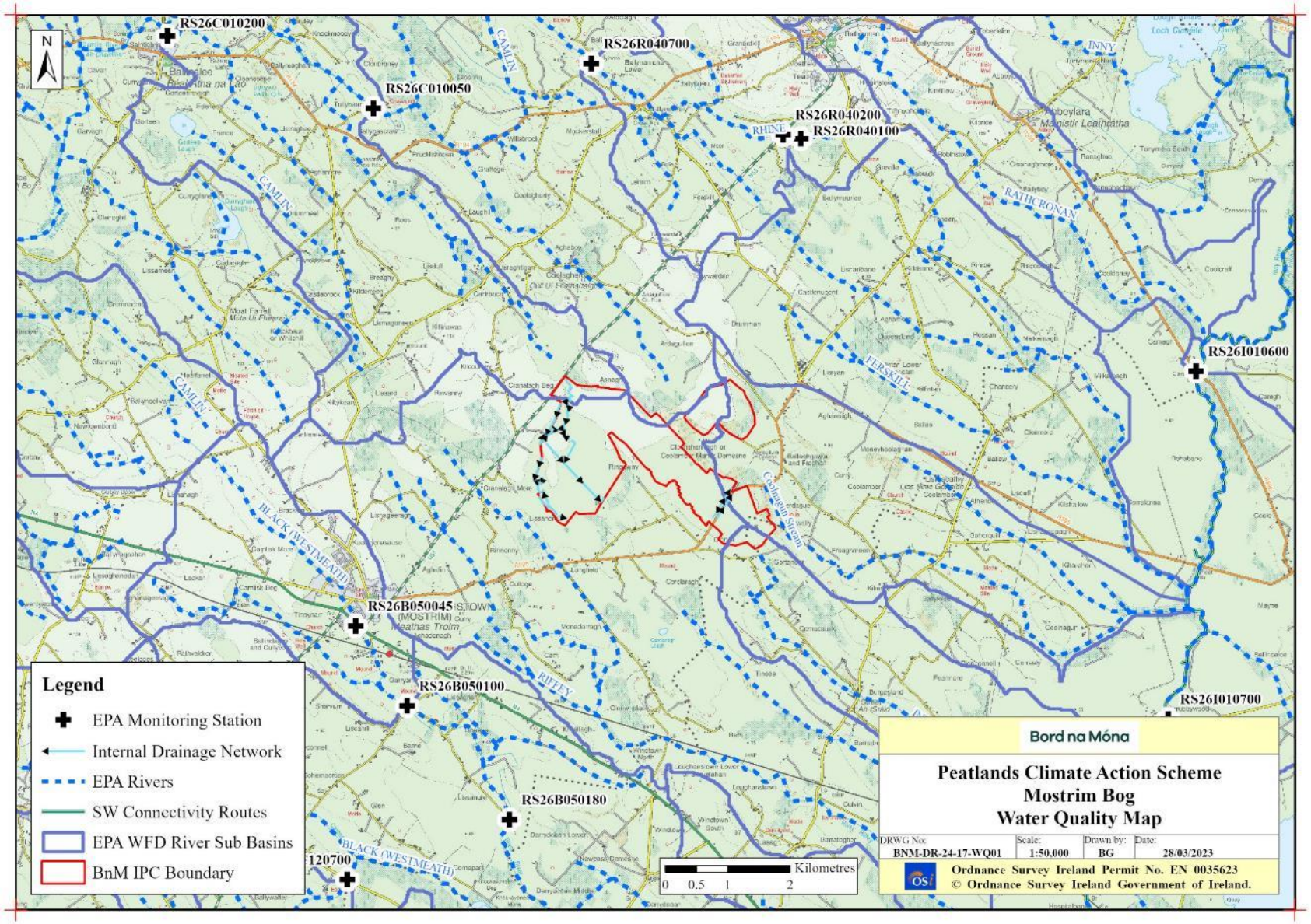


Figure 3: Water Quality Map for Mostrim Bog

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

This new sampling programme commenced in September 2021 and is enabling a baseline to be established, with sampling to progress during the scheduled rehabilitation, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

In the preparation of this monitoring programme, Bord na Móna have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2022 monitoring programme and these are included in the Water Quality Map.

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

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

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

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn et al., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva et al., 2017). The National River Basin Management Plan (NRBMP) 2018-

2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

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

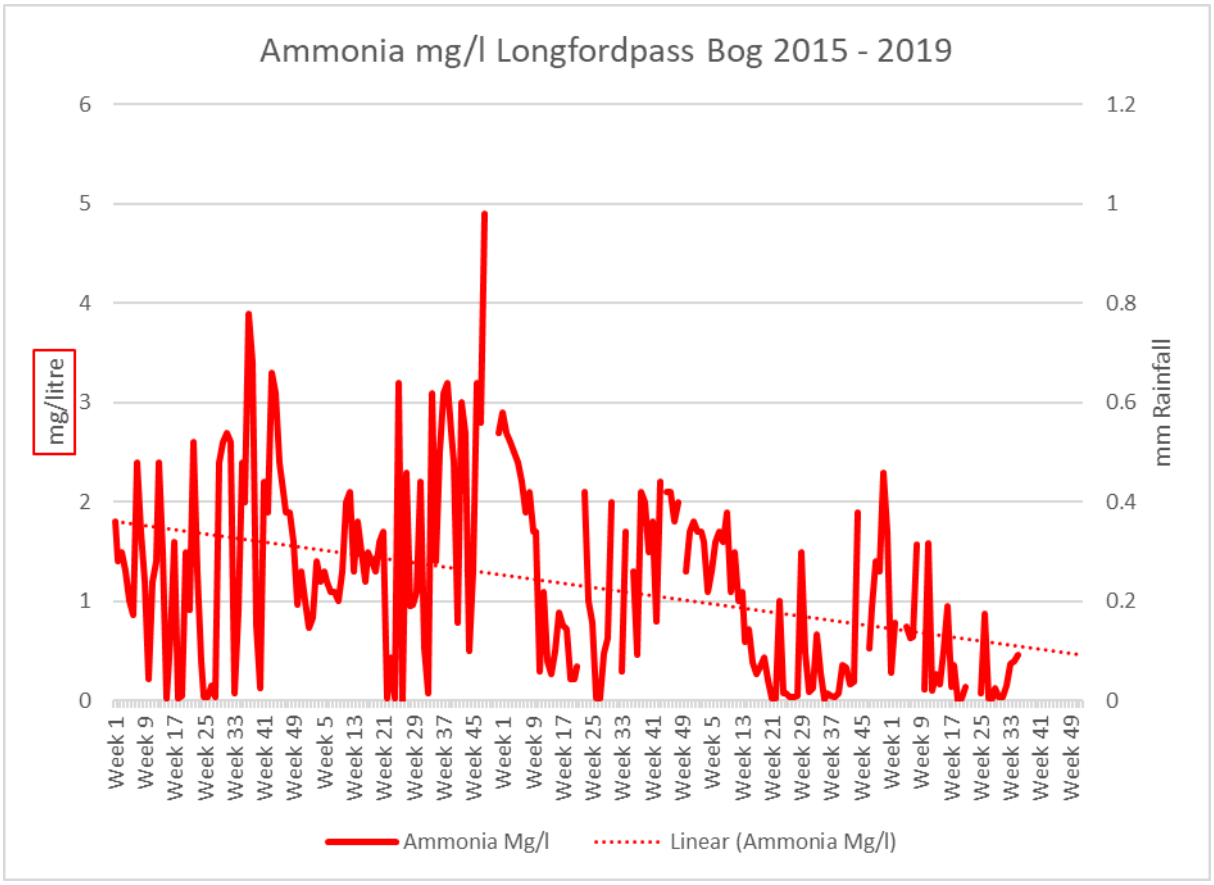
Forecasted Water Quality Trends following the PCAS Works

It is expected that following the implementation of the PCAS at Mostrim Bog the concentration of TP, ammonia, as well as Suspended Solids (SS) will follow a downward trend and will within the short-term (i.e. within a 3-year period) reduce concentrations of these parameters to below the NPWS limits.

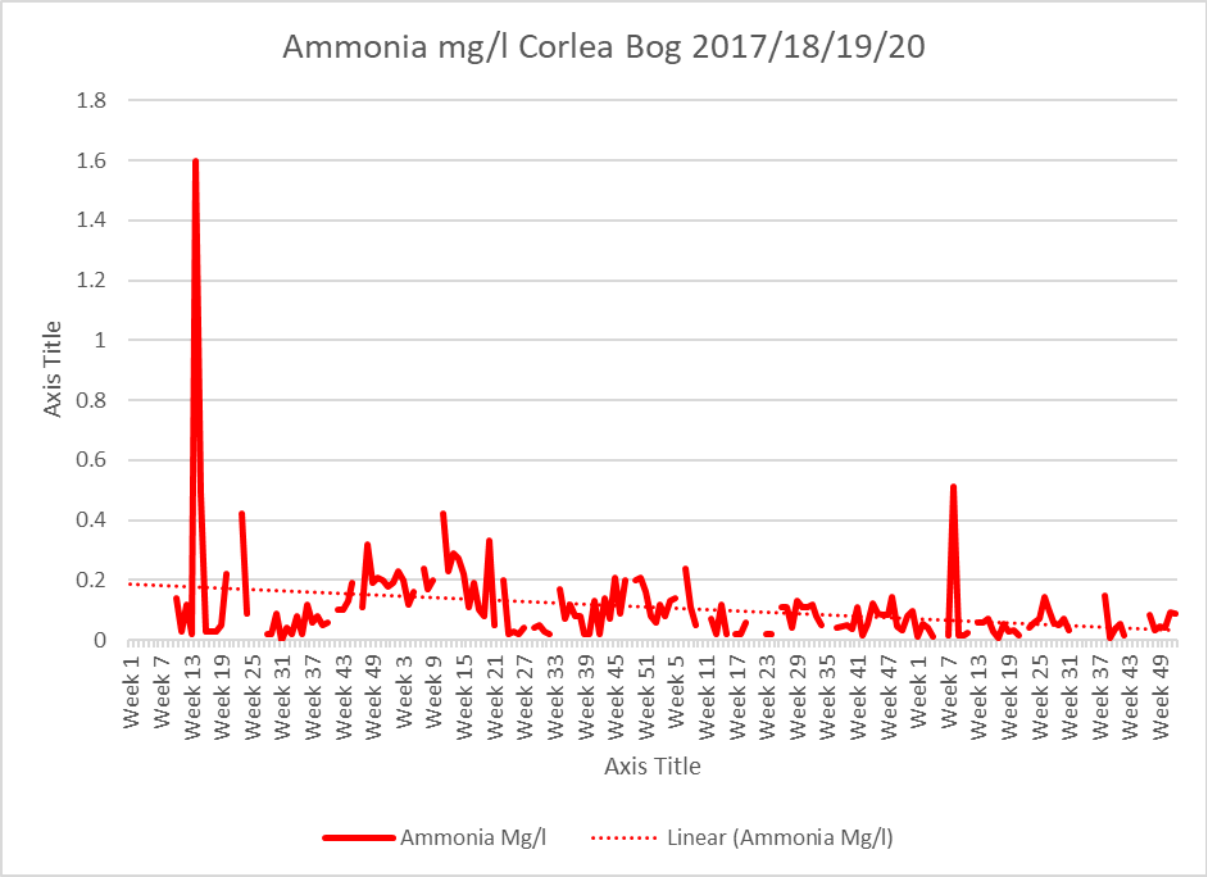
With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating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

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

As the monthly monitoring program at Mostrim Bog continues in 2022/2023 during the rehabilitation planned for 2023, and data from the 2022 monitoring program is compiled, further trending will be produced to verify any ongoing trends.



Graph 1: Ammonia levels over the period 2015-2019 at Longfordpass.



Graph 2: Ammonia levels over the period 2017-2020 at Corlea.

2.5.2 Field Assessments

2.5.2.1 Current Habitats

The most common habitats present within the Mostrim Bog site include:

Western section

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

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

Northern section

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

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

The eastern side of the northern lobe is raised bog that was drained in the past. This section largely comprised raised bog of sub-marginal, marginal and Facebank ecotope quality. *Sphagnum* cover is present but is less extensive. There are two areas of poor fen and flush (PF2) that are dominated by Purple Moorgrass. Numerous colonising feral Pine are scattered over the high bog. This section has been restored and the drains have been blocked (2019-2021). Water-levels are being maintained close to the peat surface

and in some sections, there is pooling of surface water, indicating the drain-blocking has been quite effective. There has been a limited ecological response to this re-wetting so far, but in some sections there is die-back of Heather and Common Bog Cotton is more extensive, which is a typical early indicator of bog re-wetting.

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

Eastern section

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

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

A habitat map of the rehabilitation site is presented in **Figure 4** and in Drawing number BNM-DR-24-17-17 titled **Mostrim Bog: Current Habitat Map**, included in the accompanying Mapbook.

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

Image 3.2 Sod moss trench and colonisation of ridges (2020).

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

Image 3.4. Northern section. Undrained raised bog.

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

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

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

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

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

Image 3.10. Silt pond located on the northern boundary of the site, west of the R395

Image 3.11. Cutover area located toward the centre of the site

Image 3.12. Cutover area near the centre of the site with colonising conifers

Image 3.13. Molinia dominated poor fen and flush located near the centre of the site

Image 3.14. Recent area of cutover raised bog along the southern margins of Mostrim Bog

Image 3.15: Silt pond located near the north-western corner of Mostrim Bog

Image 3.16. Shallow drainage channel located near the north-western corner of Mostrim Bog

Image 3.17. Sod moss harvesting area located near the south-western corner of the site

Image 3.18. Stock piled areas of sod moss located near the westen boundary of the site

2.5.2.2 Bird Surveys

The Mostrim Bog site was visited on February 14th 2023 and again on March 28th 2023. Bird Survey methodology included a series of spot-counts vantage points across the bog affording good views. These spot counts were supplemented by walkovers of habitats and targeted survey areas. All bird species encountered (seen or heard) during the surveys were recorded, together with the abundance of each species. Birds flying over the site were also included as part of the observations. Casual records of birds encountered during the spot counts and field walkovers, but outside of dedicated survey period were also noted.

The site walkover survey did not identify large flocks waterbirds or wildfowl using the bog areas for roosting or foraging purposes. In addition, the bog did not support large areas of ponding or standing water to support suitable foraging or roosting habitat for waterbirds. The largest waterbodies on site included silt ponds which are small localised waterbodies with the potential to support individual or small numbers of waterbird species.

Bird species identified during the February and March 2023 walkover survey are presented in **Table 4** below.

Table 4: Bird Species identified during the site walkover survey in winter / spring 2023

Common Name	Species Name	Activity within the site
Blackbird	*Turdus merula*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Blue Tit	*Cyanistes caeruleus*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Coal Tit	*Periparus ater*	Calling from adjoining conifer plantation areas.
Robin	*Erithacus rubecula*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Dunnock	*Prunella modularis*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Chaffinch	*Fringilla coelebs*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Snipe	*Gallinago gallinago*	Flushed from high bog area during the February 2023 survey.
Pied Wagtail	*Motacilla alba*	Foraging along bog access tracks.
Stonechat	*Saxicola rubicola*	Calling from marginal areas of gorse scrub.
Meadow Pipit	*Anthus pratensis*	Foraging over high bog habitats.
Skylark	*Alauda arvenis*	Displaying over high bog areas
Redpoll	*Carduelis flammea cabaret*	Overflying the site from wooded margins
Wren	*Troglodytes troglodytes*	Foraging within treeline, scrub and woodland habitats fringing the larger areas of expansive cutover bogs.
Mallard	*Anas platyrhynchos*	Flushed from the marginal wetland areas and silt pond margins.
Teal	*Anas crecca*	Flushed from drainage channel near the south-western corner of the site
Rook	*Corvus frugilegus*	Overflying the site and associated with built ground near the site margins
Hooded Crow	*Corvus cornix*	Overflying the site and associated with built ground near the site margins
Magpie	*Pica pica*	Overflying the site and associated with built ground near the site margins
Sand Martin	*Riparia riparia*	Foraging over high bog areas

2.5.2.3 Mammal Surveys

A mammal survey of Mostrim Bog was undertaken on during the site walkover surveys undertaken in mid February and late March 2023. An otter survey was completed along silt ponds and drainage channels within and adjoining Mostrim Bog. As well as the silt ponds and drainage channels used for past peat harvesting works, the watercourses adjoining and being fed by the silt ponds were also surveyed for the presence of otter and other semi-aquatic mammals. It should be noted that pathways for otter injury and mortality as a result of the proposed decommissioning and rehabilitation primarily exist at silt ponds. Therefore, survey emphasis was concentrated, but not confined, to these features.

In addition, Mostrim Bog and environs were also surveyed for the presence and usage of non-volant mammal species including badger, fox, Irish Hare, mink etc.

The otter survey methodology followed those methods employed in the 'Otter Survey of Ireland 2004/2005' (Bailey & Rochford, 2006) comprising a modification of the Standard Otter Survey Method developed by Jefferies (1980).

In addition, the mammal survey incorporated badger surveys that were completed in accordance with the *Guidelines for the treatment of badgers prior to the construction of National Road Schemes* (TII, 2006) *and The Badger and Habitat Survey of Ireland* (Smal, 1995).

The mammal survey undertaken during February and March 2023 at Mostrim Bog site identified signs of throughout the fox along the high bog margins. No signs or evidence of badger was identified during these surveys. Deer slots were identified near the south-western margins of the Mostrim Bog site.

All silt ponds and watercourses at and in the vicinity of Mostrim Bog were surveyed for signs of otter usage. There were no signs of ongoing or recent usage of these silt pond features, drainage channels or watercourses during the February and March 2023 walkover surveys.

No evidence of other mammals such pine marten was identified during the site walkover surveys. These mammals are highly unlikely to utilise the expansive cutover bog areas. However, there is suitable habitat for these mammals outside of the proposed decommissioning and rehabilitation footprint on the marginal bog areas, woodland and scrub areas located along the site bounds and outside of the proposed decommissioning and rehabilitation footprint.

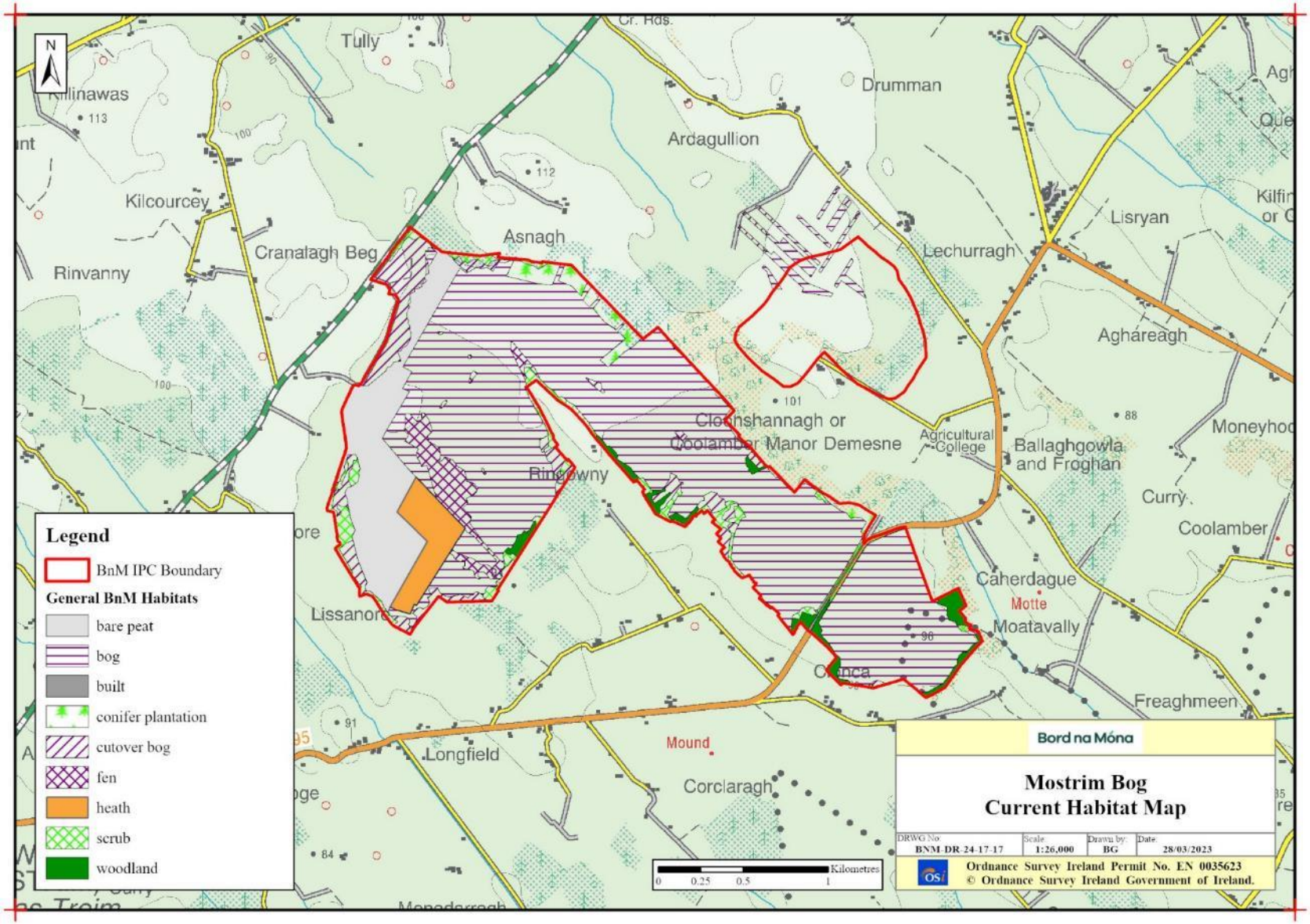


Figure 4: Current Habitats at Mostrim Bog

2.5.3 Species of Conservation Interest

A number of species of conservation concern utilize the habitats at Mostrim Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre. A full suite of species records held by the NBDC for the hectads which support Mostrim Bog are presented in **Appendix E**.

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

Bird species of conservation interest recorded at Mostrim Bog include Snipe (*Gallinago gallinago*), European Golden Plover (*Pluvialis apricaria*), Meadow Pipit (*Anthus pratensis*) and Woodcock (*Scolopax rusticola*). All of these species are currently Red listed on the most recent BOCCI list (Gilbert *et al*. 2021).

Breeding Curlew have been recorded on the site, using the intact raised bog remnant, for several years (2016 to 2018, absent in 2019, present in 2020). Targeted breeding bird surveys have been undertaken by the Bord na Móna Ecology Team and BirdWatch Ireland in line with best practice methodologies (Brown & Shepherd, 1993 & Bibby *et al*. 2000). Breeding wader surveys have been carried out by BNM during the breeding season 2023. To date (July 2023) curlew have not been recorded breeding at Mostrim Bog during the breeding season of 2023.

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

2.5.4 Invasive species

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

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

2.5.5 Certainty and Sufficiency of Data

The Biodiversity baseline information presented in this Appropriate Assessment reporting was collated from site investigations and field surveys, along with publicly available online resources including from the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS) online webpage, which are regularly updated.

All field survey work was carried out by qualified and experienced ecologists.

In addition, where required, or possible, specific data requests have been made to NPWS via the online data request facility[5], specifically with regards to records of sensitive species.

Further sources of data used to supplement the current appraisal, included current, up to date, Bord na Móna held habitat mapping datasets, as well as previously commissioned baseline reporting of Bord na Móna Bog Groups. Citations are provided at the end of this report for any reports which have been referenced.

For the avoidance of doubt although some of this supplementary baseline data was 3+ years old, due regard has been given to the passage of time & any changes to the baseline environment at Mostrim Bog in the interim period were considered by a suitably qualified ecologist; visits to inform the current appraisal were

[5] https://www.npws.ie/maps-and-data/sensitive-data-access

used as ground-truthing exercises to confirm the relevance or not of any previously defined baseline information.

In the most part, due the continuation of industrial Peat Extraction by Bord na Móna up to and including the year 2018 at Mostrim, it was considered that habitats at the bog remained relatively unchanged from the point at which many prior baseline surveys were undertaken, and therefore, it is considered that data presented in prior baseline reporting was of relevance, with exceptions noted. Nonetheless reliance is focussed primarily on the most recently available or collected data.

2.6 Decommissioning and Rehabilitation Stage

The proposed **decommissioning** at Mostrim Bog includes the following:

- Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices
- Cleaning Silt Ponds
- Decommissioning Peat Stockpiles
- Decommissioning Fuel Tanks and associated facilities
- Decommissioning or Removal of Septic Tanks

There are only sealed/locked and in use portacabins in place at Mostrim bogs. These portacabins don't support optimal bird nesting or bat roosting potential. Should bird nesting activity occur along the portacabin roof edges, the portacabin won't be removed until all proposed decommissioning and rehabilitation works are completed at Mostrim Bog, which will be outside the closed nesting season; i.e. after September 2023.

The proposed Mostrim Bog **rehabilitation** comprises a series of bespoke (to Mostrim Bog) interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS. Prescriptive measures are unique to the existing baseline habitats and comprise 3 no. broad categories,

1) those associated with (exposed) Deep Peat; drain blocking (different intensities), berms and field reprofiling and cut and fill cell bunding;

2) Conifer removal and forest to bog; and

3) those associated with remnant high bog namely drain blocking.

The aim of Rehabilitation is as much as possible to place existing peatlands on a **trajectory** towards a naturally functioning peatland system (Renou-Wilson, 2012).

2.6.1.1 Decommissioning and Rehabilitation Access

Access will be through the existing entrances from the N55 to the north and the R395 to the south. This will allow access to all areas of the bog where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction efforts.

2.6.1.2 Standard Methodology for Decommissioning

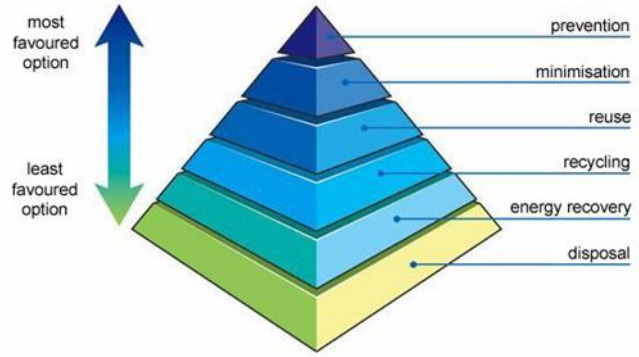
Decommissioning at Mostrim Bog will involve the deployment of a work crew to collect and oversee the removal of any remaining plant or potentially contaminating waste left *in situ* in line with Condition 7 of License Ref. P0-504-01. This condition specifically requires that BnM's procedures for the 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 the IPC license 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 EPA. Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the EPA, and only transported to the site of recovery/disposal in a manner which will not adversely affect the environment.

A full record, which shall be open to inspection by authorized persons of the EPA at all times, shall be kept by the licensee (BnM) on matters relating to the waste management operations and practices at Mostrim Bog. This record shall as a minimum contain details of the following:

- The names of the agent and transporter of the waste;

- The name of the persons responsible for the ultimate disposal/recovery of the Waste;
- The ultimate destination of the waste;
- Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site;
- 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;
- Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for Mostrim Bog. As required by the license, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, with waste records maintained as required. 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 license.

Decommissioning may also include measures to restrict access to the bog or silt ponds.

Regarding the lifting of rail lines this will be facilitated by a manual work crew either a) loading rail line components onto a trailer and removing a) direct to contractor, b) to a consolidation area via tractor, prior to disposal, or c) utilizing the rail line itself to remove the components in reverse order onto a locomotive trailer, with again, the parts being delivered up the rail line to be stored and/or disposed of, in line with IPC license conditions.

Decommission and Removal of Porto-cabin and materials store: Tea-centres were used to provide canteen and welfare facilities for bog operations and are either a concrete building, a portacabin or older prefabricated older bee hive units and typically contain tables and chairs, a fridge, lockers, cabinets, sinks and other fixtures and fittings. All basic fixtures and fittings will be retained with all other general waste or unused items removed and disposed to skips for removal off-site.

Bog area clean up: These bog areas include the parking spaces for production plant and equipment, locations for storing rail line, drainage pipes and stockpile covering. All remaining or unconsolidated old and unused polythene will be collected for recycling or disposal, depending on condition. Any remaining older and immobile plant will be brought in from bog and removed off site. Any remaining hazardous waste oils, fluids and batteries will be removed off site by qualified appropriate hazardous waste contractors. All remaining

unused drainage pipes will be gathered up for reuse, recycling or disposal. All remaining, unconsolidated unused rail line sections will be collected from the bog and stored at the main access location for dismantling.

2.6.1.3 Standard Methodology for Rehabilitation Activities

The proposed Mostrim Bog **Rehabilitation** will be undertaken using standard Best Practices in peatland restoration. These are based on published information in the Irish context, methodologies developed through rehabilitation trials, best practices employed elsewhere in Europe on peatland rehabilitation and restoration but also the 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), including examples such as the BnM Raised Bog Restoration Project[6] -see also **Section 2.8.2** Sources of Information. The development of rehabilitation activities also considered recently published guidance issued by the EPA in 2020 – *Guidance on the process of preparing and implementing a bog rehabilitation plan*.

In terms of rehabilitation the ecological and site information collected during Bord na Móna ecological baseline surveys, additional site visits, stakeholder input, and monitoring and desktop analysis forms the basis for the planning of peatland rehabilitation at Mostrim 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;
- Significant international engagement during this period with other countries in relation to best-practise regarding peatland rehabilitation and after-use through the International Peatland 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
- Hydrological modelling.

Bog Rehabilitation Techniques or Methods

The key intervention to be applied to deep peat is intensive drain blocking, modifying outfalls, management of water levels to encourage raised bog restoration. Re-wetting the deep peat in the sod moss/ cutover areas of the bog using intensive drain blocking, berms and peat dams, will raised the water level to optimal levels to encourage the development of Sphagnum-rich peat-forming vegetation.

Several different approaches can be taken to this type of restoration/rehabilitation, and the rehabilitation packages with different rehabilitation/restoration intensities to managing suitable hydrological conditions are proposed (see **Table 6**) with detailed drawings presented in **Appendix D**.

Note the table below excludes constrained areas and rehabilitation categories with no intervention.

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

Table 6: Rehabilitation Categories

Cutover Bog	
DPT2	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows
DPT4c	Contour bunding, modifying outfalls and managing overflows & drainage channels for excess water"
DPT6	Trench drain Block (max 3/100)
TCT1	Removal of self-seeded feral conifers from high bog. Fell to waste. This area overlaps with areas that have already had previous drain-blocks and this area may overlap with the drain-blocking footprint (DPT2) (84.66).
FTB1	Forest to Bog. Agreement with the Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking.
MLT1	Marginal Land
AW1 & AW2	Additional Drain Blocking
Silt Ponds	Silt Ponds

These are the prescribed rehabilitation measures at Mostrim:

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

- Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

A full set of Detailed Drawings for the Proposed Rehabilitation Methodologies are included in **Appendix D**. **Figure 5** to **Figure 7** below illustrates rehabilitation methodologies while **Figure 8** illustrates the extent of rehabilitation measures at Mostrim Bog.

1.Trench Drain Blocking (3/100m)

Re-use damaged or unsalable sod moss stock to block drains and trenches on the sod moss area – if possible. This measure was initially proposed by Bord na Móna in February 2020. Bord na Móna originally proposed (in February 2020) trialling different innovative methods to establish optimum water levels for the establishment of Sphagnum-rich peat-forming vegetation in the former trenches of the sod moss area. In some trenches water levels would be brought the surface of the bog. In other trenches water levels will be raised to re-wet the peat surface (< 10 cm of surface water). Some trenches would be infilled and levelled where suitable material is available. Cell bunding could be carried out in these areas. The extent of each approach will to be determined following a baseline survey after peat stock is removed from the overall area, and consideration is given to logistical issues such as ground conditions and stability, and hydrological modelling. These innovative measures for the former sod moss area been adapted and implemented at Glenlough Bog in a similar area formerly used for sod moss extraction where BnM have adapted a methodology to block former trench drains created by sod moss extraction (DPT6).

