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BUILT ON KNOWLEDGE

Bord na Móna

Derryadd, Derryaroge and Lough Bannow Bogs – Application for Substitute Consent

Remedial Environmental Impact Assessment Report

Chapter 7 - Biodiversity

March 2025

TOBIN

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7. BIODIVERSITY

7.1 INTRODUCTION

This chapter of the remedial Environmental Impact Assessment Report (rEIAR), prepared by the ecology team at TOBIN Consulting Engineers (TOBIN) on behalf of Bord na Móna Ltd (the Applicant), presents the findings of a remedial assessment of the likely significant effects on biodiversity, both in isolation and cumulatively with other projects, resulting from peat extraction and all related activities from July 1988 to the present day. It also considers current management actions and proposed rehabilitation activities at Derryaroge, Derryadd, and Lough Bannow bogs (the "Application Site"). The Application Site forms part of the larger Mountdillon Bog Group, owned and operated by Bord na Móna. This rEIAR has been prepared to support Bord na Móna's application for Substitute Consent for the Project, alongside a remedial Appropriate Assessment Screening Report (rAASR) and a remedial Natura Impact Statement (rNIS).The lands at Derryaroge, Derryadd and Lough Bannow Bogs encompassed within the Application Site which are the subject of this rEIAR are outlined in red in Figure 7.1. The lands at the Application Site have been used historically primarily to produce milled peat to supply the Lanesborough Power Station, and subsequently the Lough Ree Power Station, owned and operated by ESB. The Application Site occupies an area of 2,244 hectare (ha), comprising primarily of cutaway bog and bare peat, buildings, yards, railway lines, and surface water drainage systems including silt ponds and drainage channels..

To align with the temporal scope of the Bord na Móna. activities at the Application Site this Chapter evaluates the likely significant effects on important ecological features of biodiversity across the following three distinct Phases of the Project:

1. **Peat Extraction Phase (July 1988 – July 2019)** - covers peat extraction and all ancillary works at the Application Site from the required transposition of the European Communities Environmental Impact Assessment (EIA) Directive into Irish law in 1988 until the cessation of peat extraction in July 2019.
2. **Current Phase (July 2019 – Present Day) -** addresses the ongoing decommissioning and site management since peat extraction ceased.
3. **Remedial Phase (Future) -** considers the planned implementation of rehabilitation measures for the Derryaroge, Derryadd and Lough Bannow Bogs, as required under Condition 10.2 of the Environmental Protection Agency (EPA) Integrated Pollution Control (IPC) Licence P0504-01, following the cessation of peat extraction.

The Phases are collectively referred to herein as 'the Project'. This Chapter presents a remedial assessment of the likely significant effects of each Phase of the Project on biodiversity taking into account the changing environmental conditions and the management actions at the Application Site. Following this evaluation of biodiversity Residual Effects are assessed taking into account the control measures and management actions, and the rehabilitation measures proposed to minimise adverse effects to biodiversity.

The remainder of this Chapter is structured as follows:

- **Section 7.2 Statement of Authority** – provides an overview of the credentials, qualifications, and authority of the team responsible for preparing this Chapter. This statement serves to confirm that the assessments and ecological surveys have been conducted by competent professionals in compliance with relevant legal and regulatory standards.
- **Section 7.3 Assessment Methodology and Relevant Legislation** – provides an overview of the legislation, guidance and policy applicable. The section serves to highlight key elements that provide the framework for assessments undertaken in this Chapter, ensuring adherence to current best practices for the assessment of impacts and effects on biodiversity.
- **Section 7.4 Methodology –** provides an overview of the desktop study, scoping and consultations, and multidisciplinary field surveys used to gather ecological information of the Application site and surrounding area to establish baseline ecological conditions for the Application Site and its surrounding area.
- **Section 7.5 Methodology for Assessment of Impacts and Effects –** details the approach undertaken for the assessment of likely significant effects on biodiversity.
- **Section 7.6 Site Location and Activities Over Time -** describes the geographical context of the Application Site and outlines the historical activities that have shaped its ecological conditions.
- **Section 7.7 Ecological Baseline –** establishes the ecological baseline against which the assessment is conducted.
- **Section 7.8 Ecological Assessment -** presents an assessment of likely significant effects on ecological important biodiversity receptors during the Project Phases. This impact assessment is undertaken in the absence of the measures proposed to minimise effects to biodiversity.
- **Section** Error! Reference source not found. **Control Measures -** summarises the current control measures and management actions in place, as well as the planned rehabilitation measures proposed.
- **Section 7.10 Residual Effects –** present an assessment of effects to biodiversity that persist after control actions, and management strategies, and planned rehabilitation measures proposed have been implemented.
- **Section 7.11 Cumulative and In-combination Effects -** examines potential cumulative and in-combination effects, evaluating how the peat extraction activities between 1988 and present day, current decommissioning, and future rehabilitation measures may interact with other ongoing or planned developments in the area, potentially amplifying or mitigating effects to biodiversity.
- **Section 7.12 Conclusion–** summarises the main findings of the assessment.

The following defines terms used in this Chapter:

- The Derryaroge, Derryadd and Lough Bannow Bogs are referred to as the '**Application Site**', as presented in Figure 7.1.
- The '**Project**' refers to **all Phases** of the Bord na Mona activities at the Application Site. The Phases of the Project, which are described in detail Chapter 4 - Project Description, are:
    - **Peat Extraction Phase (July 1988 – July 2019)**
    - **Current Phase (July 2019 – Present Day)**

- **Remedial Phase (Future)**

- In this Chapter, following the geographic levels of importance outlined in the National Roads Authority (NRA) EcIA Guidelines (2009b), species or habitats of significant ecological importance that may be affected by likely significant effects are defined as **Key Ecological Receptors (KERs)** and selected for detailed evaluation.
- The **Zone of Influence** for KERs refers to the zone within which potential effects may have occurred or are anticipated.
  The Zone of Influence differ depending on the sensitivities of particular receptors (habitats and species) and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

At part of the Application Site, Bord na Móna is in the process of developing a wind farm project and plans to submit an application for consent for the development in due course. The proposed wind farm is called the Derryadd Wind Farm. The planning application for the proposed wind farm will be accompanied by an Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS), which will outline the potential environmental effects of the proposed wind farm and detail necessary mitigation measures. To inform the assessments of effects on biodiversity required for the EIAR and NIS, a series of detailed desk studies and multidisciplinary field survey have been undertaken. These include investigations into bird populations, flora, and fauna, as well as habitat mapping, to evaluate the potential environmental impacts and inform the development of appropriate mitigation strategies to minimise adverse effects.

While the majority of the proposed Derryadd Wind Farm site overlaps with the Application Site, the boundaries do not align completely (see in Figure 7.2). Areas of the Application Site that fall outside of the proposed Derryadd Wind Farm site were not surveyed as part of the wind farm development. However, where appropriate the data and findings from the investigations undertaken for the proposed wind farm have been integrated with survey and investigations undertaken for the Project to inform this remedial assessment of likely significant effects on biodiversity. Maps displaying the findings of the surveys conducted for the proposed Derryadd Wind Farm are presented in this Chapter, where possible, in relation to the red-line boundary of the Application Site.

7.2 STATEMENT OF AUTHORITY

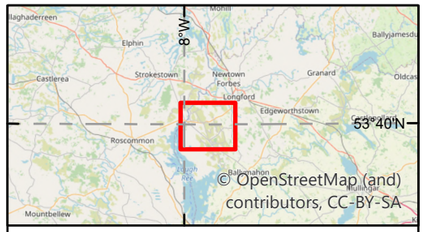
This Chapter was authored by Senior Ecologists Joao Martins (B.E. (Hons), M.Sc.) and Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM), and reviewed by Áine Sands (B.Sc. (Hons), MCIEEM).

Joao is a Senior Ecologist in TOBIN's Environment and Planning (E&P) division and holds a B.E. (Hons) in Environmental and Natural Resources Engineering and an M.Sc. in Environmental Engineering (Freshwater ecology). Joao has over 14 years' experience in freshwater ecology, associated with monitoring for the EU Water Framework Directive (e.g. macroinvertebrates, habitat/hydromorphology) and projects of scientific nature, in Germany, Portugal and Ireland. He has worked for over 7 years in environmental consultancy, developing his expertise in Appropriate Assessment (AA), Ecological Impact Assessments (EcIA) and Environmental Impact Assessment Reports (EIAR). Joao has also conducted and coordinated bird surveys (e.g. I-WeBS, Vantage Point (VP), Countryside Bird Surveys (CBS) Woodcock (*Scolopax rusticola*) surveys etc.), botanical and habitat surveys, mammal surveys (bats and non-volant) and inland fisheries (electrofishing).

James is Senior Ecologist and Technical Director of the TOBIN E&P division. James holds a B.Sc. (hons) and M.Sc. degrees in marine ecology, and a Ph.D. in ecology. James is also a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). James has almost 20 years' academic and environmental consultancy experience. He has an extensive understanding of ecology and appreciation of the objectives and mechanisms of national and international environmental legislation and policy. He has significant experience in preparing and reviewing ecological reports including Screenings for AA, Natura Impact Statement (NIS) and EcIA reporting, and EIAR. James has provided strategic technical and environmental advice for developments across a wide range of sectors, including onshore and offshore renewables, telecommunications, flood relief schemes, port and harbour developments, energy generation and transmission.

Áine is Senior Ecologist in TOBIN's E&P division. She holds an Honours Degree in Applied Ecology and has over 10 years post-graduate experience in ecology and environmental consultancy and also holds a full CIEEM Membership. Áine has predominantly been involved in large public and private infrastructure projects which she has prepared numerous Screenings for AA, NIS and EcIA reports. Áine has a strong understanding of National and European legislation and is cognisant of relevant rulings by the Court of Justice of the European Union (CJEU) associated with biodiversity and AA. She also has experience in undertaking ecological surveys for protected habitats and species and is confidently able to analyse the data to inform ecological assessments.

The baseline ecological surveys used to inform this remedial assessment of likely significant effects on biodiversity were conducted by a team of qualified ecologists with the relevant skills and experience to undertake the required surveys.



Legend

Application Site

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Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-1 Boundaries of the Application Site

Scale @ A3: 1:40,000

Prepared by:	Checked by:	Date:
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Map Ref: 11400-001-S.BO-AE-TOB-A

Draft: A

8°0'0"W
7°55'0"W
7°50'0"W
53°41'40"N
53°40'0"N
53°38'20"N
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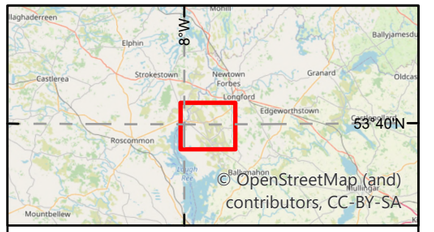
Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Legend

- Application Site
- Derryadd Wind Farm Boundary

0 1 2
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	25/02/2025	First issue	S.P	C.N
Rev	Date	Description	By	Chkd

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-2 Boundaries of the Application Site and proposed Derryadd Wind Farm

Scale @ A3: 1:40,000

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Map Ref: 11400-040-P.APP.BO-DADD.WF-TOB-A

Draft: A

7.3 Assessment Methodology and Relevant Legislation

The assessment methodology in this Chapter follows the NRA 'Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2' (NRA, 2009b) (referred to herein as the NRA Ecological Impact Assessment Guidelines), with survey methodologies based on the NRA 'Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes' (NRA, 2009a) (referred to herein as the NRA Survey Guidelines). While these guidelines relate to road schemes, these standard guidelines are recognised methodologies that ensure good practice regardless of the development type. Other guidance consulted in the preparation of this Chapter provided scope, structure and content of the assessment include CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal' (CIEEM, 2018, updated 2024) (herein referred to as the CIEEM EcIA Guidelines) and EPA 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EIAR) (EPA, 2022) (herein referred to as the EPA EIA Guidelines).

Other guidance on survey techniques consulted included:

- Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council (Smith *et al.*, 2011).
- A Guide to Habitats in Ireland. The Heritage Council (Fossitt, 2000).
- Birds of Conservation Concern in Ireland 2020-2026 (Gilbert *et al.,* 2021).
- Assessing Connectivity with Special Protection Areas (SPAs) Scottish Natural Heritage (SNH) 2016).

In addition to the national and international legislation outlined in Chapter 1 – Introduction of this rEIAR, including the EIA Directive 2011/92/EU (as amended by 2014/52/EU) and the EU (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2015 (S.I. No. 320 of 2015), this Chapter has been compiled in accordance with the following key pieces of legislation applicable to habitats, fauna, and water quality in Ireland:

- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) (as amended).
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (commonly referred to as the Habitats Directive).
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (commonly referred to as the Birds Directive).
- The Wildlife Acts 1976 (as amended) (herein referred to as the Wildlife Acts).
- The Flora (Protection) Order 2022 (S.I. No. 235 of 2022).
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009).
- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010).
- European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012).
- European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015).
- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014).

- Planning and Development Acts 2000 (as amended 2024).
- Relevant fisheries legislation up to and including the Inland Fisheries Acts 1959-2017 (as amended).

The following legislation applies with respect to non-native species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

The following publicly available planning policies and strategy guidance documents listed below were also considered in the preparation of this assessment:

- Relevant policies in Ireland's 4th National Biodiversity Action Plan 2023-2030 (DoCHG, 2024).
- Objectives relevant to ecology and biodiversity in:
    - Longford County Development Plan 2021–2027[1]
    - Longford County Development Plan 2015–2021[2]
    - Longford County Development Plan 2009–2015[3]
    - Longford County Development Plans dated from 1990 onwards. Chapter 5 – Planning Policy Section 5.5.3.1 of the rEIAR provides a brief summary of the historic plans.

7.4 METHODOLOGY

The following sections outline the methodologies employed to gather information on the baseline ecological conditions of the Application Site and its surrounding area, focusing on two distinct time periods: July 1988 and the present day. These methodologies were designed to ensure a robust understanding of historical and current ecological conditions.

7.4.1 Desk Study

The desk study undertaken for this assessment included a review of available data pertaining to the Application Site and surrounding area including the following:

- Bord na Móna ecology surveys at the Application Site.
    - The Application Site was subject to detailed habitat surveys by Bord na Móna ecologists between 2010 - 2012 as outlined below. Ecological survey reports are included in Appendix 7.1.
        - Derryaroge Bog: Site surveyed on 03/09/2012.
        - Derryadd Bog: Site surveyed on 26/07/2012 and 27/07/2012.
        - Lough Bannow Bog: Site surveyed on 27/07/2010 and 29/07/2010.
- Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans (included in Chapter 4 - Project Description - Appendix 4.3)

[1] https://www.longfordcoco.ie/services/planning/longford-county-development-plan-2021-2027/volume-1-compressed.pdf. Accessed January 2025.
[2] https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/development-plan-2015-2021/. Accessed January 2025.
[3] https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/county-development-plan-2009-2015/. Accessed January 2025

  - Derryaroge Bog – Cutaway Bog Decommissioning and Rehabilitation Plan 2023
  - Derryaroge Bog – Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025.
  - Derryadd Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025
  - Lough Bannow Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025.
- Aerial Maps from 1973 to 2020 (included in Chapter 4 - Project Description – Appendix 4.5).

As outlined above, desk studies, investigations, and surveys conducted for the proposed Derryadd Wind Farm have been utilised to inform this chapter and the evaluation of biodiversity impacts at the Application Site associated with the Project. Although some of the studies were carried out for the proposed wind farm, the findings are highly relevant to the Project. For example, the ornithological desk study and surveys provide comprehensive data on local bird populations, species diversity, abundance, and conservation status. Since the wind farm site predominantly overlaps with the majority of the Application Site, the biodiversity data established for the wind farm directly applies to the Project.

This Chapter specifically focuses on assessing the impacts of the Project rather than those of the proposed Derryadd Wind Farm. However, to enable a comprehensive assessment, it draws on desk studies, investigations, and surveys conducted for both. Care has been taken to ensure that the evaluation remains specific to theProject.

The following sources were also consulted to obtain information on the ecology of the Application Site and wider area:

- Review of historic 6 inch and 25 inch maps of the Application Site and surrounding area available through Ireland's National Geospatial Data Hub[4].
- Records from the National Park and Wildlife Service (NPWS) web-mapper and review of records from the NPWS Rare and Protected Species Database[5] for the hectads in which the Application Site is located.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper[6].
- Review of online web-mappers: NPWS[7], EPA[8], Water Framework Directive[9] (WFD) and Inland Fisheries Ireland[10] (IFI).
- Review of NPWS Article 17 maps 2019, 2013 and 2007.
- IFI Reports, where available.
- Review of relevant of publically available Plans, including the:

[4] Available at: https://www.geohive.ie/. Accessed January 2025.
[5] Available at: https://www.npws.ie/maps-and-data. Accessed January 2025.
[6] Available at: https://maps.biodiversityireland.ie/Map. Accessed February 2025.
[7] Available at: https://www.npws.ie/maps-and-data. Accessed January 2025.
[8] Available at: https://gis.epa.ie/EPAMaps/. Accessed January 2025.
[9] Available at: https://www.catchments.ie/maps/. Accessed February 2025.
[10] Available at: https://www.fisheriesireland.ie/Research/interactive-mapping.html. Accessed July 2024.

- Ireland's 4th National Biodiversity Action Plan 2023-2030 [11].
- Longford County Development Plan 2021–2027[12]
- Longford County Development Plan 2015–2021[13]
- Longford County Development Plan 2009–2015[14]
- Longford County Development Plans dated from 1990 onwards. Chapter 5 – Planning Policy Section 5.5.3.1 of the rEIAR provides a brief summary of the historic plans.

7.4.2 Scoping and Consultation

TOBIN undertook a scoping and consultation exercise during preparation of this rEIAR, as described in Section 2.4 of Chapter 2 - rEIA Methodology of this rEIAR. Copies of all responses are included in Appendix 2.1 of this EIAR.

Details of scoping and consultation responses pertaining to biodiversity are included in Table 7.1 below.

Table 7.1: Scoping and Consultation Reponses

Consultee	Response/ Observations/ Recommendations
Longford County Council (LCC)	LCC acknowledged receipt of correspondence on 08/01/2024 and welcomed the assessment of peatlands, recognising their significance to South Longford's landscape and heritage. Key points from their response include: • Historical Context: The area was used for industrial peat extraction from 1946 to 2019, predating formal planning regulations (1963) and the EIA Directive. • Development Plan Policies: The Longford County Development Plan 2021-2027 supports a regional, holistic approach to peatland development, balancing economic, tourism, and environmental considerations. • Environmental Compliance: All works should adhere to the EPA's EIA guidelines (May 2022)
Department of the Environment, Climate and Communications (DECC)	A response was received from DECC on 15/08/2024 acknowledging receipt of the correspondence. The DECC response stated that the correspondence would be brought to the Minister's attention. No further correspondence from DECC has been received to date.
Development Application Unit (DAU), Department of Housing, Local Government and Heritage (DoHLGH)	A response was received from the DAU on 22/08/2024 acknowledging receipt of the correspondence. The DAU provided further response in December 2024 which outlined the following key 'heritage-related observations/recommendations': • AA and NIS must be detailed, scientifically robust, and leave no uncertainty regarding impacts on conservation objectives.

[11] Available at: https://assets.gov.ie/233057/f1a92f68-e668-498d-a56c-df777a19b549.pdf. Accessed February 2025.
[12] Available at: https://www.longfordcoco.ie/services/planning/longford-county-development-plan-2021-2027/volume-1-compressed.pdf. Accessed February 2025.
[13] Available at: https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/development-plan-2015-2021/. Accessed February 2025.
[14] Available at: https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/county-development-plan-2009-2015/. Accessed February 2025.

Consultee	Response/ Observations/ Recommendations
	• The rEIAR should be cognisant of previous Department comments on similar substitute consent applications. • Historical, current, and future water level management should be assessed for ecological impacts, particularly on wintering and breeding birds. • Baseline field surveys are needed to assess the ecological effects of drainage and its connection to Natura 2000 sites. •

7.4.3 Field Surveys

A comprehensive suite of surveys was undertaken on various dates from 2010 to 2023 (see Table 7.2 below for specific dates).