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at on average 3 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.,* 2017[7]) and in line with methodologies originally developed by McDonagh (1997).

In all instances peat blockages will be installed using a specially adapted tracked machine. The process involves clearing the drain and creating a 'key' in the drain sides in order to ensure a tight seal is maintained. The drain is subsequently blocked with peat taken from a nearby 'borrow pit' and involves placing layer after layer of peat until it is built up to above the ground surface, after which it is covered with a 'scraw' of vegetation (where available). Each peat blockage takes approximately 5mins to complete. An example of a completed drain block is presented in **Figure 5** below.

[7] https://www.npws.ie/sites/default/files/publications/pdf/IWM99_RB_Restoration_Best%20Practice%20Guidance.pdf

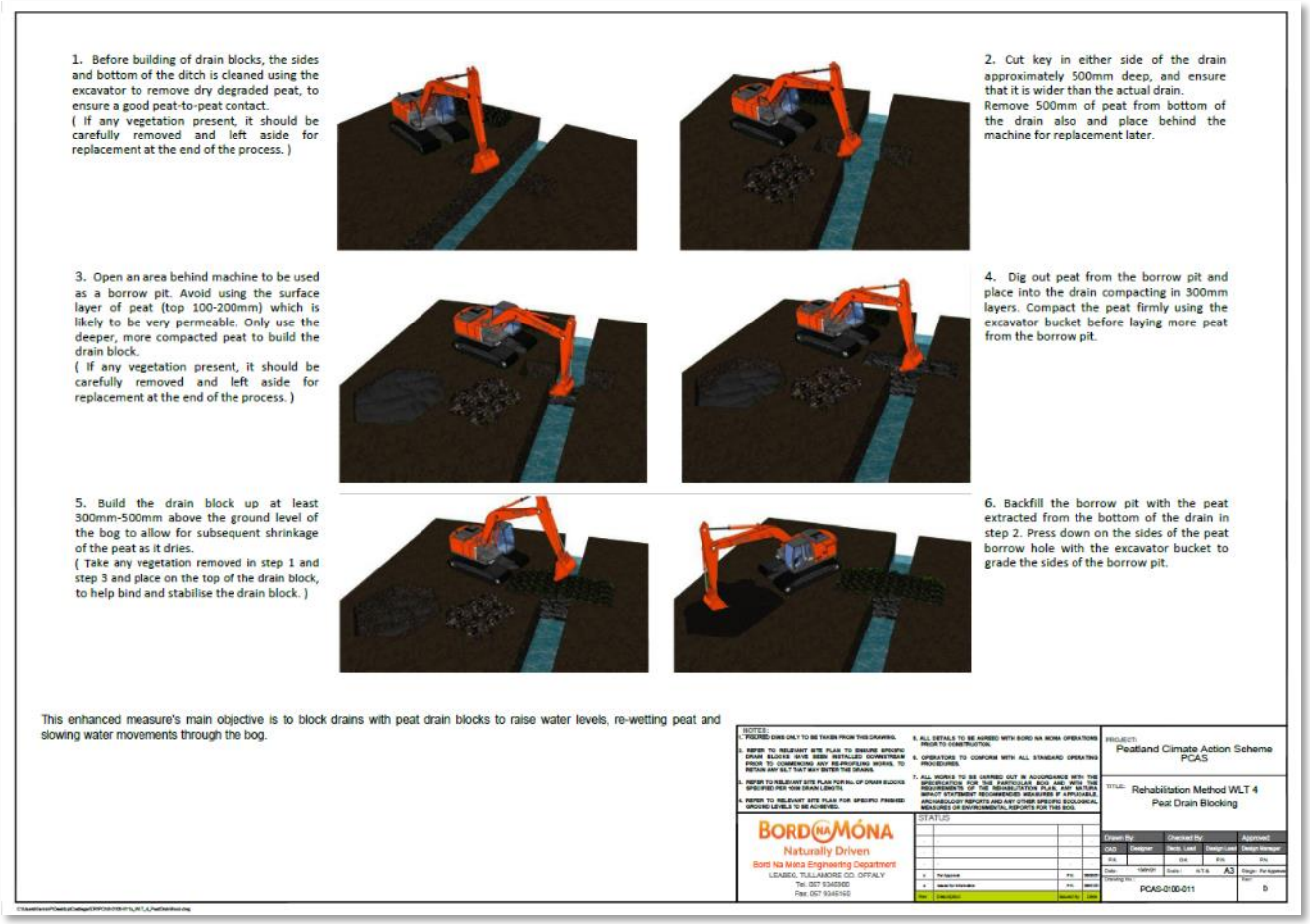


Figure 5: Completed Peat blockage (reproduced from Mackin *et al.*, 2017)

2. Intensive Drain Blocking (max 7/100m)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to block drains with peat barriers to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at a maximum of 7 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.,* 2017) and in line with methodologies originally developed by McDonagh (1997).

The increased number of peat blockages (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites. Methods are as per 1 but blockages are at a higher frequency along the length of the drainage feature.

3.Blocking Outfalls

The key objective from targeted blocking of outfalls within a bog is to re-wet peat but to manage water-levels at an appropriate level for the development of wetland and peatland vegetation. This measure optimises re-wetting of cutaway. This measure also has additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

Targeted blocking of outfalls is suitable for bogs or portions of bogs that have already had a period of natural colonisation, minimising disturbance to pioneer habitats that are already developing. It is also appropriate for locations where there are establishing habitats and where former drainage infrastructure is already starting to break down. Hydrological modelling and an understanding of site drainage is required to identify appropriate locations for targeted drain-blocking to maximise re-wetting. Drains are blocked at these locations using an excavator by lifting pipes and filling holes with peat or local sub-soils.

Again, the key objective is to manage water-levels at 0-10 cm above the peat surface for as much of the year as possible. Some deeper water is inevitable due to heterogenous topography of the cutaway. This measure can be particularly effective as outfall pipes generally run perpendicular to field drains to catch and transport water off the bog. The outfalls have been piped through high fields. Blocking pipes at the high fields means that the high fields can be converted to natural berms or embankments, creating a compartmented wetland.

4. Managing water levels with overflow pipes

This prescription is associated strongly with the blocking of outfalls. Following the blocking of outfalls, some high fields may require overflow pipes to be installed to manage water levels, with taps, at the required height above peat surface and/or in instances where a series of high fields have been flooded using the cascade effect, the lowermost field may require the outfall to be piped and managed to facilitate access for example. Overflow pipes will typically be new, 100mm plastic pipes.

Overflow pipes are installed using an excavator.

Figure 6: Examples of installed overflow pipes

6. Berms and field reprofiling (cell bunding)[8]

Certain areas of Mostrim Bog include DPT4c rehabilitation measures. These areas has been subjected to turf production however deep peat still occurs in most areas. The area was generally used as a spread ground for turf drying. The area has been cut back ''unevenly'' throughout the years, so the area has an undulating topography with quite severe slopes in some locations. For this reason and because of dense vegetation present, traditional DPT4 style bunding is not suitable. Water will be retained on the undulating topography of this area by constructing strategically positioned berms along elevation contours. This type of methodology will mean water levels can be retained on sections of the bog where continual surface run-off would normally cause an issue. Water levels will be tiered from highest topographical areas and stepped

[8] 45mx60m is the typical design but some cells may be smaller to accommodate 'corners'

down towards outfalls using overflow wiers/pipes. This method has been used with success on cut-over sections of raised bog projects between Bord na Móna and the National Parks and Wildlife Service previously. The bunding layout for this area of Mostrim Bog has been designed with technical input coming from RPS.

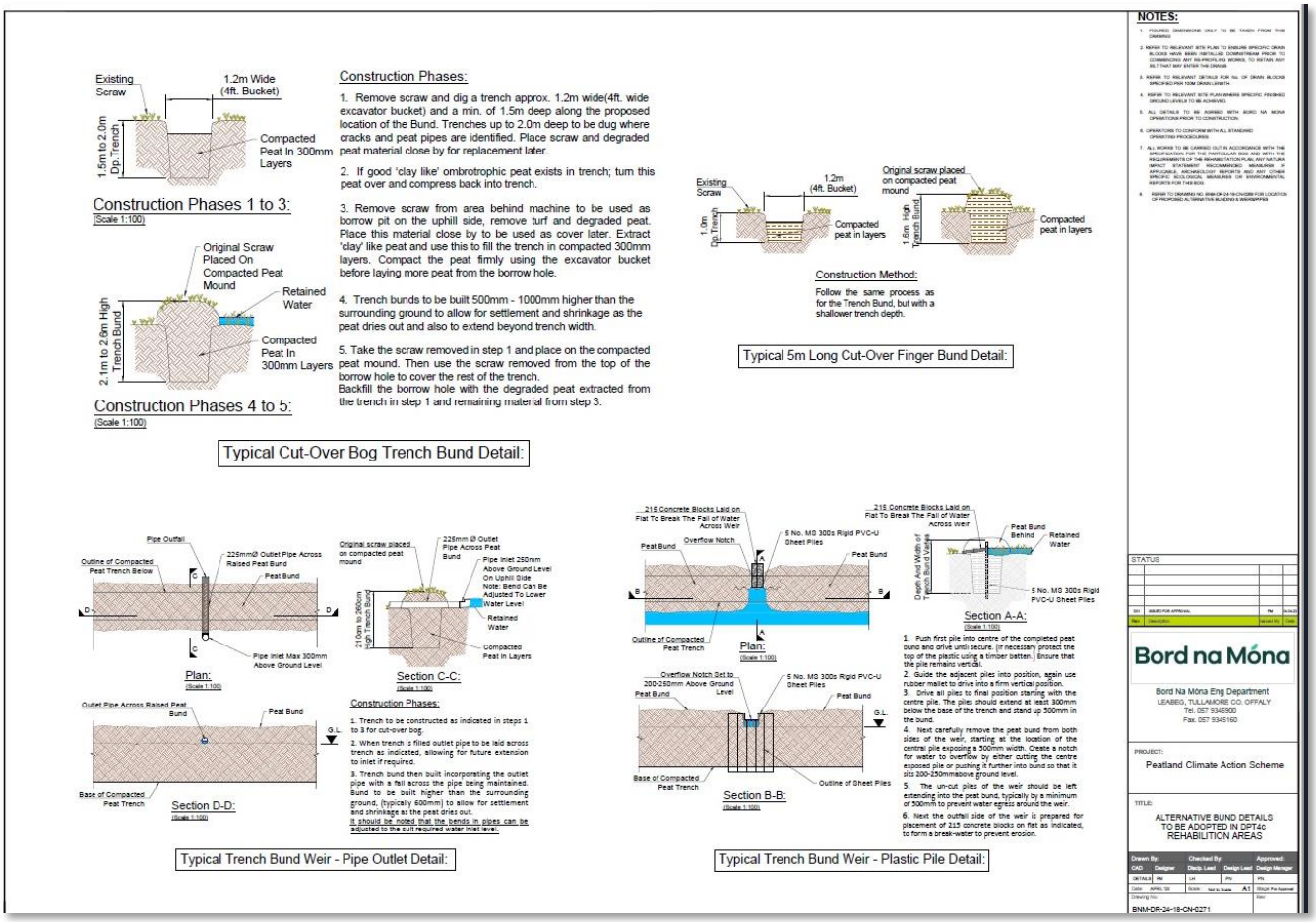


Figure 7: Indicative methodology for DPT4c

7. Drainage channels for excess water

New drainage channels (swales) are appropriate to help manage larger volumes of water at large sites during high rainfall events. The main objective is not to drain any residual peat but to manage excess water and prevent significant flooding. Swales (shallow wide drainage channels) are a common measure used in the design and construction of constructed wetlands. They may only get occasional use during the year during periods of high rainfall.

At some Bord na Móna sites, once drains and pipes are blocked water can rise to inappropriate levels due to the localised topography (basins). Permanent deeper water can inhibit the development of wetland or peatland vegetation and large open bodies of water are not encouraged, where possible.

In some instances, 'taps' can be cut between peat fields to allow water flow/reduce volumes of water from one part of the bog to another.

This measure will allow greater management of water levels across the cutaway, the benefits of which are listed above and will help protect newly created infrastructure (cell bunds). Hydrological modelling will be key to design these new drainage channels.

8. *Sphagnum* Inoculation

The main objective of this enhanced rehabilitation intervention is to accelerate the rate of natural colonisation of Sphagnum moss at suitable sites by introducing donor material. The presence of *Sphagnum*-rich vegetation on peatlands brings significant benefits as this is considered a potential carbon sink.

There is potential to use *Sphagnum* inoculation to establish and diversify selected small areas on target sites with *Sphagnum* species, which in turn, and in combination with natural colonisation, can then naturally colonise the remaining deep peat cutover bog area. *Sphagnum* inoculation should only be used in appropriate environmental conditions (water-logged, deep peat with stable water levels and with more acidic water chemistry).

It is proposed to use locally sourced *Sphagnum* and procured donor material, sourced from older established Bord na Móna cutover bog sites where possible, to inoculate Bord na Móna deep peat cutover bogs. Small amounts (handfuls) will be distributed into the newly created cells on deep peat cutover bog. This material can be planted into the soft peat or scattered into shallow water. The use of significant volumes of *Sphagnum* donor material is constrained by the small amount of suitable donor material and donor sites. It is also proposed to use *Sphagnum* donor material developed in greenhouses (e.g. Beadaplugs), where suitable donor material can be made available, and where this is required.

There are significant benefits for climate action from establishing *Sphagnum*-rich peatland vegetation communities. These have been found to quickly develop as carbon sinks (> 10 year). This enhanced measure will be used in combination with some of the other enhanced re-wetting measures (cut and fill cell bunding) to accelerate and optimise the development of *Sphagnum*-rich vegetation on suitable deep peat cutaway sites.

9. Retention of Hydraulic Breaks

To sustain hydrological continuity through the margins of the proposed rehabilitation and decommissioning site and to avoid flooding of adjacent lands, it is proposed to retain certain key hydraulic breaks (drains) along the margins of the bog site and to regrade some drains along the boundaries of the site. These measures will be completed to retain peripheral surface water drainage around the margins of the bog rehabilitation sites allowing hydrological flow from lands upstream of the site to areas downstream of the rehabilitation site. These measures may require localised instream excavation, widening and regrading of existing drains with tracked excavators. The retention of boundary drains (peripheral drains) around the margins of the bog site do not require further intervention or excavation, their capacity and condition has been assessed from a desk top study and also through a ground truthing exercise which has verified the drains required to be retained are suitable to continue to conduct flow and act as a hydraulic break to adjoining lands. This hydraulic break essentially cut the hydraulic gradient from the bog to the adjoining lands limiting the rise in ground water. The boundary drains will have a minor impact in terms of drying out peat along the edges of the bog, however it is observed from experience of BnM engineering and drainage specialists that the zone of influence of the drain is limited with positive impacts occurring in very close proximity to the drains. To modify these boundary drains would create the potential for unacceptable negative impact to adjoining lands.

10. Forest to Bog (FTB)

It is proposed to trial forest to bog restoration at Mostrim Bog. Trees will be felled and removed, conifer stumps will be “flipped”, the bog surface will be reprofiled (smoothed) and the drains will be blocked to

encourage the redevelopment of bog vegetation. Bord na Móna will engage with practitioners of forest to bog restoration in Britain to be able to apply these new techniques at Mostrim Bog.

11. Conifer Removal (TCT1)

Removal of self-seeded feral conifers from high bog. Fell to waste. This area overlaps with areas that have already had previous drain blocks.

See **Appendix D** for the full suite of Methodology Drawings.

A breakdown of the extent of deep peat rehabilitation packages is provided in **Table 7**, below.

Deep Peat Cutover Bog		Extent (Ha)
DPT 2	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows	84.66
DPT 4c	Contour bunding, modifying outfalls and managing overflows & drainage channels for excess water	18.56
DPT6	Trench drain Block (max 3/100)	72.22

Table 7 Extent of Deep Peat Rehabilitation proposed at Mostrim.

A breakdown of the extent of forest control, marginal works and silt ponds is provided in **Table 8**, below.

Dry Cutaway and Wetland		Extent (Ha)
TCT1	Removal of self-seeded feral conifers from high bog. Fell to waste. This area overlaps with areas that have already had previous drain-blocks and this area may overlap with the drain-blocking footprint (DPT2) (84.66).	124.47
FTB1	Forest to Bog. Agreement with the Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking.	13.75
MLT1	No work required	41.19
AW1 & AW2	Additional drain blocking	71.25
Silt pond	Silt ponds	2.84

Table 8 Extent of Forest control and Marginal procedures proposed at Mostrim.

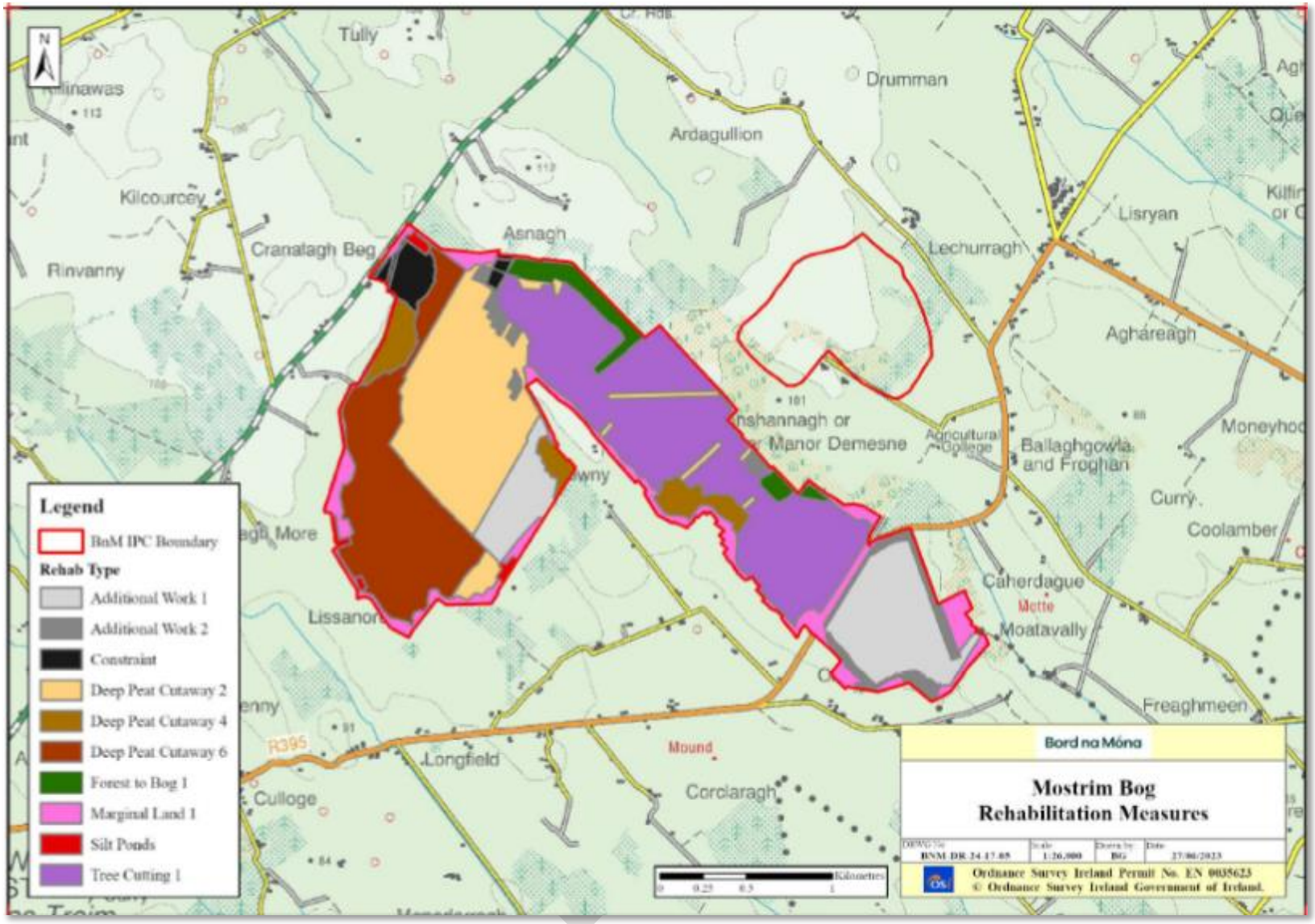


Figure 8: Mostrim Rehabilitation Measures

2.6.1.4 Decommissioning and Rehabilitation Timescale and Resource Requirements

Duration

Decommissioning activities will be completed within a period of 12 months and are scheduled to be completed before the end of 2025.

Rehabilitation activities will be completed within a period of approximately 12 months. In general activities proposed for FY24 i.e. 2023 will be carried out between the months of August and October inclusive.

The duration of activities provided are approximate and may be slightly shorter or longer, depending on weather conditions and progress on rehabilitation prescriptions. Activities may cease for the winter months due to rainfall and poor ground conditions, in line with typical BNM work practice and H&S requirements. In any case, the proposed decommissioning and rehabilitation will take approximately 12 months.

2.6.1.4.1 Hours of Work

Normal Decommissioning and Rehabilitation times will be daylight hours between 08.00 and 17.30hrs Monday to Friday.

2.6.1.5 Use of Natural Resources

Land Requirement: There is no land requirement in respect of **decommissioning**. In total **rehabilitation** activities will take place on 439.39 hectares of land. As rehabilitation through stabilisation and land cover change is the primary objective, no 'negative quality' land take is associated with rehabilitation. No land take is required for e.g. the storage of vehicles – vehicles are typically left in situ at points of work or on 'headlands'.

Water: No additional water is required for either decommissioning or rehabilitation.

Soils/Peat:

Regarding **decommissioning** some peat or topsoil material which is contaminated may be removed in line with Schedule 2 of the IPC license. This is considered negligible in magnitude.

During **rehabilitation**, minor quantities of existing peat will be excavated from drainage trenches and/or an immediately adjacent borrow pit at peat dam locations and immediately used to form peat blockages. Borrow pits are re-instated, as the final step in dam creation, by the excavator driver profiling the surrounding peat/scraw into place over the excavated borrow pit. In each instance the magnitude of extracted peat is negligible. Similarly, the installation of overflow pipes may require excavation of minor quantities of peat, and/or subsoil dependant on location (insertion of peat blockages/overflow pipes may interact with underlying subsoils where peat depths are shallow). All material used will be from the immediate vicinity and no transport of material will be required.

Existing bare peat surfaces will be re-profiled in line with pre-defined 'levels' where required to 'rewet' areas of currently dry peat. This may be through use of a dozer or a screw leveller. Dozers will be used to create 'speed bumps' or dams across existing drainage channels adjacent to re-profiled areas, by 'dozing' peat displaced in re-profiling into place at pre-defined dam locations.

Peat will also be utilised to infill any blocked outfalls or raised drainage pipes.

Hydrocarbons will be used on-site during decommissioning and rehabilitation activities and will be limited to the diesel or petrol fuel and mechanical oils used by any onsite site machinery and equipment.

2.6.1.6 Emissions & Wastes during Rehabilitation

Dust, Noise, Vibration: Dust, noise and localised vibration along access routes arising from the arrival and departure of **decommissioning** vehicles or **rehabilitation** machinery will be localised to the access tracks or rail line, occur in low volumes and last for a negligible duration – it is common practice on BnM working bogs to leave vehicles *in situ* once on site, therefore daily trips into and out of the bog are not expected. Dust and noise limits are currently set on IPC licenses.

Regarding rehabilitation, the extent of dust, noise and localised vibration from individual machines creating peat dams to block drains or blocking outfalls is momentary in duration and therefore considered negligible in magnitude. Reprofiling the surfaces of exposed peat using a 'dozer' or 'screw leveller' and creating 'speed bump' blockages or infilling drains produces a higher potential for the release of dust during drier periods, however the duration of this is expected to be brief (i.e. with effects lasting less than a day). Enhanced measures where bunded cells are created may take longer duration.

Durations overall are expected over a 12 month period at Mostrim Bog or until rehabilitation is complete.

Fuel and drainage pipes will be delivered. No blasting or piling is required.

Wastes: General waste will arise from the presence of staff. Very small quantities of chemical waste will be generated, this waste is limited to solid waste oil, such as oily rags.

Welfare Facilities: Where required, Portaloos and welfare facilities will be added to the Mostrim site.

2.6.2 Operational Stage

Duration: Once constructed and commissioned, the proposed Decommissioning and Rehabilitation will remain permanently in place.

Operational Activities: Operational activities will mainly comprise non-intrusive environmental & ecological monitoring (including surface water monitoring, vegetation monitoring but also the use of drones to provide catalogues of aerial photography), and may also include minimal works such as repairs to existing peat blockages, adjustment of overflow pipes (where required) and or fertilisation to increase successional rates. Maintenance of existing silt ponds to reduce emissions to local water bodies, as conditioned by the existing IPC license, will still be required. Activities to retain the function of drainage channels operating as hydraulic breaks along the site boundary, to include drainage channel cleaning (removal of instream aquatic vegetation), removal of trees, debris etc.

Operational Access: Operational access will be through the N55 and R395 which provides access to the existing access track infrastructure already in place to facilitate the previous peat extraction.

Timing of Operational Activities: It is expected that scheduled inspection and maintenance activities will be carried out by a 2-4 person team, typically for 1 day per month, for the foreseeable future. Limited access may occur to inspect and manage water levels within the rewetted peatland areas.

Use of Natural Resources: During the Operational Stage, there is limited requirement for the use of natural resources – negligible quantities of peat or subsoil may be used to repair existing or create additional drain blocks.

Emissions & Wastes: During the Operation Stage of Rehabilitation there will be negligible exhaust fumes, dust and noise emitted by maintenance vehicles and or other equipment such as drones during occasional maintenance works, such as to outflows.

Fugitive emissions to air

Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust. During the operational stage of peatland rehabilitation, typical emission of dust from exposed peat to air is expected to cease.

Carbon Emissions

Following rehabilitation and into the early operational stage Mostrim Bog may continue to be a carbon source, however as habitats stabilise following intervention, the bog is expected to, over time, become a carbon sink in part.

2.7 European Sites under consideration

2.7.1 Distance of the Project to European Sites

For the proposed Mostrim Bog decommissioning and rehabilitation, a limited zone of potential impact is predicted, due to the construction phase duration and localised nature of the activities proposed.

The assessment of connectivity between the European Sites and the proposed decommissioning and rehabilitation follows the potential Source>>Pathway>>Receptor model, which identifies the source of likely significant impacts, if any, the pathway (land, air, hydrological, hydrogeological pathways, etc) along which those impacts may be transferred from the source to the receiving environmental receptors (i.e. European Sites and/ or features for which the sites are designated).

The proximity of the proposed Decommissioning and Rehabilitation Plan to European sites, and more importantly QIs/SCIs of European sites, is of importance when identifying potentially likely significant effects.

This stage of the screening for AA process describes European Sites within the Zone of Influence (ZoI) of the proposed project.

Section 3.2.3 of the Guidance for Planning Authorities (DoEHLG, 2010) states that the approach to Appropriate Assessment screening can be different for different plans and projects depending on the scale of the plan, project or programme and the likely associated effects. The overriding criteria determining whether a European Site will be impacted and potentially consequently effected by a proposal is the distance between proposal and a European Site and whether there are pathways for effect linking the proposal to European Sites.

Both UK (Scott Wilson et al., 2006) and Irish guidance (DoEHLG, 2010) outline that a distance of 15km may suffice as a likely Zone of Impact (ZoI) in the case of plans on European Sites and may be sufficient to cover the geographic extent over which significant ecological effects are likely to occur. However for certain projects, the DoEHLG (2010) guidance recognises that the likely ZoI could be 'much less than 15km, and in some cases less that 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects'.

Recent guidance from Office of the Planning Regulator (2021) indicates that the zone of influence for a proposal is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European Site. This guidance indicates that the zone of influence should be established on a case-by-case basis using the Source-Pathway-Receptor framework. Using the Source » Pathway » Receptor approach and having regard for the location, the nature of the works, and the small size and scale of the works, it is considered for the purpose of this assessment that the likely ZoI on European Sites is the zone immediately around the proposed rehabilitation works, in addition to any sites with a hydrological connection downstream of the works and/or with an ecological connection, where distance would be dependent on the qualifying interests of the site. To that end the following sites are located within the Source» Pathway » Receptor zone of influence of the proposed decommissioning and rehabilitation:

- Ardagullion Bog SAC (002341);
- Lough Forbes Complex SAC (001818);
- Ballykenny-Fisherstown Bog SPA (004101);
- Garriskil Bog SAC (000679);
- Garriskil Bog SPA (004102); and
- Lough Derravarragh SPA (004043).

Furthermore, there are twelve European sites located within 15km of the proposed decommissioning and rehabilitation works as follows:

- Ardagullion Bog SAC (002341);
- Garriskil Bog SAC (000679);
- Garriskil Bog SPA (004102);
- Lough Derravarragh SPA (004043);
- Derragh Bog SAC (002201);
- Lough Kinale and Derragh Lough SPA (004061);
- Lough Sheelin SPA (004065);
- Moneybeg and Clareisland Bogs SAC (002340);
- Lough Iron SPA (004046);
- Glen Lough SPA (004045);
- Lough Owel SPA (004047); and
- Lough Owel SAC (000688).

Other European Sites outside of the 15km buffer zone, supporting remote hydrological connectivity with the proposed decommissioning and rehabilitation , have also been considered as part of this Assessment and includes European Sites downstream along the Upper Shannon Catchment as follows:

- Lough Ree SAC (000440) – located 52km downstream;
- River Shannon Callows SAC (000216) – Located 86km downstream; and
- Lough Ree SPA (004064) – located 52km downstream.

However, given the nature and scale of the proposed decommissioning and rehabilitation, likely significant effects to these European Sites are not possible due to the distance downstream to these European Sites (>52km) and the assimilative and dilutional capacity of the River Shannon catchment.

In addition, all other Special Protection Areas outside of the 15km buffer zone and identified potential hydrological zone of influence are located >25km from the proposed decommissioning and rehabilitation . These means that the proposed decommissioning and rehabilitation are not within the core foraging range for Special Conservation Interest species for these European Sites and therefore, there will be no likely significant effects to SPAs outside of the 15km buffer zone.

There are **13 European Sites** - 5 Special Area's of Conservation (SAC) and 8 Special Protection Area (SPA) - **within 15km of Mostrim Bog.** The locations of these European Sites are illustrated in **Figure 9: European Sites within 15km of Mostrim** and **Figure 10: Potentially hydrologically connected European Sites.**

The distances from the Mostrim bog rehabilitation site and comment on hydrological connectivity provided in **Table 9**.

Table 9: Proximity of the proposed Mostrim Bog to European Sites within the project zone of influence and 15km

European Site (SAC or SPA)	Site Code	Distance from the Mostrim Bog	Connectivity (Y/N:
Ardagullion Bog SAC	002341	The northern boundary of Mostrim is located to within 100m of this European Site. The area in red in Figure 2 shown overlapping Ardagullion Bog SAC is not included in the current rehabilitation and enhancement proposals.	Y: No hydrological connectivity between the proposed bog rehabilitation site and this European Site. However, due to the relative proximity there may be direct and indirect connectivity as a result of the proposed decommissioning and rehabilitation.
Lough Forbes Complex SAC	001818	19.4km west / north-west and 34km downstream of Mostrim at its closest point.	Y: Remote downstream via the Camlin watercourses (Camlin_010 – Camlin_070).
Ballykenny-Fisherstown Bog SPA	004101	19.4km west / north-west at its closest point and 34km downstream of Mostrim.	Y: Remote downstream via the Camlin watercourses (Camlin_010 – Camlin_070). The rehabilitation site is located outside of the core foraging range[9] of the SCI species for which this SPA is designated; i.e. Greenland White-fronted Goose.
Garriskil Bog SAC	000679	5.3km south/south-east at its closest point and 10.9km downstream.	Y: Remote downstream via the (Riffery_010 and Inny_070 watercourses.
Garriskil Bog SPA	004102	5.3km south/south-east at its closest point and 10.9km downstream.	Y: Remote downstream via the Riffery_010 and Inny_070 watercourses. The rehabilitation site is located outside of the core foraging range of the SCI species for which this SPA is designated; i.e. Greenland White-fronted Goose.
Lough Derravarragh SPA	004043	8.1km south-east of Mostrim Bog at its closest point and 12km downstream via the Coolnagun Stream_010 and Inny_060 watercourses	Y: Remote downstream via the Coolnagun Stream_010 and Inny_060 watercourses. The rehabilitation site is located outside of the core foraging range of the SCI species for which this SPA is designated.
Derragh Bog SAC	002201	9.0km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Kinale and Derragh Lough SPA	004061	8.8km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.

[9] Foraging ranges defined under Scottish Natural Heritage Assessing Connectivity with Special Protection Areas (SPA) Guidance version 3 (SNH, 2016)

European Site (SAC or SPA)	Site Code	Distance from the Mostrim Bog	Connectivity (Y/N:
Lough Sheelin SPA	004065	12.4km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Moneybeg and Clareisland Bogs SAC	002340	12.2km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Iron SPA	004046	8.9km south / south-east of Mostrim Bog Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Glen Lough SPA	004045	7.0km south of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.
Lough Owel SPA	004047	12.3km south-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.

*All distances cited are the closest straight line distance as measured using GIS.

The Qualifying Interests/Special Conservation Interests and locational context for each of the thirteen European Sites examined in this Screening Report are provided in **Table 10.**

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites and references including date of access, are included in **Section 3**. Conservation Objectives were reviewed to inform the current appraisal – in particular to identify any possible sensitivities and resultant pathways for likely significant effects.

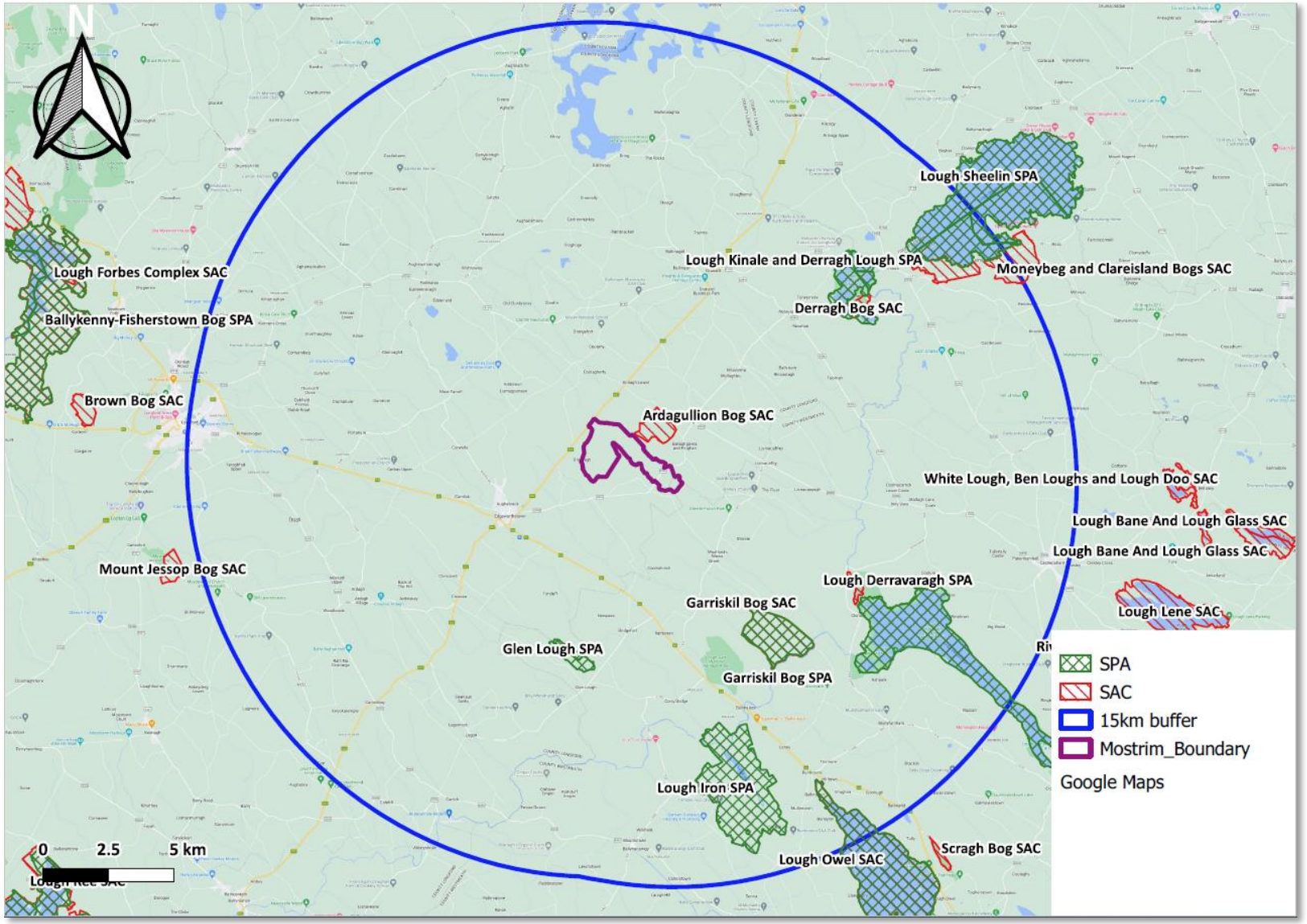


Figure 9: European Sites within 15km of Mostrim Bog

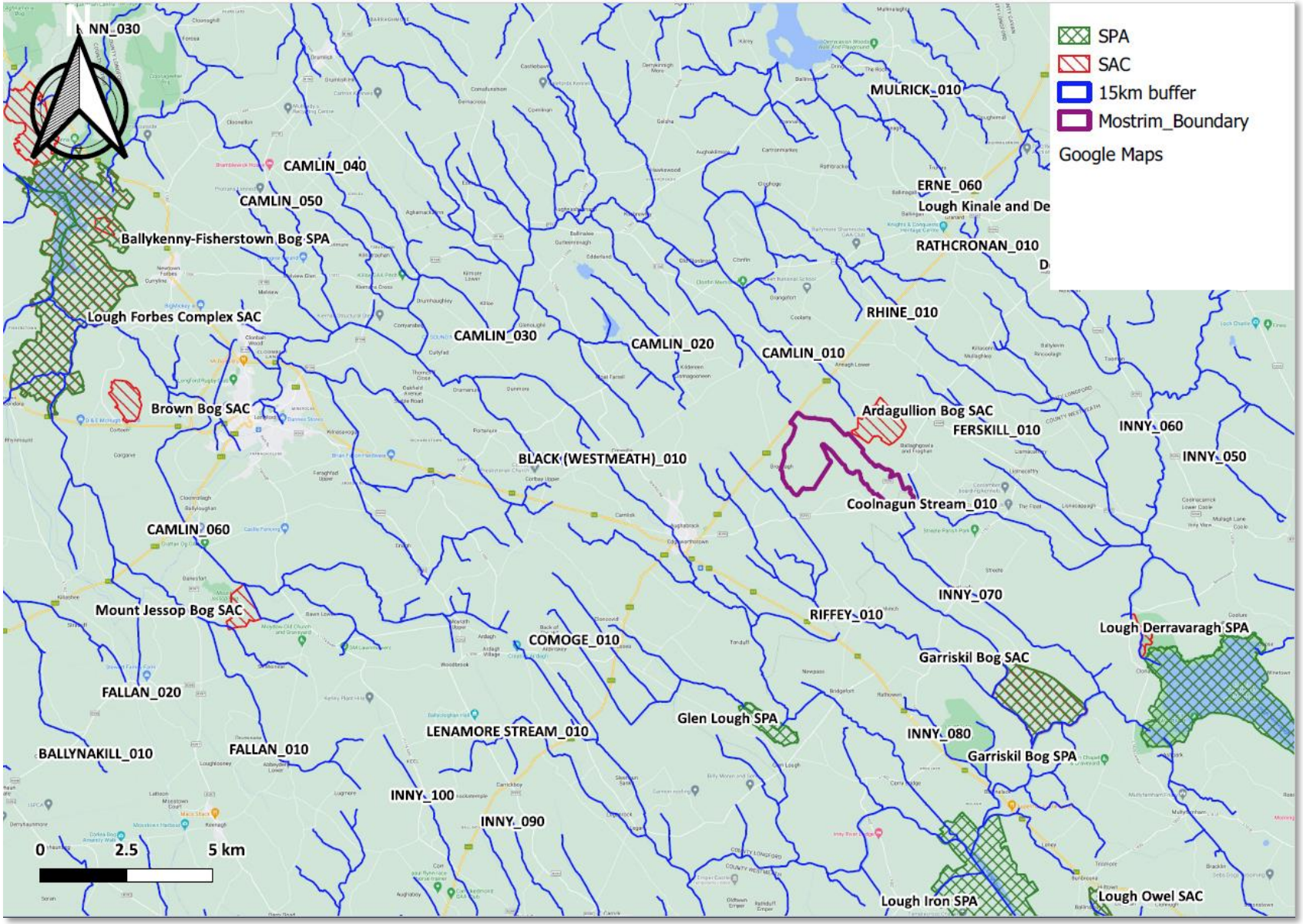


Figure 10: Potentially hydrologically connected European Sites

Table 10: Description of European Sites within 15km and zone of influence of Mostrim Bog

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
1	Ardagullion Bog SAC 002341	7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion	Ardagullion Bog is located 5 km north-east of Edgeworthstown, mainly in the townlands of Cloonshannagh (Coolamber Manor Demesne) and Ardaguillon in Co. Longford. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded in the north-east by the local road running to Coolagherty. Ardagullion Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. The site supports a good diversity of raised bog microhabitats, including hummocks and pools (NPWS, 2014)	NPWS (2015) Conservation Objectives: Ardagullion Bog SAC 002341. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 16.05.2023
2	Lough Forbes Complex SAC 001818	3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*	This site consists of a number of different habitats, and is centred around Lough Forbes, a lake formed by a broadening of the River Shannon. As well as the lake itself, there is also a series of raised bogs, callow grasslands and a variety of other aquatic and terrestrial habitats to the west of Newtown Forbes on the Longford/Roscommon boundary. The importance of the Lough Forbes site lies in its excellent diversity of habitats, some of which, for example the raised bogs, are rare and threatened. The site is also of ornithological importance for its wintering waterfowl, breeding Merlin and Red Grouse. The presence of Whooper Swan and Merlin is of particular note as these species are listed on Annex I of the E.U. Birds Directive	NPWS (2016) Conservation Objectives: Lough Forbes Complex SAC 001818. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 16.05.2023

[10] Site Synopses for Ardagullion Bog SAC, Lough Forbes Complex SPA and Ballykenny-Fisherstown Bog SPA, Garriskil Bog SAC & SPA and Lough Derravarragh SPA are presented in **Appendix C**.

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
3	Ballykenny-Fisherstown Bog SPA 004101	A395 Greenland White-fronted Goose *Anser albifrons flavirostris*	Ballykenny-Fisherstown Bog SPA is located on the border between Counties Longford and Roscommon in the north-central midlands and is underlain by Carboniferous limestone. It is centred around Lough Forbes, a naturally eutrophic lake on the River Shannon system which is fed also from the north by the River Rinn. The lake has well-developed swamp vegetation and displays natural transitions to seasonally flooded grassland, marsh and raised bog. The raised bogs, known as the Ballykenny-Fishertown complex, are separated by the Camlin River, which has further areas of callow grassland. The central core areas of the bogs are quite wet with a good complement of bog mosses (*Sphagnum* spp.) and well-developed hummocks. Ballykenny Bog is unusual in that some of its margins are intact, a rare feature in the Irish midlands. Between the Camlin River and this bog, a complete transition from raised bog to callow grasslands can be seen, while the interface between the bog and lake is colonised by a narrow band of deciduous woodland (NPWS, 2012).	NPWS (2022) Conservation objectives for Ballykenny-Fisherstown Bog SPA [004101]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.Accessed online 16.05.2023
4	Garriskil Bog SAC 000679	7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion	Garriskil Bog SAC consists of two areas of raised bog: Garriskil Bog, which covers 324.81 ha and lies 3 km east of Rathowen in Co. Westmeath; and a small outlier, within the townland of Derrya, which covers 22.9 ha and lies 2.2 km to the east on the northern shore of Lough Derravaragh. Both bogs are remnants of the large river floodplain bogs which developed where the River Inny enters and leaves Lough Derravarragh. Garriskil Bog is bounded to the south-east and south-west by the rivers Inny and Riffey and by the Dublin-Sligo	NPWS (2015) Conservation Objectives: Garriskil Bog SAC 000679. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 16.05.2025

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
			railway line to the north. It is considered an exceptional example of a midland raised bog and includes 170.26 ha of uncut raised bog and 154.55 ha of surrounding areas which includes 109 ha of cutover bog. The section at Derrya (which comprises part of Lough Derravaragh Bog NHA (site code 000684)) has been restored as part of an EU LIFE project. The site consists of 2.5 ha of high bog and 20.4 ha of cutover, all of which, except for a broadleaf woodland fringe along the River Inny, was afforested in the 1970s. All the conifer plantations were recently clear-felled and restored by drain-blocking. It is bordered by open high bog to the north-east, by the River Inny to the west and by cutover bog grading into Lough Derravaragh to the south-east. The bedrock geology of both sites is carboniferous limestone (NPWS, 2017).	
5	Garriskil Bog SPA 004102	A395 Greenland White-fronted Goose Anser albifrons flavirostris	Garriskil Bog SPA, a raised bog, is located 3 km west of Lough Derravaragh and 3 km east of Rathowen in Co. Westmeath. It is bounded to the south-east and southwest by the rivers Inny and Riffey. The bog is underlain by calcareous shales with a low permeability. A substantial area of uncut high bog remains though much of this is classified as degraded raised bog. Old cutaway bog surrounds the high bog and parts of this are dominated by Downy Birch (Betula pubescens) scrub (NPWS, 2012)	NPWS (2022) Conservation objectives for Garriskil Bog SPA [004102]. First Order Site specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2023
6	Lough Derravarragh SPA 004043	A038 Whooper Swan *Cygnus* A059 Pochard *Aythya ferina* A061 Tufted Duck *Aythya fuligula* A125 Coot *Fulica atra*	Lough Derravaragh is located approximately 12 km north of Mullingar town in Co. Westmeath. It is a medium- to large-sized lake of relatively shallow water (maximum depth 23 m). The lake extends along a south-east/north-west axis for approximately 8 km. The Inny River, a tributary of the River Shannon, is the main	NPWS (2022) Conservation objectives for Lough Derravarragh SPA [004043]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
			inflowing and outflowing river. It is a typical limestone lake with water of high hardness and alkaline pH, and is classified as a mesotrophic system. Lough Derravaragh is of major ornithological importance as it regularly supports nationally important populations of four species, and at times is used by the internationally important population of Greenland White-fronted Goose which is based in the region. Also of note is that three of the species which occur at the site, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Derravaragh is a Ramsar Convention site (NPWS, 2014)	Government and Heritage. Accessed 16.05.2023
7	Derragh Bog SAC 002201	7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration	Derragh Bog SAC includes most of the raised bog system known as Derragh Bog which occurs within Lough Kinale and Derragh Lough NHA (000985). The boundary in the west and south of the site is contiguous with the boundary of Lough Kinale and Derragh Lough SPA (site code 004061). It is a small raised bog situated 2.5 km east of Abbylara in county Longford in the townland of Derragh. This bog is an example of a floodplain raised bog which borders two lakes, Lough Kinale to the west and Derragh Lough to the south, the River Inny to the east and wet agricultural grassland to the north. To the west and south there is a full transition from high bog to cutover bog to semi-natural birch woodland, fen and swamp to Lough Kinale and Derragh Lough. The underlying geology of both lakes and bog is carboniferous Limestone (NPWS, 2020).	NPWS (2022) Conservation objectives for Derragh Bog SAC [002201]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2022
8	Lough Kinale and Derragh Lough SPA 004061	A059 Pochard *Aythya ferina* A061 Tufted Duck *Aythya fuligula*	Lough Kinale is a relatively small lake that is situated immediately downstream of Lough Sheelin, both lakes being near the top of the catchment of the Inny River, a main tributary of the River	NPWS (2022) Conservation objectives for Lough Kinale and Derragh Lough SPA [004061].

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
			Shannon. Derragh Lough, a much smaller system, is connected to Lough Kinale and the Inny River. The site is located on the border of Cos Cavan, Longford and Westmeath. This is a typical limestone system and is very shallow (maximum depth of Lough Kinale is c. 4 m). As with Lough Sheelin, the trophic status of the lake has varied greatly since the 1970s due to pollution. It was recently (1998-2000) classified as a highly eutrophic system. The lake was formerly an important Trout fishery. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Pochard and Tufted Duck. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds (NPWS, 2009).	First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2023
9	Lough Sheelin SPA 004065	A005 Great Crested Grebe *Podiceps cristatus* A059 Pochard *Aythya ferina* A061 Tufted Duck *Aythya fuligula* A067 Goldeneye *Bucephala clangula*	Lough Sheelin is a medium to large-sized lake, located on the border of Counties Cavan, Westmeath and Meath. It is a relatively shallow alkaline lake with a maximum depth of 14 m. The Inny River, a main tributary of the River Shannon, is the main outflow from the lake. Lough Sheelin is a nationally important site for four species of wintering wildfowl and is one of the main Midlands lakes sites for wintering birds (NPWS, 2009).	NPWS (2022) Conservation objectives for Lough Sheelin SPA [004065]. First Order Site specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2023
10	Moneybeg and Clareisland Bogs SAC 002340	7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion	This site is located on the border of Counties Meath and Westmeath, 9 km east of the town of Granard. It is situated mainly in the townlands of Clareisland or Derrymacegan, Williamstown and Moneybeg in Co. Westmeath, and Ross in Co. Meath. The Moneybeg and Clareisland Bogs site is of considerable conservation	NPWS (2016) Conservation Objectives: Moneybeg and Clareisland Bogs SAC 002340. Version 1. National Parks and Wildlife Service, Department of Arts,

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
			significance as it comprises two raised bogs with semi-natural lake margins. These are found at the north-eastern extreme of the range of raised bogs in Ireland. Active raised bog is a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. The site supports a diversity of raised bog habitats including hummock/hollows and pools. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this type (over 60%) and so has a special responsibility for its conservation at an international level (NPWS, 2014).	Heritage and the Gaeltacht. Accessed 16.05.2023.
11	Lough Iron SPA 004046	A038 Whooper Swan *Cygnus cygnus* A050 Wigeon *Anas penelope* A052 Teal *Anas crecca* A056 Shoveler *Anas clypeata* A125 Coot *Fulica atra* A140 Golden Plover *Pluvialis apricaria* A395 Greenland White-fronted Goose *Anser albifrons flavirostris*	Lough Iron is a small- to moderately-sized midland lake, located some 12 km northwest of Mullingar. It is situated on the Inny River, which flows from Lough Derravaragh approximately 5 km to the north-east. Lough Owel occurs a few kilometres to the south-east and is connected to Lough Iron by a small stream. The underlying geology is limestone and the lake is mesotrophic in character. Lough Iron SPA is of high ornithological importance, primarily for supporting internationally important populations of Whooper Swan and Greenland White-fronted Goose. The site also holds a notable diversity of other waterfowl, including dabbling duck, diving duck and waders. It is of note that three of the species which regularly occur, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Iron is a Ramsar Convention site and a Wildfowl Sanctuary (NPWS, 2014)	NPWS (2022) Conservation objectives for Lough Iron SPA [004046]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online: 16.05.2023

	European Site Name and Code	Qualifying Interest / Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)[10]	Data Source – Conservation Objectives Supporting Form
12	Glen Lough SPA 004045	038 Whooper Swan *Cygnus cygnus*	Glen Lough is situated about 5 km north-west of Lough Iron on the border of Co. Westmeath and Co. Longford. Extensive drainage in the 1960s has resulted in a dramatic drop in the watertable here, with the result that there is now little open water, except during flooding in the winter months. Sedge-dominated freshwater marsh now occupies the majority of what was once open water. Plant species present include Bottle Sedge (*Carex rostrata*), Water Horsetail (*Equisetum fluviatile*) and Canary Reed-grass (*Phalaris arundinacea*). Other habitats present include reedswamp, wet and dry grassland, cutaway bog colonised by heath vegetation, scrub and wet willow (*Salix* spp.) woodland.	NPWS (2022) Conservation objectives for Glen Lough SPA [004045]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2023.
13	Lough Owel SPA 004047	A056 Shoveler *Anas clypeata* A125 Coot *Fulica atra*	Lough Owel is a medium- to large-sized lake in Co. Westmeath, with a length of c. 6 km along its long axis and a maximum width of 3 km. It is fed by a number of small streams and the main outflow is to the Royal Canal. Water is relatively shallow, with a maximum depth of 22 m. Overlying Carboniferous limestone, Lough Owel is one of the most important examples of a limestone lake in the Midlands. The water is moderately hard, alkaline and virtually colourless. The lake appears to be relatively unproductive with low levels of orthophosphate and moderate chlorophyll concentrations. The lake is classified as a mesotrophic system and its status has been stable in recent years (NPWS, 2014).	NPWS (2022) Conservation objectives for Lough Owel SPA [004047]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage. Accessed online 16.05.2023

2.7.2 Other Projects and Plans with Potential to Cause In-Combination Effects

The location of the proposed Mostrim Bog decommissioning and rehabilitation does not overlap the footprint of any other existing projects or plans.

Other bogs within the larger Bog Group will also be subject to both decommissioning and rehabilitation to meet IPC license conditions. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water.

Peat extraction through turbary has recently occurred around the southern margins of Mostrim Bog and at other locations within the project zone of influence and within a 15km buffer. This has the potential to result in in-combination effects from the release of hydrocarbons, emissions to air and water, and through modification to drainage regimes.

A planning search of the National Planning Database found a number of proposed or consented developments within the vicinity of Mostrim Bog, including private dwellings or amendments to private dwellings and agricultural led planning applications such has for slatted sheds/ amendments to existing farm infrastructure etc.

There are 4 no. local authority jurisdictions within 15km of Mostrim Bog (Longford County Council, Westmeath County Council, Roscommon County Council and Cavan County Council). All local authorities have County Development Plans and/or plans relating to Heritage and / or Biodiversity.

There is a current ongoing NPWS Raised Bog Restoration Project which may include at some date some raised bogs within 15km of Mostrim Bog. Restoration activities at these bogs may have the potential for in combination effects with decommissioning and rehabilitation at Mostrim Bog, however there is no currently known temporal or spatial overlap between any planned restoration activities and the decommissioning and rehabilitation of Mostrim.

Operational phase disturbance or mortality/barrier effect pathways to avifaunal species are not predicted from the proposed decommissioning and rehabilitation. Therefore there is no source for in-combination effects with other future developments which may themselves result in potential mortality / barrier effects.

2.7.2.1 Other BnM Bog Group Decommissioning and Rehabilitation

Other BnM bogs within the larger Mount Dillon group[11] will also be subject to decommissioning and rehabilitation to meet the various, pertinent, IPC license conditions, however, currently, the only known temporal overlap between these proposed activities elsewhere in the Mount Dillon Mostrim sub-group is at the following bogs:

- Clynan – Located 16.7km south of Mostrim Bog. Clynan Bog supports hydrological connectivity to Lough Ree SPA / SAC via the Inny_100 and Inny_110 watercourses.
- Glenlough – Located 6.6km south / south-west of Mostrim Bog. Supports proximal hydrological connectivity to Glen Lough SPA via the Black(Westmeath)_020 watercourse and remote hydrological connectivity via the Inny catchment[12].

The proposed decommissioning and rehabilitation at each of these sites will be subject to Screening for Appropriate Assessment and where required, Appropriate Assessment.

[11] The Mount Dillon Bog Group IPC Licensed area is made up of two sub-groups (Lough Ree- the Mount Dillon Energy Peat Group) and Mostrim).

[12] Rehabilitation at this bog was mostly completed in 2022 – works are 95% complete

Rehabilitation is ongoing at Glenlough Bog. The construction phase of decommissioning and rehabilitation at Clynan Bog may overlap those proposed for Mostrim Bog. These sites within the Mount Dillon Group (Mostrim sub-group) support connectivity with the downstream areas of the Garriskil Bog SPA / SAC and Lough Derravarragh SPA with more remote connectivity to Lough Ree SPA / SAC. There is no temporal overlap between the proposed works at Mostrim Bog and any other bogs within the Mount Dillon bog group.

The Operational stage of Mostrim Bog Decommissioning and Rehabilitation may overlap with the Rehabilitation stage of other bogs within the Mount Dillon Mostrim sub-group however the expected magnitude of any effects from Mostrim Bog at this lifecycle stage are evaluated as insufficient to result in in-combination effects. The possibility of likely significant in combination effects can reasonably be excluded on this basis.

As outlined, bog sites within the Mount Dillon Mostrim sub-group proposed for decommissioning and rehabilitation in 2023, support potential connectivity with the downstream areas of Lough Ree SAC. The decommissioning and rehabilitation of any other bogs within the greater Mount Dillon Mostrim sub-group will be subject to Appropriate Assessment and it is considered the requisite mitigation will be in place should the potential for any adverse effects on European site integrity be identified as part of the Appropriate Assessment process. This should also identify the potential for any sequential in-combination pathways, in particular should temporal overlap exist.

2.7.2.2 Turbary

Licensed turbary occurs at various locations within 15km of Mostrim Bog, including several locations where the pathways for downstream in combination effects on European Sites may exist, primarily via drainage to EPA blue line watercourses to facilitate turbary. Unauthorised private turbary also occurs in discrete localised plots within the larger cutover raised bog complexes located within the environs of Mostrim Bog.

2.7.2.3 Quarries

There are several quarry developments located within 15km of Mostrim Bog. These are typically localised sand, gravel and limestone quarries. These quarries have the potential to contribute in-combination effects to European Sites within the project zone of influence through the potential release of unattenuated surface water run-off to the receiving watercourses and surface water catchments.

2.7.2.4 Solar Farm

Planning permission was sought and gained for a proposed solar farm at Lisnageeragh, Edgeworthstown,, Co. Longford. The application is for a 10 year permission – and was accompanied by a Screening for Appropriate Assessment report which concluded that the proposed development would not give rise to any likely significant negative effects to European Sites.

2.7.2.5 NPWS Raised Bog Restoration

It is proposed to undertake proposed decommissioning and rehabilitation of the following raised bog sites, designated as SACs or NHAs in 2022:

- Camderry SAC – completed Feb. 2023
- Kilsallagh SAC Phase 2 – completed Feb. 2023
- Daingean NHA – completed Feb. 2023
- Scohaboy NHA – completed Feb. 2023
- All Saints & Esker SAC Phase 1,2 & 3 – to be completed July 2023
- Liffey Head SAC Phase 1 – to be completed June 2023

- Mouds SAC Phase 2 – to be commence July 2023
- Milltownpass NHA – to be commence Sept. 2023
- Curraghlehannagh SAC Phase 2 – to be commence Sept. 2023
- Crosswood SAC Phase 1.5 – to be commence Sept. 2023
- Derrinlough SAC – to be commence Sept. 2023
- Annaghmaghera Bog – to be commence Sept. 2023
- Lough Forbes SAC – to be commence Sept. 2023
- Cloncrow NHA Phase 2 – to be commence Sept. 2023
- Liffey Head SAC Phase 2 – to commence Aug. 2023

The only site in Co. Longford with planned rehabilitation works is Lough Forbes SAC, located ca. 21km to the west of Mostrim Bog.

An Appropriate Assessment (of the National Raised Bog SAC Management Plan 2017-2022) has been carried out in accordance with Regulation 42(11) and 42(12) of the European Communities (Birds and Natural Habitat) Regulations 2011-2015 and has had regard to the findings of the Natura Impact Statement, the conservation and management measures set out in the National Raised Bog SAC Management Plan 2017-2022 and which constitute plan-level mitigation measures, and the submissions and observations received on the (draft) National Raised Bog SAC Management Plan . One of the primary mitigation elements proposed is that screening for appropriate assessment and if necessary appropriate assessment will be carried out in relation to any site specific/project level measures including restoration measures and turf-cutting. If AA of a project at site level determines that adverse effects are likely, or cannot be ruled out, the project will either not be pursued or, where considered appropriate, the derogation steps of Article 6(4) will apply, but only in a case in which there are imperative reasons of overriding public interest (IROPI) requiring a project to proceed, there are no less damaging alternative solutions, and compensatory measures have been identified that can be put in place.

On this basis, it is assumed that the appropriate level of Appropriate Assessment has or will be carried out in respect of any future proposed restoration activities at the above bogs, and that any required mitigation to avoid adverse effects on European Site integrity will be in place. In addition, none of these sites are located in proximity or within 15km of the proposed rehabilitation and decommissioning.

2.7.2.6 Agricultural Activity

Given the location of Mostrim Bog within the Upper Shannon catchment, there is potential for agricultural activities and their respective emissions to air (noise as a source of disturbance) and water (sediment, runoff, deleterious materials) to combine with source effects from decommissioning and rehabilitation at Mostrim Bog. Most of these activities are not subject to Appropriate Assessment, and form part of the existing baseline environment.

2.7.2.7 Licenced Facilities

The zone of influence of the proposed decommissioning and rehabilitation supports the following EPA licenced facilities:

- P0966-01 – Kiernan Breeding Stock, Ardagullion, Granard, Longford;
- P0914-01 - Westland Horticulture, Near Coole & Fineagh Co. Westmeath;
- P0408 - DDS Brady Farms Ltd; Carrickboy Farms, Ballyglassin, Edgeworthstown, Longford
- P0821 - Aughaboy Pig Farm Aughaboy, Coolarty, Longford
- P0481 - Mr Padraig Kiernan (Granard Farms) Granard Farms, Coolarty, Mostrim, Longford
- P1084 - Kepak Longford Unlimited Company Rathmore, Ballymahon, Co. Longford,

Activities at these facilities are subject to the licencing conditions, controls and ongoing monitoring.

2.7.2.8 Local Authority Development Plans

The following development plans have been identified:

- Roscommon County Development Plan 2021-2027;
- County Roscommon Heritage Plan 2017-2021;
- Westmeath Heritage Plan 2018-2023;
- County Longford Heritage Plan 2019-2024; and
- Cavan County Development Plan 2022 – 2028.

It is assumed that the above, or any other plans including those currently at draft status, will be subject to the requirement for Appropriate Assessment which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites.

2.7.2.9 Other Projects or Activities

The likelihood of cumulative interaction with other plans or projects is considered low, due to limited temporal or spatial overlap; the absence of hydrological connectivity or shared hydrological catchment with many of the other plans or projects described, the separation distance or setback buffers between the described plans or projects and European Sites, and the requirement for Appropriate Assessment for other plans or projects, such as private dwellings, forestry entrances, slatted sheds, pig sheds, masts and amendments to existing planning consents, which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites. Nonetheless the possibility of secondary effects from activities forming part of decommissioning or rehabilitation at Mostrim Bog cannot be excluded – a precautionary approach is taken.

2.8 Sources of Information & Consultation

2.8.1 Consultation

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level.

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

See **Section 4** of the Rehabilitation Plan included as **Appendix B** for a full consultation report.

Formal consultation has been undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Plans, including protected Sites. The findings and feedback from the consultation process have been fed into the final rehabilitation and decommissioning plans and the Appropriate Assessment process. Due cognisance was also given to information available on the NPWS website at:

https://www.npws.ie/development-consultations#.

Section 4 of the accompanying rehabilitation plan provides more information on the consultation process and responses received (**Appendix B**).