Several of the surveys listed in Table 7.2 were undertaken to inform the EIAR and NIS for the proposed Derryadd Wind Farm. These surveys conducted for the proposed wind farm were comprehensive and covered a significant portion of the Application Site.

The boundaries of the proposed Derryadd Wind Farm site and the Application Site are shown in Figure 7.2. In combination, the surveys undertaken to inform the EIAR and NIS for the proposed Derryadd Wind Farm, and those undertaken for this rEIAR and the rNIS for the Project provide the information necessary to undertake a robust assessment of the likely impacts of the peat extraction activities and all ancillary works, both past and present, and the implementation of the Cutaway Bog Decommissioning and Rehabilitation plans at the Application Site.

Section 7.4.3.1 through Section 7.4.3.4provide a high-level summary of the surveys undertaken, while survey limitations are described in Section 7.4.3.5.

Table 7.2: Summary of surveys used to inform this remedial Ecological Impact Assessment

Survey	Date	Survey Conducted by:
Ecology Survey Derryaroge Bog	September 2012 - Multidisciplinary Surveys	Bord na Móna
Ecology Survey Derryadd Bog	July 2012 - Multidisciplinary Surveys	Bord na Móna
Ecology Survey Lough Bannow Bog	July 2010 - Multidisciplinary Surveys	Bord na Móna
Multidisciplinary Surveys	August 2022 and July 2023 - Multidisciplinary Surveys	TOBIN
Subsite (Derryaroge Mineral Island)	May 2023	FitzGerald Ecology
Aquatic Surveys	June 2022 - River Habitat Survey	TOBIN
	September 2022 - Water Quality Assessment	Still Waters Consultancy
	September 2022 - Electrofishing	Still Waters Consultancy
Bird Surveys	Breeding Season 2021 (April 2021 – September 2021) Non-breeding Season 2021/2022 (October 2021 – March 2022)	Fehily Timoney

Survey	Date	Survey Conducted by:
Non-Volant Surveys	August 2022 and July 2023	TOBIN
Whorl Snail (Vertigo sp.) Surveys	November 2022	Arctica Ecology
Marsh Fritillary Surveys	November 2022	TOBIN
Invasive Alien Species	August 2022	TOBIN

7.4.3.1 Bord na Mona Ecology Surveys

Ecology surveys of the bogs at the Application Site were undertaken by Bord na Móna in 2010 and 2012. For these surveys the Bord na Móna ecology team classified the habitats on the bogs comprising the Application Site according to the Bord na Móna habitat classification scheme and "*A Guide to Habitats in Ireland*" Fossitt (2000).

The results of these surveys are summarised in Section 7.7.1.4 (and presented in full in Appendix 7.1). As well as providing data on the habitats comprising the site, the surveys reported observations and signs of protected species (including birds, mammals, amphibians etc.), as well as observation of invertebrates (including butterflies, damselflies, dragonflies, moths, beetles etc.).

7.4.3.2 Multidisciplinary Surveys

7.4.3.2.1 Habitat Survey

For the proposed Derryadd Wind Farm site a multidisciplinary walkover survey was carried out in August 2022 by TOBIN ecologists. This survey was complemented by a second visit in July 2023, by the same team of ecologists. Habitats were surveyed and mapped with particular focus dedicated to the areas where the infrastructure associated with the proposed Derryadd Wind Farm is to be located. Some marginal habitats were not surveyed, but were mapped based on historic survey effort at the area (i.e. TOBIN Consulting Engineers, 2019).

Habitats surveyed were classified upon the qualitative consideration of:

- plant species abundance and diversity.
- protection status.
- vegetation structure.
- Topography.
- drainage conditions.
- evidence for disturbance and/or management.

For specific habitat types, such as bog woodland or petrifying springs, specialised survey guidelines were followed, including Cross and Lynn (2013) and Denyer *et al.* (2023), respectively. In all cases, the predominant plant species were identified and named according to Parnell and Curtis (2012) and Stace (2010) for higher plants; Atherton *et al.* (2010) for bryophytes; and Fitter and Fitter (1984a,b) for grasses, sedges and rushes.

Habitats were classified according to Fossitt (2000), while satellite imagery was used to inform habitat delineation and interpretation, following Smith *et al.* (2011). Surveys considered plant

species protected under the Flora Protection Order (S.I. No. 235/2022), listed in Irish Red List Series (King *et al.*, 2011; Lockhart *et al.*, 2012; Wyse Jackson *et al.*, 2016).

A search for Invasive Alien Species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011, as amended) was also conducted.

The findings of the habitat surveys are presented in Section 7.7.2.1.1below.

7.4.3.2.2 Bog Woodland Survey

Multidisciplinary survey included the search of habitats potentially corresponding to protected habitat types listed under the Habitats Directive (Council Directive 92/43/EEC). All the habitats identified potentially corresponding to protected habitat types were bog woodland habitat. A Condition Assessment was undertaken at each location, in which as series of relevés of approximately 2m x 2m in size, were selected. In all cases, the woodland edges were avoided and relevés were selected at the middle of woodland. Each relevé was assessed individually against nine criteria (adapted from Cross and Lynn, 2013 - Table 7.3). Of the nine criteria, a minimum of seven had to reach their respective target to receive a "pass".

The findings of the surveys are presented in Section 7.7.2.1.2 below.

Table 7.3: Condition Assessment Criteria for Annex I Habitat 91D0 Classification (adapted from Cross and Lynn, 2013)

Assessment Criterion	Habitat 91D0 Classification Target
Positive indicator species	Betula pubescens & Sphagnum sp. plus at least 5 other positive species
Negative species cover	≤ 10% cover of plot
Medium canopy height	≥ 4m
% total canopy cover	≥ 30% of plot
Portion of Betula in canopy	≥ 50% of canopy
% native dwarf shrub layer cover	< 50% of plot
% Calluna cover	< 40%
% Sphagnum cover	>25%
% total bryophyte cover	≥ 50%

7.4.3.2.3 Subsite (Derryaroge Mineral Island) Habitat Survey

During the multidisciplinary walkover survey, a subsite within Derryaroge Bog, locally known as 'Derryaroge Mineral Island' was identified as holding potential to meet the designation criteria defined by the European Commission (2013) for habitats listed in the Annex I of the Habitats Directive (Council Directive 92/43/EEC). The Derryaroge Mineral Island potential sensitivities identified during the multidisciplinary walkover survey afforded the necessity for a higher level of detail dedicated for surveying it, and, in April 2023, FitzGerald Ecology carried out a detailed survey of this subsite, following a similar methodology described for the habitat survey during the multidisciplinary walkover in terms of habitat classification, species identification and nomenclature (Appendix 7.2).

The findings of the surveys are summarised in Section 7.7.2.1.3 below.

7.4.3.3 Aquatic Surveys

For the proposed Derryadd Wind Farm, a series of aquatic surveys were conducted to characterise the local aquatic ecology. These surveys, carried out by TOBIN and Still Waters Consultancy in June and September 2022, assessed fish and macroinvertebrate communities, relevant habitat features, and overall ecological quality at 12 representative sampling sites within and downstream of the proposed Derryadd Wind Farm. TOBIN conducted River Habitat Surveys in June 2022 using a survey methodology adapted from Environment Agency (2003) and Toland and Murphy (2013), while Still Waters Consultancy conducted surveys at the same locations in September 2022, which included Kick-sampling (adapted from Toner *et al.*, 2005) and Electrofishing (adapted from O'Grady, 2006, and Matson *et al.,* 2018). The aquatic surveys are briefly described in the following sections.

7.4.3.3.1 River Habitat Survey

In June 2022, at 12 sampling sites, a 50m reach of river was selected as representative of the local habitat and hydromorphological conditions, and relevant aquatic and riparian features were recorded. The features recorded included:

- Bank characteristics: bank height; width; habitat classification (Fossitt, 2000); riparian vegetation; land use;
- Aquatic habitat: wetted width; depth; water level (qualitative); flow velocity (qualitative); flow typology; substrate composition; instream vegetation (macrophyte; filamentous algae); and
- Local pressures.

These features were used to assess the physical suitability of each channel for supporting salmonids, lampreys and other fish species, a macroinvertebrate assemblage typical of equivalent *Good* WFD water quality status streams, and to ascertain an ecological evaluation at the survey sites. The survey results are presented in detail in Section 7.7.2.2.2 below.

The sampling sites were revisited by Still Waters Consultancy in September 2022 to conduct kick-sampling and electrofishing surveys. The September 2022 surveys provided an opportunity to confirm June 2022 findings or offer new observations.

7.4.3.3.2 Kick-Sampling - Water Quality Assessment

In September 2022 the macroinvertebrate communities at the 12 sampling sites were surveyed with the use of a 'D' shaped net (250mm width; 500µm mesh size), which was submerged on the riverbed with its opening facing upstream. The kick-sampling method involves disturbing the river substrate immediately upstream of the net for two minutes, to dislodge the invertebrates, which are then captured in the net. The survey started at riffle areas of the reach (if present), moving along other flow types and aquatic habitats (including vegetation sweeping), finalising with one minute of stone/cobble washing. This semi-quantitative sampling methodology ensures the final sample is representative of the macroinvertebrate assemblage of the reach, and suitable for a qualitative water quality classification (Letovsky *et al.*, 2012).

The water quality for each sampling site was assessed using the EPA scheme of Biotic Indices or Quality Value (Q Value) (Toner *et al.*, 2005), which uses benthic macroinvertebrates as indicators due to their well-documented responses to a wide range of water quality characteristics and pollutants (Feeley *et al.*, 2020).

The Q Value system divides the benthic invertebrates into five 'Macroinvertebrate Faunal Groups' according to their tolerance to pollution (mostly related with deoxygenation and eutrophication), ranging from most sensitive species (Group A), to the most tolerant (Group E). Based on the relative taxa abundance within the sample, a Q Value is attributed, from Q1 to Q5, with intermediate values denoting transitional conditions (Toner *et al.*, 2005) - Table 7.4.

The findings of the surveys are presented in Section 7.7.2.2.3 below

Table 7.4: Q Value Ranking and WFD Water Quality Status

Q Value	WFD Water Quality Status	EPA Quality Status
Q5	High	Unpolluted
Q4-5		
Q4	Good	
Q3-4	Moderate	Slightly Polluted
Q3	Poor	Moderately Polluted
Q2-3		
Q2	Bad	Seriously Polluted
Q1-2		
Q1		

7.4.3.3.3 Electrofishing Survey

Electrofishing was carried out on the 12 sampling sites following the methodology described in Bohlin *et al.*, (1989) and CEN (2003) (see Section 7.7.2.2.4 and Appendix 7.3). The surveys were carried out under licence to determine freshwater fish species present, age class and hence provide an up-to-date data (2022) of fish present in receiving waters.

The qualitative timed (ten minute) electrofishing methodology (Matson *et al.*, 2018) was used, and fish were collected while wading each sampling site reach in a 'zigzag' manner, allowing the electrical field to cover the entire width of the river, as much as possible, in an upstream direction, carrying one portable Smith-Root® LR-24 electro-fisher backpack (40Hz, 250V, with 18% duty cycle). Captured fish were removed quickly using the anode net, or dip net (carried by an assistant operator), and placed into a container of water, located on the bank. After each sampling site was surveyed, all captured fish were measured (fork length - for age group estimation), transferred to a container of river water (to recover), before being released alive, and spread evenly over the sampled reach. All fish recovered quickly, and no mortalities were observed. The approach allowed defined area or length of stream in a systematic way ensuring that the entire habitat is sampled consistently providing quantitative data to estimate fish abundance, biomass, and population structure.

There are a number of limitations inherent to field-based surveying, in particular with regards to suitable weather/water flow conditions, which can restrict access to sampling sites, or

integrate a bias in the field survey assessments. Although careful consideration and planning was put in assuring optimal weather conditions during field surveys, the sampling sites 1, 6, 7, 8, 9, 11 and 12 did not carry enough water to allow the use of the electrofishing methodology. Nevertheless, every effort was made to carry out the surveys, including the adaptation of the methodology to suit the observed conditions using 'spot-electrofishing'. Unlike qualitative electrofishing method describe above, spot-electrofishing technique is usually conducted in a non-systematic manner, focusing on discrete locations where fish are likely to be present, such as undercut banks, vegetation, or other structures. The technique is usually conducted in a non-systematic manner, focusing on areas of interest rather than covering a standard area, and provides qualitative data to confirm species presence, and assess habitat use.

Strict biosecurity measures were carried out during the aquatic surveys. All equipment and used PPE were inspected and disinfected with 1% Virkon® solution prior to, and post-survey completion.

The findings of the surveys are presented in Section 7.7.2.2.4 and Appendix 7.3 below

7.4.3.4 Protected Species

7.4.3.4.1 Bird Surveys

Field surveys were conducted from April 2021 to March 2022 for the proposed Derryadd Wind Farm. Fehily Timoney undertook both summer (2021) and winter (2021–2022) ornithological surveys for the proposed Derryadd Wind Farm. The surveys were undertaken assess activity of specific target bird species recorded during both the summer and winter survey periods. The ornithological survey provided evaluation of bird species occurring within the proposed site boundary, as well as surveys of surrounding habitats of value to birds. All surveys adhered to Scottish Natural Heritage guidance (SNH, 2017). The surveys of relance to the Project include:

- Summer Surveys (2021):
  - Hinterland survey
  - Breeding wader survey
  - Breeding bird transect survey
- Winter Surveys (2021–2022):
  - Hinterland survey
  - Winter transect survey

The findings of the above listed surveys are presented in Section 7.7.2.3 below

Table 7.5: Ornithological Surveys Undertaken for the proposed Derryadd Wind Farm

Season	Survey	Period	
Breeding 2021	I-WeBS	May 2021 - September 2021	Fehily Timoney (Appendix 7.6)*
	Breeding Waders	May and June 2021	
	Countryside Bird Survey		
	Countryside Bird Survey	March 2022	

Season	Survey	Period	

* Appendix 7.6a and Appendix 7.6binclude individual reports for Breeding Season 2021 and Non-breeding Season 2021/22, respectively.

7.4.3.4.2 Non-volant Mammal Surveys

During the multidisciplinary walkover surveys, TOBIN ecologists conducted searches for non-volant mammals following the methodologies outlined in NRA Survey Guidelines (2009a). These searches focused on identifying mammal signs such as spraints, scat, prints, couches, holts, and dens. The survey findings complement observations of mammal activity made by Bord na Móna during ecology surveys at the bogs.

The findings of the surveys are presented in Section 7.7.2.4 below.

7.4.3.4.3 Whorl Snail Surveys

A dedicated Whorl Snail (*Vertigo* spp.) survey was conducted on the 11th and 12th of November 2022 by Arctica Ecology for the proposed Derryadd Wind Farm (see survey report in Appendix 7.4). The objective of the survey was to establish the presence or absence of Whorl Snails at the site. An adapted methodology based on Moorkens and Killeen (2011) and Long and Brophy (2019) was applied, including extending the survey period into winter (which does not affect detectability) and using professional judgment to identify suitable areas for the snails. The survey was guided by the results of multidisciplinary surveys (described in Section 7.4.3.2 above), focusing efforts on the most suitable habitats for *Vertigo* spp., such as Reed Beds, Wet Grasslands, Sedges, and Rushes.

The findings of the surveys are presented in Section 7.7.2.5 below.

7.4.3.4.4 Marsh Fritillary Surveys

Following the identification of suitable habitat for Marsh Fritillary (*Euphydryas aurinia*) during the multidisciplinary survey, targeted species surveys were undertaken in November 2022 (Appendix 7.5). The optimal period for detecting larval webs falls between late August and early October. During this time, larvae form conspicuous silken webs on their host plant, Devil's-bit Scabious (*Succisa pratensis*), making detection easier before they disperse into smaller groups for overwintering. Surveys were carried out on dry days, with no rain and little to no wind, ensuring optimal conditions for detecting larval webs.

The survey methodology followed the NRA Survey Guidelines (2009a) best practice guidance document. In addition, habitat suitability assessments were undertaken within areas of suitable habitat for the species. The surveys also aligned with the NBDC's Marsh Fritillary Monitoring Scheme[15], which provides standardised protocols for assessing larval web presence and habitat quality to support conservation efforts. This involved an assessment of the vegetation characteristics at a requisite number of stops within the area of suitable habitat. Records of vegetation height, abundance of Devil's-bit Scabious, presence of structured vegetation, low invading scrub and stock grazing were noted within the relevant recording sheets.

[15] Detail available at https://biodiversityireland.ie/surveys/marsh-fritillary-monitoring-scheme/.

The findings of the surveys are presented in Section 7.7.2.6 below.

7.4.3.5 Survey Limitations

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the field surveys that were undertaken to establish the current ecology of the Application Site.

Where required, surveys, studies, analysis, and reporting have been conducted in accordance with the appropriate guidelines. With the exception of electrofishing, the habitats and species survey were readily identifiable during site visits, allowing for comprehensive assessments, and no significant limitations were identified in this regard.

Electrofishing surveys are subject to certain field-based limitations, particularly regarding suitable weather and water flow conditions, which can affect access to sampling sites or introduce biases in assessments. Despite careful planning to ensure optimal conditions, sampling sites 1, 6, 7, 8, 9, 11, and 12 (see Section 7.7.2.2.4) did not contain sufficient water to allow full implementation of the electrofishing methodology outlined in Section 7.4.3.3.3. To address these constraints, survey methodologies were adapted as necessary, including the use of a targeted 'spot-electrofishing' approach where electrofishing was conducted at discrete locations with adequate water depth rather than across entire river reaches.

Information gathered during the surveys described above provided information on the nature of the habitats at present in areas where peat extraction had very recently ceased, in areas where peat extraction had ceased for some time and in areas of remnant raised bog which had never been subject to peat extraction. Using this information, it is possible to infer what the ecological baseline at the Application Site was likely to have been in 1988. However, no detailed, site specific ecology and habitat surveys from that time are available to inform the description.

7.5 Methodology for Assessment of Impacts and Effects

The following Sections outline the methodology used to identify ecological receptors and assess the potential impacts and effects of historic peat extraction, associated activities, and proposed rehabilitation at the Application Site.

7.5.1 Key Ecological Receptors (KERs)

The assessment herein followed a precautionary screening approach with regard to the identification of KERs following the NRA EcIA Guidelines (2009b). Based on comprehensive desk study, initial site visits, stakeholder consultation and ecological field surveys, KERs likely to occur in the Zone of Influence (see Section 7.1) of the Project were identified. The KERs are those receptors of ecological importance that may be affected by likely significant effects. The KERs included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive and EU Birds Directive including Qualifying Interests (QI) and Special Conservation Interests (SCIs) of Special Areas of Conservation (SAC) and) and Special Protected Area (SPAs) within the likely Zone of Influence.
- Species protected under the Wildlife Acts 1976-2021.
- Species protected under the Flora Protection Order 2015.

The importance of the ecological receptors identified was assessed using geographic importance levels (e.g., International, National, County, and Local) following the NRA EcIA Guidelines (2009b). This ensured that only receptors of significant ecological importance were selected for detailed evaluation. The full set of KER identified during the assessment are presented in Section 7.7.6 below.

The ecological impacts and effects were characterised according to the CIEEM EcIA Guidelines (2018), considering factors such as magnitude, duration, extent, reversibility, and whether the effects were positive or negative.

The assessments herein also adhered to the EPA EIA Guidelines (2022) ensuring all significant ecological effects, including cumulative and Residual Effects, were identified and addressed comprehensively.

By integrating the established methodologies described in the guidelines above, this Chapter provides a thorough evaluation of the likely ecological impacts and effects, both in isolation and cumulatively, ensuring alignment with best practice standards in EcIA and EIA.