2.8.2 Sources of Information

Other sources of Information, which were considered during this Screening evaluation, included both desktop studies and fieldwork:

- Review of the Conservation Objectives, Site Synopsis and Site boundary information for the European Sites within with study area;
- Review of OSI Discovery Mapping for the 15km study area around Mostrim Bog;
- Review of EPA online mapping for watercourse features (https://gis.epa.ie/EPAMaps/);
- Review of location and layout mapping for proposed Rehab;
- Review of the detailed description of proposed Decommissioning and Rehabilitation measures, including methodologies specific to the main categories of land types under consideration, which occur in cutaway bogs;
- Review of other plans and projects within 15km;
- Review of the results of previous Ecological Surveys of Mostrim Bog, along with recent confirmatory site visits; and

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

- 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);
- 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 2022;
- Spatial data in respect of Article 17 reporting, available online at https://wwLaw.npws.ie/maps-and-data/habitat-and-species-data/article-17.
- Spatial data in respect of Article 12 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data.
- Available data on Greenland White-fronted Geese such as annual reporting by the Greenland White-fronted Goose Study and National Parks and Wildlife Service.

Planning peatland rehabilitation also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best-practise guidance (full citations are in the References **Section 4**):

- Bord na Móna Biodiversity Action Plan
- Anderson *et al.* (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- 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 2017-2022. Department of Arts, Heritage and the Gaeltacht.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- 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.

2.9 Potential Sources, Pathways and Timing of Impacts to European Sites (SACs & SPAs)

2.9.1 Potential Sources, Pathways and Timing of Impacts to SACs

2.9.1.1 Direct Impact to Habitats within the SAC

There is no spatial overlap between Mostrim Bog and any of the SAC's under consideration[13]. It can therefore reasonably be concluded that there is no potential for direct impact/effects (such as habitat loss, disruption or disturbance or loss of habitat connectivity) on any SAC's from the proposed decommissioning and rehabilitation of Mostrim Bog. Possible pathways can only exist for indirect effects on SAC's either secondary, cross-factor or 'ex-situ'. Therefore, there is no possibility of direct impacts to SAC habitats, and this impact pathway is screened out from further evaluation. No potential for likely significant effects identified.

2.9.1.2 Indirect loss or degradation of terrestrial or aquatic habitats within SAC boundaries

Sources (all outside SAC boundaries): Movement of soil or peat, machinery; earthworks, excavations, installation or pipes/ temporary overburden storage, cleaning of silt ponds, removal of waste and/or raw material; use of fuels, chemicals or fertiliser and spread of invasive alien plant species.

Working within silt ponds and marginal drainage channels which support connectivity with watercourses in the environs of Mostrim Bog. Works will also be undertaken along the periphery of the bog to retain the function of hydraulic barriers between the site and the surrounding environment and to sustain the flow of surface water around the margins of the site. Such works will only involve the removal of instream aquatic vegetation and will not necessitate further excavations or deepening of watercourses or hydraulic breaks. The majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and marginal hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. Such impacts are not expected to exceed the minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial or aquatic habitats or their reliant species.

A water quality map for Mostrim Bog is presented in **Figure 3**.

Pathway: Surfacewater runoff flow paths to receiving drainage systems, downstream watercourses

Potential Mostrim Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

The identified impact sources could possibly reduce water quality or aquatic habitat quality in the local context, where all works are located outside of and at a distance from any designated SAC. The closest hydrologically connected SAC is the Garriskil Bog SAC, 5.3km south / south-east and 10.9km downstream via the Riffery_010 and Inny_070 watercourses. Mostrim Bog is also located in proximity (to within 100m) of Ardagullion Bog SAC, however there is no hydrological / surfacewater connectivity between Mostrim Bog and this European Site.

The current appraisal evaluates the possibility for any effects in downstream hydrologically connected SAC European Sites through sediment/contaminant/nutrient laden runoff, or the spread of invasive species, with

[13] The area in red shown overlapping Ardagullion Bog SAC on Figure 2 is not included in the current rehabilitation and enhancement proposals.

regard to any indirect habitat loss, reduction in habitat extent, or degradation effects (i.e. to habitat quality) in respect of Qualifying Interests.

Timing of Impacts: The potential for impact sources arising from the project only relates to the stage (i.e. Decommissioning and Rehabilitation), when groundworks and use of machinery will take place for a limited duration - in this instance expected to be completed over a 2 year period. Once decommissioning and rehabilitation are complete, the decommissioned and rehabilitated Mostrim Bog will require some monitoring, generally involving visual inspections of habitat succession, sometimes using drones, and any ongoing scheduled maintenance such as of silt ponds, or collection of water samples. Due to the negligible (both in terms of source magnitude but also duration) and non-intrusive nature of operational activities, there is no potential for the operational phase of the proposed decommissioning and rehabilitation to cause effects to European Sites.

2.9.1.3 Indirect or ex-situ disturbance or displacement of mobile species of Qualifying Interest

The SACs within the project zone of influence do not support mobile species of qualifying interest. Therefore, there will be no indirect or ex-situ disturbance to mobile species associated with these SACs.

2.9.1.4 Indirect or ex-situ mortality to Features of Qualifying Interest

The SACs within the project zone of influence do not support mobile species of qualifying interest. Therefore, there will be no indirect or ex-situ mortality to mobile species associated with these SACs.

2.9.1.5 Other Projects with Potential to Cause Cumulative Impacts to SAC sites

Sources (all outside SAC boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including rail; presence of personnel; noise and vibration and/or visual intrusion from PCAS activities.

Working within silt ponds and adjoining drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works will only involve the removal of instream aquatic vegetation and will not necessitate further excavations or deepening of the drainage channel.

Pathway: contact (direct contact with BnM personnel or machinery during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Mostrim Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The identified impact sources could possibly reduce water quality or aquatic habitat quality in the local context.

The current appraisal evaluates the possibility for any effects in downstream hydrologically connected SAC European Sites through sediment/contaminant/nutrient laden runoff, or the spread of invasive species, with regard to any indirect habitat loss, reduction in habitat extent, or degradation effects (i.e. to habitat quality) in respect of Qualifying Interests.

The disturbance related impact sources identified above may result in possible localised impacts occurring within the local context of the decommissioning and rehabilitation area during the works phase.

Timing of Impacts: It is considered that during the decommissioning and rehabilitation stages at Mostrim Bog, the possibility exists for any inadvertent release of silt or other degrading materials to possibly combine with downstream effects from other projects. Significant effects during operation can be screened out.

2.9.2 Potential Sources, Pathways and Timing of Impacts SPAs

2.9.2.1 Direct Impacts to Habitats within SPAs

There is no spatial overlap between Mostrim Bog and any of the SPA's under consideration. It can therefore reasonably be concluded that there is no potential for direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SPA's from the proposed decommissioning and rehabilitation of Mostrim Bog. Possible pathways can only exist for indirect effects on SPA's either secondary, cross-factor or 'ex-situ'. Therefore, there is no possibility of direct impacts to SPA species or their associated habitats, and this impact pathway is screened out from further evaluation. No potential for likely significant effects identified.

2.9.2.2 Indirect loss, reduction or degradation of terrestrial or aquatic habitats within SPA sites

Sources (some but not all inside SPA boundaries): Movement of soil or peat, machinery; earthworks, excavations, temporary overburden storage, cleaning of silt ponds, installation of overflow pipes, removal of waste and/or raw material,; use of fuels, chemicals or fertiliser.

Pathway: Surfacewater runoff flow paths to receiving drainage systems, downstream watercourses

Potential Mostrim Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The identified impact sources could reduce water quality or aquatic habitat quality in the local context – with some of this potentially occurring within at least 3 no. SPA boundaries; i.e. Garriskil Bog SPA, Ballykenny-Fisherstown Bog SPA and Lough Derravarragh SPA. The current appraisal evaluates the possibility of any effects to downstream hydrologically connected SPAs through sediment/contaminant/nutrient laden runoff, changes to hydrological regimes or morphology of supporting watercourses, or through the spread of invasive species, regarding any indirect (effective) habitat loss or degradation effects to Special Conservation Interests.

The proposed Decommissioning and Rehabilitation at Mostrim Bog supports remote hydrological connectivity with three SPAs. Effects on these hydrologically connected downstream SPAs are evaluated to determine the potential (or not) for significant effects.

Timing of Impacts: The potential for impact sources arising from the PCAS activities only relates to the Decommissioning and Rehabilitation Stage, when groundworks and use of machinery will take place for a limited duration - completed over a 2 year period. Once decommissioning and rehabilitation are complete, the decommissioned and rehabilitated Mostrim Bog will require minimal monitoring, generally involving visual inspections of habitat succession, sometimes using drones, and any ongoing scheduled maintenance such as of silt ponds. Due to the negligible (both in terms of source magnitude but also duration) and non-intrusive nature of operational activities, there is no potential for the operational phase of the proposed decommissioning and rehabilitation to cause significant effects to European Sites.

2.9.2.3 Indirect or ex-situ disturbance/displacement of bird species of Special Conservation Interest

Sources (some but not all inside SPA boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including; installation of overflow pipes; presence of personnel; noise and vibration and/or visual intrusion from PCAS activities.

Working within silt ponds and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works will only involve the removal of instream aquatic vegetation and will not necessitate further excavations or deepening of the drainage channel.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Mostrim Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity: The impact sources identified above, in addition to the impact pathways are evaluated with regard to potential in-situ or ex-situ disturbance or displacement effects on bird species listed as Special Conservation Interests of the SPA sites.

Mostrim Bog is not located in proximity to SPAs. The nearest SPA, Garriskil Bog SPA, is located 5.3km south / south-east of Mostrim Bog at its closest point. The SCI species for this SPA is Greenland White-fronted Goose which has a core foraging range of 5-8km. There are historic records for Greenland White-fronted Goose populations for this SPA, but recent evidence suggests that these species have abandoned peatland sites, such as Garriskil Bog, in favour of grassland sites elsewhere (NPWS, 2012)[14]. This suggests that this bog no longer supports a resident Greenland White-fronted Goose flock and as such expansion of this flock to graze, forage and roost on peatland areas within the surrounding locality, including Mostrim Bog and environs is extremely low. To that end, ex-situ disturbance and displacement to these Greenland White-fronted Goose flocks associated with Garriskil Bog SPA are not likely.

All other SPAs are located greater than 7.0km from Mostrim Bog. These sites are located outside of the core foraging range for their associated SCI species. Therefore, indirect or ex-situ disturbance / displacement from key or core foraging or feeding areas for these species are unlikely as a result of the proposed decommissioning and rehabilitation.

SCI species associated with these European Sites may experience ex-situ disturbance/displacement as a result of the proposed decommissioning and rehabilitation.

Timing of Impacts: Potential ex-situ disturbance impacts and consequent effects are not likely given the remote location of the proposed development from SPA sites, most of which are outside of the core foraging range for associated SCI species.

2.9.2.4 Other Projects with Potential to Cause Cumulative Impacts to SPA sites

The potential for the construction phase of the proposed Mostrim Bog decommissioning and rehabilitation to cause cumulative effects with other plans or projects is evaluated with regard to impact pathways which may be connected to SPA sites within the zone of influence.

Sources (all outside SPA boundaries): Decommissioning and Rehabilitation activities; movement of construction machinery and vehicles including; presence of personnel; noise and vibration and/or visual intrusion from works and machinery.

Working within silt ponds and drainage channels along the site boundary / periphery to retain the function of hydraulic barriers between the site and the surrounding environment. Such works will only involve the removal of instream aquatic vegetation and will not necessitate further excavations or deepening of the drainage channel.

Pathway: contact (direct contact with BnM personnel during site works), air (through its ability to transmit noise effects), visibility (on site presence of BnM personnel)

Potential Mostrim Bog Decommissioning and Rehabilitation Impact/Pathway Connectivity:

The identified impact sources could reduce water quality or aquatic habitat quality in the local context, where projects support downstream hydrological connectivity to a SPA. The current assessment evaluates the possibility of any effects in downstream hydrologically connected SPAs through

[14] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004102.pdf NPWS Site synopsis for Garriskil Bog SPA (004102)

sediment/contaminant/nutrient laden runoff or through the spread of invasive species, regarding any indirect habitat loss or degradation effects to Special Conservation Interests, in combination with other plans or projects. Disturbance related impact sources identified above, in addition to the impact pathways are evaluated with regard to potential ex-situ disturbance or displacement effects on bird species listed as Special Conservation Interests of the SPA sites, specifically in terms of plans or projects which may act as sources of similar sources of effects and where similar pathways exist. Ex-situ disturbance or displacement impacts and consequent effects are not likely given the remote location of the proposed decommissioning and rehabilitation from SPA sites, most of which are outside of the core foraging range for associated SCI species.

Timing of Impacts: The potential for in combination impact sources arising from the project only relates to the works stage (i.e. Decommissioning and Rehabilitation), when groundworks and use of machinery will take place for a limited duration -completed over a 2 year period. Construction works could contribute cumulative effects to downstream hydrologically connected SPAs through sediment/contaminant/nutrient laden runoff or through the spread of invasive species, regarding any indirect habitat loss or degradation effects to Special Conservation Interests, in combination with other plans or projects in the downstream catchment.

2.10 Screening Evaluation of the Potential for Effects on European Sites (SACs & SPAs)

The Screening evaluation is based on a conceptual site model which identifies potential impact source-pathways between the described Mostrim Bog decommissioning and rehabilitation and each European Site. This allows for an assessment of any potential for significant effects on the Qualifying Interests / Special Conservation Interests and their respective Conservation Objectives.

The following impact source-pathways for the five SAC sites are evaluated in relation to any potential for significant effects (**Table 11** below):

- Indirect loss or degradation of terrestrial or aquatic habitats within SAC sites (during the construction and operational phases), alone and in combination.

The following impact source-pathways for the eight SPA sites are evaluated in relation to any potential for significant effects (**Table 12** below):

- Indirect loss, reduction or degradation of terrestrial or aquatic habitats within SPA sites (during the construction and operational phases), alone and in combination.

As described in **Section 2.9.1** and **2.9.1**, there is **potential for indirect effects** to features of qualifying Interest associated with European Sites due to remote downstream hydrological connectivity with European Sites.

The evaluation of potential for in-combination effects with regard to Other Plans or Projects includes the plans or projects described in **Section 2.7.2**.

Table 11: Evaluation of Possibly Significant Effects to the five SAC sites

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
1	Ardagullion Bog SAC 002341	The northern boundary of Mostrim is located to within 100m of this European Site.	Y: No hydrological connectivity between the proposed bog rehabilitation site and this European Site. However, due to the relative proximity there may be direct and indirect connectivity as a result of the proposed rehabilitation works.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed decommissioning and rehabilitation are not located within this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Although this European Site is located in relative proximity to this European Site, there is no hydrological connectivity between Mostrim Bog and the proposed decommissioning and rehabilitation areas and this European Site. Mostrim Bog drains to the north-west via the Camlin watercourses and to the south-east via the Coolnagun_010 stream and Inny watercourses. None of these watercourses or hydrological systems provide hydrological connectivity between the proposed decommissioning and rehabilitation at Mostrim and Ardagullion Bog. The proposed rehabilitation works aim to raise groundwater levels within Mostrim Bog. The Drainage Management Plan prepared for this rehabilitation plan suggests that raised water table levels to the bog surface will create a hydraulic gradient across the bog into the adjacent lands, which include Ardagullion Bog SAC. Water table levels in lands within this hydraulic gradient will potentially rise. To that end, there is no anticipated degradation of the groundwater dependent habitats for this European Site. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect or ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect or ex-situ effects in this regard.

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
2	Lough Forbes Complex SAC 001818	19.4km west / north-west and 34km downstream of Mostrim at its closest point.	Y: Remote downstream via the Camlin watercourses (Camlin_010 – Camlin_070).	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed decommissioning and rehabilitation is not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** The majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and marginal hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. The works will also include the removal of waste and/or raw material, use of fuels and targeted use of fertiliser as part of the rehabilitation works. Such impacts are not expected to exceed the de-minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial or aquatic habitats or their reliant species. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** This SAC does not support species of Qualifying Interest, therefore there will be no indirect or ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** This SAC does not support species of Qualifying Interest, therefore there will be no ex-situ mortality effects in this regard.
3	Garriskil Bog SAC 000679	5.3km south/south-east at its closest point and 10.9km	Y: Remote downstream via	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed decommissioning and rehabilitation is not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out – Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC**

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites: **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
		downstream.	the (Riffery_010 and Inny_070 watercourses.	The majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and marginal hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. The works will also include the removal of waste and/or raw material, use of fuels and targeted use of fertiliser as part of the rehabilitation works. Such impacts are not expect to exceed the de-minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end, the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial or aquatic habitats or their reliant species. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** This SAC does not support species of Qualifying Interest, therefore there will be no indirect or ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** This SAC does not support species of Qualifying Interest, therefore there will be no ex-situ mortality effects in this regard.
4	Derragh Bog SAC 002201	9.0km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed decommissioning and rehabilitation is not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to this European Site can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed decommissioning and rehabilitation is located 9.0km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	**Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the twelve SAC Sites:** **1**. Direct effects to Qualifying Interest habitats or species of an SAC Site (i.e. species mortality, habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC 2. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site; **2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest. **3.** Indirect or ex-situ mortality of Qualifying Interests
				The proposed decommissioning and rehabilitation is located 9.0km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.
5	Moneybeg and Clareisland Bogs SAC 002340	12.2km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out – No likelihood for direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within or ex-situ the SAC** The proposed decommissioning and rehabilitation is not located within or in proximity to this European Site. Therefore there will be no direct impacts to this European Site. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SAC** Due to the separation distance to this SAC and the lack of hydrological connectivity, possible pathways for indirect loss, reduction or degradation of terrestrial / aquatic habitats within or in close proximity to this European Site can be excluded. **3: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests** The proposed decommissioning and rehabilitation is located 12.2km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ disturbance effects in this regard. **4: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests** The proposed decommissioning and rehabilitation is located 12.2km from this European Site. There are no species of Qualifying Interest listed for this European Site. Therefore there will be no indirect of ex-situ effects in this regard.

Table 12: Evaluation of Possibly Significant Effects to the eight SPA sites

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
1	Ballykenny-Fisherstown Bog SPA 004101	19.4km west / north-west at its closest point and 34km downstream of Mostrim.	Y: Remote downstream via the Camlin watercourses (Camlin_010 – Camlin_070). The rehabilitation site is located outside of the core foraging range of the SCI species for which this SPA is designated; i.e. Greenland White-fronted Goose.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is the potential for remote hydrological connectivity between Mostrim Bog and Ballykenny-Fisherstown Bog SPA. However, the majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and margins hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. The works will also include the removal of waste and/or raw material, use of fuels and targeted use of fertiliser as part of the rehabilitation works. Such impacts are not expected to exceed the de-minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial habitats or their reliant SCI species. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The SCI species for this SPA is Greenland White-fronted Goose which has a core foraging range of 5-8km[15]. The proposed decommissioning and rehabilitation at Mostrim are located outside of the core foraging range for this SCI species. Therefore there will be no ex-situ disturbance or displacement effects to Greenland White-fronted geese associated with this European Site.

[15] As per SNH 2016 Scottish Natural Heritage Assessing Connectivity with Special Protection Areas (SPAs) Guidance Version 3 – June 2016.

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
2	Garriskil Bog SPA 004102	5.3km south/south-east at its closest point and 10.9km downstream.	Y: Remote downstream via the Riffery_010 and Inny_070 watercourses. The rehabilitation site is located outside of the core foraging range of the SCI species for which this SPA is designated; i.e. Greenland White-fronted Goose.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is the potential for remote hydrological connectivity between Mostrim Bog and Garriskil Bog SPA. However, the majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and margins hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. The works will also include the removal of waste and/or raw material, use of fuels and targeted use of fertiliser as part of the rehabilitation works. Such impacts are not expect to exceed the de-minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial habitats or their reliant SCI species. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The SCI species for this SPA is Greenland White-fronted Goose which has a core foraging range of 5-8km. There are historic records for Greenland White-fronted Goose populations for this SPA, but recent evidence suggests that these species have abandoned peatland sites, such as Garriskil Bog, in favour of grassland sites elsewhere (NPWS, 2012). This suggests that this bog no longer supports a resident Greenland White-fronted Goose flock and as such expansion of this flock to graze, foraging and roost on peatland areas within the surrounding locality, including Mostrim Bog and environs is unlikely. To that end, ex-situ disturbance and displacement to these Greenland White-fronted Goose flocks associated with Garriskil Bog SPA are not likely as a result of the proposed decommissioning and rehabilitation.

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
3	Lough Derravarragh SPA 004043	8.1km south-east of Mostrim Bog at its closest point and 12km downstream via the Coolnagun Stream_010 and Inny_060 watercourses	Y: Remote downstream via the Coolnagun Stream_010 and Inny_060 watercourses. The rehabilitation site is located outside of the core foraging range of the SCI species for which this SPA is designated.	**1. Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is the potential for remote hydrological connectivity between Mostrim Bog and Lough Derravarragh SPA. However, the majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and margins hydraulic breaks but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. The works will also include the removal of waste and/or raw material, use of fuels and targeted use of fertiliser as part of the rehabilitation works. Such impacts are not expected to exceed the minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial habitats or their reliant SCI species. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim is located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.
4	Lough Kinale and Derragh Lough SPA 004061	8.8km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed decommissioning and rehabilitation at Mostrim is not located within the bounds of a SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA**

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
			rehabilitation site and this European Site.	There is no downstream hydrological connectivity between proposed activities and this European Site. Therefore there is no possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to this SPA. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim is located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.
5	Lough Sheelin SPA 004065	12.4km north-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed decommissioning and rehabilitation at Mostrim is not located within the bounds of a SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is no downstream hydrological connectivity between proposed activities and this European Site. Therefore there is no possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to this SPA. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim is located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.
6	Lough Iron SPA 004046	8.9km south / south-east of Mostrim		**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed decommissioning and rehabilitation is not located within the bounds of a SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded.

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
		Bog Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is no downstream hydrological connectivity between proposed activities and this European Site. Therefore there is no possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to this SPA. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim is located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.
7	Glen Lough SPA 004045	7.0km south of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed decommissioning and rehabilitation at Mostrim is not located within the bounds of a SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is no downstream hydrological connectivity between proposed activities and this European Site. Therefore there is no possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to this SPA. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim is located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.

	European Site	Separation Distance from Mostrim Bog	Hydrological Connection – Yes/No	Evaluation of the potential for Mostrim Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the four SPA Sites: 1. Direct Impacts to Habitats within SPAs (i.e. disturbance, displacement, mortality) 2. Indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to the SPA site; (i.e. through habitat loss, degradation, fragmentation or reduction/loss of connectivity of suitable habitat, or through a reduction in prey item species) 3. Indirect or Ex-Situ disturbance or displacement of bird species of Special Conservation Interest (i.e. through disturbance, displacement or mortality of SCI species).
8	Lough Owel SPA 004047	12.3km south-east of Mostrim Bog at its closest point.	N: No hydrological connectivity between the proposed bog rehabilitation site and this European Site.	**1: Screened Out - Possibility for direct loss, reduction or degradation of terrestrial or aquatic habitats within the SPA** The proposed decommissioning and rehabilitation is not located within the bounds of a SPA. Due to the separation distance to this SPA, possible pathways for direct effects can be excluded. **2: Screened Out - Possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within, or in close proximity to, the SPA** There is no downstream hydrological connectivity between proposed activities and this European Site. Therefore there is no possibility for indirect loss, reduction or degradation of terrestrial or aquatic habitats within or in close proximity to this SPA. **3: Screened Out - Possibility for indirect or ex-situ disturbance or displacement effects of bird species of Special Conservation Interest** The proposed decommissioning and rehabilitation at Mostrim are located outside of the core foraging range for the SCI species associated with this SPA. Therefore there will be no ex-situ disturbance or displacement effects to the SCI species associated with this European Site.

2.11 Screening for Appropriate Assessment: Conclusion Statement

The proposed project has been assessed taking into account:

- The nature, size and location of the proposed project and the associated works and possible impacts arising from same;
- The Qualifying Interests (QIs) and Special Conservation Interests (SCIs), Conservation Objectives and conservation status of any European Sites within the project zone of influence;
- The potential for likely significant effects impacts arising from the project on any European Sites; and
- The potential for cumulative impacts.

The Appropriate Assessment Screening process considered the potential for likely significant effects which may associated with the decommissioning and rehabilitation of Mostrim Bog, Edgeworthstown, Co. Longford.

The following six European Sites are located within the potential Source» Pathway » Receptor zone of influence of the proposed decommissioning and rehabilitation at Mostrim Bog:

- Ardagullion Bog SAC (002341);
- Lough Forbes Complex SAC (001818);
- Ballykenny-Fisherstown Bog SPA (004101);
- Garriskil Bog SAC (000679);
- Garriskil Bog SPA (004102); and
- Lough Derravarragh SPA (004043).

The closest European Site to Mostrim Bog is the Ardagullion Bog SAC, located 100m north; however, there is no hydrological or hydrogeological connectivity identified in relation to the sensitivities of the features of Qualifying Interest for this SAC, in view of the Conservation Objectives. The proposed rehabilitation works aim to raise groundwater levels within Mostrim Bog. The Drainage Management Plan prepared for this rehabilitation plan suggests that raised water table levels to the bog surface will create a hydraulic gradient across the bog into the adjacent lands, which include Ardagullion Bog SAC. Water table levels in lands within this hydraulic gradient will potentially rise. To that end, there is no anticipated degradation of the groundwater dependent habitats for this European Site.

The proposed decommissioning and rehabilitation at Mostrim Bog supports remote hydrological connectivity with Garriskil Bog SPA / SAC, Lough Derravarragh SPA, Ballykenny-Fisherstown Bog SPA and Lough Forbes Complex SAC. The majority of the proposed decommissioning and rehabilitation within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and marginal hydraulic breaks, but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. Any impacts arising from such works are not expected to exceed the de-minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed decommissioning and rehabilitation will not result in indirect loss, reduction or degradation of downstream terrestrial or aquatic habitats or their reliant species.

In particular, no potential for significant effects are identified with respect to European Sites within the project zone of influence, either alone or in combination with other plans or projects. There are no impact pathways arising from the proposed project which could interact with the Special Conservation Interests or Qualifying Interests with the potential to give rise to significant effects. Therefore, taking account of the nature and

specific, standardised works practices, the potential for significant effects via hydrological impact pathways and other environment pathways are excluded.

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

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Appendix A FONSE: Finding of No Significant Effects Report (FONSE)

In accordance with the EC (2001) guidance document, *Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, A Finding of No Significant Effects Report has been completed for the proposed Decommissioning and Rehabilitation Plan for Mostrim Bog. The standard matrix for this report provided in Annex 2 of the guidance document was followed. Line items in italics are taken directly from the guidance document.

Finding of No Significance Effects Report	
Name and location of the Natura 2000 sites	The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. There is a total of 16 European sites located within project zone of influence: - Ardagullion Bog SAC (002341); - Lough Forbes Complex SAC (001818); - Ballykenny-Fisherstown Bog SPA (004101); - Garriskil Bog SAC (000679); - Garriskil Bog SPA (004102); and - Lough Derravarragh SPA (004043).
Description of the project or plan	**Overview:** Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Ref. P0504-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the bog lands within the licensed area. Mostrim Bog is part of the Mount Dillon Bog group (Mostrim sub-group). Mostrim Bog is located in Co. Longford. A document titled 'Mostrim Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at **Mostrim Bog** as appended to this document as **Appendix B**. **Purpose:** The decommissioning and Rehabilitation of **Mostrim Bog** as required under IPC license.
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No
	Yes: In addition to the proposed decommissioning and rehabilitation plan the following projects were considered:

Finding of No Significance Effects Report	
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	1 Other BnM Bog Group Decommissioning and Rehabilitation 2 NPWS Raised Bog Restoration 3 Agricultural Activity 4 Turbary 5 Agriculture 6 Local Authority Development Plans 7 Local and Regional Amenity Developments 8 Local small residential and agricultural developments, extensions, alterations
The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	The closest European Site to Mostrim Bog is the Ardagullion Bog SAC, located 100m north; however, there is no hydrological or hydrogeological connectivity identified in relation to the sensitivities of the features of Qualifying Interest for this SAC, in view of the Conservation Objectives. The proposed works at Mostrim Bog support remote hydrological connectivity with Garriskil Bog SPA / SAC, Lough Derravarragh SPA, Ballykenny-Fisherstown Bog SPA and Lough Forbes Complex SAC. The majority of the proposed works within Mostrim Bog will be retained to the high bog footprint. There may be minor maintenance works to in-situ silt pond areas and marginal hydraulic breaks, but such works will not generate or spread excessive pollutant sources such as particulate matter and sedimentation downstream. Any impacts arising from such works are not expected to exceed the minimis impact threshold of the receiving and downstream aquatic environment and by extension, receiving European Sites. To that end the proposed works will not result in indirect loss, reduction or degradation of downstream terrestrial or aquatic habitats or their reliant species.
Explain why these effects are not considered significant	In particular, no potential for significant effects are identified with respect to European Sites within the project zone of influence, either alone or in combination with other plans or projects. There are no impact pathways arising from the proposed project which could interact with the Special Conservation Interests or Qualifying Interests with the potential to give rise to significant effects. Therefore, taking account of the nature and specific, standardised works practices, the potential for significant effects via hydrological impact pathways and other environment pathways are excluded.
Name of Agency or Body Consulted	**Summary of Response**
NPWS	Formal consultation has been undertaken with NPWS regarding PCAS Decommissioning and Rehabilitation plans in 2023. Due cognisance was also given to information available on the NPWS website at: https://www.npws.ie/development-consultations#.

Finding of No Significance Effects Report			
	In addition, two meetings were held with the EAU in 2021 to discuss consultation in general.		
Data Collected to Carry out the Assessment			
Who carried out the assessment	*Sources of Data*	*Level of assessment completed*	*Where can the full results of the assessment be accessed and viewed*
Delichon Ecology	A combination of consultation, desktop studies and field surveys.	Screening for Appropriate Assessment	Bord na Móna, Leabeg, Blueball, Tullamore, Co. Offaly, R35 P304.

Appendix B Mostrim Bog Decommissioning and Rehabilitation Plan 2023

Bord na Móna

Mostrim Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2023

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

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

This licence condition requires Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Mostrim Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

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

Industrial peat production has now fully ceased at Mostrim Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0504-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan*, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

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

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

Bord na Móna have defined the key rehabilitation outcome at Mostrim Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Mostrim Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Document Control Sheet	
Document Name:	Mostrim Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Mountdillon ref.504 (Mostrim)\Mostrim
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This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	44	4	0	13

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Date:	05/12/2022	20/01/2023	20/01/2023

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Name(s):	JOS		
Date:	03/07/2023		
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):			
Date:			

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NON-TECHNICAL SUMMARY

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

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

- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon (Mostrim) Bog Group (Ref. P0504-01) (see Appendix II for details of the bog areas within this Group). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Mostrim Bog is located in Co. Longford.

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

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

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

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

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

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

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

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

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

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

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

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

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

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. It is anticipated that the combination of active rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g. Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

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

1.1 Constraints and Limitations

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

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

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

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

2. METHODOLOGY

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

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2011 to 2022 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;
- Hydrological modelling; and
- The development of a Methodology Paper[1] outlining the Scheme (PCAS). This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Mostrim Bog, in particular, optimising climate action benefits.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References Section):

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

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

- DAHG (2014). Review of Raised Bog Natural Heritage Area Network. Department of Arts, Heritage, and the Gaeltacht.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Mountdillon Integrated Pollution Control Licence;
- Mountdillon Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;

- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027
- Bord na Móna Annual Report 2021 & 2022.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Mostrim Bog was surveyed in 2012. Additional surveys have also taken place between 2014 and 2023. An ecotope bog condition survey was carried out in spring 2023 to measure the current ecological condition of the site. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, ecotope survey results and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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

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

3. SITE DESCRIPTION

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

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

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

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, and other bogs, many owned and managed by Bord na Móna. Ardnagullian Bog SAC is located to the north of Mostrim bog is separated from it by a band of conifer forestry. Clonwhelan Bog lies approximately 500m south-west of Mostrim Bog.

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

3.1 Status and Situation

3.1.1 Site history

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

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

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

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

3.1.2 Current land-use

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

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

3.1.3. Socio-Economic conditions

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

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

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

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

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

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

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

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

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

3.2.2 *Peat type and depths*

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

3.3 Key Biodiversity Features of Interest

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

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

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

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

3.3.1 Current habitats

Western section

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

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

Northern section

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

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

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

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

Eastern section

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

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

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

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

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

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

Figure 3.4. Northern section. Undrained raised bog.

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

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

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

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

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

3.3.2 Species of conservation interest

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

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

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

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

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

3.3.3 Invasive species

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

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

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

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

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

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

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

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

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

3.5 Hydrology and Hydrogeology

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

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

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

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

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

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

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

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

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

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed

area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence.

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

Mostrim bog has 7 treated surface water outlets from previously active sod peat extraction catchments, which discharge to Riffery River (IE_SH_26R030100 RIFFEY_010), the Coolnagun Stream (IE_SH_26C080860 Coolnagun Stream_010) and the Camlin (IE_SH_26C010050 CAMLIN_010).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-24-17-02 titled **Mostrim Bog: Structures and Sampling**, along with Drawing number BNM-DR-24-17-WQ01 titled **Mostrim Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Mostrim Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders. Peat extraction was identified as pressure in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation.

The main emission limit value (ELV) associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 1.42mg/l and COD 100mg/l. From an analysis of the results in 2018, under the IPC licence environmental monitoring of some of the discharges from this bog, these indicate that results were under the Emission Limit Value for Suspended Solids, broadly under the trigger level for Ammonia and under the trigger level for COD. Ammonia averaged 0.95 mg/l and ranged from 0.52 to 2.2 mg/l with Suspended Solids averaging 5mg/l.

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already vegetated in some areas. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

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

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

Initial monthly results are included in Appendix XIV for Mostrim bog. These results cover the period from January 2023 to March 2023 and are from the surface water outlet from the sections of bog to be rehabilitated in 2023. Peat extraction ceased sod moss extraction from this bog in 2018 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating no significant trend for both SW119 and SW120. During this period ammonia displayed a slight downward trend for SW 119 and an upward trend for SW 120, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, including rainfall.

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

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

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

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

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

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

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

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the former production area will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

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

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

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

It is expected that Mostrim Bog will become a reduced carbon source/part carbon sink following rehabilitation. Mostrim Bog has the potential to follow a similar trajectory to Moyarwood Bog, although the area used for sod moss extraction has a longer trajectory to become a stable naturally-functioning raised bog habitat. The potential of any raised bog site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this site is raised bog in poorer condition and has potential for raised bog restoration. Some areas of the bog are cutover bog and a range of different habitats is expected to develop in these areas. Birch woodland is expected to develop on drier, more elevated areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

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

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

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

4. CONSULTATION

4.1 Consultation to date

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

There has been ongoing consultation about rehabilitation, biodiversity, and other general issues over the years about Mountdillon group bogs including Mostrim Bog with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- General consultation with Westmeath County Council – 2016.
- Turf cutting trespass. A turf cutting trespass incident was reported to Inland Fisheries Ireland and the EPA in 2016, due to silting of nearby watercourses. Remedial action was taken by Bord na Móna to prevent trespass and remediate the silting.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Consultation with NPWS during the review of the NHA network (NPWS 2014).
- Site visit with NPWS 05/2016 & 05/2017.
- A site visit with key stakeholder groups to discuss the proposed rehabilitation work programme (21st of July 2018). Representatives of National Parks and Wildlife Service (NPWS), Irish Peatland Conservation Council (IPCC), BirdWatch Ireland and Bord na Móna were in attendance.
- Meeting with NPWS February 2020 and March 2023.

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

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

4.2 Issues raised by Consultees

4.2.1 Engagement with stakeholders in 2018.

Bord na Móna was subject to legal action in 2018 related to an infringement of the Wildlife Act. This happened when a contractor licenced by Bord na Móna continued to prepare a portion of bog for industrial peat extraction by removing vegetation after March 1st. After engagement with stakeholders and after internal consultation, Bord na Móna made the decision to cease industrial peat extraction and to restore this bog. A site visit with stakeholders in 2018 discussed issues including:

- The removal of sod moss that had already been harvested. It was agreed that Bord na Mona would remove this harvested sod moss.
- The restoration of the site. It was agreed that Bord na Móna would begin restoration of the bog following guidelines for raised bog restoration (Mackin et al. 2017).

A draft rehabilitation plan was prepared by Bord na Móna and circulated to stakeholders. Comments were received and the rehabilitation plan updated. A meeting was held with NPWS staff in December 2019 where there were further discussions about the rehabilitation of Mostrim Bog. The draft rehabilitation plan was then updated again based on these discussions and some additional rehabilitation measures were proposed to NPWS at this time. The legal action was struck out in October 2020.

4.3 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not completed.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in including drain-blocking to encourage raised bog restoration and the development of active raised bog habitat.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich raised bog vegetation communities on areas of bare peat formerly used for sod moss extraction, where possible.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- It will take some time for stable naturally functioning habitats to fully develop at Mostrim Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- Mostrim contains a relatively intact (undrained) section of high bog in the north of the site which already supports the priority EU Annex I listed habitat 'active raised bogs (7110)' deemed to be of international importance. Re-wetting (and other proposed measures) across the entire bog, as part of the scheme, will further improve the condition of this active raised bog.
- Mostrim Bog has the potential to further develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). However, only a proportion of the bog has potential to develop Annex I active raised bog (approximately 443 ha based on hydrological modelling) in this timeframe. Nevertheless, re-wetting or further measures such as tree removal across the entire bog, as part of the scheme, will improve habitat conditions of the whole bog.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

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

6. SCOPE OF REHABILITATION

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

- The area of Mostrim Bog.
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Mostrim bog is part of the Mount Dillon Bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Mostrim Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Mostrim Bog mean that raised bog restoration and deep peat measures are the most suitable rehabilitation approach for this site. Mostrim Bog has a gravity drainage regime and has residual deep peat.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Mostrim Bog as **environmental stabilisation**, **optimising residual peat re-wetting, and the development of active raised bog along with the development of embryonic *Sphagnum*-rich raised bog vegetation communities on areas formerly used for sod moss extraction**.
- Consultation and engagement with various stakeholders. Bord na Móna agreed to restore Mostrim Bog in 2018 and have proposed several rehabilitation measures after consultation and engagement with stakeholders.
- Rehabilitation of Mostrim Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- Current land-uses. Boundary drains will be maintained to act as a hydrological break between Glenlough Bog and adjoining lands.

6.1 Key constraints

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

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

- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology at Mostrim Bog. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. There is one known right of way at Mostrim Bog along the western boundary. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Turbary.** Some areas of active turbary are excluded as they are currently being used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Mostrim Bog.
- **High Voltage Power Lines.** 10kV, 20kV and 38kV power lines run overhead to the north western entrance to the bog. These power lines should be given due consideration when planning access/egress routes and rehabilitation works. No rehabilitation works are proposed in proximity to the power line which provides an adequate buffer. Other than the area that is constrained, the power lines will have no impact on the proposed rehabilitation measures.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Active turbary areas are excluded.
- The longer-term development of stable naturally functioning habitats at Mostrim Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.

- This plan is not intended to be an after-use or future land-use plan for Mostrim Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by Bord na Móna as:

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

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

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

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

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

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

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

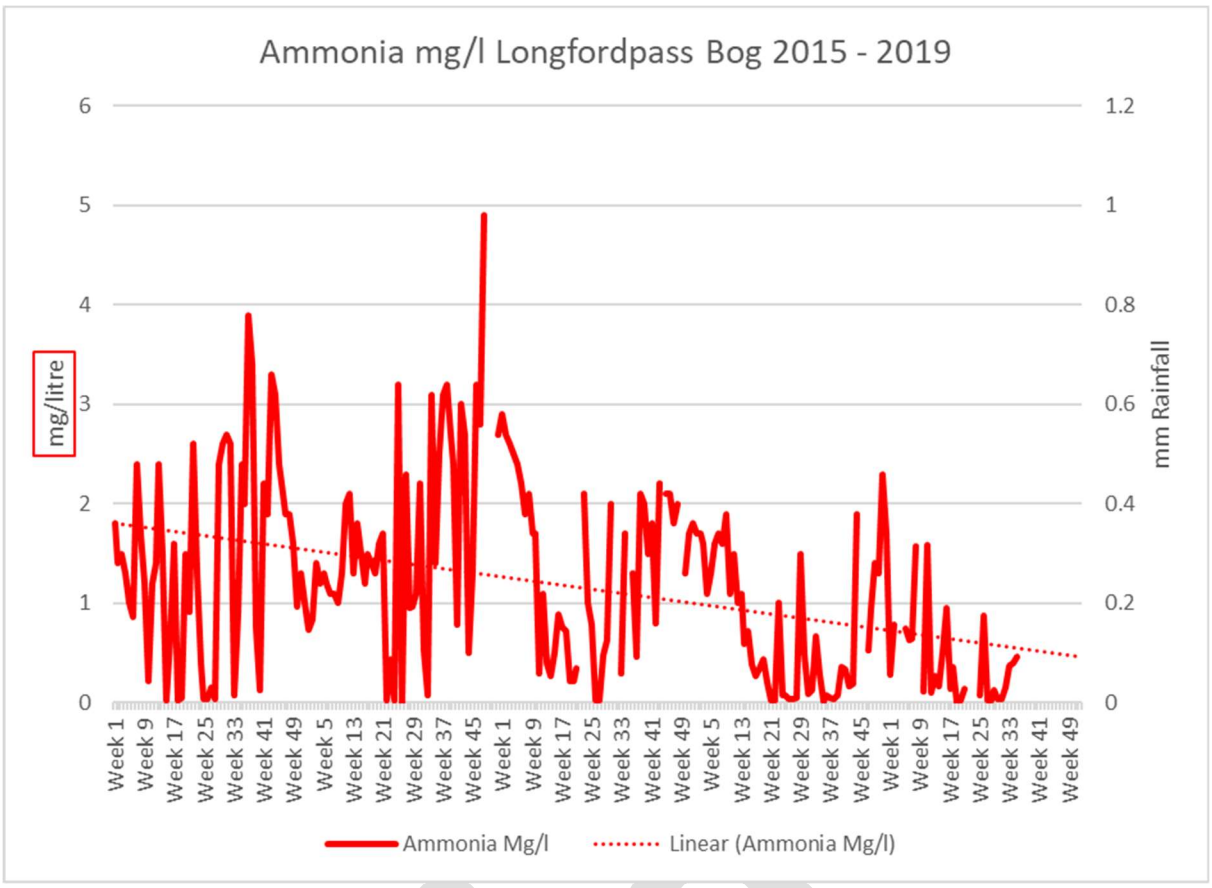

Plate 7-1 Ammonia levels over the period 2015-2019 at Longfordpass.

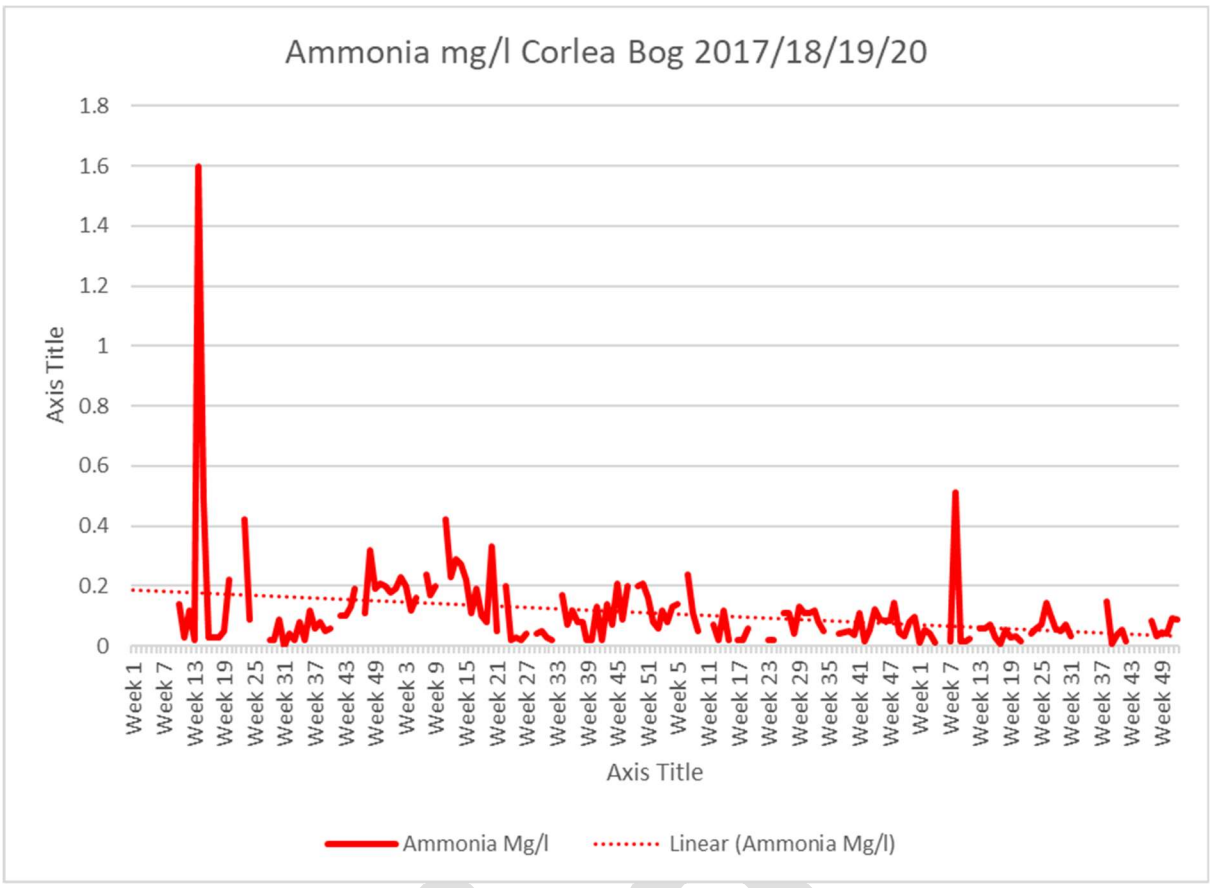

Plate 7-2 Ammonia levels over the period 2017-2020 at Corlea.

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

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

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

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

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2023-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2022-2024
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when	2023-2025

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

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of

rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson et al. 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

8. REHABILITATION ACTIONS AND TIME FRAME

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

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

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

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

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

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

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

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

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

- Removal of feral self-sown conifer trees from the high bog. Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration. This measure was initially proposed by Bord na Móna in February 2020.
- Monitor excavator disturbance caused by the bog restoration measures across the bog. Reduce long-term impacts by alternating routes across the bog. This measure was initially proposed by Bord na Móna in February 2020.
- Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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

Type*	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows	84.66
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water	18.56
Deep Peat	DPT6	Trench drain Block (max 3/100)	72.22
Conifer removal	TCT1	Removal of self-seeded feral conifers from high bog. Fell to waste. This area overlaps with areas that have already had previous drain-blocks.	124.47
Forest to bog	FTB1	Forest to Bog. Agreement with the Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking.	13.75
Marginal land	MLT1	No work required	41.19
Additional Work	AW1 & AW2	Additional drain blocking	71.25
Silt ponds	Silt pond	Silt ponds	2.84
Constraint	Constraint	Constraint	10.45
Total			**439.39**

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

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

8.1 Completed

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

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

- Seek formal approval of the plan, noting the alternative standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Mostrim Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or receptors such as invasive species is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan.

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

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of bunding and drain blocking on deep peat, in addition to stump flipping and hydrological management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.
- Submit an *ex post* report to the scheme regulator to verify the eligible measures to be carried out in year 1 of the scheme, and an *ex ante* estimate for year 2 of the scheme; and so on for each year of the Scheme.

8.4 Long-term (>3 years)

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

8.5 Timeframe

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

8.6 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna, 2022). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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

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

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Scope of rehabilitation

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

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

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Mostrim Bog is environmental stabilisation of the site via wetland creation. This is defined as:

- Carrying out drain blocking to re-wet peat and slow runoff.
- Stabilising potential emissions from the site (e.g. suspended solids).
- Environmental stabilisation.

The outcome is setting the site on a trajectory towards establishment of natural habitats.

Criteria for successful rehabilitation:

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

Rehabilitation targets

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

Rehabilitation measures:

- Blocking field drains in drier sections of the former industrial production area using a dozer to create regular peat blockages (three blockages per 100 m) along each field drain.
- Re-alignment of piped drainage; and management of water levels to create/enhance existing wetlands.
- No measures are planned for the majority of surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

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

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

Table AP 1 Rehabilitation measures and target area.

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

See Drawing number BNM-DR-24-07-20 titled Mostrim **Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

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

APPENDIX II: BOG GROUP CONTEXT

The Mount Dillon Bog Group IPC Licensed area is made up of two sub-groups (Lough Ree- the Mount Dillon Energy Peat Group) and Mostrim) and have been in industrial peat production for several decades. There are 28 defined sites covering a total area of 11,322 ha. Of the 28 sites, 23 mainly straddle the River Shannon within counties Roscommon and Longford, with five sites partially in County Westmeath to the east. Each bog area further comprises a range of habitats from bare milled peat former production areas to re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied ESB power stations at Lanesborough (LRP), the BnM power station at Edenderry, or for horticultural peat products.

Industrial peat extraction in the Mount Dillon Bog Group ceased in 2019. Both power stations ceased using peat by the end of 2020. All remaining peat stocks will also be removed by 2023. Intensive decommissioning and rehabilitation for the Mount Dillon Bog Group started in 2020/2021.

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

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

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

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

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

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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Clooneeny	358	Cutover Bog Industrial peat production commenced at Clooneeny Bog in 1985 and ceased in 2020. Deep peat reserves remain on much of the former production area. Clooneeny is considered a deep peat cutover bog.	Clooneeny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power Most of the former production area on site is bare peat. Some areas of cutaway on site are developing pioneer cutaway vegetation communities.	2020	Finalised 2022 Rehab started in 2022
Cloonmore	102	N/A	Never developed for industrial peat production; scattered plots.	N/A	N/A
Cloonshannagh	494	Cutover Bog Industrial peat production commenced at Cloonshannagh Bog in 1985 and ceased in 2020. Deep peat reserves remain across the former production area. Cloonshannagh is considered a deep peat cutover bog.	Cloonshannagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power Restoration work has been carried out on a 38ha section of high bog within Cloonshannagh Bog. Some of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat.	2020	Draft 2017
Cloonshannagh Rail Link	28	Cloonshannagh rail link is a link between sites.	N/A	N/A	N/A
Corlea	163	Cutaway Bog Industrial peat production commenced at Corlea Bog in 1960 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Corlea is considered a shallow peat cutaway bog.	The former production area at Corlea has already extensively colonised. Pioneer wetland and scrub development has occurred over much of the site. Some wetland and rehabilitation management was undertaken between 2016-2018. Part of site leased to local community development group to develop amenity walkway in association with Longford County Council.	2018	To be finalised 2023
Derraghan	289	Cutover Bog Industrial peat production commenced at Derraghan Bog in the 1940's and ceased in 2020. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derraghan is considered a shallow peat cutover bog.	Derraghan Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derraghan has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2020	Plan Finalised 2021 Rehab commenced 2022
Derryadd	653	Cutover Bog Industrial peat production commenced at Derryadd Bog in 1960 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd is considered a shallow peat cutover bog.	Much of the former production area at Derryadd has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities Derryadd Bog will form part of the footprint of the proposed Derryadd Windfarm Project (in pre-planning).	2020	Draft 2017
Derryadd2	328	Cutover Bog Industrial peat production commenced at Derryadd 2 Bog in 1960 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of	Much of the former production area at Derryadd 2 has been out of peat production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities	2020	To be finalised 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd 2 is considered a shallow peat cutover bog.			
Derryarogue	895	Cutover Bog Industrial peat production commenced at Derryarogue Bog in 1941 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryarogue is considered a shallow peat cutover bog.	Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland, cutaway and scrub vegetation communities. Derryarogue Bog will form part of the footprint of the proposed Derryadd Windfarm project (in pre-planning). An amenity walkway through part of Derryarogue is proposed for the Derryadd Windfarm project	2020	To be finalised 2023
Derrycashel	388	Cutover Bog Industrial peat production commenced at Derrycashel Bog in 1951 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derrycashel is considered a shallow peat cutover bog.	Derrycashel Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities. Some wetland and rehabilitation management was undertaken (c.60ha) between 2014-2015.	2018	Finalised 2021 Rehab started in 2021
Derrycolumb	454	Cutover Bog Industrial peat production commenced at Derrycolumb Bog in the 1980's and ceased in 2019. Most of the former production area still has deep peat reserves. Derrycolumb is considered a deep peat cutover bog.	Derrycolumb Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derrycolumb has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2018	Finalised 2021 Rehab started in 2021
Derrymoylin	356	Cutover Bog Industrial peat production commenced at Derrymoylin Bog in 1985 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Derrymoylin is considered a shallow peat cutover bog.	Derrymoylin Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Most of the former production area on site is bare peat.	2020	Draft 2021
Derryshannoge	452	Cutover Bog Industrial peat production commenced at Derryshannoge Bog in 1985 and ceased in 2020. Deep peat reserves remain across most of the site. Derryshannoge is considered a deep peat cutover bog.	Derryshannoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Derryshannoge has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	To be finalised 2023
Edera	281	Cutover Bog Development for industrial peat production commenced at Edera Bog in 1990's. Active extraction from Edera began in 2003 and ceased in 2018. Edera is considered a deep peat cutover bog.	Edera Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. The majority of Edera Bog former production area is bare peat.	2020	Finalised 2021 Rehab started in 2021

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Erenagh	93	Cutover Bog Development for industrial peat production commenced at Erenagh Bog in 1970's. Erenagh is considered a deep peat cutover bog.	Erenagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Erenagh has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2017
Granaghan	212	Cutover Bog Development for industrial peat production commenced at Granaghan Bog in 1980's. Long-term peat extraction has reduced peat reserves on this bog but deep peat reserves remain on site. Granaghan is considered a deep peat cutover bog.	Granaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. The majority of Granaghan Bog former production area is bare peat.	2020	To be finalised 2023
Killashee	110	Cutover Bog Development for industrial peat production commenced at Killashee Bog in 1985. Killashee is considered a deep peat cutover bog.	Killashee Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. The majority of Killashee Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2020	To be finalised 2023
Knappoge	313	Cutaway Bog Peat Production at Knappoge bog commenced in 1963, and finished in 2018. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Knappoge is considered a shallow peat cutaway bog.	Knappoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. The majority of Knappoge Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2018	Finalised 2021 Rehab started in 2022
Lough Bannow	739	Cutaway Bog Peat Production at Lough Bannow bog commenced in the 1960'S, and finished in 2020. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Lough Bannow is considered a shallow peat cutaway bog.	Much of the former production area at Lough Bannow has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities. A small (35ha) conifer plantation was established in 1980's. Lough Bannow will form part of the footprint of proposed Derryadd Windfarm Project (in pre-planning).	2020	Draft 2017
Moher	483	Cutover Bog Peat Production at Moher bog commenced in the 1960'S, and finished in 2020. Peat depths on the former production area remain relatively deep. Moher is considered a deep peat cutover bog.	Moher Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Moher has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2021
Mount Dillon	592	Cutaway Bog Peat Production at Mount Dillon bog commenced in the 1940'S, and finished in 2020. Peat depths on the former production largely	Mount Dillon Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Mount Dillon has been out of production for some	2020	Draft 2017

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

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

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

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

See Drawing number BNM-DR-23-17-24 titled **Mount Dillon Bog Group**, included in the accompanying Mapbook which illustrates the location of Glenlough Bog and the Mount Dillon Bog Group in context to the surrounding area.

APPENDIX III: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	**Mostrim**	**Area (ha):**	449ha
Works Name:	Mostrim	**County:**	Longford
Recorder(s):	MMC, DF & BO'L	**Survey Date(s):**	01/03/2010, 27/01/2011, 24/04/2014, 05/2016, 25/05/2017 & 16/05/2018

Habitats present (in order of dominance)

The most common habitats present at this site include:

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

Description of site

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

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

Western section

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

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

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

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

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

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

Northern section

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

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

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

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

Eastern section

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

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

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

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

Ardgullion Bog

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

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

None on the main Mostrim peatland.

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

Adjacent habitats and land-use

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

Watercourses (major water features on/off site)

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

Fauna biodiversity

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

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

Mammals

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

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

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

APPENDIX V. BIOSECURITY

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

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

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[4] will be adhered with throughout all rehabilitation measures and activities.

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

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

APPENDIX VI. POLICY AND REGULATORY FRAMEWORK

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

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

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

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

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mountdillon bog group (Ref. PO-504-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Mountdillon group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

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

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

and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

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

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

3 National and EU Climate and Biodiversity Policy

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

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

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

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

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

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

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

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

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

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

7 National conservation designations

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

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

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

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

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

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

11 National Archaeology Code of Practice

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

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

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

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

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

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

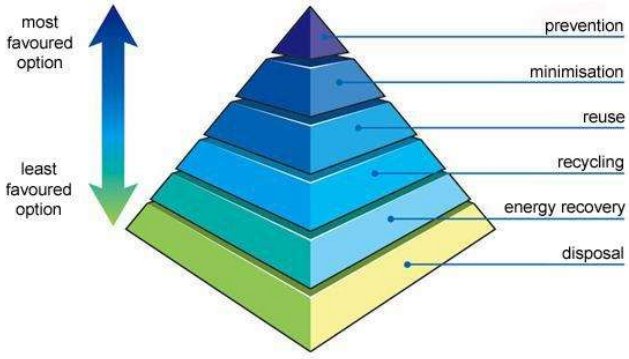
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

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

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

APPENDIX VIII. GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref P0504-01, Mountdillon Group of Bogs located in Co. Longford/Co. Westmeath.

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

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

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

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

2.0 P0504-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

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

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

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

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

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

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

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

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

Classification in accordance Annex II.

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

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

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Mountdillon IPPC Licence P0504-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

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

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Table APX -2 Response summary from Consultees contacted

APPENDIX XII. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.

Code of Practice

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Code of Practice

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

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

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

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

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

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

Bord na Móna	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

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

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

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.534 hectares at Mostrim Bog, Co. Longford on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Mostrim Bog will include:

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

- Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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

Methodology

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

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

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

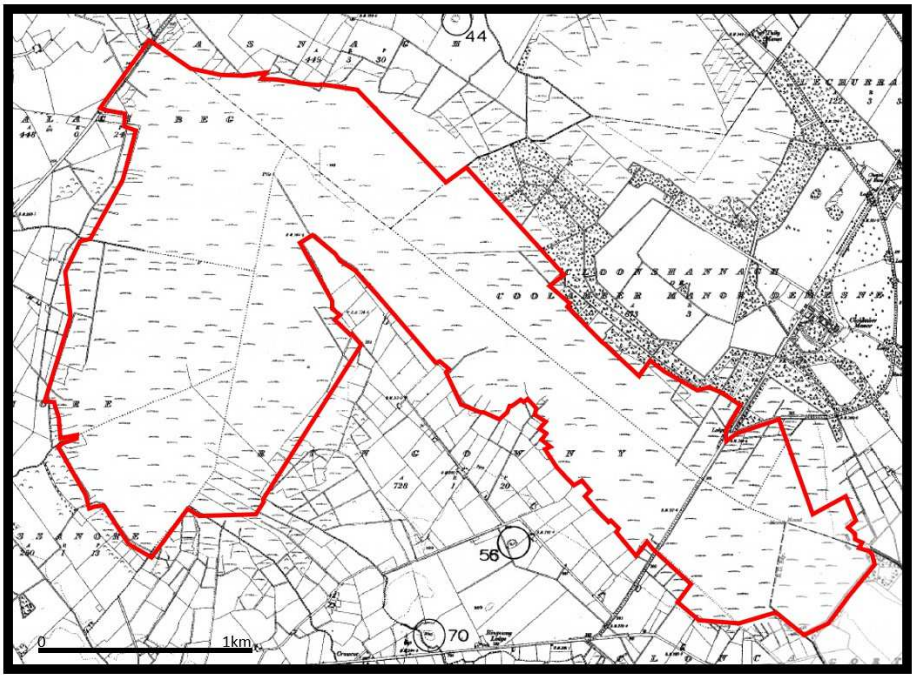

Fig. 1. Mostrim Bog, Co. Longford, detail of the Record of Monuments and Places map sheets Longford No. 15 and Westmeath No. 2. The proposed rehabilitation area is outlined with the red line.

Desktop assessment

Peatland survey

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

Recorded Monuments

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

Sites and Monuments Record

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

Archaeological Excavations

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

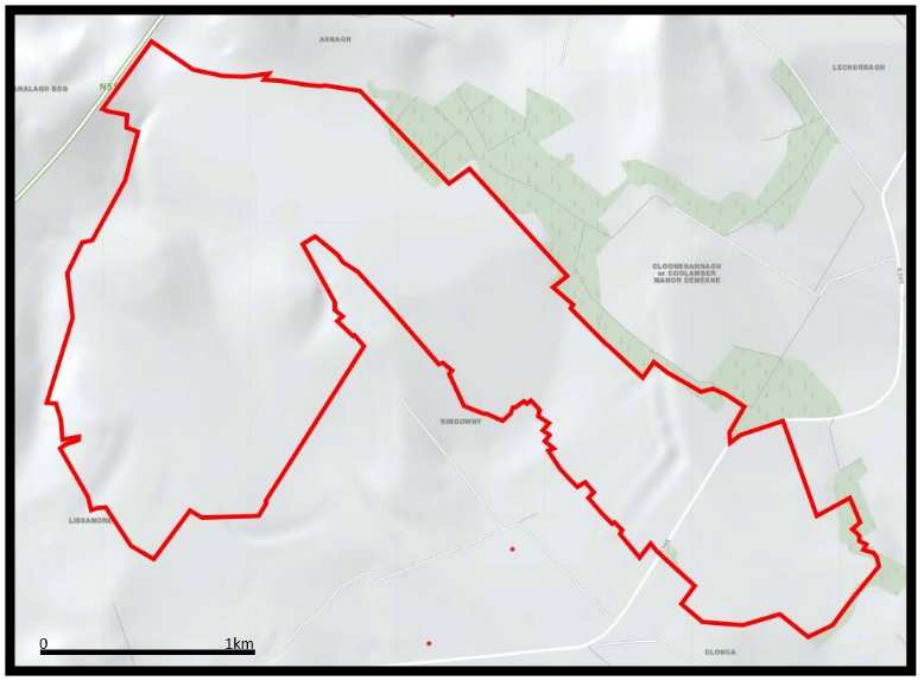

Fig. 2. Mostrim Bog, Co. Longford, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

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

Reported finds

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

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

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

Impact assessment

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

Recommendations

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

Conclusion

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

References

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

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

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

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

Dr. Charles Mount
13 June 2023

APPENDIX XIII. FOREST TO BOG RESTORATION.