7.5.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the Application Site and surrounding areas followed the methodology set out in Chapter 3 of the NRA EcIA Guidelines (NRA, 2009b). These guidelines set out the context for the determination of value of receptors on a geographic basis with a hierarchy assigned in relation to the importance of the receptor. The NRA EcIA Guidelines outline criteria for assigning ecological features to the following geographic levels of importance:

- **International Importance** applies to sites designated under the Natura 2000 Network (SACs, SPAs) or other globally significant areas like Ramsar sites, which support critical habitats or species.
- **National Importance** includes sites protected under Irish law (e.g. Natural Heritage Areas (NHAs) or proposed NHAs, Flora Protection Order 2015) that are rare, biodiversity-rich, or vital for nationally significant species.
- **County Importance** covers ecological features valuable at a county or regional level, such as County Biodiversity Areas or habitats essential for regional ecological networks.
- **Local Importance (Higher Value)** refers to semi-natural habitats or species of local significance that support biodiversity and ecosystem services.
- **Local Importance (Lower Value)** includes common, widespread habitats and species with limited ecological significance beyond the immediate area.

The NRA Ecological Impact Assessment Guidelines emphasise the importance of selecting ecological receptors of a certain value for detailed assessment. The guidelines state

- "*In the context of national road projects, ecological resources of below 'Local Importance (higher value)' should* ***not*** *be selected as 'key ecological receptors' for which detailed assessment is required*" (NRA, 2009b).

Following this recommendation, any ecological receptors that are determined to be of International, or National or County or Local importance (Higher Value) are considered to be KERs for the purposes of ecological impact assessment if there is a pathway for effects to occur

following the source-pathway-receptor model. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be KERs.

7.5.3 Characterisation of Effects and Impacts

In this Chapter the ecological effects of the Project are classified in line with the CIEEM EcIA Guidelines (2018). This Chapter has also been prepared in accordance with the EPA EIA Guidelines (2022). The impacts are characterised using the headings outlined in the CIEEM EcIA Guidelines and applied as appropriate.

A summary the characteristics considered in assessments is provided below:

- **Positive or Negative:** Assessment of whether effect of a proposed development or project on the ecological receptor is beneficial or adverse.
- **Extent:** Description of the spatial area over which the effect occurs.
- **Magnitude:** Assessment of the size, amount, intensity, and volume of the impact quantified (if possible) in absolute or relative terms, such as the amount of habitat lost or the percentage change in a species population.
- **Duration:** Defining the time period over which the effect occurs, considering ecological characteristics and human timeframes.
- **Frequency and Timing:** Considering how often the impact occurs and its timing, noting that even small-scale impacts can be significant if repeated over time.
- **Reversibility:** Evaluating whether the effect can be undone within a reasonable timescale, which may vary between receptors.

7.5.4 Determining the Significance of Effects

The ecological significance of the Project's effects is determined using the precautionary principle, in line with the CIEEM EcIA Guidelines (2018). A 'significant effect' is one that meets or exceeds a threshold, either supporting or undermining biodiversity conservation objectives for the KERs or biodiversity overall. The objectives can be specific (e.g., for designated sites) or broad (e.g., national/local policies or biodiversity enhancement). Effects may be significant at scales ranging from international to local (CIEEM, 2018). Significance is assessed based on consideration of whether:

- Any processes or key characteristics of KERs will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features.
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA EIA Guidelines (EPA, 2022) and the NRA EcIA Guidelines (NRA, 2009b) were also considered when determining significance and the assessment is in accordance with those guidelines, with the terminology used in this Chapter for the determination of significance following the suggested language set out in the EPA Guidelines as shown in Table 7.6.

Table 7.6: Criteria for determining significance of effect, based on EPA EIA Guidelines (2022)

Effect Magnitude	Definition
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per NRA EcIA Guidelines (2009b) and CIEEM EcIA Guidelines (2018) the following key elements should also be examined when determining the significance of effects:

- In the context of EcIA, **'integrity'** refers to the coherence of a site's ecological structure and function, enabling it to sustain its valued resources (NRA, 2009b). The likely effects on integrity should be used to determine whether an impact is significant. Adverse changes to habitat extent, structure, or function, as well as impacts on species population size and viability, can compromise integrity by shifting the ecosystem to an unfavourable condition. If an impact threatens long-term stability for example through habitat loss, degradation, fragmentation, or disruptions to population dynamics, it is considered significant. The assessment should evaluate whether proposed activities could undermine the site's viability, coherence, or conservation objectives..
- A '**significant effect**' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018). Significant effects include impacts on the structure and function of designated sites, habitats, or ecosystems, as well as on the conservation status of habitats and species, encompassing changes in their extent, abundance, and distribution.

Conservation status - An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM EcIA Guidelines (2018) the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing.
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM EcIA guidelines, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

7.5.5 Incorporation of Control Measures and Mitigation

Section 7.9.1 of this rEIAR presents the remedial impact assessment of the likely significant effects outlines the control measures, where applicable, that were/are in place during the Peat Extraction Phase and Current Phases.

Section 7.9.2 summarises the control measures which are to be in place during the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site during the Remedial Phase.

Since the year 2000 all operations at the Application Site have been licenced under IPC Licence (No. P0504-01) and have been subject to the conditions of that licence. The IPC Licence is described in Section 7.9.2 below and presented in full in Chapter 4 - Project Description - Appendix 4.1. Cutaway Bog Decommissioning and Rehabilitation Plans will be implemented across the Application Site to fulfil the requirements of Condition 10 of the IPC licence. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The implemented control measures and mitigation measures avoid or reduce or offset potential significant Residual Effects, post mitigation.

7.5.6 Remedial Impact Assessment Structure

The following section outlines the structure of the impact assessment presented in Section 0. This structured approach followed ensures a clear and systematic evaluation of potential impacts, mitigation measures, and Residual Effects, providing a comprehensive understanding of the environmental implications of the Project, while ensuring alignment with best practice standards of EcIA and EIA.

7.5.6.1 'Do Nothing' Scenario

As stated in the EPA EIA Guidelines (May 2022), the concept of 'Do-Nothing Effects' refers to the projected state of the environment in the future if the proposed Project did not proceed. For the Project the assessment of the effects of the 'Do Nothing' scenario is present in Section 7.8.1. The Do Nothing' scenario assessment considers the natural progression of environmental conditions at the Application Site in the absence of the Project, including any ongoing processes, existing land uses, and potential changes over time.

This Chapter of the rEIAR consider two 'Do-Nothing' scenarios:

- The first 'Do-Nothing' scenario is defined as the Project (as described in Section 4.2 of Chapter 4 - Project Description) having ceased at the Application Site in 1988.
- The second 'Do-Nothing' scenario assumes that Substitute Consent is not granted. In this case, the ongoing obligations under the IPC Licence would still apply, requiring Bord na Móna to continue implementing the Cutaway Bog Decommissioning and Rehabilitation Plans. Bord na Móna's obligations under the IPC Licence remain in place regardless of the Substitute Consent process.

7.5.6.2 Remedial Impact Assessment

As outlined in Section 7.1 above the remedial impact assessment of the Project follows a phased evaluation approach to assess biodiversity effects throughout the Project's lifecycle. This approach ensures a clear understanding of the changing environmental conditions, and the control measures and management actions in place or proposed to be implemented. The remedial assessment of impacts for the Project are presented in Section 0 below. Specifically, the assessments for each Phase of the Project are presented in the following:

- **Section 7.8.3 Peat Extraction Phase (July 1988 – July 2019)**
    - Considers impacts due to peat extraction and all associated ancillary works at the Application Site from when the EIA Directive was required to be transposed into Irish law in 1988 until the cessation of peat extraction in July 2019.
      The baseline for the assessment is established as the likely ecological condition at the Application Site in July 1988 following installation of drainage in 1950s, and peat extraction ongoing since at least the 1960s.
      As much of the Application Site would have been drained by the 1988 baseline and characterised by dominant cutover bog, the habitats present then would have predominantly bare peat and cutover bog with small sections of remnant raised bog.
- **Section 7.8.3 Current Phase (July 2019 – Present Day)**
    - Considers impacts due to peat extraction and all associated ancillary works at the Application Site from when extraction activity was ceased in July 2019 until present day.
- **Section 7.8.3.4.3 Remedial Phase (Future)**
    - Considers impacts of planned implementation of rehabilitation measures proposed as part of the Cutaway Bog Decommissioning and Rehabilitation Plans.

7.5.6.3 Residual Effects

The CIEEM EcIA Guidelines (2018) and EPA EIAR Guidelines (2022) categories residual effect by significance, permanence, and reversibility, ensuring clear differentiation from unmitigated effects and transparent assessment of cumulative impacts.

The assessment of Residual Effects is presented in Section 7.8.5.5. The section presents an assessment of the Residual Effects (i.e. the impacts that remain after all mitigation, control, and best practice measures have been implemented). It evaluates the extent to which these measures have effectively minimised or eliminated potential adverse effects on biodiversity receptor, and other environmental factors across the Peat Extraction Phase (see Section 7.8.3), the Current Phase (see Section 7.8.3.4.3), and the Remedial Phase (see Section 7.8.4.4) of the Project.

After characterising the KERs and assessing the significance of effects from peat extraction and associated activities, including decommissioning and rehabilitation measures at the Application Site, specific additional mitigation measures may be identified to avoid and/or reduce the significance of these ecological effects. Following the implementation of these measures, a final assessment of the likely significant Residual Effects on KERs would be required, applying the criteria outlined in Table 7.6, where relevant.

7.5.6.4 Cumulative and In-combination Effects

Annex IV of the EIA Directive (2011/92/EU as amended by 2014/52/EU) requires that an EIAR provides a "d*escription of the likely significant effects of the project on the environment resulting from…the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.*'

The EPA EIA Guidelines (EPA 2022) defines cumulative effects as:

- " *The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects*".

A relatively minor effect on a biodiversity receptor caused by the Project in-isolation could result in a significant effect if it is added to by impacts from other projects. This Chapter identifies and provides an assessment of likely significant cumulative effects caused by the Project in combination with other projects.

With respect to cumulative effects CIEEM EcIA Guidelines (CIEEM 2018) outlines the following:

- *"Different types of actions can cause cumulative impacts and effects*
  - *Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space; and*
  - *Associated/connected – a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the* Project *which may be authorised under different consent processes. It is important to assess the potential impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process.*"

Taking into account the above, along with the characterisation of the KERs and the description of effects, information regarding other relevant plans and projects has been gathered to assess the potential for cumulative effects and effect interactions between effects considering spatial and temporal scope of the Project.

The assessment of cumulative and in-combination effects is presented in Section 7.11.

7.6 SITE LOCATION AND ACTIVITIES OVER TIME

7.6.1 Site Location

The Application Site comprises three bogs Derryaroge, Derryadd and Lough Bannow bogs (the 'Application Site'), locatedwithin the Mountdillon Bog Group. Derryaroge Bog is located at the northern extent of the Application Site, Derryadd Bog at the centre of the Application Site and Lough Bannow Bog to the south. The Application Site comprises an overall area of 2,244 ha.

Derryaroge Bog

Derryaroge Bog (approximately 863ha) is located 1km east of Lanesborough, County Longford. It is divided into western and eastern sections by a privately owned mineral island, which lies outside the Application Site boundary. Derryaroge Bog is separated from the Derryadd Bog to the southeast of Lanesborough by the N63 road. The main access point to Derryaroge Bog was off the N63.

Derryaroge Bog was in industrial peat production since the 1950s, with satellite imagery and annual reports confirming active extraction in 1988. By this time, the bog consisted largely of cutover areas dominated by bare peat, supported by established drainage and rail infrastructure. Aerial imagery (see Appendix 4.5 in Chapter 4 – Project Description) further highlights the extent of cutover bog and peat extraction during this period.

Drainage of the bog to facilitate peat extraction was already in place in 1988, predominantly orientated in a northwest-southeast direction and several pumps were in operation.

Railway infrastructure was laid in the bog (since the 1950s), terminating at the Mountdillon Works at Derryaroge Bog which included machine passes, canteens, workshops, welfare facilities, fixed fuel tanks and peat loading facilities.

A pumped drainage system in operation in 1988 at the Derryaroge Bog remains in place, with nine active surface water pumps. There is an artificial silt pond, and surface water emission points which remain in-situ today.

Derryadd Bog

Derryadd Bog (approximately 649ha) lies 4km southeast of Lanesborough. The bog is separated from Derryaroge Bog by the N63 road and Mountdillon Works. It is a single peatland block with two privately owned mineral islands (Annaghmore).

A rail link connects Derryadd Bog to both Derryaroge (to the north) and Lough Bannow (to the south). In addition, a rail line running in an east-west direction, dividing the bog into a larger northern section and a smaller southern section, remain in-situ today. Hydrological management, historically supporting industrial peat extraction, continues through active pumping infrastructure.

Lough Bannow Bog

Lough Bannow Bog (approximately 731ha) is situated 7km southeast of Lanesborough. It is bordered by the R392 Regional Road to the west, the R398 Regional Road to the north, and the L1136 Local Access Road (Keenagh Road) to the south. The Royal Canal and Greenway are located 500m east.

Two large privately owned mineral islands exist within the site. A rail line crosses the southern part of the bog in an east-west direction.

Lough Bannow Bog had hydrological management via pumping to support peat extraction. Pumping continues today, with three active pumps (one to the south and two along the northern boundary). Some eastern drains have been excavated down to limestone bedrock.

7.6.2 Overview of Peat Extraction Extent

This section provides an overview to the temporal change in the spatial extent of peat extraction activities at the Application Site.

Between 1973 and 2019, the spatial extent of peat extraction at the Application Site underwent significant changes. Table 7.7, based on peat extraction reported by Bord na Móna, shows that greatest extent of area subject to peat extraction occurred by 1988, covering 1,963 hectares. However, from that peak onward, the relative spatial extents of extraction areas at the Application Site steadily began to decrease, with extraction ceasing entirely by 2019. The area that was drained but not subject to peat extraction expanded significantly from zero hectares in 1988 to 1,695 hectares by 2019. This shift from active extraction to drained but non-extracted land reflects an ongoing transformation, facilitating a gradual ecological transition in some areas from bare peat to early-stage or pioneer habitats, with early colonising species such as rush and patchy scrub.

. Despite the low resolution of aerial imagery from 1988, this transition is clearly visible and further substantiated by high-resolution aerial photographs of the Application Site taken between 1995 and 2020 (see Appendix 4.5 in Chapter 4 – Project Description).

The spatial extent of peat extraction activities and the resulting effects on biodiversity have been documented in this Chapter of the rEIAR. The Chapter captures both the historical changes in extraction and the environmental transitions that have occurred since cessation of peat extraction in 2019.

Table 7.7: Bord na Móna Estimates of Peat Extraction Extents (ha) at the Application Site

Area Type	1973	1988	1995	2004	2019
Neither drained nor subject to peat extraction	12.93	12.93	12.93	12.93	12.93
Subject to peat extraction	1,907.6	1,963	p 1,826.7	1,353.2	269.4
Drained but not subject to peat extraction	56.7	0	136.3	610.4	1,695.38

7.7 ECOLOGICAL BASELINE

As outlined, the Project covers the period from July 1988, when the EIA Directive was required to be transposed into Irish law, through to the present day and into the future. Specifically, this Chapter evaluates the likely significant effects on biodiversity using ecological baseline of:

- **1988**– Represents the ecological conditions at the time the EIA Directive was required to be transposed into Irish law and serves as the reference point for assessing historical impacts.

The following sections present the results of a detailed desk study and field surveys conducted to gather ecological data and establish the **1988 baseline** at the Application Site and its surrounding area.

It should be noted, however, that in order to provide as detailed a description as possible of the Application Site over time to inform the assessment, the environmental conditions during each of the Phases of the Project have also been described, using a combination of referenced surveys and studies, as well as information acquired during a desk study.

7.7.1 Peat Extraction Phase (July 1988 – July 2019)

By 1988 the land use at the Application Site was well established as industrial peat extraction, with all bogs fully drained, with milled peat extraction underway and railway infrastructure in place.

Prior to the insertion of any drainage and the commencement of peat extraction activity, the Application Site was likely dominated by uncut raised bog and associated habitats, including fens, flushes, soaks, and bog woodland, while in 1988 the habitats at the site would have been predominantly bare peat and cut over bog, with small sections of remnant raised bog.

In the absence of historical data for the Application Site, this description of the baseline ecology at the site before the Project and during the Peat Extraction Phase, is informed by Fossitt (2000) "*A Guide to Habitats in Ireland*" and by NPWS published accounts of bog habitats at SACs.

- Fossitt (2000) provides detailed descriptions habitat and fauna of:
  - **Raised Bog (PB1):** Characterised by peat-forming vegetation, including Sphagnum mosses, heathers, and other wetland species, typical of undisturbed raised bogs.
  - **Cutover Bog (PB4):** Areas where peat extraction has occurred, altering the natural vegetation and hydrology, but which may still support some bog species and have potential for ecological recovery.
- NPWS reports on SAC sites that contain examples of bog habitats, including:
  - **Active Raised Bogs (Habitat Code 7110)**: This habitat features waterlogged, peat-forming vegetation and intact hydrological conditions.
  - **Degraded Raised Bogs Still Capable of Natural Regeneration (Habitat Code 7120):** These areas, though affected by drainage or extraction, still retain the potential for ecological recovery and regeneration.

Section 7.7.1.1 through Section 7.7.1.3 summarises habitat and fauna descriptions from Fossitt (2000) and NPWS, focusing on raised and cutover bogs, their ecological characteristics, and their conservation status within SACs.

The reason describing sources, such as Fossitt (2000) and NPWS, in Sections Section 7.7.1.1 through Section 7.7.1.3, is to provide a knowledge base to establish an understanding of the ecological characteristics, habitats, and fauna present at the Application Site prior to any disturbance or development activities. Moreover, these sources help address the information gap regarding the baseline ecology at the Application Site during the earlier years of the Peat Extraction Phase. This is especially important given that detailed ecological survey reports are not available until 2010–2012. As a result, the sources used facilitate the description of the 1988 baseline, in the absence of, or with limited, available information from that period. The findings of these surveys are presented in Section 7.7.1.4 below.

7.7.1.1 Raised Bog and Associated Habitats

The habitats that were likely present at the Application Site before any drainage or peat extraction activities would have been similar to those found in the well-preserved raised bogs in Ireland, such as the Brown Bog Special Area of Conservation (SAC) (002346), which is located 6km northwest of the Application Site.

The NPWS have published Site Specific Conservation Objectives (SSCOs) for the SAC (NPWS, 2016). For the site the NPWS have also published Site Synopsis Report (NPWS. 2014) and SSCO Supporting Document (NPWS, 2016b) that present background information that has been used to inform the process of setting the SSCO in relation to the Annex I habitats. The SSCO Supporting Document for the site provide detailed descriptions of the habitats and fauna recorded at the site.

The Brown Bog SAC (Site code 002346) is designated for Active raised bogs [7110]* (priority habitat), Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150] (NPWS, 2016a). The Application Site is located in a drumlin-filled valley and features an area of raised bog with a central wet depression, quaking mats of bog mosses, and tear pools (small, water-filled depressions) colonised by algae (NPWS, 2014). Water flows through the pools, and a possible spring may be present at the bog's centre. An active peat-forming flush occurs in the north, while abandoned cutover areas are found along the northern, western, and northeastern margins. Remnants of mature deciduous woodland are present to the northwest. The SAC supports characteristic midland raised bog communities, with minimal disturbance with only small areas of cutover present, and the high bog largely remains intact within its original peat basin. Despite its small size, the site hosts a diverse range of raised bog microhabitats, including hummock-hollow complexes, pools, and a flush system with a surrounding tear pool complex peat-forming vegetation, including sphagnum mosses, bog cotton (*Eriophorum* spp.), and heathers (*Calluna vulgaris*, *Erica tetralix*). Such habitats rely on stable hydrological conditions and minimal disturbance to maintain their ecological integrity.