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

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

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

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

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

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

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

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

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

APPENDIX XIV. INITIAL WATER QUALITY DATA FROM MOSTRIM BOG

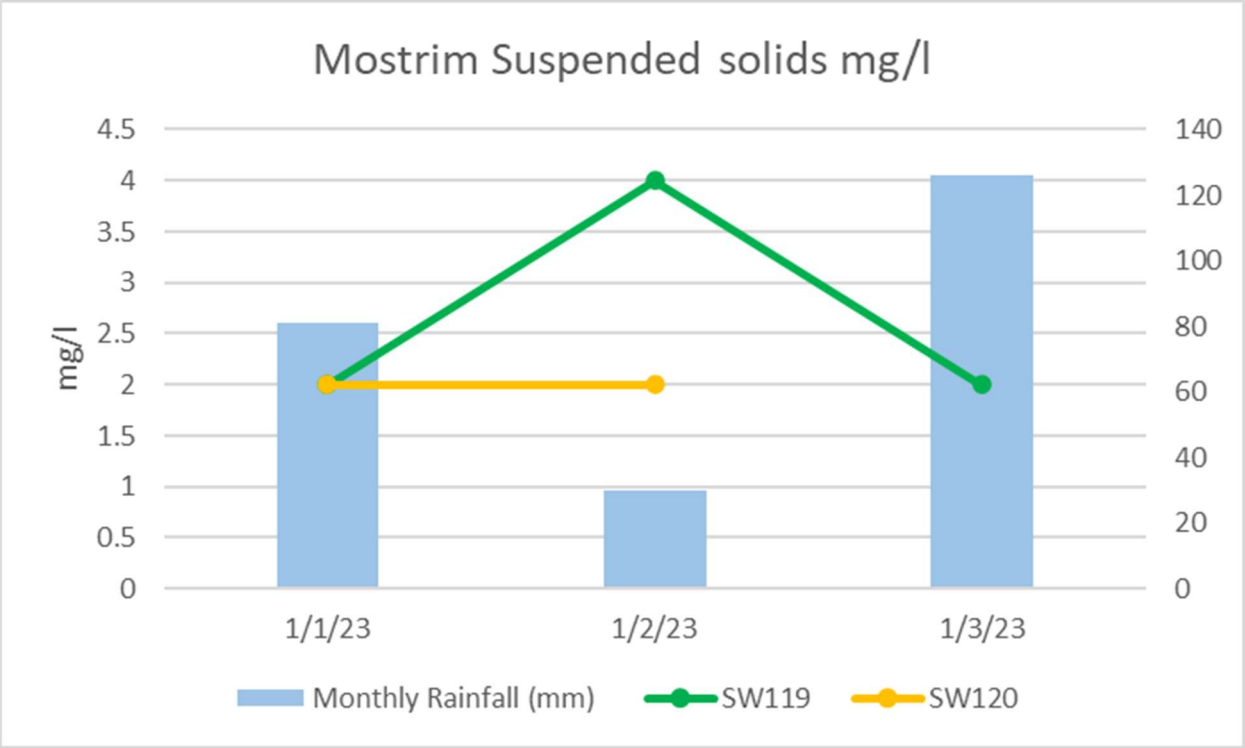

Figure AP13.1. Suspended solids in water sampling at Mostrim bog from different discharge points.35 mg/l is the emission limit value.

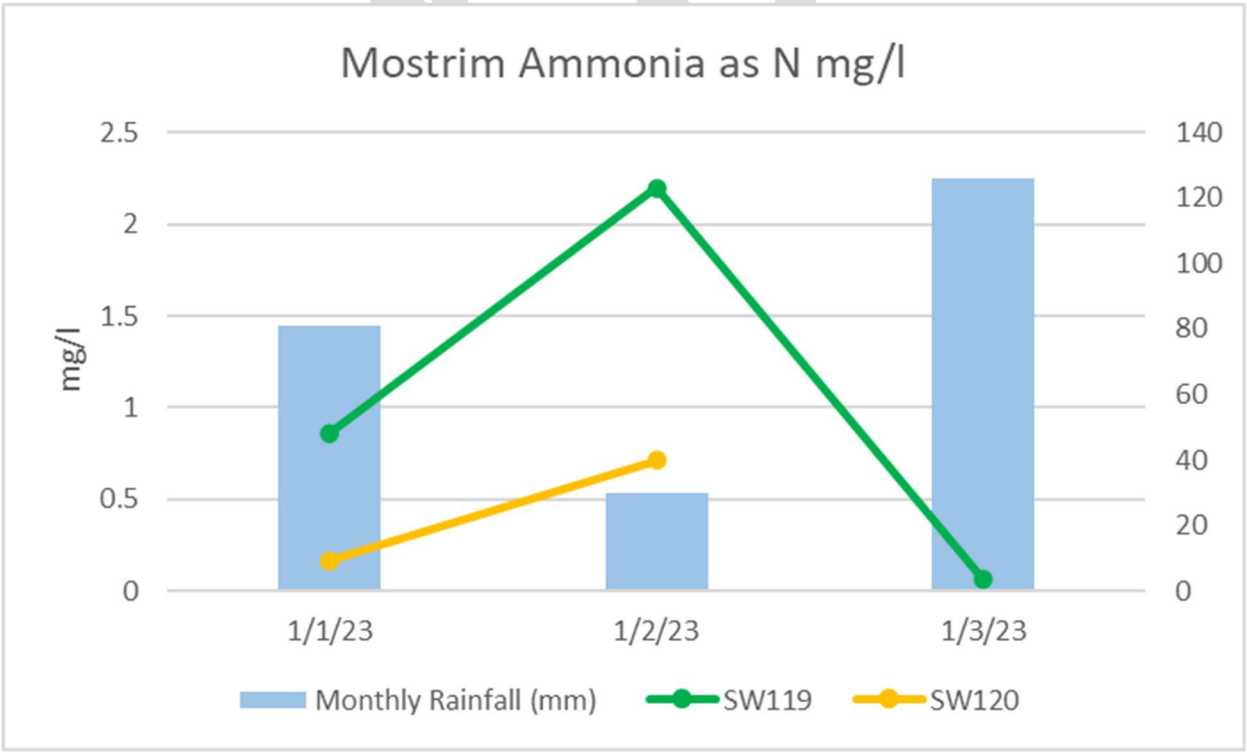

Figure AP13.2. Ammonia concentrations in water sampling from Mostrim bog from different discharge points. The main trigger level for ammonia is 1.42mg/l for reporting to EPA.

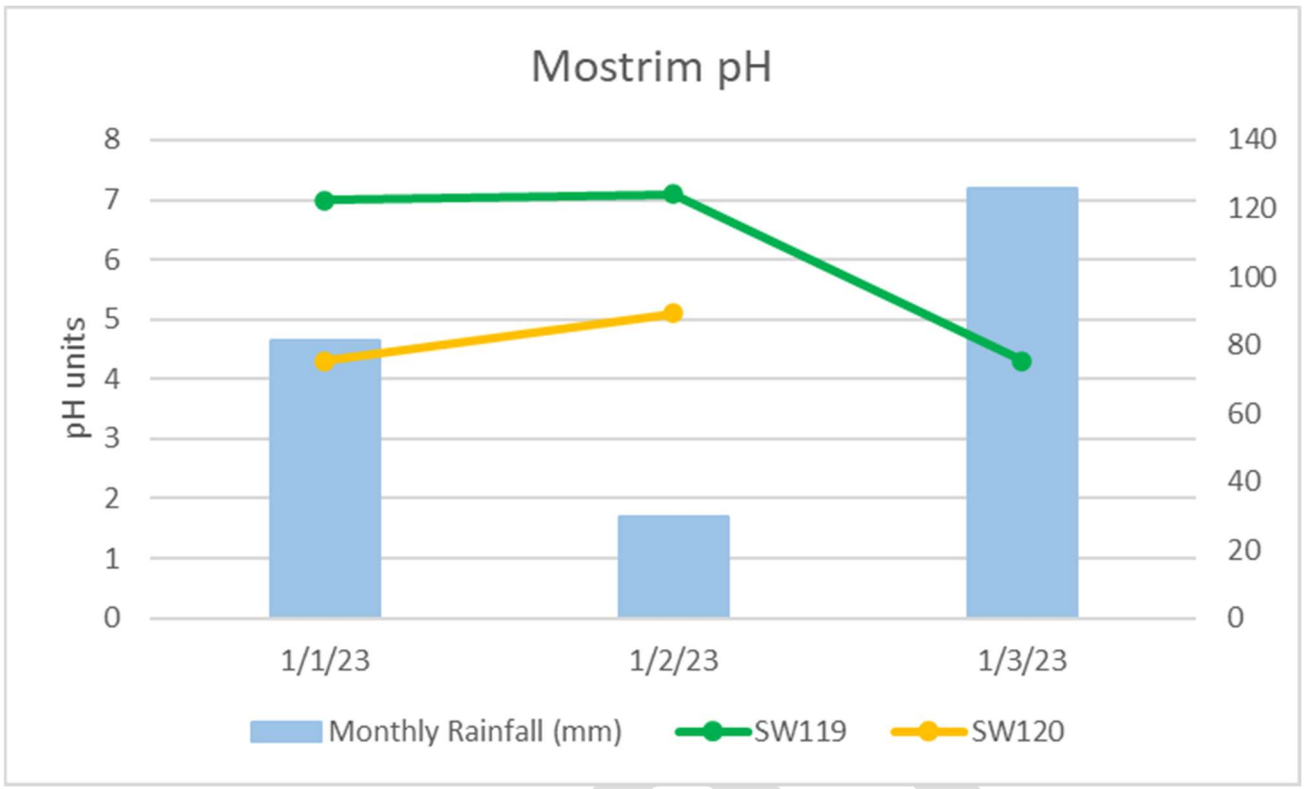

Figure AP13.1. pH in water sampling at Mostrim bog from different discharge points.

Appendix C Site Synopses

SITE SYNOPSIS

Site Name: Ardagullion Bog SAC

Site Code: 002341

Ardaguillion Bog is located 5 km north-east of Edgeworthstown, mainly in the townlands of Cloonshannagh (Coolamber Manor Demesne) and Ardaguillon in Co. Longford. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded in the north-east by the local road running to Coolagherty.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation

Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

This site is the remnant of a much larger bog that is now cutover and afforested. There are areas of hummocks and pools in the centre of the high bog and the ground is wet and quaking. There is one flush in the centre of the high bog. There is a small area of coniferous forestry on a section of high bog and cutover in the south-west of the site. Cutover bog is found all around this site.

Much of the high bog has vegetation typical of a Midland Raised Bog, consisting of Heather (*Calluna vulgaris*), Cranberry (*Vaccinium oxycoccos*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), White Beak-sedge, Bog Asphodel and Bog-rosemary (*Andromeda polifolia*). The bog mosses *Sphagnum papillosum*, *S. capillifolium* and *S. magellanicum* are common on the high bog, and *S. imbricatum* is found at the centre of the site. At the centre of the high bog there are frequent pools that all contain the bog moss *S. cuspidatum*. Great Sundew (*Drosera anglica*) is found in all the pools in the

centre of the bog and Bogbean (*Menyanthes trifoliata*) is present in some. The inter-pool areas have a high bog moss cover. Many hummocks have good clumps of the lichens *Cladonia portentosa* and *C. uncialis*. On the south-west margins of the high bog there are some young Lodgepole Pine (*Pinus contorta*) but none are thriving. There is one very wet flush in the centre of the high bog with Common Cottongrass (*E. angustifolium*), extensive lawns of the bog moss *S. cuspidatum* and some Purple Moor-grass (*Molinia caerulea*). The cutover in the north-west, east and south-east is dominated by Purple Moor Grass, Soft Rush (*Juncus effusus*) and Common Cottongrass. There is some Gorse (*Ulex europaeus*) scrub in the east of the site and extensive Downy Birch (*Betula pubescens*) scrub in the south-east.

Current land uses on the site include forestry, peat-cutting and agriculture. The forestry is found on a small section of high bog and adjoining cutover in the south-west of the site. Areas of cutover in the south and west of the site that were previously forested have only recently been clear-felled. Active peat-cutting is taking place in the north-west, east and south-east of the site. Two fields in the north of the site have been reclaimed for agriculture. Damaging activities associated with these land uses include drainage throughout the site and burning of the high bog. There is also evidence of old burning in the northern part of the high bog. All these activities have resulted in the loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability.

Ardagullion Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. The site supports a good diversity of raised bog microhabitats, including hummocks and pools. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.

SITE SYNOPSIS

SITE NAME: BALLYKENNY-FISHERSTOWN BOG SPA

SITE CODE: 004101

Ballykenny-Fisherstown Bog SPA is located on the border between Counties Longford and Roscommon in the north-central midlands and is underlain by Carboniferous limestone. It is centered around Lough Forbes, a naturally eutrophic lake on the River Shannon system which is fed also from the north by the River Rinn. The lake has well-developed swamp vegetation and displays natural transitions to seasonally flooded grassland, marsh and raised bog. The raised bogs, known as the Ballykenny-Fishertown complex, are separated by the Camlin River, which has further areas of callow grassland. The central core areas of the bogs are quite wet with a good complement of bog mosses (*Sphagnum* spp.) and well-developed hummocks. Ballykenny Bog is unusual in that some of its margins are intact, a rare feature in the Irish midlands. Between the Camlin River and this bog, a complete transition from raised bog to callow grasslands can be seen, while the interface between the bog and lake is colonised by a narrow band of deciduous woodland.

At the time this site was designated as a Special Protection Area (SPA) it was being used by part of the Loughs Kilglass and Forbes Greenland White-fronted Goose population. The geese appear to have since abandoned the peatland sites in favour of grassland sites elsewhere. The site was regularly utilised during the 1980s and Greenland White-fronted Goose is regarded as a special conservation interest for this SPA. The last record of Greenland White-fronted Goose at this site was in 1990/91 (111 individuals).

Merlin and Red Grouse have also been recorded within the site.

The lake and callow grasslands provide good habitat for a range of wintering waterfowl species though most occur in relatively low numbers: Cormorant (51), Whooper Swan (40), Wigeon (419), Teal (444), Tufted Duck (49) and Goldeneye (11) – are counts are two year mean peaks for the period 1998/99 to 1999/2000.

24.4.2012

SITE SYNOPSIS

Site Name: Garriskil Bog SAC

Site Code: 000679

Garriskil Bog SAC consists of two areas of raised bog: Garriskil Bog, which covers 324.81 ha and lies 3 km east of Rathowen in Co. Westmeath; and a small outlier, within the townland of Derrya, which covers 22.9 ha and lies 2.2 km to the east on the northern shore of Lough Derravaragh. Both bogs are remnants of the large river floodplain bogs which developed where the River Inny enters and leaves Lough Derravarragh. Garriskil Bog is bounded to the south-east and south-west by the rivers Inny and Riffey and by the Dublin-Sligo railway line to the north. It is considered an exceptional example of a midland raised bog and includes 170.26 ha of uncut raised bog and 154.55 ha of surrounding areas which includes 109 ha of cutover bog. The section at Derrya (which comprises part of Lough Derravaragh Bog NHA (site code 000684)) has been restored as part of an EU LIFE project. The site consists of 2.5 ha of high bog and 20.4 ha of cutover, all of which, except for a broadleaf woodland fringe along the River Inny, was afforested in the 1970s. All the conifer plantations were recently clear-felled and restored by drain-blocking. It is bordered by open high bog to the north-east, by the River Inny to the west and by cutover bog grading into Lough Derravaragh to the south-east. The bedrock geology of both sites is carboniferous limestone.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation

Active Raised Bog (ARB) habitat comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded Raised Bog (DRB) habitat corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration to ARB within 30 years. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

Garriskil Bog is a large raised bog with 51.7% of the original bog still present. It contains a large, wet high quality central core of active raised bog which comprises approximately 50.87 ha (30%) of the uncut high bog area. There are extensive, well developed systems of pools and hummocks present. The bog mosses *Sphagnum imbricatum, S. fuscum* and the moss *Leucobryum glaucum* are important components of the hummocks, which are frequently crowned by the moss *Racomitrium lanuginosum* and sometimes colonised by Bilberry (*Vaccinium myrtillus*). The numerous areas of inter-connecting pools are mostly dominated by Rhynchosporion vegetation which forms floating rafts on the water surface. Typical plant species present include the bog mosses *Sphagnum cuspidatum* (generally dominant) and *S. auriculatum*, the liverwort *Cladopodiella fluitans*, White Beak-sedge, Bogbean (*Menyanthes trifoliata*), bladderworts (*Utricularia* spp.), Common Cottongrass (*Eriophorum angustifolium*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a sedge species considered to be rare on a national basis, is present in some of the bog pools. The areas between the pools support occasional wet and quaking lawns of White Beak-sedge, as well as Bog Asphodel.

The vegetation of the rest of the high bog, including the DRB, tends to be dominated by Heather (*Calluna vulgaris*), Deergrass, Bog Asphodel, cottongrasses (*Eriophorum vaginatum* and *E. angustifolium*) and Cross-leaved Heath (*Erica tetralix*). The distribution and relative abundance of these species varies with peat wetness. *Sphagnum* cover is generally less than 30%. In these drier areas the cover of the lichen *Cladonia portentosa* can be locally high. Outside the ARB area, pool complexes are rare and where they do occur they tend to be dominated by shallow open water or algal mats. Small areas of Rhynchosporion vegetation also occur here, however the habitat is, in general, not well developed outside the ARB area. In a number of places the high bog is being invaded by Downy Birch (*Betula pubescens*) and pines. Often the pines are associated with small flushes dominated by species such as Purple Moor-grass (*Molinia caerulea*), Soft Rush (*Juncus effusus*), Bramble (*Rubus fruticosus* agg.) and Heather.

The large areas of old cutover bog provides an additional habitat where Purple Moor-grass and Heather dominate, along with cottongrasses, while in some parts Downy Birch woodland is developing. Along the north-east margin of the high bog a narrow band of fen-grassland occurs.

Past drainage of the bog, associated with arterial drainage of the Inny and Riffey rivers and peat cutting, has unfavourably impacted on the site and led to widespread subsidence and drying out. The northern area of the site was also affected in the 1990s by intensive surface drainage which directly affected the area of ARB reducing it from 71.23 ha to 45.12 ha. Those drains were blocked by NPWS in the late 1990s and by 2014 the area of ARB had increased by 5.75 ha to 50.87 ha. There has been no turf cutting since the 1990s and though burning has caused damage in the past, there has been no severe fire in recent years.

The outlier bog at Derrya comprises a part of Lough Derravaragh Bog NHA. Lough Derravaragh Bog is a remnant of a larger area of bog much of which has now been

cutover and reclaimed for forestry and agriculture with only 48 ha (approximately 40%) of high bog remaining. A small area of Active Raised Bog habitat is present and, based on hydrological modelling, an area of 2.1 ha is considered to be Degraded Raised Bog habitat. In Derrya Bog both the high bog and cutover were planted with a closed canopy plantation of Sitka Spruce (*Picea sitchensis*) in the 1970s. This conifer plantation was clear-felled in 2011 and the drains were blocked with peat dams in 2013. As a consequence, water-levels have risen and some raised bog vegetation has returned to the wetter areas of the high bog. These areas contain Ling Heather, Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bilberry, Purple Moor-grass and Tormentil (*Potentilla erecta*) with the bog moss *Sphagnum palustre* and, in the wet drains, *Sphagnum fallax*. There is some scattered Birch and Sitka Spruce regenerating and these are being controlled. On the cutover bog, once the plantations were clear-felled, the ground layer became dominated by the moss *Hypnum jutlandicum*, with Bracken, Bramble, Holly (*Ilex aquifolium*), Ivy (*Herdera helix*), Bilberry, Creeping Bent-grass (*Agrostis stolonifera*), Tufted Hair-grass (*Deschampsia cespitosa*), Creeping Butter-cup (*Ranunculus repens*), Meadow-sweet (*Filipendula ulmaria*), Soft Rush, Honeysuckle (*Lonicera pericylmenum*) and scattered Birch. There is some Lodgepole Pine (*Pinus contorta*) regeneration, which is being controlled. Most of this area will develop into dry native broadleaf woodland but 4.5 ha may be wet enough to support wet woodland conditions.

A draft restoration plan has been developed for Garriskil Bog to help meet the national conservation objectives for raised bogs. One of the key objectives of that plan is to restore the area of ARB to 84.9 ha. The area of ARB was reported as 50.9 ha during the latest monitoring survey (2014) and it has been concluded that there is 31.6 ha of Degraded Raised Bog (DRB) on the high bog which can be restored to ARB with the appropriate restoration measures. There is also long-term potential for 2.4 ha of bog peat-forming habitats (BPFH) to develop if restoration measures are undertaken on cutover areas. Such detailed objectives have yet to be developed for the Derrya Bog subsite of the SAC but will be produced as part of the restoration plan for the Lough Derravaragh Bog NHA site. Current information suggests that up to 4.5 ha of cutaway could rewet sufficiently to support wet native woodland. Derrya Bog is being actively managed for conservation by the landowner, Coillte, as part of an EU LIFE Project and most of the required restoration measures have already been carried out. An After LIFE management plan is being developed by Coillte for the future conservation management of that part of the SAC and its conservation management should support the retention and redevelopment of Active Raised Bog habitat within Lough Derravaragh Bog NHA.

Garriskil Bog SAC is a site of considerable conservation significance comprising two subsites, Garriskil Bog and Derrya Bog which contain raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. It contains good examples, covering significant areas, of the E.U. Habitats Directive Annex I habitats Active Raised Bog, Degraded Raised Bog (which is being restored to the priority Annex 1 habitat Active raised bog), and Depressions on peat substrates (Rhynchosporion). The site already supports a large area of high quality raised bog microhabitats, which is unusual for a site in the east Midlands, including some very

well developed hummock/hollow complexes and has a large area with the potential for restoration to ARB. Although the Derrya Bog subsite of the SAC is small (22.3 ha) and lacks annex habitats it has been restored and has the potential to support the retention of ARB and the restoration of DRB to ARB in Lough Derravaragh Bog NHA. Ireland has a high proportion of the total E.U. resource of Atlantic raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

SITE SYNOPSIS

SITE NAME: GARRISKIL BOG SPA

SITE CODE: 004102

Garriskil Bog SPA, a raised bog, is located 3 km west of Lough Derravaragh and 3 km east of Rathowen in Co. Westmeath. It is bounded to the south-east and south-west by the rivers Inny and Riffey. The bog is underlain by calcareous shales with a low permeability. A substantial area of uncut high bog remains though much of this is classified as degraded raised bog. Old cutaway bog surrounds the high bog and parts of this are dominated by Downy Birch (*Betula pubescens*) scrub.

At the time this site was designated as a Special Protection Area (SPA) it was known to be utilised by part of an internationally important population of Greenland White-fronted Goose centred around the midland lakes. The geese appear to have abandoned these peatland sites in favour of grassland sites elsewhere. Greenland White-fronted Goose is regarded as a special conservation interest for this SPA.

The site is within the range of the midland lakes Greenland White-fronted Goose flock, which is centred on four major lakes (Derravaragh, Iron, Owel and Ennell). The last record of Greenland White-fronted Goose at this site was in 1986/87 (43 individuals).

The site is within the breeding territory of a pair of Merlin. Nesting probably occurs outside of the site boundary, with the bog being used primarily as a foraging area.

Several wader species breed within the site – Snipe (an estimated 5 pairs), Curlew (2-3 pairs) and Redshank (2 pairs). Barn Owl has been recorded hunting along the margins of the bog, while Red Grouse is considered to occur occasionally.

24.4.2012

SITE SYNOPSIS

SITE NAME: LOUGH DERRAVARAGH SPA

SITE CODE: 0004043

Lough Derravaragh is located approximately 12 km north of Mullingar town in Co. Westmeath. It is a medium- to large-sized lake of relatively shallow water (maximum depth 23 m). The lake extends along a south-east/north-west axis for approximately 8 km. The Inny River, a tributary of the River Shannon, is the main inflowing and outflowing river. It is a typical limestone lake with water of high hardness and alkaline pH, and is classified as a mesotrophic system.

At the western end of the lake are extensive areas of swamp dominated by Common Reed (*Phragmites australis*). Elsewhere along the shore there is freshwater marsh vegetation dominated by sedges (*Carex* spp.) and tussock-forming grasses such as Tufted Hair-grass (*Deschampsia cespitosa*) and fescues (*Festuca* spp.), with a range of flowering herbs. The lakeshore is a mineral-rich substrate and several plant species of fen habitats occur in abundance, such as Black Bog-rush (*Schoenus nigricans*) and Long-stalked Yellow-sedge (*Carex lepidocarpa*). Deciduous woodland fringes the lake in some areas.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Pochard, Tufted Duck and Coot. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lough Derravaragh is one of the most important midland lakes for wintering waterfowl. It supports nationally important populations of Whooper Swan (102), Pochard (3,129), Tufted Duck (1,073) and Coot (1,358) - all counts are mean peaks for the five winters 1995/96-1999/2000. The Pochard population is of particular note as it represents over 6% of the all-Ireland population total, and at times has exceeded the threshold for international importance (i.e. 3,500). Other species which occur include Mute Swan (159), Little Grebe (42) Great Crested Grebe (34), Cormorant (34), Wigeon (207), Teal (52), Mallard (195), Pintail (6), Shoveler (12), Goldeneye (46), Golden Plover (158) and Lapwing (1,079). The lake is occasionally used as a roost site by small numbers of Greenland White-fronted Goose.

Lough Derravaragh is of major ornithological importance as it regularly supports nationally important populations of four species, and at times is used by the internationally important population of Greenland White-fronted Goose which is based in the region. Also of note is that three of the species which occur at the site, Greenland White-fronted Goose, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. Lough Derravaragh is a Ramsar Convention site.

7.7.2014

SITE SYNOPSIS

Site Name: Lough Forbes Complex SAC

Site Code: 001818

This site consists of a number of different habitats, and is centred around Lough Forbes, a lake formed by a broadening of the River Shannon. As well as the lake itself, there is also a series of raised bogs, callow grasslands and a variety of other aquatic and terrestrial habitats to the west of Newtown Forbes on the Longford/Roscommon boundary.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3150] Natural Eutrophic Lakes
[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation
[91E0] Alluvial Forests*

Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

The raised bogs, located on the south-eastern shore of Lough Forbes, are known as the Ballykenny-Fishertown complex. These bogs are of international importance as unique examples of Shannon River edge bogs and they are also the most northerly intact bogs adjacent to the River Shannon. The central core areas of the bogs are quite wet and spongy, with a good complement of bog mosses and well developed hummocks. Ballykenny Bog is unusual in that some of its margins are intact, a rare feature in the Irish midlands. Between the Camlin River and this bog, a complete transition from raised bog to callow grasslands can be seen, while the interface between the bog and lake is colonised by a narrow band of deciduous woodland.

In the wetter areas of the bog surface, Rhynchosporion vegetation is sometimes found. *Sphagnum cuspidatum* is frequent, along with Bogbean (*Menyanthes trifoliata*), White Beak-sedge and Common Cottongrass (*Eriophorum angustifolium*). The relatively rare Brown Beak-sedge has also been recorded. Degraded raised bog is largely confined to the marginal areas of uncut high bog where drainage effects from adjoining turbary are most pronounced. The plant species composition of degraded raised bog is generally similar to that of active raised bog, however species typical of very wet bog conditions are either much reduced in abundance or absent. In general, the most frequent vascular species are Deergrass, Common Cottongrass, Hare's-tail Cottongrass (*E. vaginatum*), Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Carnation Sedge. The most frequent lower plant species present are the lichen *Cladonia portentosa* and the mosses *Hypnum cupressiforme* and *Sphagnum capillifolium*.

Lough Forbes is a medium sized lake underlain by limestone. It has extensive swamps of Common Reed (*Phragmites australis*) which provide good cover for wildfowl, although numbers have declined recently, possibly due to the increase in cruisers and other pleasure boats. Freshwater marshes are also a common feature along the lakeshore. These areas contain a good diversity of aquatic and emergent vegetation, comprised of species such as sedges (*Carex vesicaria, C. rostrata and C. acuta*), Bogbean, Common Spike-rush (*Eleocharis palustris*), Fine-leaved Water-dropwort (*Oenanthe aquatica*), Water Plantain (*Alisma plantago-aquatica*), Cowbane (*Cicuta virosa*), Common Club-rush (*Scirpus lacustris*) and Reed Canary-grass (*Phalaris arundinacea*).

The site contains extensive areas of woodland. The wet woodland types present include willow woodland, Ash-Alder woodland on slightly higher ground, Ash-oak woodland at the highest levels and birch woodlands on dried-out or cut-away bog. The principal woodland type, however, is a drier mixed oak-Ash woodland. The total area of woodland within the SAC is estimated at over 170 ha, of which at least 40 ha are alluvial woodland. Several individual woodlands exceed 40 ha and there is good continuity. There is little woodland on the Roscommon side of the lough. The majority of the woodland within the SAC is recorded as having been present in part or in full on the 1st edition Ordnance Survey maps from the 1840s. These may be considered therefore as potentially ancient or long-established woodlands, a conclusion reinforced by the presence of a number of relatively rare species and ancient woodland indicator species.

The dry Pedunculate Oak (*Quercus robur*) – Ash (*Fraxinus excelsior*) woodland is dominated by Pedunculate Oak and Ash, up to 20 m tall, with occasional Alder (*Alnus glutinosa*), Rowan (*Sorbus aucuparia*) and Yew (*Taxus baccata*), as well as a variety of exotic species, principally Sycamore (*Acer pseudoplatanus*), Beech (*Fagus sylvatica*) and lime (*Tilia* sp.). The shrub layer is variable in cover and species, with Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*), Hawthorn (*Crataegus monogyna*), Spindle (*Eunoymus europaea*), willows (*Salix caprea* and *S. cinerea* subsp. *oleifolia*) and the relatively rare species Bird Cherry (*Prunus padus*), Buckthorn (*Rhamnus catharticus*) and Alder Buckthorn (*Frangula alnus*). The introduced and invasive

Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*) are locally abundant. The herb layer consists of Bramble (*Rubus fruticosus* agg.), Enchanter's-nightshade (*Circaea lutetiana*), violet (*Viola* sp.), Bluebell (*Hyacinthoides non-scripta*) and several species of ferns, e.g. *Dryopteris filix-mas, D. affine, D. dilatata* and *Polystichum setiferum*.

Areas of birch woodland are dominated by birch, occasional Alder on more base-rich sites, Rowan, Holly and Scots Pine (*Pinus sylvestris*). Rhododendron forms thickets in some stands. The herb layer is relatively species-poor with Bramble, Purple Moor-grass (*Molinia caerulea*), Bracken (*Pteridium aquilinum*), Wood-sorrel (*Oxalis acetosella*) and abundant mosses, e.g. *Polytrichum* species.

Extensive areas of alluvial woodland fringe the shores of Lough Forbes and the Shannon, as well as extending along some of the tributaries. Three main types occur: willow woodlands, Alder-Ash woodlands and Ash-oak woodlands.

The willow woodland stands are generally found fringing the rivers and lake, and are usually quite narrow due to the hilly/boggy landscape which tends to rise steeply from the river. This results in a mostly narrow floodplain, but in places, lower lying ground may be flooded at times of high water levels. These woodlands are generally structurally complex stands of multi-stemmed Rusty Willow (*Salix cinerea* subsp. *oleifolia*), up to 8 m tall, where the roots are in permanently waterlogged, acidic to neutral, base-rich silty soils. Birch (*Betula* sp.) and Alder are occasional. A thin shrub layer of Hawthorn may be present in drier locations. Ivy (*Hedera helix*) and Bramble occur only in small amounts. The field layer consists of tall herbaceous species such as Reed Canary-grass, Yellow Loosestrife (*Lysimachia vulgaris*), Purple Loosestrife (*Lythrum salicaria*), Meadowsweet (*Filipendula ulmaria*), Marsh Ragwort (*Senecio aquaticus*), Yellow Iris (*Iris pseudacorus*) and Marsh-marigold (*Caltha palustris*). The moss layer is poorly developed with just a scattering of species such as *Rhizonmium punctatum* and *Mnium hornum*.

Alder-Ash woodland is the most extensive type of alluvial woodland at this site. This community occurs behind the willow woodland on slightly more elevated land that nonetheless is regularly flooded. The main canopy species are Alder and Ash, with occasional Pedunculate Oak, birch and Sycamore. Rusty Willow and Hawthorn are the principal shrub species, with a small amount of Guelder-rose (*Viburnum opulus*), Bird Cherry and Hazel. The herb flora is species-rich and is dominated by Meadowsweet, with Remote Sedge (*Carex remota*) and Golden Saxifrage (*Chrysosplenium oppositifolia*). Geophytes include Bluebell and Lesser Celandine (*Ranunculus ficaria*). Other characteristic species include Ivy, Enchanter's-nightshade, Reed Canary-grass, Yellow Iris, Cuckooflower (*Cardamine pratensis*), Yellow Loosestrife and Broad Buckler-fern (*Dryopteris dilatata*). Where grazing occurs, Creeping Bent (*Agrostis stoloniifera*) is abundant. The moss layer is mostly poorly developed, with *Thamnobryum alopecurum, Calliergonella cuspidata* and *Conocephalum conicum* being the most frequent species. The rare Elongated Sedge (*Carex elongata*) occurs locally.