Fossitt (2000) describes Raised Bogs (PB1) as:

- *'…accumulations of deep acid peat (3-12 m) that originated in shallow lake basins or topographic depressions. The name is derived from the elevated surface, or dome, that develops as raised bogs grow upwards from the surface; the domed effect is often exaggerated when the margins of a bog are damaged by turf cutting or drainage, and are drying out…'*

In their natural state, raised bogs rely on water retention, primarily sustained by precipitation but also due to groundwater. Actively accumulating peat conditions occur in the wettest parts of the bog, indicating the presence of good quality active raised bog (Fossitt, 2000). In active raised bogs the upper living peat-forming layer is actively growing and primarily composed of Sphagnum mosses, which are essential for peat accumulation. This living layer, termed the acrotelm, is underlaid by the dead peat layer, the catotelm.

The surface of an intact active raised bog is typically wet, acidic, nutrient-poor, and features a complex topography with hummocks and hollows. Bogs are typically driest at the edges and become wetter towards the centre, where well-developed pool systems are common (Fossitt, 2000). In drier areas and hummocks support species such as ling heather (*Calluna vulgaris*), deergrass (*Trichophorum germanicum*), hare's tail cottongrass (*Eriophorum vaginatum*), cross-leaved heath (*Erica tetralix*), and various species of Sphagnum moss. Wetter areas and pools are characterised by species such as common cottongrass (*Eriophorum angustifolium*), bog asphodel (*Narthecium ossifragum*), white beak sedge (*Rhynchospora alba*), bogbean (*Menyanthes trifoliata*), and various species of Sphagnum moss.

Intact raised bogs areas are likely to have included extensive soaks and flushed areas. These areas can be either wet or dry, where the nutrient supply is increased over time through concentrated surface flows or connections with groundwater and underlying mineral substratum (Fossitt, 2000). This mineral enrichment enhances both habitat and species diversity. Flush and soaks are considered an integral part of the raised bog habitat. Typical Fauna of Raised Bogs

Raised bogs are nutrient-poor ecosystems with acidic, waterlogged conditions that limit species diversity and population densities. Most species are opportunistic rather than specialised but still impact the ecosystem through nutrient exchanges. Despite the challenging conditions, Irish raised bogs, support faunal assemblages. The NPWS SSCO supporting document for the Brown Bog SAC (NPWS, 2016b) describes the key fauna found on Irish blanket bogs as:

- **Amphibian**

  The Common Frog (*Rana temporaria*), Ireland's only native frog species, is well adapted to the acidic waters of raised bogs and breeds in the bog pools.

- **Reptile**

  The Common Lizard (*Zootoca vivipara*) is often found on raised bogs.

- **Birds**

  Meadow Pipit (*Anthus pratensis*) is a characteristic bird species of Irish peatlands, often seen perching on bog vegetation.

  Skylark (*Alauda arvensis*) is often found breeds in open bog habitats.

  Snipe (*Gallinago gallinago*) is a wader that nests in bog vegetation, its distinctive "drumming" display flight is common in spring.

  Red Grouse (*Lagopus lagopus scotica*) is a key indicator species of healthy bog ecosystems, relying on heather for food and cover.

- **Mammals**

Irish Hare (*Lepus timidus hibernicus*) is frequently found in raised bogs, using the open landscape for feeding and shelter.

Otter (*Lutra lutra*) occurs in bogs with wet channels and streams, hunting amphibians and fish.

Badger (*Meles meles*) often use these areas for foraging and as movement corridors between other habitats.

While Pine Marten (*Martes martes*) is more commonly associated with woodlands, it occasionally traverses raised bogs in search of food.

- **Invertebrates**

Dragonflies and damselflies (*Odonata*) species like the Black Darter (*Sympetrum danae*) and the Large Red Damselfly (*Pyrrhosoma nymphula*) are found in pools and wet areas of the bog.

Butterflies and moths (*Lepidoptera*) species found include the Large Heath Butterfly (*Coenonympha tullia*) which is identified as a peatland specialist.

A variety of ground beetles and water beetles (*Coleoptera*) are found in the waterlogged conditions present.

Several species of spiders (Araneae) that inhabit the surface of the raised bogs.

7.7.1.2 Cutaway Bog and Associated Habitats

By 1988, the installation of drainage systems and extensive peat extraction activities would have significantly altered the Application Site, leaving small patches of uncut raised bog, largely confined to the edges. Excavated bog face banks would have been a common feature along the margins of raised bogs areas at the Application Site, resulting from historical and ongoing peat extraction. Active face banks, where peat was still being cut, would contribute to further water loss, leading to the drying out of adjacent bog areas. This impacts the ability of the bog to sustain its characteristic vegetation, particularly Sphagnum mosses, which are essential for peat accumulation and bog growth. Inactive face banks, depending on their exposure and hydrological conditions, may begin to support early successional habitats. Over time, these abandoned face banks can develop vegetation such as birch (*Betula spp.*), purple moor-grass (*Molinia caerulea*), and other species adapted to drier conditions.

As shown by historic aerial imagery (see Appendix 4.5 in Chapter 4 – Project Description) the Application Site in 1988 was dominated by cutover bog and extensive areas of bare peat where large sections of the bogs had been drained and vegetation removed due to peat extraction activity.

Fossitt (2000) describes Cutover Bog (PB4) as:

> *'...a variable habitat, or complex of habitats, that can include mosaics of bare peat and revegetated areas with woodland, scrub, heath, fen and flush or grassland communities....'*

The recolonisation of vegetation in cutover bogs is a complex process influenced by various environmental factors such as the frequency and extent of disturbances, hydrological conditions, the depth of remaining peat, the nature of the peat, and the underlying substratum.

Standing water, often present in drains, pools, or excavated hollows, also a role in influencing regeneration of vegetation. In some cases, large sections of cutover bogs have been reclaimed for agricultural use or planted with coniferous trees. These reclamation practices can significantly alter the dynamics of recolonisation. Determining the full extent of the cutover is often difficult as in many places it frequently transitions into other marginal habitats or adjacent farmland, making it difficult to delineate the boundaries of the bogs.

7.7.1.3 Typical Fauna of Cutaway Bogs

By 1988, most of the Application Site consisted of cutover bog, with smaller patches of uncut raised bog likely remaining around the edges. This history of drainage and peat extraction significantly shaped the site's habitats, making it more likely to support wildlife typical of cutover bogs rather than species found exclusively in intact raised bogs. Therefore, this ecological assessment focuses more on species associated with cutover bogs, reflecting the open, varied landscape created by peat extraction and drainage.

Cutover bogs are a patchwork of habitats, including bare peat, regrowing vegetation, pools, and patches of scrub. This mix of features supports a variety of species adapted to the changing landscape.

The open, sparsely vegetated areas of cutaway bogs are ideal for Skylarks and Meadow Pipits, which use the exposed peat and scattered plants for feeding and nesting. Other ground-nesting birds might also take advantage of the open terrain, including Snipe, Lapwing, Curlew, and Common Redshank (*Tringa totanus*). Other bird species often found at cutaway bogs include foraging Reed Bunting (*Emberiza schoeniclus*) on the more vegetated areas, particularly near drainage channels ,and Kestrel (*Falco tinnunculus*) hunting over open terrain, feeding on small mammals.

Irish hares are well suited to the open spaces of cutover bogs, while Badger and Otter often use these areas for foraging and as movement corridors between other habitats.

The mix of wet pools and drier open ground supports a variety of insects, including beetles, spiders, and dragonflies, which thrive in these diverse microhabitats.

Common frogs are likely to be found in the wetter areas, using pools and damp ground for breeding.

7.7.1.4 Bord na Móna Ecology Surveys at Derryaroge, Derryadd and Lough Bannow Bogs

As detailed above, the Application Site was subject to detailed ecology surveys by Bord na Móna ecologists between 2010 and 2012. Section 7.7.1.4.2 through Section 7.7.1.4.4 provide summary accounts of the ecological surveys undertaken. The ecological surveys used the Heritage Council habitat classification scheme (Fossitt 2000) and the Bord na Moña habitat classification scheme. These classification schemes are described in the survey reports, including the correspondence between the classifications schemes and the codes used. For convenience, the dominant habitats recorded are listed in Table 1 and Table 2 in Section 4, using Fossitt (2000) habitat codes. Where possible, ecological evaluations are assigned to each habitat following NRA EcIA Guidelines (2009b). A review of the habitat maps prepared by Bord na Móna for the Mountdillon Bog Group shows that the Application Site comprises a mosaic of

cutover bog habitats including areas of bare peat, scrub, bog woodland, secondary heath type vegetation, pioneer open cutaway habitats, fen and grassland. Areas of remnant uncut raised bog were also present.

The finding of the surveys undertaken between 2010 and 2012 data is presented below to supplement gaps in historical records, providing a more complete and accurate reconstruction of the 1988 baseline by incorporating long-term environmental trends and site-specific changes.

7.7.1.4.1 Overview

The 2010 – 2012 surveys described the dominant habitat and fauna at Derryaroge Bog, Derryadd Bogs and Lough Bannow Bogs (as detailed in Section 7.7.1.4.2 through Section 7.7.1.4.4). The three bogs share common elements including significant coverage of bare peat (BP). In addition to bare peat areas, the Derryaroge and Derryadd Bog both contain early-stage or pioneer habitats in specific areas with early colonising species such as Soft Rush, and patchy scrub, primarily dominated by Willow and Birch. These areas are still undergoing ecological development, with limited vegetation layers and species diversity. While bare peat is also identified as a major component habitat of Lough Bannow Bog, the site also contains other habitat types including most notably areas of poor fen habitats. This site also included more developed bog woodland and raised bog remnants, and presence of unique features such as calcareous springs and transition mire.

Like the habitats at the bogs, the three bogs share common fauna. They do, however, differ in terms of diversity, likely due to variations in habitat complexity. Derryaroge Bog and Derryadd Bogs support a range of common bird, mammal, and invertebrate species, but their fauna tends to be more characteristic of early successional habitats. The presence of species like the Grasshopper Warbler, Whitethroat, and Buzzard at Derryaroge, and Heron, Kestrel, and Skylark in Derryadd indicates that both sites host a mix of species that are adapted to open, less complex environments with scrub, heath, and wetland areas. Mammals like Pine Marten, Fox, and Badger are recorded at both bogs. Lough Bannow Bog has a more diverse fauna, consistent with its reported diverse habitats. Bird species included species like Meadow Pipit and Swallow, but also wetland-dependent species such as Snipe and Swans.

The habitat conditions and species present at the sites documented between 2010 and 2012 are likely to have persisted largely unchanged throughout the later years of the Peat Extraction Phase and into the Current Phase, which coincides with the cessation of peat extraction activities. While improvements in habitat quality and thus species diversity may have become increasingly more pronounced over time after peat extraction activities ceased, any recovery would be slow depending on factors such as hydrological conditions, vegetation type, and rehabilitationefforts. For instance, a study on Killyconny Bog in County Cavan, Ireland, reported that 5.0 hectares of Sphagnum-rich regenerating bog vegetation developed across a 26.9-hectare study site over a period of 7–13 years post implementation of drainage management measures (Crowly *et al.*, 2021). Given this slow rate of natural change and the somewhat limited ongoing management in place at the site significant rehabilitation is unlikely to have been achieved in the years since cessation of peat extraction. As a result, the conditions at the Application Site continue to largely reflect those described in the 2010–2012 surveys. This is

supported by the findings of habitat surveys undertaken at the Application Site between 2021 and 2023 described in Section 7.7.2.1 below.

7.7.1.4.2 Derryaroge Bog - September 2012

The September 2012 Ecological Report outlines that peat extraction had been ongoing at the site since 1960s, supplying fuel peat to Lanesboro Power Station and later to Lough Ree Power Station. While large areas remained subject to peat extraction during the 2010 – 2012 surveys, significant cutaway sections had developed diverse habitats. Numerous private lines supplied energy to surface water pumps to prevent flooding. The northern section is separated by an east-west rail line and features both active peat production and pioneer habitats, including birch and Willow Scrub (*Salix* spp.), Oak (*Quercus* spp.) and Pine (e.g. *Pinus* spp., *Picea spp.*). Some areas contain exposed gravel and clay subsoil, with lower-lying western sections supporting reed-bed growth. A flood defence berm was built in 2011 to protect against River Shannon flooding.

The central area contains varied habitats, including a mineral island. Despite land-use maps indicating limited cutaway, large portions of the bog had were no longer subject to peat extraction by 2012. Pioneer habitats included Birch Scrub (*Betula* spp.), dry heath, and poor fen. Wetlands were emerging, supporting species like Reed-mace (*Typha* spp.), rushes and marsh vegetation, providing habitat for birds like Mallard (*Anas platyrhynchos*) and Snipe.

The eastern section remained largely subject to peat extraction but also featured cutaway areas in different stages of colonisation by poor fen and scrub. Some scrubland along the eastern edge was maturing into bog woodland.

In 2012, a honey project was established with ten beehives on the mineral island, managed by Hyland Honey.

Small conifer plantations, primarily Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta*), were planted as shelter belts about 40 years ago near Mountdillon Works but have not been managed. The survey reported that some areas of the site may be suitable for future forestry once peat extraction ends.

The Mountdillon Works area is in the south, and the N63 Longford-Roscommon Road runs along the southern boundary.

Key biodiversity features of interest

- The site contained some establishing pioneer cutaway habitats at various developmental stages. Some of these areas were flooded to various extents and contain developing wetlands.
- The establishing cutaway habitats were attracting other typical wildlife, including signs of Otter around the silt pond complex to the west of the site.
- The area subject to peat extraction was surrounded by some typical marginal habitats of high local value including intact raised bog (PB1) and bog woodland (WN7).
- The River Shannon flows close to the western edge of the bog. The Shannon is an important wildlife corridor along which species can move from one area to another.

Habitats present (in order of dominance)

The most common habitats present at this site in September 2012 included:

- Bare peat.
- Pioneer Soft Rush (*Juncus effusus*)-dominated poor fen with less frequent Bog Cotton (*Eriophorum* spp.) or Bottle Sedge (*Carex rostrata*) -dominated poor fen.
- Willow-dominated scrub (in mosaic with Pioneer Soft Rush (*Juncus effusus*)-dominated poor fen) (in those areas that are flooded regularly).
- Open Water (permanent) and Temporary Open Water
- Birch (*Betula* spp.)-dominated scrub (on drier higher ground that is not flooded).
- Pioneer dry heath (mainly in mosaic with Birch Scrub).
- Dry pioneer Purple Moorgrass (*Molinia caerulea*) -dominated grassland.
- Access routes.
- Riparian zones (with drains and associated habitats such as scrub and bog woodland).
- Silt ponds (Silt) with Gorse (*Ulex europaeus*)/Birch scrub and Purple Moorgrass-dominated grassland.

The most common habitats found around the margins of the site in September 2012 included:

- Raised bog (PB1)
- Cutover Bog (PB4)
- Scrub (WS1)
- Wet (callows-type) grassland (GS4)
- Bog woodland (WN7)
- Dense Bracken (HD1)
- Improved grassland (GA1) around the boundary

Fauna biodiversity

- Several bird species were noted on the site during the survey.
    - Grasshopper Warbler (*Locustella naevia*), Whitethroat (*Curruca communis*), Buzzard
- Other more common species include Grey Crow (Hooded Crow), (*Corvus cornix*), Blackbird (*Turdus merula*), Robin (*Erithacus rubecula*), Wood Pigeon (*Columba palumbus*), Swallow (*Hirundo rustica*), Pied Wagtail (*Motacilla alba yarrellii*), Pheasant (*Phasianus colchicus*)
- Mammals - signs of several mammal species were noted on the site during the survey.
    - Pine Marten, Fox, Badger, Hare
- Other species reported
    - Butterflies - Brimstone (*Gonepteryx rhamni*), Speckled Wood (*Pararge aegeria*), Peacock (*Inachis io*), Painted Lady (*Vanessa cardui*), Small Tortoiseshell (*Aglais urticae*)
    - Three-Spined Stickleback (*Gasterosteus* spp.) in drains.
    - Honeybee (*Apis mellifera*).

7.7.1.4.3 Derryadd Bog - July 2012

The July 2012 Ecological Report outlined that peat extraction was active across most of the site. The extraction activity had been ongoing since the early 1960s, supplying fuel peat to Lanesboro Power Station and later to Lough Ree Power in Lanesborough. Pumps continue to be used (in

the southwestern corner and along the northern boundary) to maintain dry conditions and support ongoing peat extraction.

The site contains two mineral islands, Annaghmore and Annaghbeg, which are privately owned and used for grazing. A minor road connects these islands to a public road on the eastern edge of the site. Derryaroge Bog lies to the north, separated by the Longford-Roscommon road, while a rail link connects the site to Derryaroge Bog to the north and Lough Bannow Bog to the south.

The survey noted a central cutaway area had been regenerating for years, with dry ridges colonised by calcareous grassland and scrub, including Birch, Scots Pine, Lodgepole Pine, Hazel (*Corylus avellana*), and Ash (*Fraxinus excelsior*). Smaller cutaway areas across the site primarily consisted of pioneer poor fen habitats. Two small, 50-year-old conifer plantations of Sitka Spruce and Lodgepole Pine were present but in poor condition, though it was detailed that at the time of reporting, they may have been viable for clear-felling. Some elevated, dry areas were also indicated to be potentially suitable for future planting.

Extensive drainage work was underway in the southwestern corner of the bog during the ecological survey. A canalised watercourse, a tributary of the River Shannon, flows through the southern section of the site. Additional habitats along the site's margins include bog woodland, wet grassland, dry heath, and cutover bog.

Much of the peat depths across the bog were less than 2m deep, with exposed gravel in several areas. However, some sections in the southwest contained young, Sphagnum-rich peat.

Key biodiversity features of interest

- In 2012 the majority of the bog was subject to peat extraction; however, a significant area of cutaway has developed into calcareous grassland and scrub.
- The margins of the Bord na Mońa property included some remnant habitats including raised bog (PB1) and bog woodland (WN7) that acts as a refuge for local wildlife.

Habitats present (in order of dominance):

The most common habitats present at this site in July 2012 included:

- Bare peat
- Pioneer dry heath communities
- Scrub
- Silt Ponds (Silt) with associated habitats such as scrub, bracken, rank grassland (GS2), dry calcareous grassland and typical pioneer communities of disturbed areas

The most common habitats present around the margins at this site in July 2012 included:

- Bog woodland (WN7)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4).

Fauna biodiversity

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

- Heron (*Ardea cinerea*), Mallard , Kestrel (*Falco tinnunculus*), Skylark, Willow Warbler (*Phylloscopus trochilu*) , Grasshopper Warbler
- Other more common species included Wood Pigeon, Meadow Pipit, Robin, Blackbird, Grey Crow, Magpie (*Pica pica*)
- Some Bord na Mońa employees are actively releasing Pheasant onto the site.

- Mammals - signs of several mammal species were noted on the site during the survey.
  - Otter, Badger, Pine Marten, Red Squirrel (*Sciurus vulgaris*) or Grey Squirrel (*Sciurus carolinensis*), Hare
- Other species reported
  - Frog, Butterflies - Green-veined White (*Pieris napi*), Small Copper (*Lycaena phlaeas*), Small Heath (*Coenonympha pamphilus*), Large White (*Pieris brassicae*), Meadow Brown (*Maniola jurtina*)

7.7.1.4.4 Lough Bannow Bog - July 2010

By the time of survey in July 2010 Lough Bannow Bog had been subject to milled peat extraction for over five decades. The Ecological Report outlines that peat extraction was expected to continue for another five years in selected areas. Some sections were no longer subject to peat extraction and are at various stages of natural revegetation, while other areas remained subject to peat extraction, consisting of bare peat. The site featured undulating terrain with exposed gravel hills and ridges emerging as the peat is depleted.

A failed conifer plantation, established in 1995 with Sitka Spruce and Norway Spruce, was present on-site, with many trees having died due to nutrient competition from heather. However, Birch and Scots Pine have established successfully in these areas. Adjacent to the plantation, dense Birch woodland and a mosaic of wet and dry habitats were developing, with some areas showing signs of bog woodland formation.

The ecological report references the large mineral island used for agricultural grassland and the rail line dividing the land into northern and southern sections.

Vegetation varied across the site, with dry grassland mosaics, poor fen habitats, Birch scrub, and re-vegetating pioneer species. In the south-west, a former lake, Lough Anpastia, was no longer present, with the area consisting of bare peat and drainage channels.

The report referenced a small works area (described as local holding areas in Chapter 4 – Project Description - Section 4.4.5.5) along the railway line contains storage facilities, machinery, and an artificial pond with limited aquatic vegetation. Scrubland near this area was developing into Oak-Ash-Hazel woodland, featuring diverse flora such as Birch, Oak, Holly (*Ilex aquifolium*), hawthorn (*Crataegus monogyna*), and various grasses and wildflowers. Otter activity had been recorded in drainage ditches, which connect to the nearby Royal Canal.

At the time of reporting the site remained dry due to pumping, with several drainage channels excavated down to limestone bedrock, and while peat extraction was continuing in some areas, much of the land was transitioning towards natural regeneration, creating a diverse and evolving landscape.

Key biodiversity features of interest:

- Calcareous springs (or depressions collecting tufa-rich groundwater). If classified as tufa-forming (active springs), they qualify as the Annex I habitat Petrifying springs with tufa formation (Cratoneurion) [Habitat code: 7220].
- Extensive bog woodland (WN7) along the western edges of the transition mire.
- Pioneer dry calcareous grassland developing on cutaway.
- Oak-Ash-Hazel woodland (WN2) in the northeast section of the site.
- Areas of Birch (oBir and cBir) dominated scrub that are becoming species rich and likely to develop into Oak-Ash-Hazel woodland (WN2).
- Oak-Ash-Hazel woodland (WN2) in the future.
- Otters were using the drains in the northeastern section of the site and were likely to be using the drainage system that is connected to the Royal Canal.
- Pine Marten were present on the site at numerous locations

Habitats present (in order of dominance):

The most common habitats present at this site in July 2010 included:

- Poor fen (pEang, pJeff, pTyp, pPhrag and pTrig)
- Bare peat (BP)
- Dry calcareous grassland (gCal)
- Disturbed ground (Colt's Foot dominated) (DisCf)
- Pioneer Campylopus-dominated community (pCamp)
- Rip - riparian areas (streams/drains with fringing habitats)
- Birch dominated scrub (ebir, oBir and cBir)
- Exposed gravel
- Pioneer dry heath communities (dHeath)
- Temporary open water (tow)
- Conifer plantation (WD4)
- Transition mire and quaking bog (PF3)
- Bog woodland (WN7)
- Raised bog (PB1) remnant
- Oak-Ash-Hazel woodland (WN2)
- Possible calcareous springs (FP1)
- Dense Bracken (*Pteridium* spp.) (HD1)
- Wet grassland (GS4) along the fringes of the bog

Fauna biodiversity

- Several bird species were noted on the site during the survey.
    - Raven (*Corvus corax*), Sky Lark, Sand Martin (*Riparia riparia*), Common Gull (*Larus canus*), Snipe , Swans (*Cygnus* sp.) are reported to be using the flooded areas during the winter.
    - Other more common species include Meadow Pipit, Swallow (*Hirundo rustica*), Dunnock (*Prunella modularis*), Blackbird, Chaffinch (*Fringilla coelebs*), Wood Pigeon, Pheasant and Magpie.
- Mammals were noted on the site during the survey.
    - Otter spraint found in a drainage ditch in the northeast of the site, this drain is connected to the nearby Royal Canal.

    - Other mammals noted include Pine Marten, Badger, Fox, Hare, Rabbit (*Oryctolagus cuniculus*).
- Invertebrates
    - Butterflies - Silver-washed Fritillary (*Argynnis paphia*), Peacock, Green-veined White, Large Heath (*Coenonympha tullia*), Large White, Small Heath, Small Copper, Painted Lady.
- Fish
    - Three-Spined Stickleback in the drains.

7.7.1.4.5 Corresponding Fossitt (2000) Codes

Based on the survey findings presented in Section 7.7.1.4.2 through Section 7.7.1.4.4, the most common habitats present (in order of dominance) at the at Derryaroge, Derryadd and Lough Bannow Bogs are presented in the Table 7.8. Where possible, ecological evaluations are assigned to each habitat following NRA EcIA Guidelines (2009b). The ecological evaluations have been in part informed by more recent surveys undertaken (see Section 7.7.2.1).

*Table 7.8: Most common habitats present at Derryaroge Bog (in order of dominance). Ecological Evaluation greater than Local Importance (Lower Value) highlighted in **bold.***

Bord na Móna Classification	Fossitt Classification			Ecological Evaluation
Habitat Type	Habitat Type	Habitat Code	Description	
Spoil and bare ground	Spoil and bare ground	ED2	Spoil and bare ground, often a result of peat extraction	Local Importance (Lower Value)
Pioneer Soft Rush (*Juncus effusus*) dominated poor fen with Bog Cotton or Bottle Sedge	Poor fen and flush	PF2	Poor fen and flush, characteristic of wet, nutrient-poor conditions	**Local Importance (Higher Value)**
Willow-dominated scrub (in mosaic with pJeff in regularly flooded areas)	Scrub (Gorse)/ Wet Willow-Alder-Ash woodland	WS1/WN6 mosaic	Scrub or Wet Willow-Alder-Ash woodland, depending on development	**Local Importance (Higher value)**
Open Water (permanent)	Acid Oligotrophic lakes	FL2	Acid oligotrophic lakes, typically nutrient-poor	**Local Importance (Higher Value)**
Temporary Open Water	Artificial ponds (slit ponds)	FL8	Artificial ponds, often seasonal and influenced by water level fluctuations	**Local Importance (Higher Value)**
Birch (Betula spp.)-dominated scrub (on drier, higher ground not flooded)	Emergent Betula-dominated community/ Closed Betula scrub community	WS1	Scrub, often dominated by Birch and occurring on drier peatland areas	**Local Importance (Higher Value)**
Pioneer dry heath (mainly in mosaic with Birch Scrub)	Dry Heath	HH1	Dry heath, early successional stage of heathland development	Local Importance (Lower Value)
Dry pioneer Purple Moorgrass (*Molinia caerulea*) dominated grassland	Wet grassland	GS4	Wet grassland, often found in areas with impeded drainage	**Local Importance (Higher value)**

Bord na Móna Classification	Fossitt Classification			Ecological Evaluation
Habitat Type	Habitat Type	Habitat Code	Description	
Access routes	Buildings and artificial surfaces	BL3	Tracks, paths, and other artificial surfaces	Negligible Importance
Riparian zones (with drains and associated habitats such as scrub and bog woodland)	Depositing rivers	FW2	Depositing rivers	**Local Importance (Higher value)**
Silt ponds (with Gorse/Birch scrub and Purple Moorgrass-dominated grassland)	Artificial ponds (slit ponds)	FL8	Artificial ponds	**Local Importance (Higher value)**

*Table 7.9: Most common habitats present at Derryadd Bog (in order of dominance). Ecological Evaluation greater than Local Importance (Lower Value) highlighted in **bold**.*

Bord na Móna Classification	Fossitt Classification			Ecological Evaluation
Habitat Type	Habitat Type	Fossitt Code	Description	
Spoil and bare ground	Spoil and bare ground	ED2	Spoil and bare ground, often a result of peat extraction	Local Importance (Lower Value)
Pioneer dry heath communities (dHeath)	Dry Heath	HH1	Pioneer dry heath communities	Local Importance (Lower Value)
Scrub (eBir, oBir, cBir)	Scrub (Gorse) Emergent Betula-dominated community Closed Betula scrub community	WS1	Scrub and Scrub, often dominated by Birch and occurring on drier peatland areas	**Local Importance (Higher value)**
Silt Ponds (Silt) and associated habitats	Artificial ponds (slit ponds)	FL8	Silt Ponds and associated habitats	**Local Importance (Higher value)**

Table 7.10: Most common habitats present at Lough Bannow Bog (in order of dominance)

Bord na Móna Classification	Fossitt Classification			Ecological Evaluation
Habitat Type	Habitat Type	Fossitt Code	Description	
Poor fen	Poor fen and flush	PF2	Poor fen	**Local Importance (Higher Value)**
Spoil and bare ground	Spoil and bare ground	ED2	Spoil and bare ground, often a result of peat extraction	Local Importance (Lower Value)
Dry calcareous and neutral grassland	Dry calcareous and neutral grassland	GS1	Dry calcareous grassland	**Local Importance (Higher value)**
Recolonising bare ground	Recolonising bare ground	ED3	Disturbed ground (Colt's Foot dominated)	**Local Importance (Higher value)**
Pioneer Campylopus-dominated community (pCamp)	Poor fen and flush	PF2	Pioneer *Campylopus* dominated community	**Local Importance (Higher value)**
Riparian areas	Depositing rivers	FW2	Riparian areas of depositing river / streams/drains with fringing habitats)	**Local Importance (Higher value)**
Birch-dominated scrub (eBir, oBir, cBir)	Scrub (Gorse) WS1 Emergent Betula-dominated community WS1 Closed Betula scrub community	WS1	Scrub/ Birch-dominated scrub depending on development	**Local Importance (Higher value)**
Exposed gravel	Exposed sand, gravel or till	ED1	Exposed gravel	**Local Importance (Higher value)**
Pioneer dry heath	Dry Heath	HH1	Pioneer dry heath	**Local Importance (Higher value)**
Temporary open water	Acid Oligotrophic lakes Artificial ponds (slit ponds)	FL2 and FL8	Temporary open water FL2 (Acid Oligotrophic lakes) or FL8 (Artificial ponds)	**Local Importance (Higher Value)**
Conifer plantation	Conifer plantation	WD4	Conifer plantation	Local Importance (Lower Value)

Transition mire and quaking bog	Transition mire and quaking bog	PF3	Transition mire and quaking bog where floating vegetation mats form over saturated ground, creating an unstable, spongy surface	**Local Importance (Higher Value)**
Bog woodland	Bog woodland	WN7	Bog woodland	**Local Importance (Higher Value)**
Raised bog (PB1) remnant	Raised Bog	PB1	Raised bog	**International Importance**
Oak-Ash-Hazel woodland	Oak-Ash-Hazel woodland	WN2	Oak-Ash-Hazel woodland	**Local Importance (Higher Value)**
Possible calcareous springs	Poor fen and flush	PF1	Possible calcareous springs supporting specialised plant communities adapted to alkaline conditions, potentially often forming tufa deposits over time.	**International Importance**[16]
Dense Bracken (Pteridium spp.)	Dense Bracken	HD1	Dense Bracken (Pteridium spp.)	Local Importance (Lower Value)
Wet grassland	Wet grassland	GS4	Wet grassland ong the fringes of the bog	**Local Importance (Higher value)**

[16] given the habitat is listed under EU Habitats Directive (Habitat code: 6210) adopting a precautionary approach it is considered here to be of **International Importance**.

7.7.2 Current Phase (July 2019 – Present Day)

The description of the ecological environment present during the Current Phase (July 2019 – Present Day) is based on a series of survey undertaken for the proposed Derryadd Wind Farm; these surveys are described below.

7.7.2.1 Habitats

7.7.2.1.1 Habitats Surveys

During August 2022 and July 2023 multidisciplinary surveys were undertaken as part of the Derryadd Wind Farm development. The habitats found reflect historic land-use, as well as the first signs of habitat transition. The survey results also reflect ecology surveys undertaken by Bord na Móna in 2010 to 2012 (see Section 7.7.1.4).

Figure 7.3 through Figure 7.5 show the habitats mapped during the multidisciplinary surveys undertaken for the proposed Wind Farm Development. Overall, the area surveyed occupies a total extent of approximately 1,900ha, encompassing a total of 27 Fossitt (2000) habitat types (excluding the Derryaroge Mineral Island described below in Section 7.7.2.1.3). However, 91% of this area (approximately 1,700ha) is occupied by solely five habitats (Table 7.11): Cutover bog (PB4); Bog woodland (WN7); Other artificial lakes and ponds (FL8); Raised bog (PB1); and Conifer plantation (WD4). Beyond this habitat homogeneity, these habitats do not seem to show great intrinsic diversity, being occupied by a large quantity of graminoids, with limited ecological value, perhaps reflecting the longevity and intensity of the historical industrial activity operating at the proposed wind farm site (Bog woodland habitat - WN7 – is further appraised in Section 7.7.2.1.2.). Nevertheless, the occurrence of some characteristic species of peatland habitats (e.g. Round-leaved Sundew, *Drosera rotundifolia*; Common Cottongrass, *Eriophorum angustifolium*) confer some degree of rehabilitation potential to this large peatland area.

It is also evident that the majority of the remainder portion of the area surveyed occupied by semi-natural habitats and significantly vegetated habitats with relevant vegetation cover (i.e. approximately 157ha/8% of the area surveyed) is occupied by a managed habitat with limited ecological value (i.e. Conifer plantation WD4 approximately 44.4ha 2.4%/) and several ecologically valuable habitats due to their species diversity, and potential for expansion and colonisation of other habitats of lower quality in the area surveyed. These latter habitats occur scattered around the area surveyed, in restricted extents (approximately 112ha/6% of the area surveyed.

With regards to linear habitats, four habitat types regularly intersect the habitat areas described above: Depositing/lowland rivers (FW2); Drainage ditches (FW4); Hedgerows (WL1); and Treelines (WL2) (Figure 7.3 through Figure 7.5). Drainage ditches (FW4), although not depicted in Figure 7.9 due to its abundant occurrence, regularly occurred throughout the cutover bog habitat in vertical lines, spaced approximately 5-10m apart. This habitat connects hydrologically the area surveyed with neighbouring surface water bodies, also establishing important ecological corridors that, although holding water seemingly of poor quality, present the highest plant species diversity within the whole area surveyed.

Hedgerows (WL1) and Treelines (WL2) habitats occurred sparsely in the area surveyed, with the few examples displaying a good structure, but limited diversity. One hedgerow included an IAPS but, otherwise, these habitats are important features in the current landscape. Table 7.11 provides a summary of various habitats categorising them based on their ecological importance and the rationale behind their valuation, in terms of its ecological value, ranging from international, or national/ county importance to local importance (higher or lower value).

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770000

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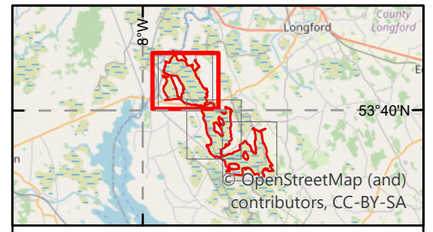

Legend

- Application Site

Habitats

- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub
- BC1 - Arable crops
- BL2/FS1
- BL2/WS1
- BL3 - Buildings and artifical surfaces
- ED1 - Exposed sand, gravel or till
- ED2 - Spoil and bare ground
- ED3 - Recolonising bare ground
- FL8 - Other artificial lakes and ponds
- FL8/PF2
- FP1 - Calcareous springs
- FS1 - Reed and large sedge swamps
- FW4 - Drainage ditches
- GA2/GS2
- GS1 - Dry calcareous
- GS4 - Wet grassland
- GS4/WS1
- GS4/WS1
- HD1 - Dense bracken
- HH1 - Dry siliceous heath
- HH1/WS1
- PB1 - Raised bog
- PB4 - Cutover bog
- PB4/WS1
- PF1 - Rich fen and flush
- PF2 - Poor fen and flush
- WD2 - Mixed broadleaved/ conifer woodland
- WD3 - (Mixed) conifer woodland
- WD4 - Conifer plantation
- WN2 - Oak-ash-hazel woodland
- WN7 - Bog woodland
- WN7/PB4
- WS1 - Scrub
- WS1/GS4
- WS1/WS2
- WS2 - Immature Woodland

0 0.5 1
Kilometers

NOTES

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	27/02/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-3 Habitats Page 1 of 3

Scale @ A3: 1:16,000

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Map Ref: 11400-014-HAB-S.BO-TOB-A

Draft: A

7°56'0"W

7°54'0"W

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53°39'0"N

53°38'0"N

768000

766000

605000

607500

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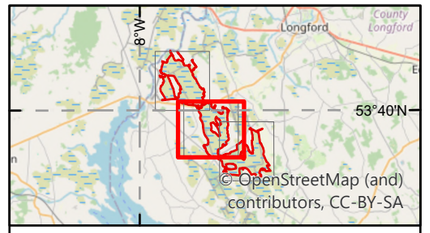
N63

R392

R398



Legend

- Application Site
- Habitats
- FW2 - Depositing/ lowaland rivers
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub
- BL2 - Earth banks
- BL2/WS1
- BL3 - Buildings and artifical surfaces
- ED2 - Spoil and bare ground
- ED3 - Recolonising bare ground
- FL8 - Other artificial lakes and ponds
- FS1 - Reed and large sedge swamps
- FW4 - Drainage ditches
- GA2/GS2
- GS3 - Dry-humid acid grassland
- GS4 - Wet grassland
- GS4/WN7
- HH1 - Dry siliceous heath
- PB1 - Raised bog
- PB4 - Cutover bog
- PB4/GS4
- PF2 - Poor fen and flush
- WD1 - (Mixed) broadleaved woodland
- WD2 - Mixed broadleaved/ conifer woodland
- WD3 - (Mixed) conifer woodland
- WD4 - Conifer plantation
- WN5 - Riparian woodland
- WN6 - Wet willow-alder-ash woodland
- WN7 - Bog woodland
- WN7/PB4
- WS1 - Scrub
- WS2 - Immature Woodland

0 0.5 1
Kilometers

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A	27/02/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-4 Habitats Page 2 of 3

Scale @ A3: 1:16,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	February 2025

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Map Ref: 11400-014-HAB-S.BO-TOB-A

Draft: A

7°54'0"W
7°52'0"W
7°50'0"W
53°39'0"N
53°38'0"N
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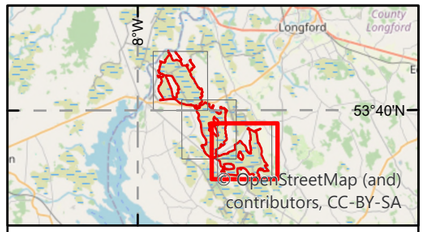

Legend

- Application Site
- Habitats
- FW2 - Depositing/ lowaland rivers
- FW4 - Drainage ditches
- WL2 - Treelines
- BL2 - Earth banks
- BL3 - Buildings and artifical surfaces
- FL8 - Other artificial lakes and ponds
- FL8/PF2
- FS1 - Reed and large sedge swamps
- FW4 - Drainage ditches
- GS2 - Dry meadows and grassy verges
- GS3 - Dry-humid acid grassland
- GS4 - Wet grassland
- PB1 - Raised bog
- PB4 - Cutover bog
- PB4/GS4
- PB4/WS1
- PF2 - Poor fen and flush
- PF3 - Transition mire and quaking bog
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WD4/WN7
- WN5 - Riparian woodland
- WN6 - Wet willow-alder-ash woodland
- WN7 - Bog woodland
- WS1 - Scrub

0 0.5 1
Kilometers

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A	27/02/2025	First issue	S.P	C.N

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Title: Figure 7-5 Habitats Page 3 of 3

Scale @ A3: 1:16,000

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Map Ref: 11400-014-HAB-S.BO-TOB-A

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Table 7.11: Summary of Habitats (Fossitt, 2000) within the Proposed Wind Farm Site and their Ecological Valuation

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
PB4	Cutover bog	1,128.16ha	**County Importance (Higher Value)**	Although very degraded habitat, it occupies a very large area providing shelter, breeding and foraging habitat for several protected species such as Eurasian Woodcock. Cut-over bogs can support a rich variety of species, particularly wetland-adapted plants and animals, and can be rehabilitated to enhance their biodiversity value. However, they are sensitive to disturbance and require careful management to maintain their ecological integrity.
WN7	Bog woodland	423.73ha	**Local Importance (Higher Value)**	Although not qualifying for a higher valuation (see Section 7.7.2.1.2), this habitat displays high species diversity, and occupies a significant extent of the study area, providing an excellent ecological resource for protected species.
FL8	Other artificial lakes and ponds	78.33ha	**Local Importance (Higher Value)**	Although these artificial habitats showed evidence of holding water of poor quality, these locations regularly flood, providing a foraging resource of importance, for example, to waterfowl.
PB1	Raised bog	52.39ha	**International Importance**	Areas of high plant diversity (32 plant species identified within PB1 habitat – see list in Appendix 7.7)
WD4	Conifer plantation	44.39ha	Local Importance (Lower Value)	Although its marginal areas were occupied by other species, this habitat was dominated, in its majority, by monocultural plantations, with limited ecological value.
WS1	Scrub	34.99ha	**Local Importance (Higher Value)**	Marginal/transitional habitat that provides important shelter resources for protected faunal species.