Ash-Pedunculate Oak alluvial woodland occurs behind the Alder-Ash woodland where the land is subject to occasional flooding or where the water-table is high. Ash and Pedunculate Oak are the dominant canopy species, with occasional Sycamore, Beech and Horse-chestnut (*Aesculus hippocastanum*). The shrub layer is formed chiefly from Hazel, with Elder (*Sambucus nigra*), Hawthorn and occasional Bird Cherry, along with regenerating Ash and Sycamore. It is essentially a wetter version of the Oak-Ash woodland described above, but the field layer is characterised by moisture-loving species such as Golden Saxifrage, Remote Sedge, Wood-sedge (*Carex sylvatica*) and Bugle (*Ajuga reptans*). While the field layer is diverse and species-rich, the moss layer is only moderately developed, the most common species being *Thamnobryum alopecurum*, *Thuidium tamariscinum* and *Rhytidiadelpus triquetrus*.

Areas of callows (winter-flooded grassland) along the Camlin River are also included within this site. Like the internationally important Shannon Callows, these wet grasslands are included for their botanical interest as well as for the waterbirds that they support. Both Lough Forbes and the callow grasslands provide good habitat for a range of wintering waterfowl species though most occur in relatively low numbers. Counts in two of the winters in the 1995/96 to 1999/00 period are as follows: Cormorant (51), Whooper Swan (40), Wigeon (419), Teal (444), Shoveler (6), Tufted Duck (49) and Goldeneye (11). The bogs were formerly used by part of the Loughs Kilglass and Forbes Greenland White-fronted Goose wintering population, but these appear to have now been abandoned in favour of grassland sites elsewhere. Merlin has been recorded within the site and may nest. Whooper Swan and Merlin are listed on Annex I of the E.U. Birds Directive. Red Grouse are known from the bogs. Red Grouse is a Red Listed species in Ireland as it has declined in numbers in recent decades.

The raised bogs are vulnerable to water loss from peat-cutting and drainage, though ongoing restoration work involving blocking of drains is occurring. There are no known threats to the wintering birds though the increased use of the River Shannon system by leisure craft could cause disturbance.

The importance of the Lough Forbes site lies in its excellent diversity of habitats, some of which, for example the raised bogs, are rare and threatened. The site is also of ornithological importance for its wintering waterfowl, breeding Merlin and Red Grouse. The presence of Whooper Swan and Merlin is of particular note as these species are listed on Annex I of the E.U. Birds Directive.

Appendix D Drawings of Proposed Rehabilitation Methodologies

Bord na Móna

Mostrim Bog
Rehab Plan
GIS Map Book
2023

MAKING COMPLEX EASY

Document Control Sheet	
Document Name:	Mostrim Bog Rehab Plan GIS Map Book 2023
Document File Path:	
Document Status:	**Final v1.0**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	14	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	ML	MMcC
Date:	28/03/2023	28/03/2023	28/03/2023
Rev. 1.0	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	ML	MMcC
Date:	29/06/2023	29/06/2023	29/06/2023

Bord na Móna would like to thank and acknowledge RPS Consultants for their input into this document and the provision of data for inclusion in these maps.

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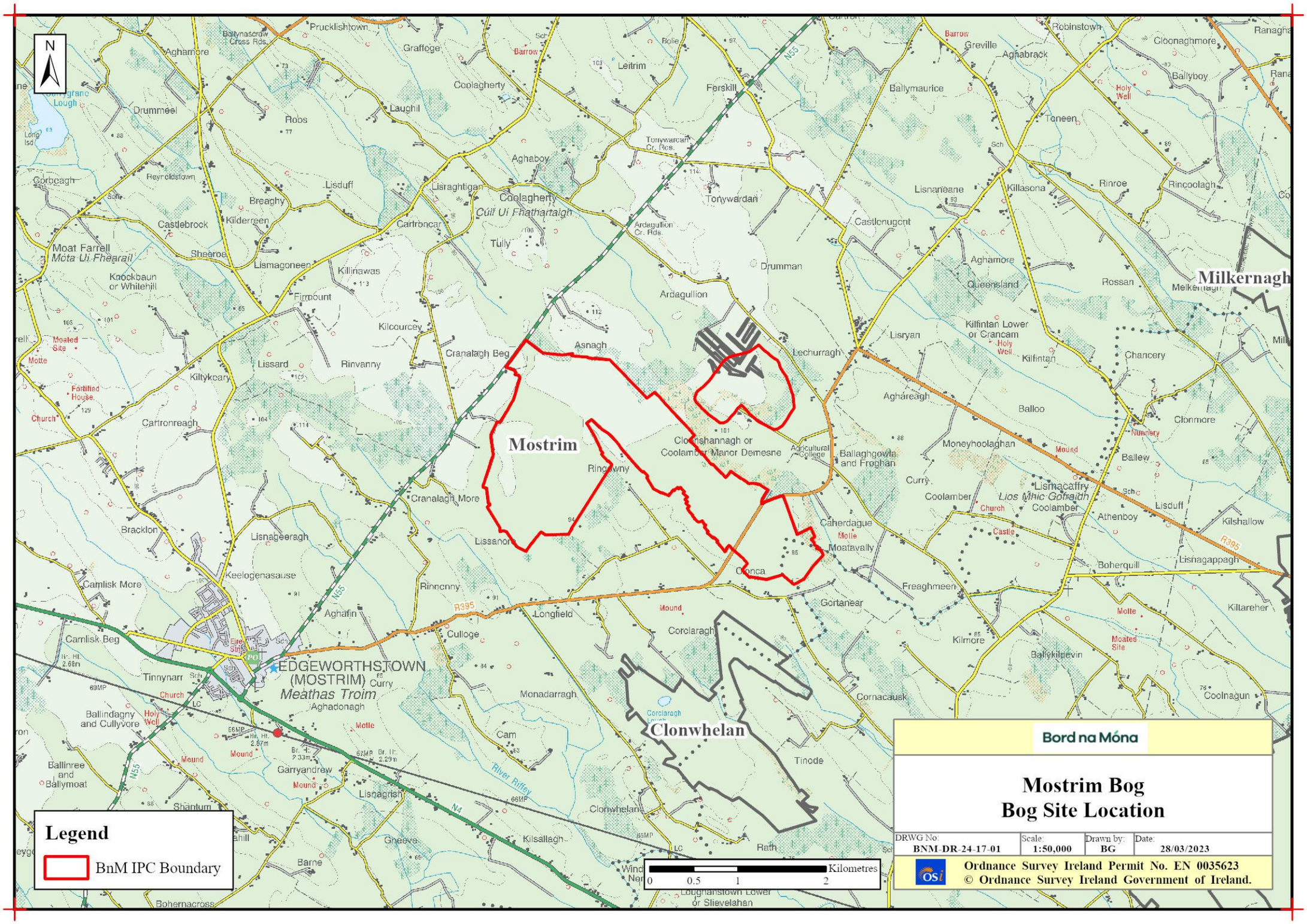

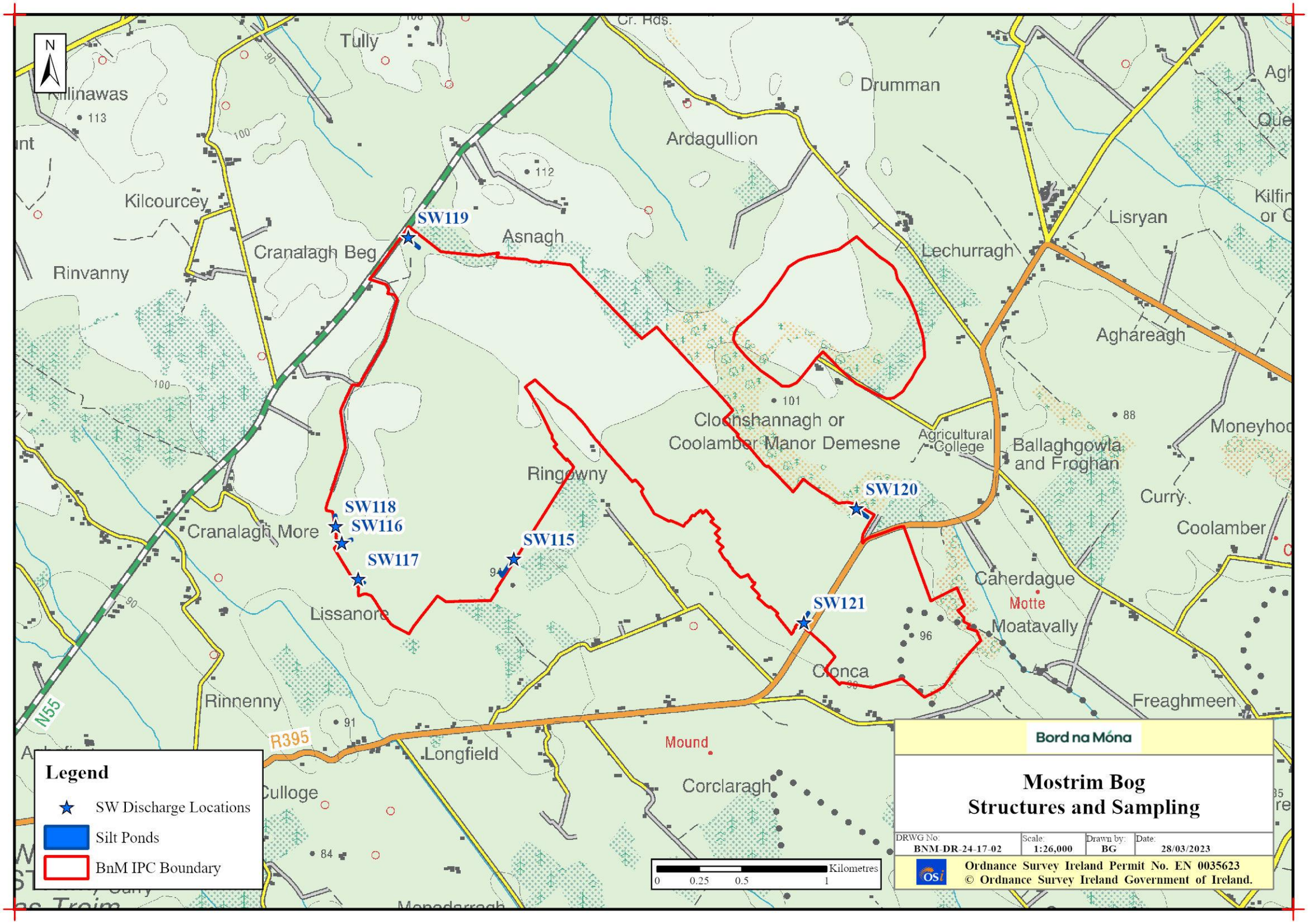
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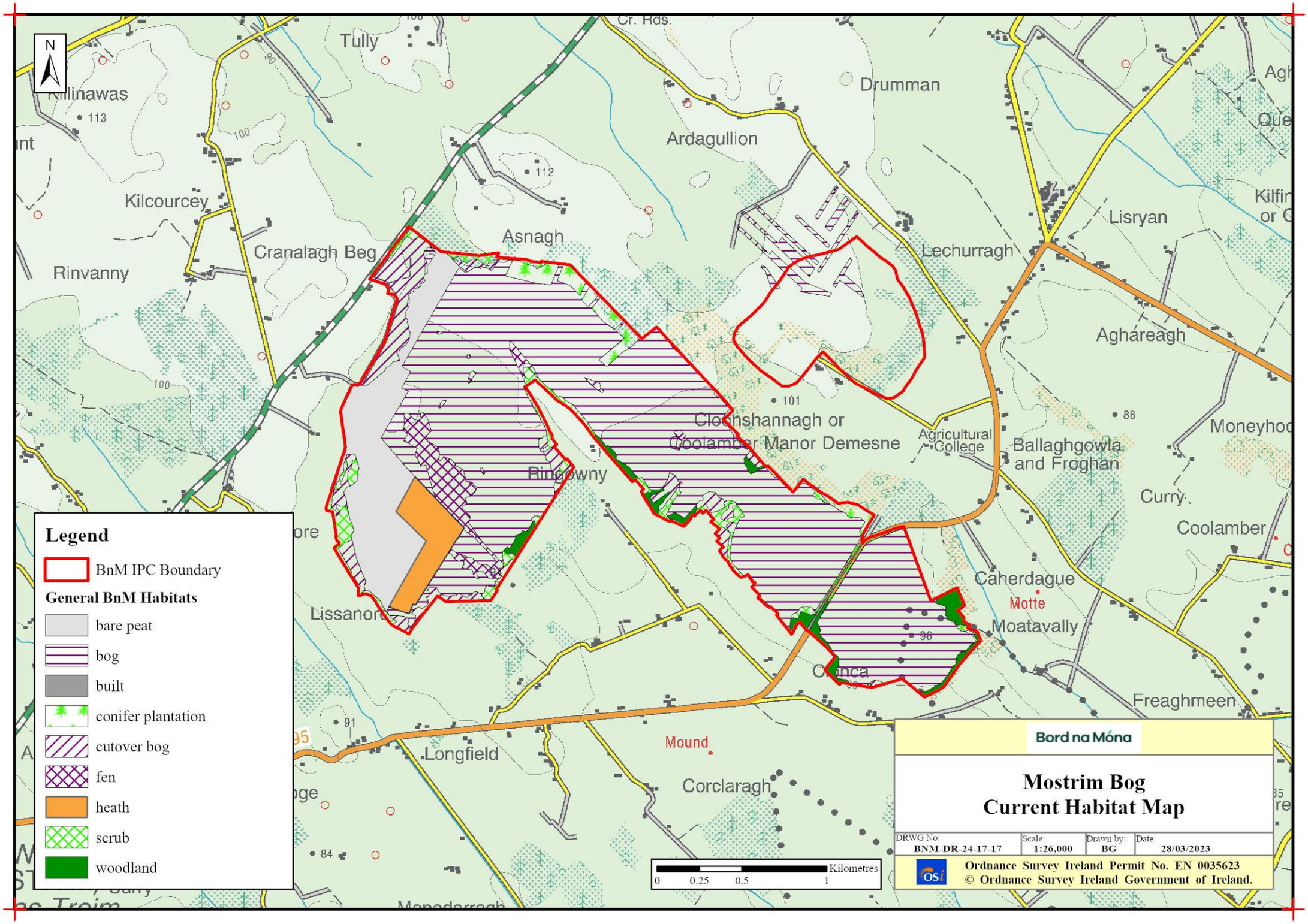

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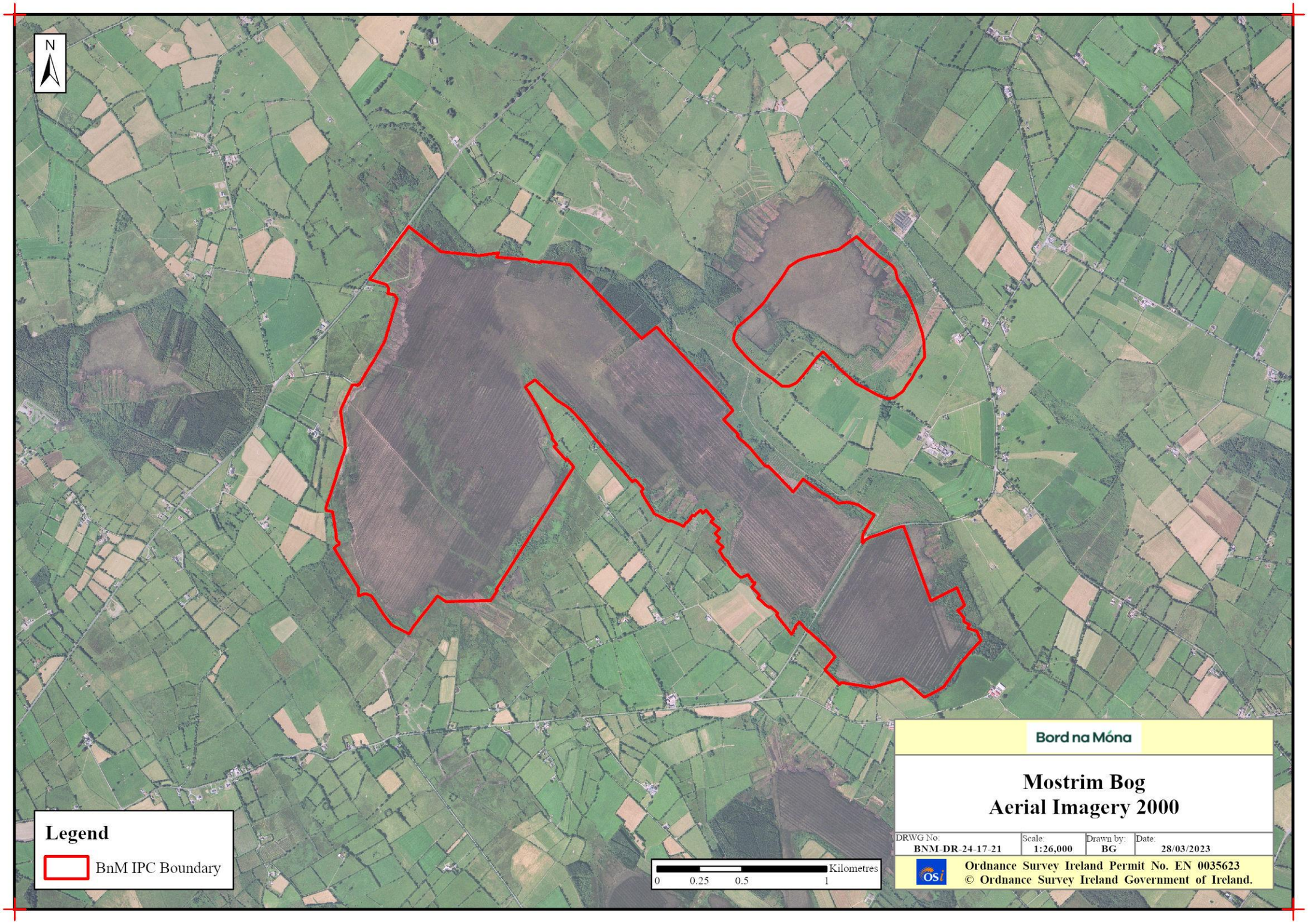

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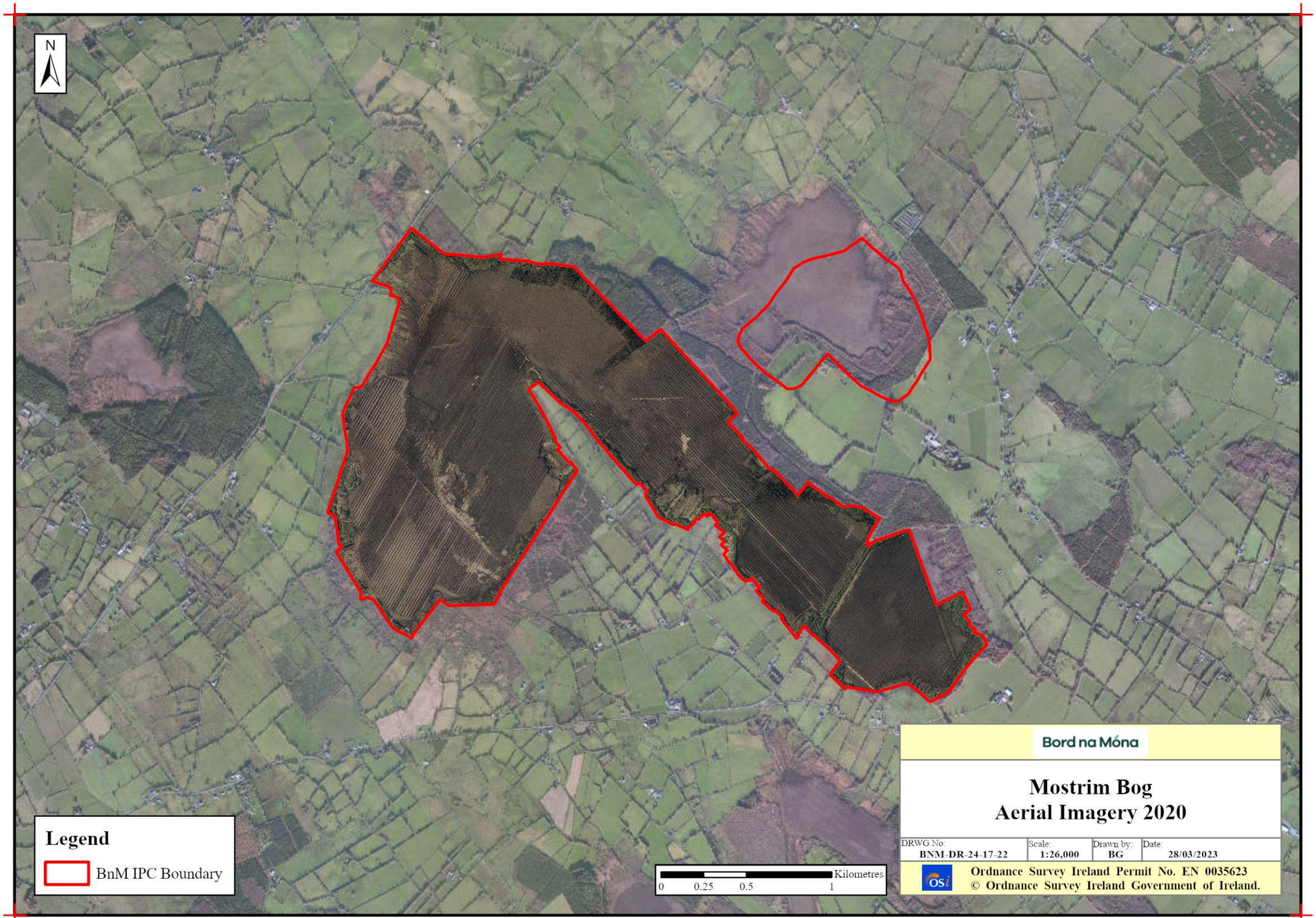

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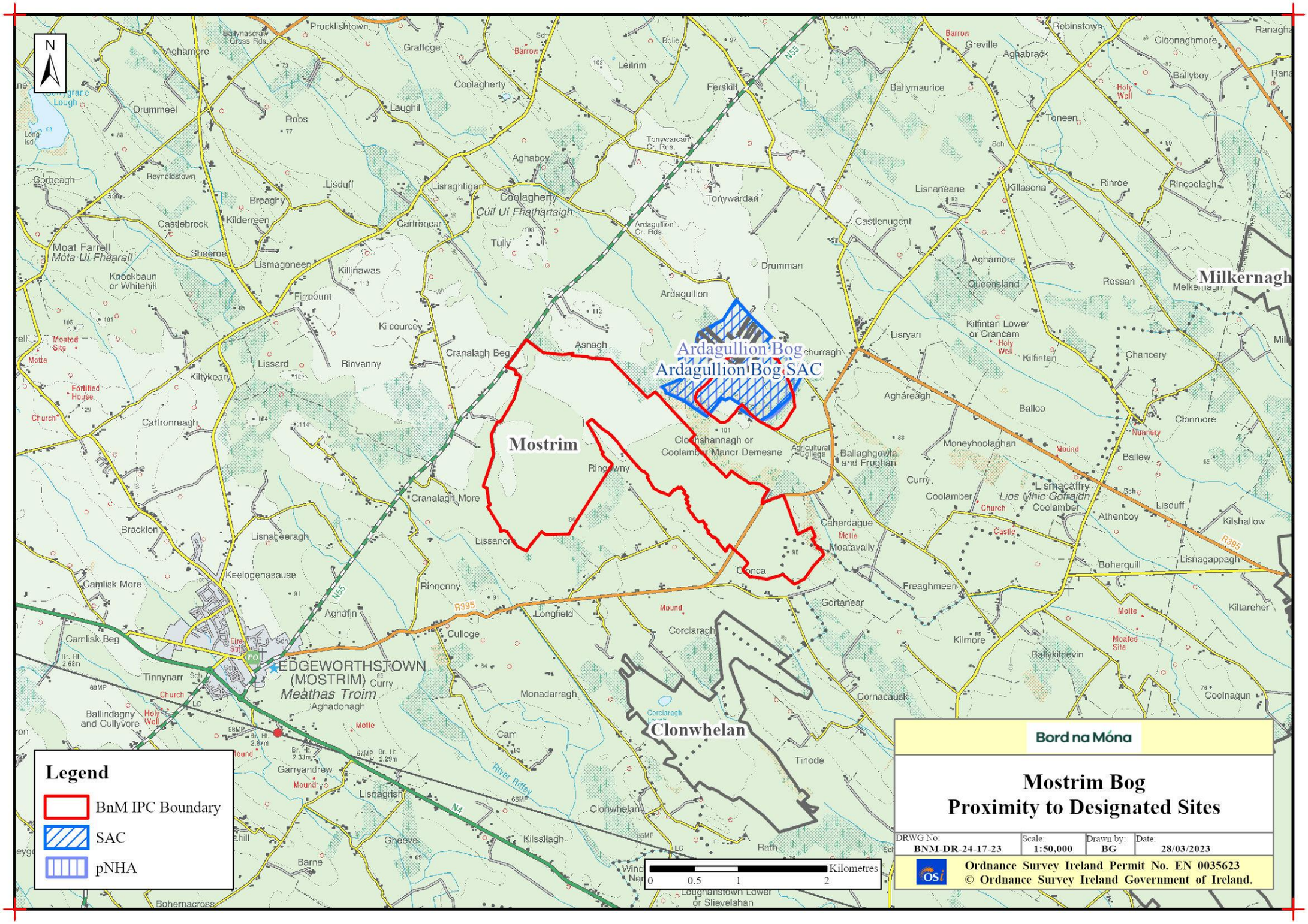

BNM-DR-24-17-24: Bog Group Map

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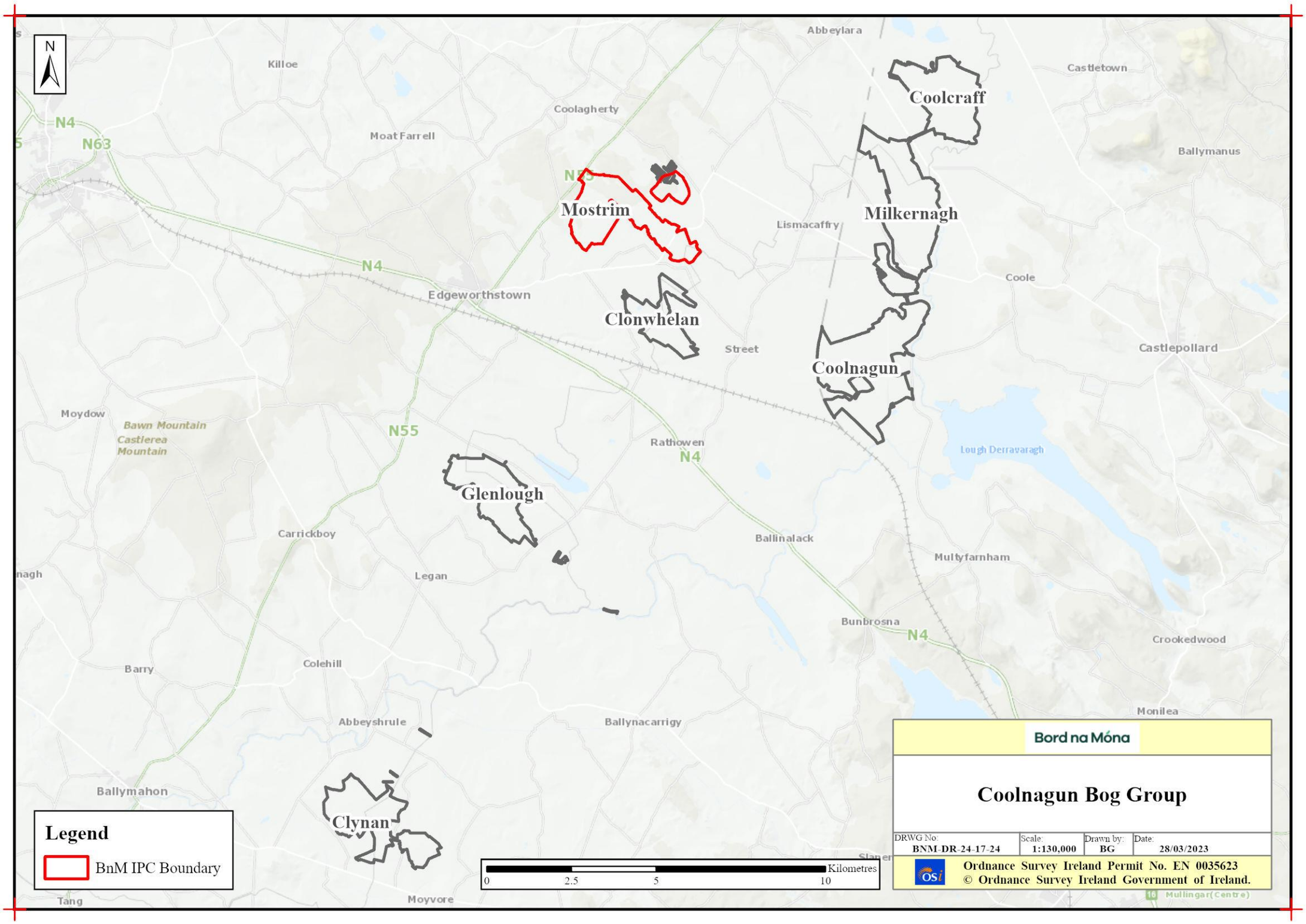

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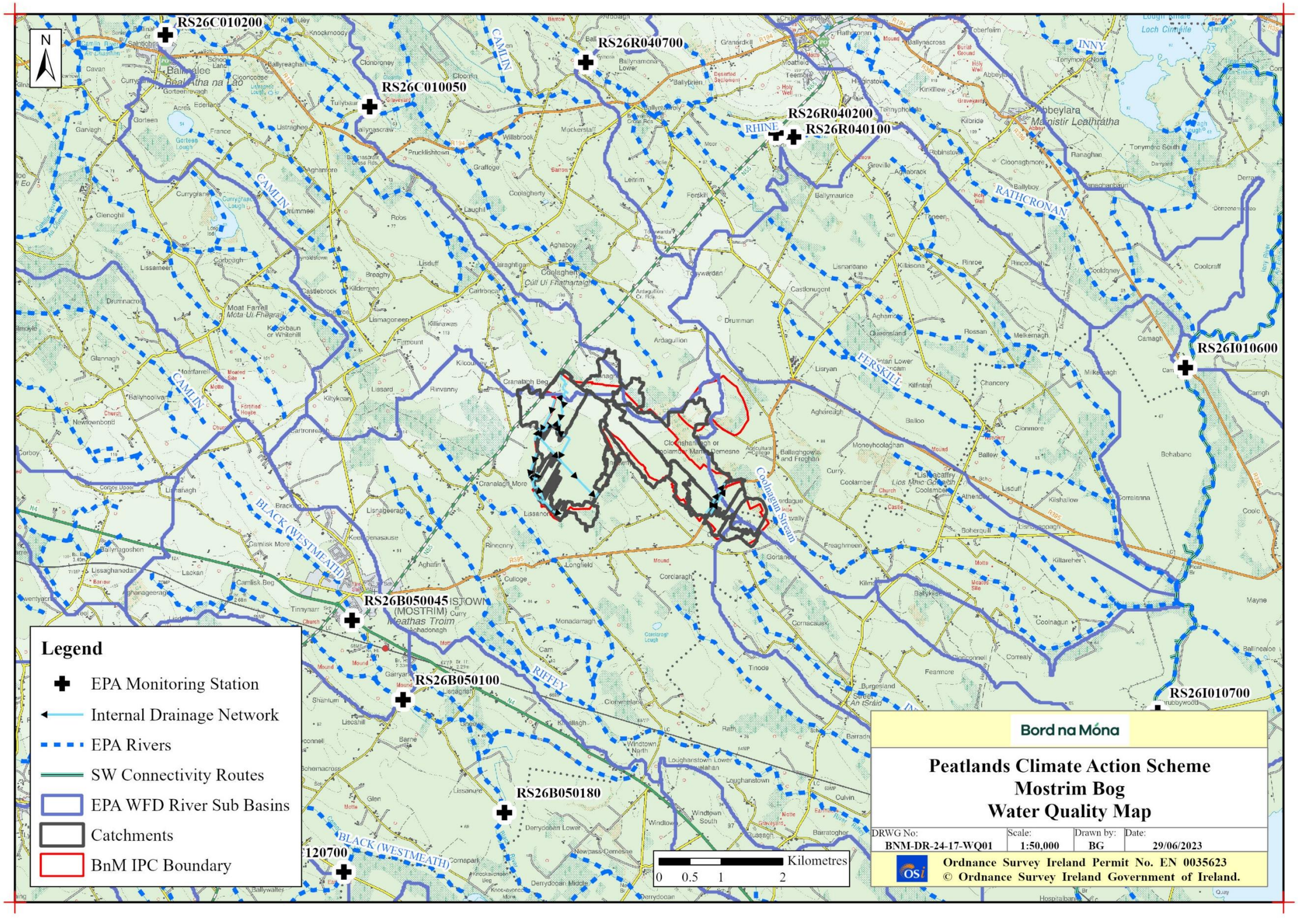