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
FS1	Reed and large sedge swamps	33.75ha	**Local Importance (Higher Value)**	Habitat that provides shelter, foraging resources and breeding habitat for locally important populations of birds, in particular, waterfowl.
WS2	Immature woodland	20.26ha	**Local Importance (Higher Value)**	Although of limited diversity at present (Appendix 7.7), this habitat provides important shelter and foraging resources for protected faunal species, beyond establishing important ecological corridors.
BL3	Buildings and artificial surfaces	20.10ha	Negligible Importance	Artificial habitat, with limited ecological value at the present conditions.
ED2	Spoil and bare ground	12.28ha	Local Importance (Lower Value)	Limited ecological value, with scarce vegetation cover and foraging/shelter opportunities for protected species
GS4	Wet grassland	8.70ha	**Local Importance (Higher Value)**	Relatively diverse habitat, which, beyond the resources it currently provides to protected species (e.g. Whooper Swan (*Cygnus cygnus*)), it contains frequent occurrences of important species that may be important in future ecological rehabilitation of the area (e.g. Common Cottongrass, Sharp-flowered Rush (*Juncus acutiflorus*).

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
PF3	Transition mire and quaking bog	7.87ha	**National Importance**	• Although not surveyed in 2022 this habitat has been historically reported as occurring with the boundary of Lough Bawn pNHA. The ecological valuation of the Nationally important site will be assumed for this habitat (Appendix 7.7). Transition mires and quaking bogs are both important wetland habitats with unique biodiversity. Transition mires are nutrient-poor areas between bogs and fens, supporting a mix of plants and species adapted to fluctuating water levels. Quaking bogs, characterised by unstable, spongy surfaces, are more acidic and support specialised plants like carnivorous species. Both habitats are typically rich in biodiversity, providing essential environments for rare species, water regulation, and carbon sequestration.
PF2	Poor fen and flush	4.90ha	**Local Importance (Higher Value)**	• Diverse habitat (Appendix 7.7) that should be regarded of special importance (Fossitt, 2000). Poor fens and flushes are nutrient-poor wetland habitats but differ in their conditions. Poor fens are typically acidic and support fewer species, mainly mosses and sedges, in low-nutrient environments. Flushes, on the other hand, are areas with mineral-rich groundwater that support a wider range of plant species and provide important habitat for wildlife. Both habitats are valuable for biodiversity but are sensitive to changes in water quality and environmental disturbance.
HD1	Dense bracken	3.54ha	Local Importance (Lower Value)	• Habitat with limited diversity that may provide shelter opportunities to some animal species. Dense bracken habitats are dominated by the fast-growing bracken fern, which provides shelter for some wildlife, like small mammals and birds. However, its dense growth limits plant diversity by suppressing other species.

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
GS3	Dry humid acid grassland	3.18ha	**Local Importance (Higher Value)**	• Important transitional habitat in the local context, with relatively high diversity (Appendix 7.7) that may provide foraging opportunities to protected species (e.g. Marsh Fritillary). • Dry humid acid grasslands support a diverse range of plant species and provide important habitat for insects, birds, and small mammals. These grasslands thrive in acidic, nutrient-poor soils and play a role in carbon storage and water regulation.
ED1	Exposed sand, gravel or till	2.51ha	Local Importance (Lower Value)	• Limited ecological value, with scarce vegetation cover and foraging/shelter opportunities for protected species. • Habitat can support specialised plant and animal species adapted to harsh conditions.
WD1	(Mixed) broadleaved woodland	2.01ha	**Local Importance (Higher Value)**	• Mostly located near the boundaries of Lough Bannow Bog, occupying restricted areas (i.e. 4 areas, summing to a total of 2ha) with poor diversity. However, it holds valuable species for present and future ecological development (e.g. Hawthorn).
ED3	Recolonising bare ground	2.01ha	Local Importance (Lower Value)	• Limited ecological value, with scarce vegetation cover and foraging/shelter opportunities for protected species
GS2	Dry meadows and grassy verges	1.65ha	**Local Importance (Higher Value)**	• Despite its restricted occurrence (i.e. western part of Lough Bannow Bog – this habitat offers important resources for protected (e.g. Marsh Fritillary and pollinator species
HH1	Dry siliceous heath	1.30ha	Local Importance (Lower Value)	• Due to the habitat's restricted extent and species diversity (Appendix 7.7), this habitat offers limited ecological value.

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
WN6	Wet willow-alder-ash woodland	1.15ha	**Local Importance (Higher Value)**	• One of the areas this habitat occupies the floodplain of the Lough Bannow stream_010 WFD river water body (Appendix 7.7), constituting an important ecological corridor in the local context.
WD3	(Mixed) conifer woodland	0.99ha	Local Importance (Lower Value)	• Although with a higher ecological value than the habitat WD4 above, this habitat is, originally a monocultural plantation of Lodgepole Pine (*Pinus contorta*) that has been encroached by broadleaved species (mostly Downy Birch (*Betula pubescens*) Common Alder (*Alnus glutinosa*) and Willow, *Salix* spp.). The restricted extent of this habitat in the local context, limit its ecological valuation.
BL2	Earth banks	0.60ha	Local Importance (Lower Value)	• Some area supporting a plant species and providing habitats for small mammals, insects and birds, but the limited extent of this habitat does not amount to a significant ecological valuation.
WD2	Mixed broadleaved/conifer woodland	0.60ha	Local Importance (Lower Value)	• Limited diversity for this habitat (Appendix 7.7) and patchy distribution contributes to habitat being assigned a poor ecological resource. The habitat does not amount to a significant ecological valuation.
WN2	Oak-Ash-Hazel woodland	0.58	**Local Importance (Higher Value)**	• This woodland type supports a variety of wildlife, including bird species, mammals that rely on the trees for food, nesting, and shelter. The undergrowth of hazel also provides a valuable habitat for smaller mammals, amphibians, and invertebrates (Appendix 7.7)

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
GA2	Amenity grassland (improved)	0.30ha	Local Importance (Lower Value)	• Amenity grassland (improved) has low biodiversity value, as it is typically managed for aesthetic or recreational purposes with regular mowing, fertilisation, and reseeding. This reduces plant diversity and limits support for wildlife, making it less ecologically beneficial compared to natural grasslands. While it can provide some benefits, like food for certain birds or recreational space, its contribution to biodiversity is minimal.
FP1	Calcareous springs	0.16ha	**International Importance**	• While the habitat is of limited extent, calcareous springs are valuable ecosystems that support specialised plant and animal species due to their alkaline, mineral-rich waters. These springs are important for maintaining ecosystem functions and supporting species adapted to their unique water condition. Some of these springs are considered priority habitats for conservation due to their rarity and the unique ecosystems they support. In Europe, calcareous springs are a habitat type listed under the EU Habitats Directive (Habitat code: 7220) as "Petrifying springs with tufa formation, which provides legal protection to these delicate ecosystems.

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
GS1	Dry calcareous and neutral grassland	0.13ha	**International Importance**	• Dry calcareous and neutral grasslands are important habitats with significant biodiversity value. These grasslands support a wide range of plant species, including wildflowers, grasses, and herbs, which in turn attract a variety of insects, birds, and other wildlife. They are often rich in species adapted to specific soil types, such as chalky (calcareous) or neutral soils, and can provide vital habitats for rare and endangered species. • These grasslands also play a crucial role in maintaining ecosystem services, such as carbon storage, water filtration, and soil preservation. Additionally, they offer important forage for grazing animals and contribute to landscape diversity. Despite the small extent of this habitat, given the habitat is listed under the EU Habitats Directive (Habitat code: 6210) it is of International Importance.
WS3	Ornamental/non-native shrub	0.07ha	Local Importance (Lower Value)	• Ornamental/non-native shrubs generally have limited biodiversity value compared to native plants. While they may provide some food or shelter for wildlife, their ecological benefits are often lower, and they can potentially become invasive, outcompeting native species.
FW2	Depositing/ lowland rivers	931m	**Local Importance (Higher Value)**	• Important ecological habitat, establishing hydrological connectivity with Internationally important sites (Section 7.7.5).
FW4	Drainage ditches	1,233.83km (estimate)	**Local Importance (Higher Value)**	• Although this is an artificial habitat, mostly holding water of, seemly, poor quality, this habitat displayed the highest diversity (56 plant species - (Appendix 7.7, while also being important ecological corridors.

Code	Habitat Name	Area (ha) or Length (m / km)	Ecological Valuation	Rationale
WL1	Hedgerows	521m	**Local Importance (Higher Value)**	• Although showing evidence of active management (localised), this habitat was of general good condition, establishing important ecological corridors for protected species. It is important to note that this habitat holds an IAPS (Appendix 7.7).
WL2	Treelines	1,596m	**Local Importance (Higher Value)**	• Generally, well structured, this habitat within the study area, beyond offering shelter, breeding and foraging resources to protected species, establishes important ecological corridors, connecting other relevant habitats.

7.7.2.1.2 Bog Woodland Survey

Bog Woodland (WN7) was recorded in large patches particularly along the margins of the Cutover Bog habitat (PB4) (Figure 7.6). There was evidence of water level fluctuation throughout the woodland habitat, with some areas being permanently waterlogged, while the majority of the habitat was recorded as being very dry underfoot.

Given the potential high ecological value of this habitat in the local context, and the apparent good condition of this habitat, a Condition Assessment was undertaken on five locations (relevés) where this habitat occurred, to appraise the habitat status against the protected habitat types listed under the Habitats Directive (Council Directive 92/43/EEC). The following conclusions on the habitat classification were drawn:

- In all five locations within the areas of Bog Woodland (WN7), none of the five positive indicator species were noted. In all plots, Birch was dominant with Purple Moor-Grass, and Soft Rush also present. None of the areas of bog woodland met the pass target for positive indicator species;
- Four out of the five plots (relevé plots B to E - Table 7.12) were found to have negative species, such as Bramble and Bracken, with a coverage greater than 10%. The presence of Bramble and Bracken are indicative of dry conditions within the woodland which, in turn, is likely to be a consequence from the historical turf cutting and associated drainage (Cross and Lynn, 2013). Only relevé (A) had a negative species coverage lower than 10%;
- Medium canopy height of most of bog woodland ranged between 4-8m in height (with the exception of plot A) and, therefore, met the pass target for medium canopy height. At relevé plot A, the median canopy height was lower than 4m, thus resulting in a fail;
- In relation to total canopy cover, relevé plots B, C and E displayed a total canopy cover greater than 30%, and therefore passed this condition criterion. Relevé plots A and D had less than 30% of total canopy cover;
- In relation to *Betula* cover, in relevé plots A to C, *Betula* cover accounted for more than 50%. Plots D and E displayed a *Betula* cover lower than 50%, failing to pass this target criterion;
- The percentage of native dwarf shrub layer, in all relevé plots, was less than 50%, which granted a pass for all plots;
- All relevé plots displayed a percentage of *Calluna* cover ranging between 10% to 20%, thus failing to meet the target for *Calluna* cover;
- The percentage of *Sphagnum* cover at bog woodlands was very low, ranging between 10% to 20%. Thus, none of the relevé plots met the pass target for *Sphagnum* cover; and
- Similarly, the percentage of bryophyte cover at the five representative relevé plots of bog woodland ranged between 5% and 20%, failing to achieve a pass for this Condition Assessment criterion.

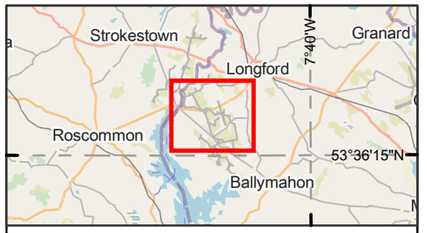
As none of the relevé plots passed a minimum of seven criteria, all five plots failed the Condition Assessment (Cross and Lynn, 2013). Therefore, it is concluded that the Bog Woodland (WN7) at the proposed wind farm site does not correspond to the habitat coded as 91D0 and listed as priority habitat in the Annex I the Habitats Directive (Council Directive 92/43/EEC).

The condition of the Bog Woodland habitat (WN7) within the surveyed area is poor and degraded, likely due to the historical peat drainage and extraction, and consequent drying out process that occurred since then. Bog Woodland (WN7) is therefore evaluated as being of **Local Importance (Higher Value)** (see Table 7.11 above), as this is a natural habitat with high biodiversity in the local context.

Table 7.12: Condition Assessment of Bog Woodland (WN7) Plots. ITM coordinate shown in parentheses.

Relevé Plot	A (609126.8, 764145.7)	B (609124.4, 764153.0)	C (606841, 766147)	D (605851, 768260)	E (605342.2, 76911.0)
Positive indicator species	Fail	Fail	Fail	Fail	Fail
Negative species cover	Pass	Fail	Fail	Fail	Fail
Medium canopy height	Fail	Pass	Pass	Pass	Pass
% total canopy cover	Fail	Pass	Pass	Fail	Pass
Portion of *Betula* in canopy	Pass	Pass	Pass	Fail	Fail
% native dwarf shrub layer cover	Pass	Pass	Pass	Pass	Pass
% *Calluna* cover	Fail	Fail	Fail	Fail	Fail
% *Sphagnum* cover	Fail	Fail	Fail	Fail	Fail
% total bryophyte cover	Fail	Fail	Fail	Fail	Fail
Overall Result	**Fail**	**Fail**	**Fail**	**Fail**	**Fail**

8°0'0"W
7°55'0"W
7°50'0"W
53°42'0"N
53°40'0"N
53°38'0"N
772000
766000
601000
608000



Legend

- Application Site
- Bog Woodland Assessment locations

0 1 2
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	31/03/2025	First issue	S.P	C.N
Rev	Date	Description	By	Chkd

Client:

Bord na Móna

Project:

Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title:

Figure 7.6: Locations Where Bog Woodland Condition Assessment Was Undertaken

Scale @ A3:	1:40,000	
Prepared by:	Checked by:	Date:
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Map Ref: 11400-047-Bog.W-S.BO-TOB-A

Draft: A

7.7.2.1.3 Subsite (Derryaroge Mineral Island) Habitat Survey

The subsite in Derryaroge Bog was subject to a detailed survey, which reported eleven habitat types and/or their mosaics (see Table 7.13 below). These eleven, included two potential habitats listed in the Annex I of the Habitats Directive, one of which is designated as priority habitat.

Ecological valuations of the 11 habitats identified are presented below. Nine (of the 11) habitats are identified as KERs, are included for in Section 7.7.6 Key Ecological Receptors

Table 7.13: Classification of Habitats within the Derryaroge Mineral Island (Appendix 7.2)

Habitat	Code (Fossitt, 2000)	Area (ha)	Annex I Habitat (92/43/EEC)	Area (ha)	Valuation
Other artificial lakes and ponds	FL8	0.02	-	-	**Local Importance (Higher value)**
Dry calcareous and neutral grassland	GS1	0.13	-	-	**International Importance** Note 1
Scrub	WS1	3.20	-	-	**Local Importance (Higher value)**
Wet grassland	GS4	1.51	-	-	**Local Importance (Higher value)**
Dense Bracken	HD1	0.17	-	-	Local Importance (Lower value)
Oak-ash-hazel woodland	WN2	0.58	-	-	**Local Importance (Higher Value)**
Cutover Bog	PB4	0.13	-	-	**County Importance**
Immature woodland	WS2	0.01	-	-	**Local Importance (Higher value)**
Buildings and artificial surfaces	BL3	4.48	-	-	Negligible Importance
Rich fen and flush	PF1	1.07	Alkaline fens (7230)	1.07	**International Importance** Note 2
Calcareous springs	FP1	0.16	Petrifying springs with tufa formation (*Cratoneurion*)* {listed as a * 7220 is listed as a 'priority habitat' under the Habitats Directive	0.16	**International Importance** Note 3

Total	**11.46**		**1.23**	
Note 1 - despite the very small extent of this habitat, given the habitat is listed under EU Habitats Directive (Habitat code: 6210) adopting a precautionary approach it is considered here to be of **International Importance**. **Note 2** - despite the small extent of this habitat, given the habitat is listed under the EU Habitats Directive (Habitat code: 7230) adopting a precautionary approach it is considered here to be of **International Importance**. **Note 3** – while small in area, given the habitat type it is listed under the Habitats Directive (Habitat code: 7230) adopting a precautionary approach it is considered here to be of **International Importance**.				

7.7.2.2 Aquatic Ecology

7.7.2.2.1 Overview

For the Derryadd Wind Farm development the local aquatic ecology was characterised through surveys that assessed fish and macroinvertebrate communities, and the observation of relevant habitat features and appraisal of the overall ecological quality of 12 sampling sites. Figure 1 in Appendix 7-3 shows the 12 representative locations (termed here sampling sites) sampled by Still Waters Consultancy within and downstream of the proposed wind farm site between the 16th and 18th of September 2022. The full survey report is included as Appendix 7.3. The surveys were undertaken according to:

- River habitat survey (adapted from Environment Agency, 2003; and Toland and Murphy, 2013);
- Kick-sampling (adapted from Toner *et al.*, 2005); and
- Electrofishing (O'Grady, 2006; Matson *et al.*, 2018).

Also, the river habitat was also classified for its suitability to support protected aquatic species of conservation concern (e.g. White-clawed Crayfish, *Austropotamobius pallipes*; River Lamprey, *Lampetra fluviatilis*; Brook Lamprey, *Lampetra planeri*; and Atlantic Salmon, *Salmo salar*).

The 12 sampling sites have been previously visited by TOBIN ecologists on the 29th and 30th of June 2022. However, because the water levels were too high, it was only possible to carry out the River Habitat Survey on that occasion.

7.7.2.2.2 River Habitat Survey

The analysis of the full dataset of the results of the River Habitat Survey carried out in June 2022 show the sites surveyed reflect the local historical land-use, where peat extraction activities were carried out for decades. Thus, the majority of these watercourses show signs of having been regulated (i.e. the river channel shows signs of being man-made, or having been straightened/excavated in the past), noticeable by the presence of high banks (an average bank height across all the sampling sites of almost 3m), and a limited extent between the water edge and respective bank, reflective of the existing limited riparian gallery lateral extent (average of 1m as the difference between the average bank width and average wetted width, across all sampling sites). Moreover, the riparian vegetation on each site, beyond limited in its lateral extent, also reflects the local land use pressures on the wider landscape (e.g. pasture, peat extraction), where ruderal species occupy most of the lower vegetation *stratum* at the sampling sites (e.g. Bramble, *Rubus fruticosus* agg; Nettle, *Urtica dioica*), while more than half of those sampled reaches had little to no canopy cover.

7.7.2.2.3 Kick-Sampling - Water Quality Assessment

Kick-sampling results carried out at the sampling sites in September 2022 generally confirmed the local pressures to the aquatic environment, as well as the failure of the majority of the WFD river water bodies in the vicinity of the proposed wind farm site to achieve the WFD objectives. Thus, the Q-Value of the sampling sites was typically Q3, while none of the 12 sites met the WFD and Surface Water Regulations (S.I. No. 77/2019) (as amended) objectives (i.e. ≥Q4; EQR good ≥0.75). The macroinvertebrate assemblages were dominated by Group C taxa, whereas only two sampling sites had Group A individuals in their samples (Sampling Site 2 and 3 - Appendix 7.35).

Thus, the aquatic habitats at the sampling sites were generally unsuitable for supporting the protected White-clawed Crayfish, with the exception of Sampling Site 4. White-clawed Crayfish (*Austropotamobius pallipes*) require moderate to good water quality, similar to that needed by Brown Trout (*Salmo trutta*), with conditions such as oxygen saturation above 50% and BOD below 3ppm (Reynolds, 1998; Demers *et al.*, 2003). This protected species also needs relatively hard water, with a pH of 7 or above, and calcium concentrations of at least 5mg/l, as sufficient calcium is necessary to harden their exoskeletons after moulting (Gallagher *et al.*, 2006). Additionally, firm substrates and moderate productivity levels are important for crayfish habitats (Reynolds, 1998). All watercourses onsite were deemed unsuitable for White-clawed Crayfish due to inappropriate geology, low channel energy, and lack of suitable habitat, particularly the absence of gravels required for crayfish hatchlings (Reynolds, 1998; Reynolds *et al.*, 2010). Larger crayfish need stones to hide under or earthen banks for burrowing (Demers *et al.*, 2003), while hatchlings typically shelter in vegetation, gravel, and fine tree roots, and smaller crayfish are often found among weeds and debris in shallow water. Larger juveniles are more commonly found among cobbles and detritus, such as leaf litter (Reynolds and O'Keeffe, 2005).

There was also a lack of suitable burrowing habitat required for White-clawed Crayfish. As such there is no clear availability of suitable refuges for this species.

The findings of the surveys are presented in Table 7.14.

7.7.2.2.4 Electrofishing Survey

More than half of the sampling sites (i.e. 55%) retrieved null results for the electrofishing survey. The remainder of the sampling sites displayed limited diversity, with Brown Trout accounting for 90% of all the sampled fish. Furthermore, overall, these sites had limited value as salmonid habitat due to the absence of enough holding pools, oxygenated riffle habitat, slow to moderate flow, boulders, spawning gravels, combined with the presence of heavy siltation and low energy nature of the watercourses.

Also, access for salmonids from downstream would be difficult given the modified nature of the watercourses, localised dense and encroaching instream vegetation, presence of culverts, low gradients and heavy siltation.

Peat based catchments, such as the one in which the proposed wind farm site is located, are commonly less productive than those flowing over other geologies (O'Grady, 2006), with reduced primary productivity, macroinvertebrate diversity and lower fish biomass (Richardson, 1993). In addition, the low local gradient might contribute to the lower fish abundance and diversity in the sampled reaches as it is one of the principal determinants of juvenile salmonid production, with medium gradients being the most optimal in terms of successful recruitment and population persistence (Amiro, 1993; Kennedy and Strange, 2006; O'Grady, 2006; Wood and Budy, 2009). Due to the historic modification of these watercourses, channel gradient is very low and not optimal for salmonids.

The survey sites were not considered suitable for lamprey species. Suitable spawning habitat by way of finer, unbedded gravels was absent from all sampling sites, with the exception of sampling site 5. Electrofishing at sampling site 5 contained one ammocete, while there was light to moderate siltation present at the culvert on this section of river providing good localised ammocoete habitat (burial areas in silt and nearby fine gravels for spawning) and creating overall moderate habitat for lampreys.

Three of the four survey sites contained high levels of mud and wooden debris mud and lacked the deposition of fine, organic rich sediment, which are favoured by larval lamprey (Goodwin *et al.*, 2009; Aronsuu and Virkkala, 2014).

The findings of the surveys are presented in Appendix 7.3.

Table 7.14: Summary of Survey Findings in September 2022

EPA Name	Sampling Site	Summary of Findings	Q-Value
Ballynakill_26	3	• Dominated by glide habitat with very localised riffle upstream of a culvert; • Riparian vegetation comprised of Hawthorn, Blackthorn (*Prunus spinosa*), Grey Willow (*Salix cinerea*), Bramble (*Rubus fruticosus* agg.), Bracken (*Pteridium aquilinum*), Field Bindweed (*Convolvulus arvensis*), Bittersweet (*Solanum dulcamara*) and Reed Sweet-grass (*Glyceria maxima*); • Instream vegetation included Branched Bur-reed (*Sparganium erectum*), Yellow Water Lily (*Nuphar lutea*) and Common Duckweed (*Lemna minor*); • Stagnant flow downstream of the culvert crossing, containing dark coloured, peat-stained, water; • Spawning and nursery value is low given the low percentage of riffle zones and heavy siltation; • No fish were recorded during electrofishing; • The channel was not considered of value to crayfish given the observed heavy siltation; • Macroinvertebrate sample dominated by Group C, but also containing Group A, B and D taxa.	Q3-4
	4	• Substrate containing gravels, but with heavy silt content; • The riparian vegetation included comprised of Grey Willow, Blackthorn, Field Bindweed, Great Willowherb (*Epilobium hirsutum*), and Bramble; • Instream vegetation included Branched Bur-reed, Common Water-starwort (*Callitriche stagnalis*) and patches of Small Pondweed (*Potamogeton berchtoldii*); • Electrofishing retrieved 15 individuals of two fish species: Three spined stickleback (*Gasterosteus aculeatus*) (n=2); and Brown Trout (*Salmo trutta*) (n=13); • The sample did not include any Lamprey species, despite the presence of some soft sediment; • The electrofishing sample also included one White-clawed Crayfish (n=1), while other individuals were incidentally observed in the water; • Otter secondary evidence (spraints) was recorded at the culvert, containing crayfish remains. Otter latrines were also observed; • Macroinvertebrate sample was dominated by Group C, while also containing Group A, B and D taxa.	Q3

EPA Name	Sampling Site	Summary of Findings	Q-Value
	10	• Instream vegetation contained dense growths of Common Reed (*Phragmites australis*); • The riparian vegetation included dense Bramble, Bracken, Nettle, and Grey Willow scrub; • The reach was unsuitable for electrofishing as it comprised a series of small pools with minimum flow through the dense reed growth. • There was no suitable spawning or nursery habitat present for salmonids. The reach would not support lamprey habitat; • Invertebrate sample was dominated by Group C and D species; • No evidence of Otter was recorded.	Q3
	11	• Substrate comprised of coarse gravel and fibrous peat material. It also included boulder, cobble and gravel, bedded with heavy siltation; • Instream vegetation contained Fool's-water-cress; • The riparian vegetation included dense Bramble and Willow scrub. • Fished sample included 3 fish species, in a total of 14 individuals: Brown Trout (n=11); Gudgeon (*Gobio gobio*) (n=2); and Roach (*Rutilus rutilus*) (n=1); • Overall, the sampling site had low spawning and nursery value, although it had moderate holding habitat for salmonids and coarse fish. The substrate was of moderate value for fisheries, although the heavy silt content would reduce its spawning value, as reflected by the absence of Brown Trout and the small amount of shallower oxygenated riffle zones; • The channel had moderately suitable for Crayfish, but none were observed; • There were some small pockets of gravel and silt suitable for Lamprey, but no individuals were recorded; • No evidence of Otter presence was identified; • Macroinvertebrate sample was dominated by Group C species.	Q3

EPA Name	Sampling Site	Summary of Findings	Q-Value
Lough Bannow Stream	2	• Substrate was gravel and soft silt; • Instream vegetation included a dense cover of Fool's-water-cress, Shining pondweed (*Potamogeton lucens*) and Common Water-starwort. Ivy-leaved Duckweed (*Lemna trisulca*) and Common Duckweed were also present; • The riparian vegetation steep banks included Bramble, Great Willowherb, Wild Angelica (*Angelica sylvestris*), rank grasses and Willow (*Salix* spp.); • A single Pike (*Esox lucius*) (29.5cm in length) was recorded during the electrofishing survey. This stretch of river did not hold fisheries value for salmonids but was considered of value for coarse fish due to its deep channel and slow gradient. • No evidence for Otter presence was noted; • Invertebrate sample was dominated by Group C and D taxa.	**Q3-4***
	7	• Substrate consisted of soft peat with gravels, at places; • Instream vegetation included Water Wint, Fool's-water-cress and Water-cress (*Nasturtium officinale*); • Riparian vegetation included dense Bramble, Bracken and Grey Willow scrub; • The electrofishing sample contained one specimen - a Tench (*Tinca tinca*); • The reach contained holding area value for coarse fish; • The samples did not include any crayfish; • One Otter spraint was identified, seemingly with no Crayfish remains. • The invertebrate sample was dominated by Group C species, but also included Group B and D taxa.	**Q2-3***
Derrygeel	6	• The stream substrate had a gravel and peat base; • The riparian vegetation contained Bramble, Bracken, Field Bindweed and Willow scrub; • Instream vegetation included Branched Bur-reed, Common Water-starwort, Water-plantain (*Alisma plantago-aquatica*) and Small Pondweed; • No fish were sampled during the electrofishing. However, two Three-spined Stickleback were caught within the kick sample for macroinvertebrates; • The reach did not contain suitable spawning or nursery habitat for salmonids; • No evidence for the presence of Otter was noted; • Invertebrate sample was dominated by Group C, but also included significant abundance of Group D taxa.	**Upstream: Q2-3** **Downstream: Q3**

EPA Name	Sampling Site	Summary of Findings	Q-Value
Rappareehill	8	• Substrate composed of mixed gravels and soft silt; • The riparian vegetation included Bramble, Gorse, Nettle, Hedge Bindweed (*Calystegia sepium*), Grey Willow, Osier (*Salix viminalis*) and Ash; • Instream vegetation was abundant and included Water Horsetail (*Equisetum fluviatilis*), Yellow Water Lily, Water Mint (*Mentha aquatica*) and Common Reed; • The channel was not of value to salmonid species, considering the slow flows, extensive instream vegetation and heavy siltation; • Heavy siltation reduced the potential for salmonid spawning or nursery habitat to be present; • No fish were recorded during the electrofishing survey. One Stone Loach (*Barbatula barbatula*), measuring 4cm, was recorded in the macroinvertebrate sample; • No evidence for the presence of Otter, and no Crayfish were recorded at the site; • Invertebrate sample dominated by Groups C and D.	Q2-3*
Bilberry	1	• The substrate comprised of gravels with heavy peat sedimentation; • The channel was heavily overgrown with instream macrophytes, including Branched Bur-reed, Bulrush, and Water Mint. • The riparian vegetation comprised of dense Gorse, Field Bindweed, Great Willowherb and Grey Willow, bordering cutover lowland blanket bog; • No fish were recorded during the electrofishing survey; • The channel had limited value to fish or crayfish due to heavy sedimentation, limited flows and dense vegetation growth. • No evidence of Otter was noted; • The macroinvertebrate sample was dominated by Group C and D indicators.	Q3

EPA Name	Sampling Site	Summary of Findings	Q-Value
Ledwithstown_26	12	• Instream vegetation contained Spiked Water-milfoil (*Myriophyllum spicatum*), Floating Sweet-grass (*Glyceria fluitans*) and Water-plantain; • Riparian vegetation contained Grey Willow, Downy Birch, Ash, Bramble, Hogweed (*Heracleum sphondylium*) and Great Willowherb. • This sampling site was not electrofished (Section 7.4.3.3.3); • There was limited, or no salmonid holding value the reach's depth, peat-substrate and absence of flow. It does not have any spawning or nursery value for salmonids; • The reach did not hold potential (or suitability) for crayfish or Lamprey species; • Invertebrate sample was dominated by Group C, and occasional Group D species.	Q3
Trib Fallan West	5	• The substrate included a mix of coarse gravels, with silt accumulations in the margins; • The riparian vegetation comprised of Great Willowherb, Bramble, Wild Angelica, along with rank grasses; • Instream vegetation included Fool's-water-cress, Branched Bur-reed, and frequent Common Duckweed; • Electrofishing sample retrieved 66 individuals of two species: Brown Trout (n=65) and Lamprey (n=1); • The sampling site presented light to moderate siltation, with most silt accumulations occurring the box culvert, providing moderate lamprey habitat (burial areas in silt and nearby fine gravels for spawning); • Although the sample did not capture any Crayfish, and there was no observable evidence for the presence of Otter, the sampling site was suitable for Crayfish and offered good foraging value for Otter; • Invertebrate sample was dominated by Group C. However, the presence of Group B species and absence of Group A, were contributing factors for the Q-Value valuation.	Q3

EPA Name	Sampling Site	Summary of Findings	Q-Value
Kilnacarrow	9	• The substrate was mostly compacted peat; • Instream vegetation included Broad-Leaved Pondweed (*Potamogeton natans*), Fool's-water-cress and occasional Water Mint; • The riparian vegetation included Grey Willow, Alder, Ash and Bramble; • No fish were recorded in electrofishing sample; • Due to the limited flow of water, this sampling site did not hold fisheries value. Also, beyond not supporting suitable salmonid spawning or nursery habitat, the sampling site did not present suitable lamprey habitat; • Considering the water flow conditions, the sampling site was not suitable for crayfish, not any was captured in the electrofishing sample; • No evidence for Otter presence was noted; • No invertebrate sample was collected at this sampling site.	-

* Adjusted Q-Value from the classification attributed in Appendix 7.3

7.7.2.3 Bird Surveys

7.7.2.3.1 Overview

Section 7.7.2.3.2 through Section 7.7.2.3.4 presents summary findings of the field studies conducted between April 2021 and March 2022, focusing on the bird activity recorded during four surveys:

- I-WeBS,
- Breeding Waders
- Countryside Bird Survey
- Breeding Woodcock Survey

The species recorded during the surveys illustrate the significant ecological importance of the Application Site for bird activity and its role in supporting biodiversity. The designations applicable to the species are presented in Table 7.15. Several of the species recorded are protected under the Bird Directive and/ or Wildlife Act 1976 (as amended). Bird species are considered here to be a KER of **International Importance**.

Table 7.15: Conservation Status of Bird Species Recorded During Winter 2021/2022, Breeding Season 2021, and Migratory Surveys

Designation	Species
Annex I (EU Birds Directive)	Golden Plover (*Pluvialis apricaria*) Whooper Swan, Hen Harrier, Kingfisher, Peregrine
Red-listed	Golden Plover, Lapwing, Snipe, Redwing, Meadow Pipit, Woodcock
Amber-listed	Whooper Swan, Hen Harrier, Ringed Plover, Skylark, Linnet, Starling
Not listed	Buzzard, Kestrel, Peregrine, Merlin, Shoveler, Mute Swan, Dunnock, Stonechat (*Saxicola torquata*), Blackbird, Robin, Meadow Pipit, Little Egret, Common Tern, Cormorant, Gadwall, Greylag Goose (*Anser anser*), Teal

7.7.2.3.2 Winter Bird Activity

During the winter of 2021/2022, 83 bird species were recorded, including 14 Red-listed species, 27 Amber-listed species, and 10 species protected under Annex I of the EU Birds Directive. The Study Areas for winter bird surveys is shown in Figure 7.7. Winter surveys revealed frequent observations of species such as:

- Golden Plover (Annex I, Red-listed) – Seen on 37 occasions, often in flocks up to 500 individuals.
- Lapwing (Red-listed) – Recorded 49 times, with groups averaging 52 individuals.
- Whooper Swan (Annex I, Amber-listed) – Frequently observed in flight and foraging.
- Hen Harrier (Annex I, Amber-listed) – Observed hunting on 11 occasions.
- Snipe (Red-listed) – Recorded 16 times, mostly flying low.
- Buzzard – Observed frequently across multiple vantage points.
- Other notable winter species: Kestrel, Peregrine, Merlin, Shoveler, and Mute Swan

7.7.2.3.3 Breeding Bird Activity (Summer 2021)

The breeding bird surveys identified 58 species, with a strong presence of waders and other key species:

- Lapwing, Snipe, and Woodcock (all Red-listed) were confirmed as breeding on-site.
- Ringed Plover (Amber-listed) was also breeding in the area.
- Skylark (Amber-listed) showed strong evidence of breeding activity.
- Other breeding indicators included: Dunnock, Stonechat, Blackbird, Robin, and Meadow Pipit.
- General breeding bird surveys also suggested the presence of Kingfisher, Little Egret, and Peregrine (Annex I species) in the wider landscape.

Representative bird survey transects are shown in Figure 7.8 and Figure 7.9 presents Breeding Eurasian Woodcock Transects.

7.7.2.3.4 Migratory and Hinterland Bird Surveys

- Redwing and Meadow Pipit (both Red-listed) were noted as significant winter visitors.
- Linnet and Starling (Amber-listed) were also commonly recorded.
- The hinterland surveys highlighted species such as Common Tern, Kingfisher, Cormorant, Gadwall, Greylag Goose, and Teal, indicating the importance of adjacent waterbodies for both resident and migratory species

Overall, the site demonstrates significant ecological value for bird species, serving as an important habitat for breeding waders, migratory waterfowl, and wintering raptors. The mixture of open peatland, regenerating scrub, and nearby wetland habitats provides a range of ecological niches that support diverse bird communities year-round.

7.7.2.3.5 Assumptions and Limitations

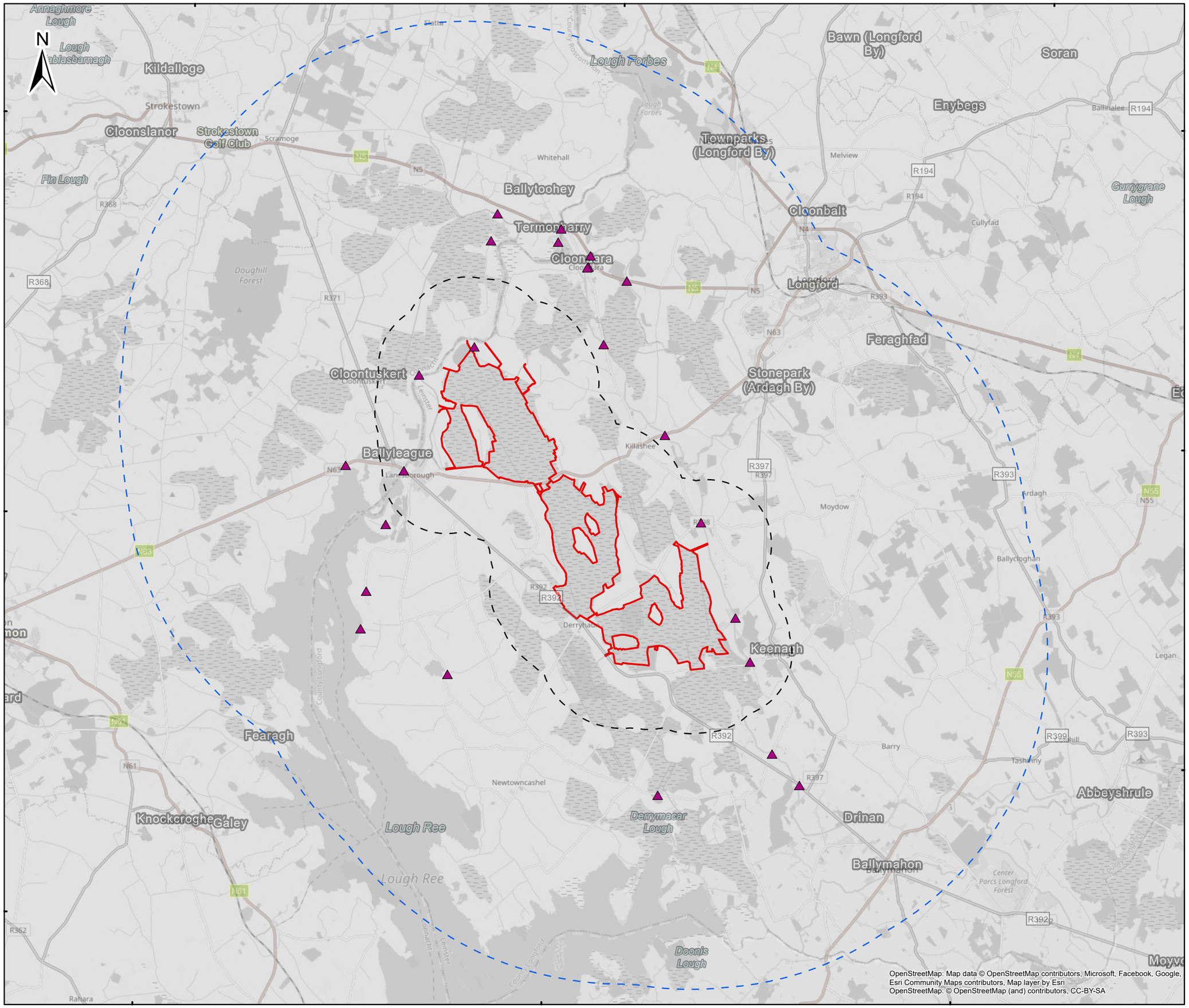
There are a number of limitations inherent to field-based surveying, in particular for bird surveys. These may relate to the availability of suitable weather conditions for completing surveys, with good visibility and limited wind or rain conditions of paramount importance. As such, when undertaking and completing fieldwork, careful consideration and planning was made to ensure optimal weather conditions during survey periods. To this effect, it is considered that there were no significant constraints, and the survey data presented herein provides accurate detail on the baseline ornithology on the site and environs.