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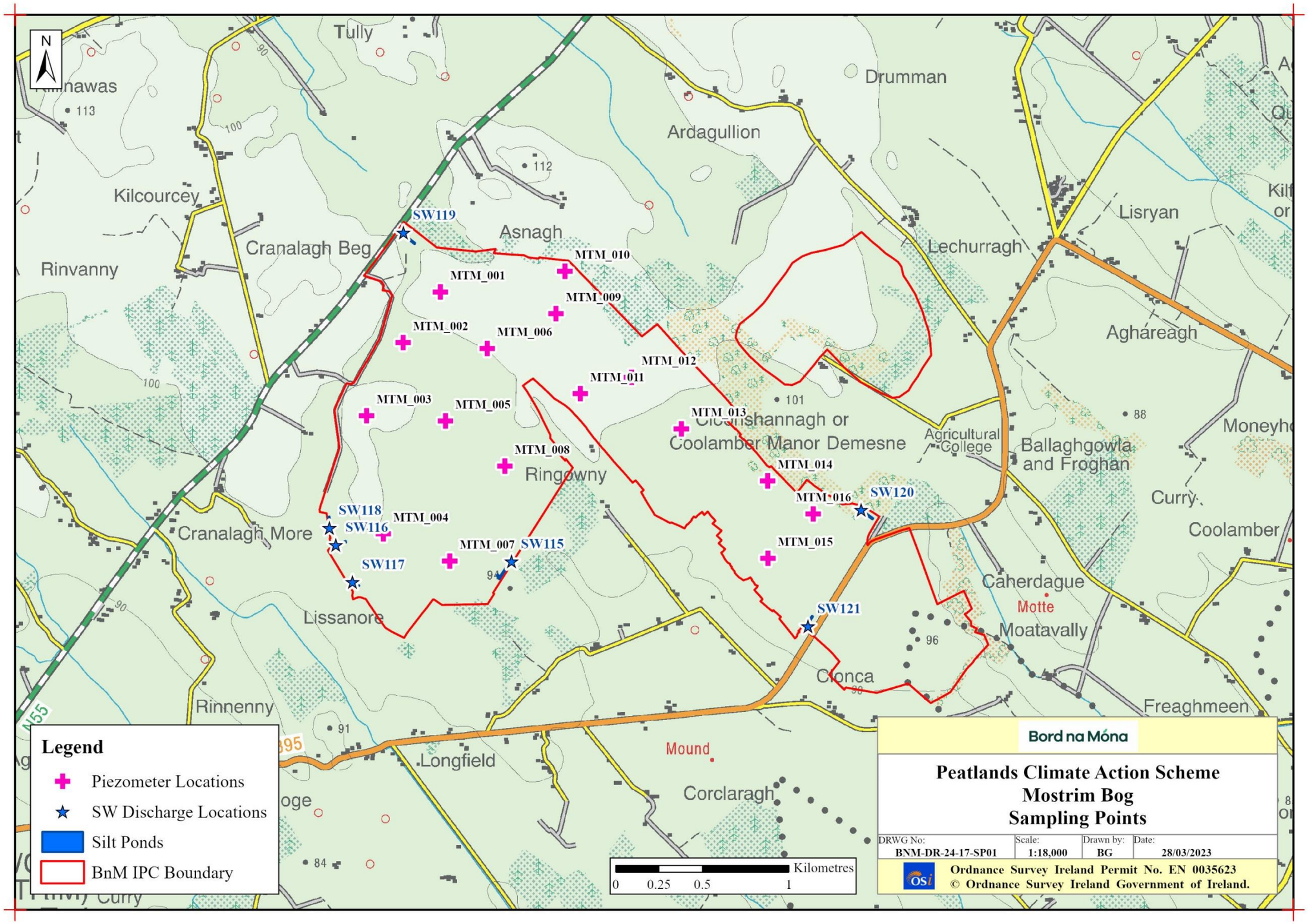

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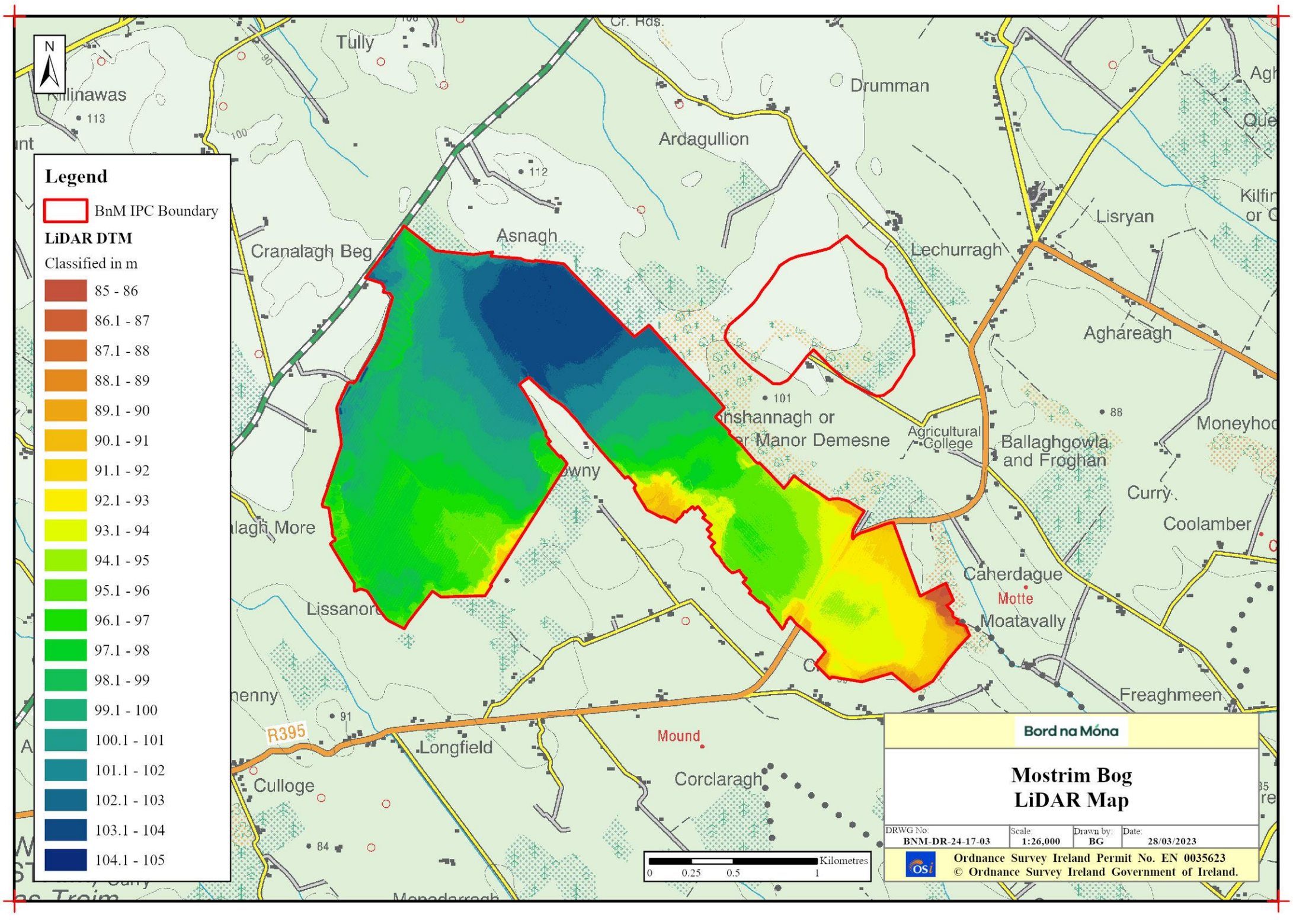

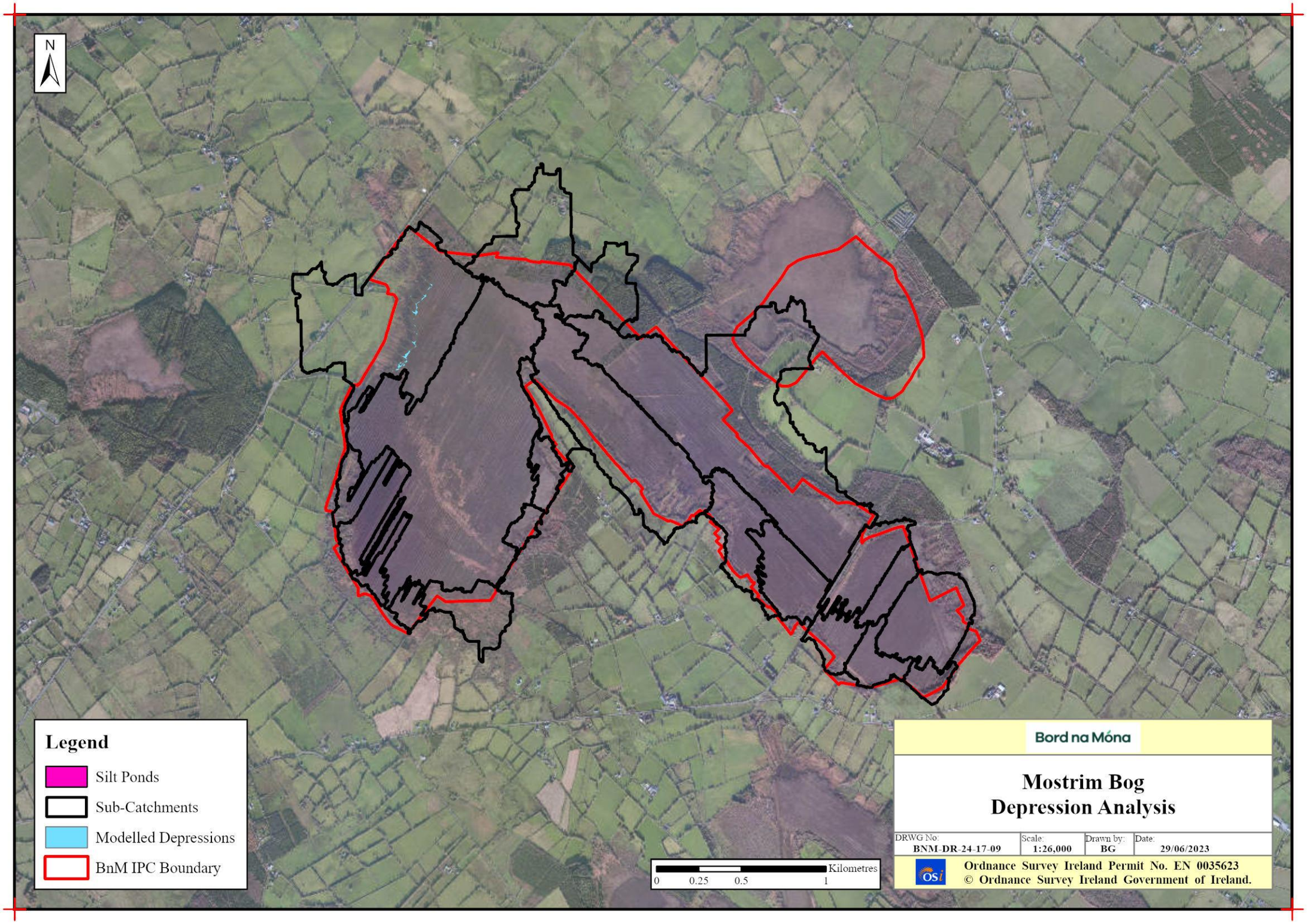
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BNM-DR-24-17-13: General Drainage Map

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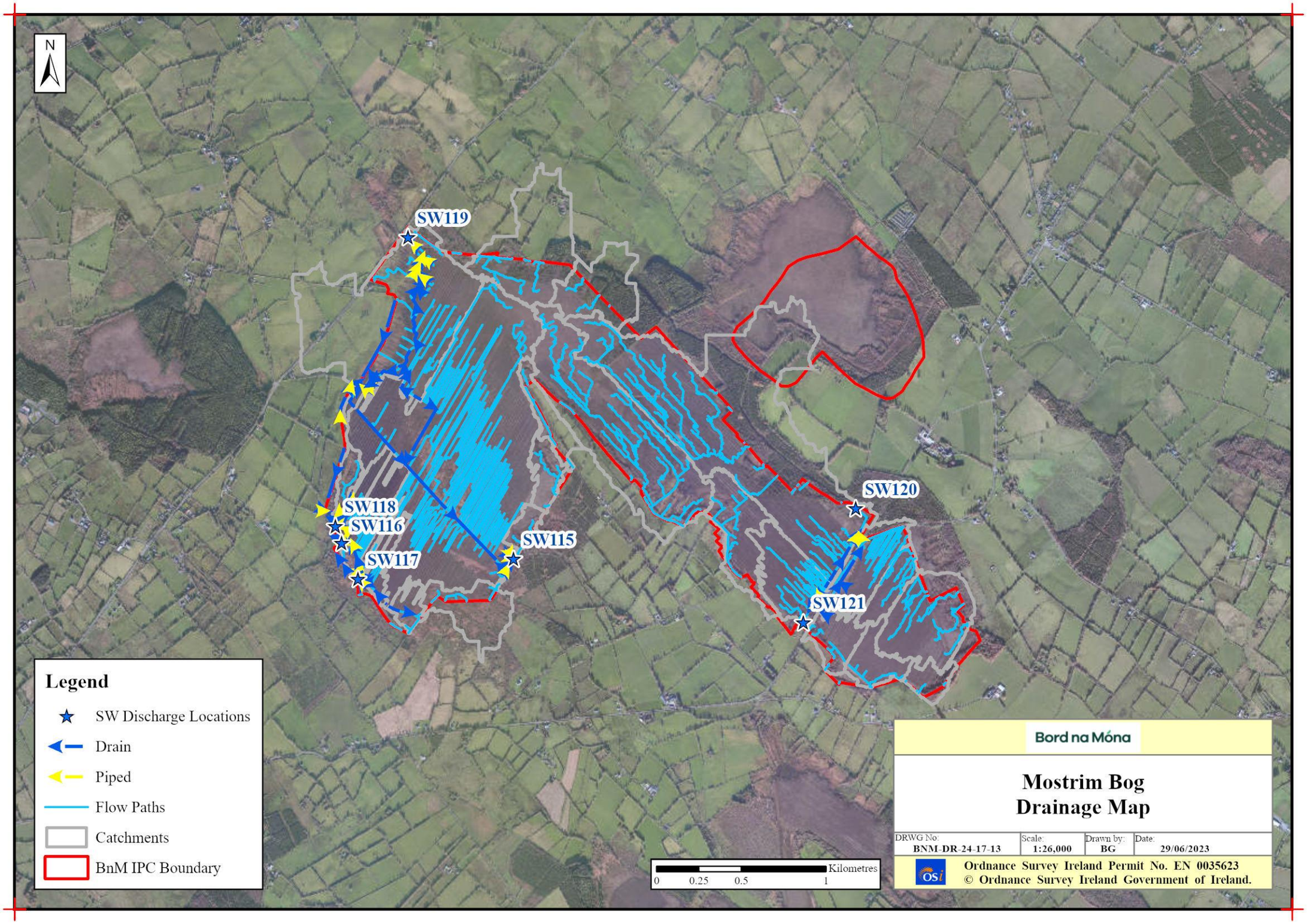

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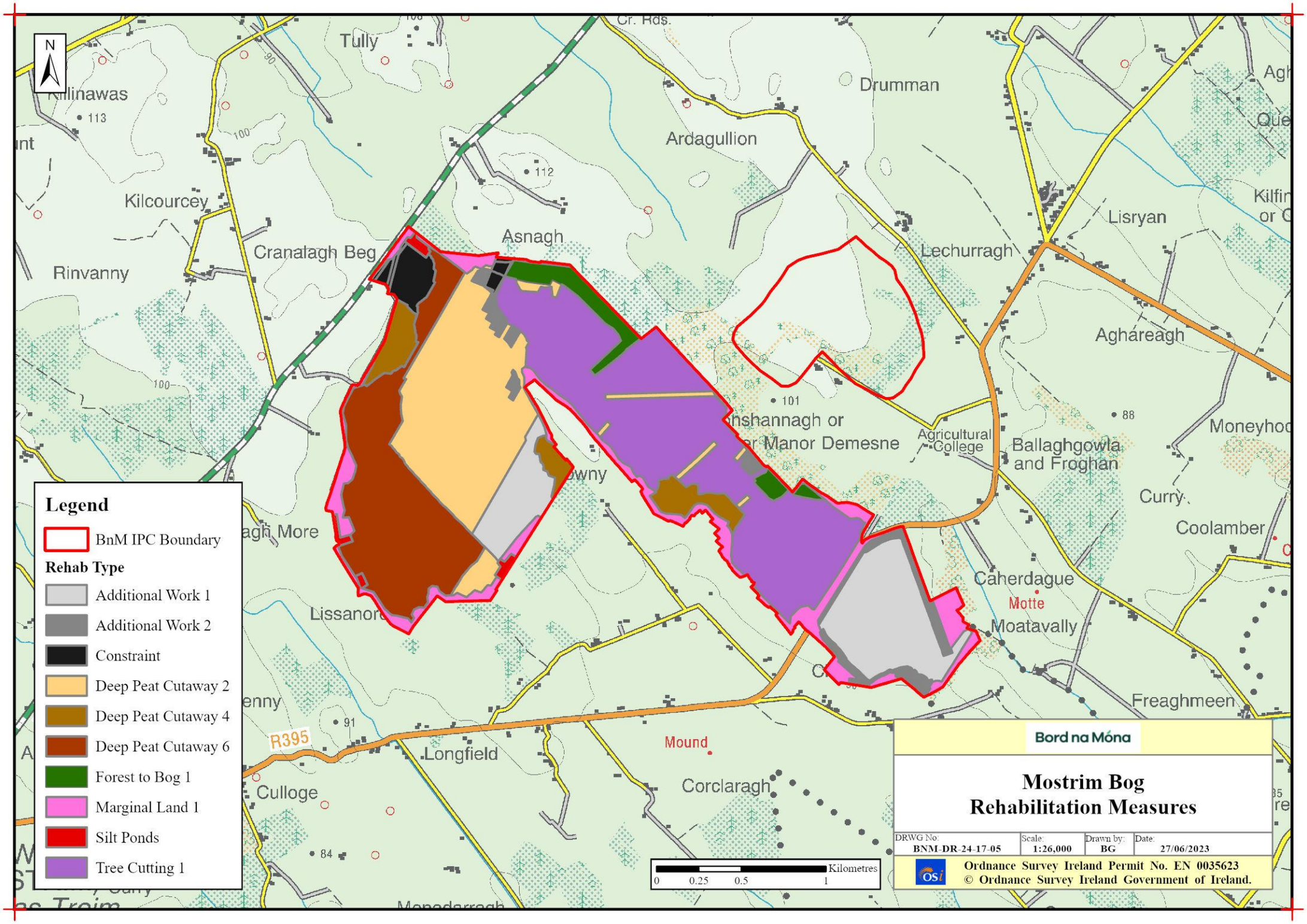

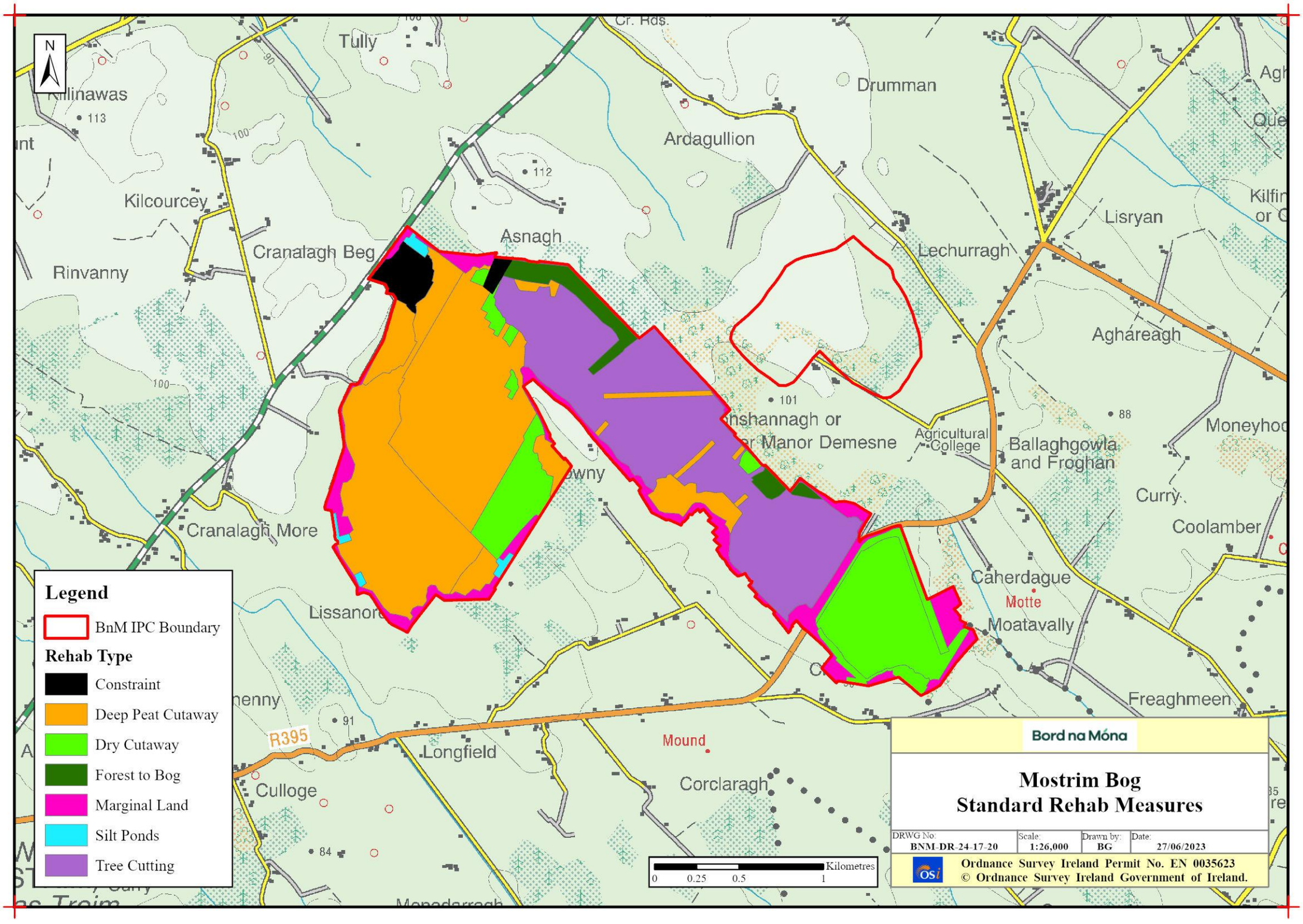
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Appendix E NBDC & NPWS Records of Protected and Invasive Species

Table E.1: NBDC records of protected and invasive species in N27 & N37 10km grid squares (hectads)

Common Name (Species Name)	Date of Record	Hectad	Designation
Common Frog (*Rana temporaria*)	17/02/2005	N27 & N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Smooth Newt (*Lissotriton vulgaris*)	31/05/2011	N27	Protected Species: Wildlife Acts
Barn Owl (*Tyto alba*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Barn Swallow (*Hirundo rustica*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Black-headed Gull (*Larus ridibundus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Coot (*Fulica atra*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Goldeneye (*Bucephala clangula*)	31/12/2001	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Grasshopper Warbler (*Locustella naevia*)	31/12/2011	N27	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Common Name (Species Name)	Date of Record	Hectad	Designation
Common Kingfisher (*Alcedo atthis*)	31/07/1972	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Linnet (*Carduelis cannabina*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Pheasant (*Phasianus colchicus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Common Pochard (*Aythya ferina*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Redshank (*Tringa totanus*)	31/12/2011	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Sandpiper (*Actitis hypoleucos*)	31/07/1972	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Snipe (*Gallinago gallinago*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Starling (*Sturnus vulgaris*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	12/05/2022	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species:

Common Name (Species Name)	Date of Record	Hectad	Designation
			Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Tern		N37	
Common Wood Pigeon (*Columba palumbus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Corn Crake (*Crex crex*)	31/07/1972	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Eurasian Curlew (*Numenius arquata*)	10/01/2018	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Eurasian Teal (*Anas crecca*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Wigeon (*Anas penelope*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Woodcock (*Scolopax rusticola*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
European Golden Plover (*Pluvialis apricaria*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds

Common Name (Species Name)	Date of Record	Hectad	Designation
			Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Great Cormorant (*Phalacrocorax carbo*)	31/12/2001	N27	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Great Crested Grebe (*Podiceps cristatus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Greater Scaup (*Aythya marila*)	29/02/1984	N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Partridge (*Perdix perdix*)	31/07/1972	N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Greylag Goose (*Anser anser*)	31/12/2011	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Martin (*Delichon urbicum*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Common Name (Species Name)	Date of Record	Hectad	Designation
Lesser Black-backed Gull (*Larus fuscus*)	31/12/2011	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Grebe (*Tachybaptus ruficollis*)	31/12/2001	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard (*Anas platyrhynchos*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Mew Gull (*Larus canus*)	31/12/2001	N27	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mute Swan (*Cygnus olor*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Northern Wheatear (*Oenanthe oenanthe*)	31/07/1972	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine (*Falco peregrinus*)	31/12/2011	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Red Grouse (*Lagopus lagopus*)	29/02/1984	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

Common Name (Species Name)	Date of Record	Hectad	Designation
Ringed Plover (*Charadrius hiaticula*)	31/12/2011	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Rock Pigeon (*Columba livia*)	31/12/2011	N27	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Sand Martin (*Riparia riparia*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Sky Lark (*Alauda arvensis*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Spotted Flycatcher (*Muscicapa striata*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Pigeon (*Columba oenas*)	31/07/1972	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Tufted Duck (*Aythya fuligula*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Water Rail (*Rallus aquaticus*)	31/12/2011	N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Whinchat (*Saxicola rubetra*)	31/07/1972	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Whooper Swan (*Cygnus cygnus*)	31/12/2011	N27 & N37	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of

Common Name (Species Name)	Date of Record	Hectad	Designation
			Conservation Concern >> Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella*)	31/07/1972	N27 & N37	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Butterfly-bush (*Buddleja davidii*)	15/08/2021	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Canadian Waterweed (*Elodea canadensis*)	31/07/2019	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Cherry Laurel (*Prunus laurocerasus*)	26/10/2022	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Japanese Knotweed (*Fallopia japonica*)	30/05/2016	N27 & N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Rhododendron ponticum	10/05/2005	N27 & N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Sycamore (*Acer pseudoplatanus*)	14/05/2022	N27 & N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Traveller's Joy (*Clematis vitalba*)	13/07/2004	N37	Threatened Species: Near threatened
Enochrus melanocephalus	21/06/2019	N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable
Marsh Fritillary (*Euphydryas aurinia*)	10/04/1982	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Budapest Slug (*Tandonia budapestensis*)	10/04/1982	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Common Garden Snail (*Cornu aspersum*)	23/08/2017	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

Common Name (Species Name)	Date of Record	Hectad	Designation
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	20/02/1980	N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Threatened Species: Least concern
Large White-moss (*Leucobryum glaucum*)	13/07/2004	N37	Threatened Species: Near threatened
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*)	03/04/2019	N27	Threatened Species: Near threatened
Common Garden Snail (*Cornu aspersum*)	11/04/1982	N27	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Ear Pond Snail (*Radix auricularia*)	31/12/1899	N27	Threatened Species: Vulnerable
Field Slug (*Deroceras* (*Deroceras*) *agreste*)	31/12/1902	N27	Threatened Species: Data deficient
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	17/08/2018	N27	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Marsh Whorl Snail (*Vertigo* (*Vertigo*) *antivertigo*)	11/04/1982	N27	Threatened Species: Vulnerable
Smooth Grass Snail (*Vallonia pulchella*)	11/04/1982	N27	Threatened Species: Vulnerable
Zebra Mussel (*Dreissena* (*Dreissena*) *polymorpha*)	22/10/2019	N27	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
American mink (*Mustela vision*)	21/09/2007	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Daubenton's Bat (*Myotis daubentonii*)	03/09/2014	N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eastern Grey Squirrel (*Sciurus carolinensis*)	31/12/2010	N27 & N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)

Common Name (Species Name)	Date of Record	Hectad	Designation
Eurasian Badger (*Meles meles*)	15/02/2015	N27 & N37	Protected Species: Wildlife Acts
European Otter (*Lutra lutra*)	19/10/2010	N27 & N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
European Rabbit (*Oryctolagus cuniculus*)	03/04/1992	N27 & N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Eurasian Red Squirrel (*Sciurus vulgaris*)	21/08/2014	N37	Protected Species: Wildlife Acts
Feral Goat (*Capra hircus*)	31/12/1981	N37	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Pine Marten (*Martes martes*)	22/06/2021	N27 & N37	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	22/09/2009	N27	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	22/09/2009	N27	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	15/06/2016	N27 & N37	Protected Species: Wildlife Acts

National Parks and Wildlife Service Data Request

Table E.2 presents protected species records held for hectad N27 & N37 by the National Parks and Wildlife Service.

Table E.2: NPWS records of protected and invasive species in N27 & N37 10km grid square

Species Name	Common Name	Record Date	Location(s)
Austropotamobius pallipes	White-clawed Crayfish	2005 2009 1983 1981	Camlin Between Lough Kinale and Derragh Lough, Co. Longford
Bromus racemosus	Smooth Brome	1990 & 1991	Rathowen, Daramona House
Carex spicata	Spiked Sedge	1986	Near Daramona House
Cladina rangiferina	Reindeer Moss	1986	Shrubbywood Bog
Cladonia ciliata	Cladonia ciliata	1986	Shrubbywood Bog
Cladonia portentosa	*Cladonia portentosa*	1986, 2007	Shrubbywood Bog, Mayne Bog
Erinaceus europaeus	West European Hedgehog	1979 & 1981	Near Granard, Co. Longford Rathowen, Co. Westmeath Ringowney, Co. Longford Wostrim Church, Co. Longford Streete, Co. Westmeath Boherquill, Co. Westmeath
Falco tinnunculus	Kestrel	2008	Ardagullion Bog NHA, Coolamber Co. Longford
Lepus timidus subsp. hibernicus	Irish Hare	Numerous dates	Various locations within the hectad including Mostrim, Co. Longford.
Lutra lutra	Eurasian Otter	2005 & 2010	Inny / Camagh Bridge, Co. Longford Bridge d/s Cloonfin Lough, Co.Longford Bridge nr Shrubbywood, Co.Westmeath
Martes martes	Pine Marten	2005 & 2010	Mostrim & Clonwhelan, Co. Longford
Meles meles	Eurasian Badger	Numerous dates	Various locations
Rana temporaria	Common Frog	2003 & 2005	Various locations
Sciurus vulgaris	Red Squirrel	1981	Various locations