7.7.2.4 Non-Volant Mammals

7.7.2.4.1 Badger

Badger and its breeding/resting sites (setts) are legally protected under the Wildlife Act 1976 (as amended). The presence of the species was confirmed during the multidisciplinary walkover surveys by the identification of secondary evidence. No Badger individuals were observed, but used tracks, latrines and snuffle holes were observed throughout the proposed wind farm site. Two potential Badger setts (i.e. 'D'-shaped burrows) were identified at the southern boundary of the Derryadd Bog (see Figure 7.10). However, the presence of leaf litter and spider webs at

their entrances is indicative that these structures may have been abandoned and are unoccupied. Given the above, and protection afforded to the species by the Wildlife Act 1976 (as amended), Badger is considered a KER of **Local Importance (Higher Value)**.



Legend

- Application Site
- 2km buffer from the application site
- 10km buffer from the application site
- Surveyed wetlands

0 2.5 5
Kilometres

NOTES

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2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
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Rev	Date	Description	By	Chkd
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-7 Study Areas for Winter Bird Surveys

Scale @ A3: 1:110,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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Map Ref: 11400-046-WB..SUR-S.BO-TOB-A

Draft: A

8°0'0"W
7°54'0"W
7°48'0"W
53°42'50"N
53°39'40"N
53°36'30"N
773500
768000
762500
600000
606000
612000

Legend

- Application Site
- Transects

0 1 2
Kilometres

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Rev	Date	Description	By	Chkd
A	31/03/2025	First issue	S.P	C.N

Client:

Bord na Móna

Project:

Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title:

Figure 7-8
Representative Transects for General Bird Characterisation

Scale @ A3: 1:45,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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Map Ref: 11400-045-TR-S.BO-TOB-A

Draft: A

8°0'0"W
7°54'0"W
7°48'0"W
53°42'50"N
53°39'40"N
53°36'30"N
773500
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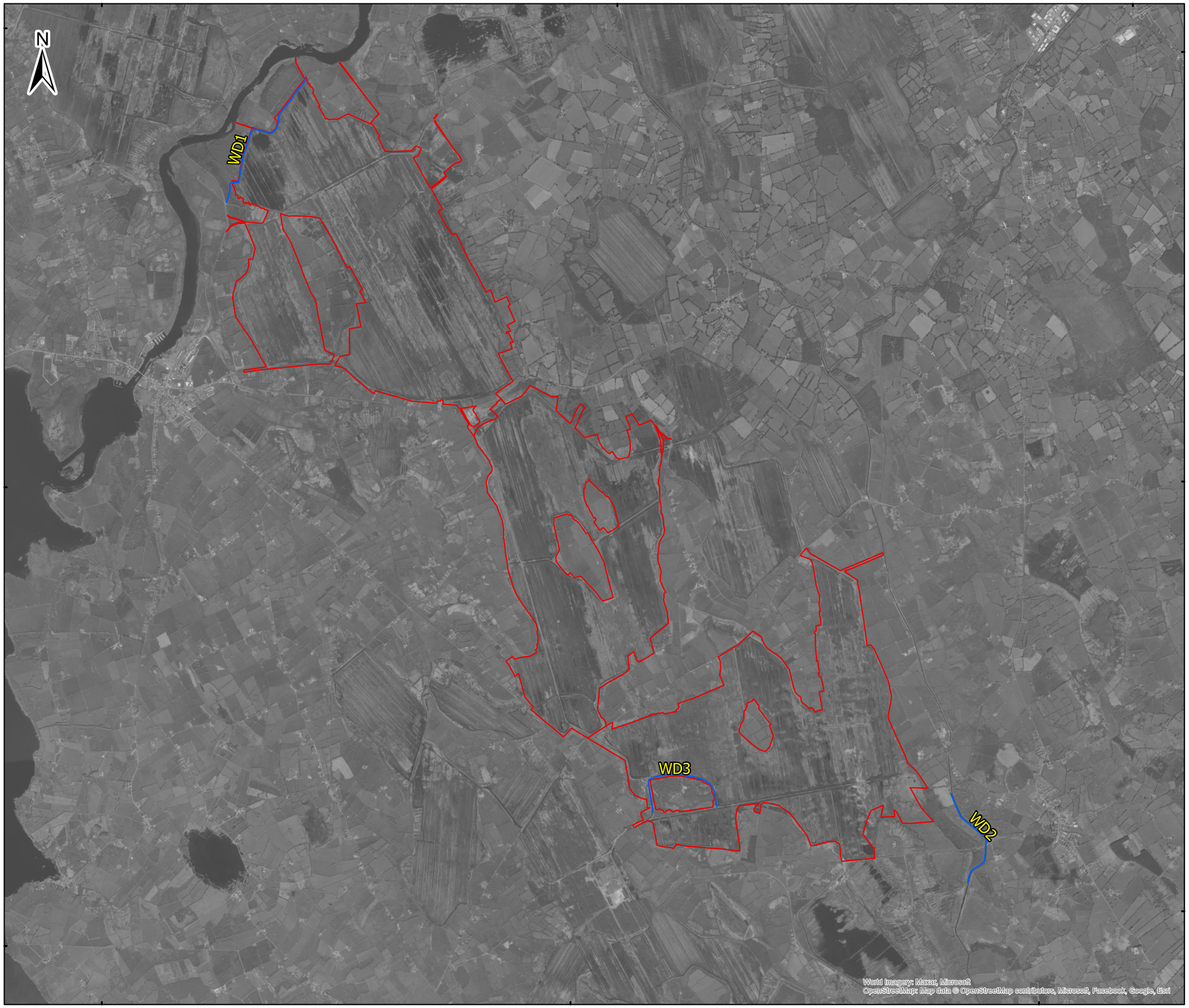

Legend

- Application Site
- Transects

0 1 2
Kilometres

NOTES

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Rev	Date	Description	By	Chkd.
A	31/03/2025	First issue	S.P	J.M

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-9 Breeding Eurasian Woodcock Transects

Scale @ A3: 1:45,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	March 2025

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Map Ref: 11400-045-TR-S.BO-TOB-A

Draft: A

8°0'0"W
7°54'0"W
53°39'40"N
773500
768000
762500
600000
606000
612000
N
tuskert
R371
Ballyleague
lyclare
Lanesborough
N63
Knock
R392
Rathcline
R398
Stonepark
(Ardagh Ry)
Dunbeg
(Moydow
R397
Keenagh
R39
World_Imagery: Earthstar Geographics
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri

Legend

- Application Site

Relevant findings

- Rhododendron
- Badger Activity
- American Mink
- Common Blue
- Common Frog
- Deer
- Eurasian Badger
- Irish Hare
- Large White
- Meadow Brown
- Pine Marten
- Raft Spider
- Red Fox
- Small Tortoiseshell

0 1 2
Kilometres

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Rev	Date	Description	By	Chkd.
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7.10: Relevant Observations Within the Study Area During the Multidisciplinary Walkover Survey

Scale @ A3: 1:40,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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Map Ref: 11400-043-SPE-S.BO-TOB-A

Draft: A

7.7.2.4.2 Otter

Otter and its breeding/resting sites (holts, couches) are protected under the Wildlife Act 1976 (as amended), and listed on the Annex II and Annex IV of the Habitats Directive (Council Directive 92/43/EEC). As with Badger, the multidisciplinary walkover surveys confirmed the presence of Otter, where several tracks identified across (Figure 7.10). Although no Otter holts or couches have been recorded, Otter tracks were observed near the northern boundary of Lough Bannow Bog.

Considering its international designation, and the presence of a SAC designated for Otter (i.e. Lough Ree SAC) in relative proximity, Otter is a KER of **International Importance**.

7.7.2.4.3 Irish Hare

During the multidisciplinary walkover surveys, frequent sightings of Irish Hare, as well as evidence of their presence (tracks and scat) were frequently recorded.

Considering protection under the Wildlife Act 1976 (as amended) to the Irish Hare, it is considered a KER of **Local Importance (Higher Value).**

7.7.2.4.4 Other Mammals

Despite that no evidence for other protected mammal species were found during the multidisciplinary walkover surveys, given the presence of favoured habitat, some other protected species may occur within the proposed wind farm site. Species protected under the Wildlife Act 1976 (as amended), such as Hedgehog, Pygmy Shrew, Irish Stoat and Pine Marten, which could occur around woodlands and their fringing habitats at the Applicant Site.

The potential likely occurrence of other protected mammal species within the proposed wind farm site is valued as of Local Importance (Lower Value).

Although not a protected species, secondary evidence of Fox was also regularly observed (e.g. scat, tracks and dens - Figure 7.10).

7.7.2.5 Whorl Snail (Vertigo sp.)

The detailed Whorl Snail Survey (see Section 7.4.3.4.3 revealed the presence of three species in the proposed wind farm site: Common Whorl Snail (*Vertigo antivertigo*), Striated Whorl Snail (*Vertigo pygmaea*) and Marsh Whorl Snail (*Vertigo pusilla*) (see Figure 7.11). None of these species are listed in Annex II of the Habitats Directive (Council Directive 92/43/EEC), while only Marsh Whorl Snail is listed in Irish Red List (Byrne *et al.*, 2009). Detailed analysis of the results of the Whorl Snail Survey is included in Appendix 7.4.

Considering the conservation status of the species, they are considered as being of Local Importance (Lower Value).

7.7.2.6 Marsh Fritillary

Three locations within the Application Site have been identified holding Marsh Fritillary larval webs, although only two of those locations had webs occupied by larvae (Figure 7.12). Survey report included in Appendix 7.5.

Despite the relative abundance of Devil's-bit Scabious, the Marsh Fritillary results may be indicative of the historic local abandonment by the species due to the intensive habitat disturbance from the peat extraction activities. In fact, one of the major threats to the survival of this species has been identified as "*Wetland drainage*" (Lavery, 1993).

It seems that Devil's-bit Scabious is recolonising in areas but, as the peat extraction has only ceased relatively recently (2019), and the existing habitats seem to be in a transition phase, the availability of food plant for Marsh Fritillary larvae is still quite sparse.

While survey did not record significant population of the species at the Application Site, the species is the listed in the Annex II of the Habitats Directive (Council Directive 92/43/EEC) and is therefore considered to be of **International Importance**.

7.7.2.6.1 Other Butterfly species

During the multidisciplinary walkover surveys four butterfly species were recorded, including Common Blue (*Polyommatus icarus*), Small Tortoiseshell (*Aglais urticae*), Large White (*Pieris brassicae*), and Meadow Brown (*Maniola jurtina*). All four species are listed as 'Least Concern' under the Ireland Red List of Butterflies (Regan *et al.,* 2010).

Considering the conservation status of the recorded butterfly species, they are considered as being of Local Importance (Lower Value).

7.7.2.7 Invasive Alien Species

7.7.2.7.1 Invasive Alien Plant Species

Multiple shrubs of Rhododendron an IAPS listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011, as amended), were recorded within a Hedgerow (WL2) adjacent to the N63. It is most likely that the shrubs were planted intentionally in the past as they are growing in a linear alignment. No suckers (i.e. smaller plant emerging from the roots of the parent plant) were present, which suggests that there is no current likelihood of this species spreading aggressively throughout the surrounding area.

7°56'10"W
7°55'0"W
7°53'50"W
53°40'30"N
53°39'45"N
770000
769000
768000
604500
606000

Legend

Application Site

Whorl Snail Sampling and Findings

- Vertigo antivertigo
- Vertigo pygmaea
- Vertigo substriata
- No observations

0 0.25 0.5
Kilometres

NOTES

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Rev	Date	Description	By	Chkd
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7.11: Whorl Snail Sampling and Findings

Scale @ A3: 1:12,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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Map Ref: 11400-041-Wh.Sn-S.BO-TOB-A

Draft: A

7°54'0"W
7°52'30"W
7°51'0"W
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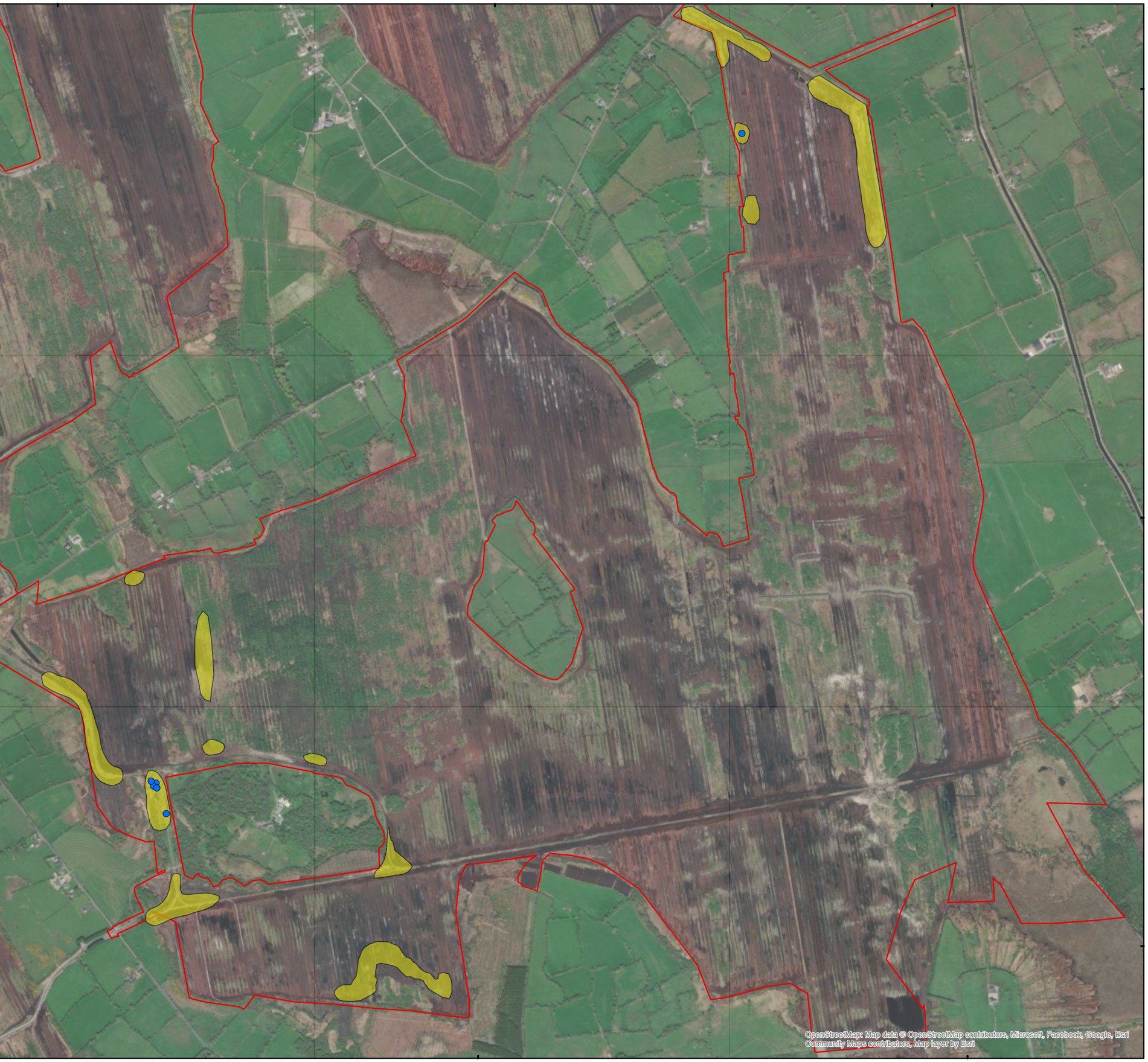

Legend

- Application Site
- Devil's-bit Scabious stands
- Marsh Fritillary Larvae

0 250 500
Meters

NOTES

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Rev	Date	Description	By	Chkd.
A	31/03/2025	First issue	S.P	C.N

Client:
Bord na Móna

Project:
Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title:
Figure 7.12:
Marsh Fritillary Survey:
Devil's-bit Scabious Stands Locations and Survey Results

Scale @ A3: 1:14,000

Prepared by:	Checked by:	Date:
S.Pezzetta	C.Naughton	March 2025

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Draft: A

7.7.3 Protected Species

7.7.3.1 National Biodiversity Data Centre Records

Table 7.16 below present the results of a search for records (historical and current) from the Biodiversity Ireland website[17] of species from the area surrounding the Application Site, with a focus on 10x10 km hectads N06, N07 and N16 within which the Application Site is located.

The table below provides a summary of species recorded within the study area, focusing on amphibians, birds, clubmoss, crustaceans, flowering plants, insects, lichens, and molluscs. The records include the species name, the hectad (10 km square) where the species was observed, the number of records, the most recent observation date, and the relevant legal or conservation designations. The designations referenced include protections under the Wildlife Acts, EU Habitats Directive, and EU Birds Directive.

For bird species, only those listed as Red or Amber under the Birds of Conservation Concern in Ireland (BoCCI) are included, as these categories indicate species of higher conservation priority. Species listed as Green are not included in this table, as they are not considered to be of immediate conservation concern.

In addition to outlining records of protected species Table 7.16 also lists any species identified as invasive under the EU Invasive Alien Species Regulation or listed on the Third Schedule of the Wildlife (Amendment) Act are highlighted, as they may pose ecological threats.

[17] Available at: https://maps.biodiversityireland.ie/Map. Accessed February 2025.

Table 7.16: Biodiversity Records within N06, N07 and N16 Grid Squares

Species name	(Hectad – No. Record – Last Record Date)	Designation
Amphibian		
Common Frog (*Rana temporaria*)	(N16 2 17/03/18) (N06 8 02/07/20) (N07 8 23/02/23)	Wildlife Acts - EU Habitats Directive
Smooth Newt (*Lissotriton vulgaris*)	(N16 5 31/12/12)	Wildlife Acts
Birds		
Northern Pintail (*Anas acuta*)	(N06 1 31/12/01)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Barnacle Goose (*Branta leucopsis*)	(N06 1 31/12/01)	Wildlife Acts - BoCCI - Amber List
Gadwall (*Anas strepera*)	(N06 1 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Little Egret (*Egretta garzetta*)	(N06 10 25/11/22)	Wildlife Acts - BoCCI - Amber List
Tufted Duck (*Aythya fuligula*)	(N06 10 31/12/11) (N07 2 29/02/84)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Spotted Flycatcher (*Muscicapa striata*)	(N06 13 19/03/23) (N07 10 13/04/23) (N16 10 31/12/11)	Wildlife Acts - BoCCI - Amber List
Common Coot (*Fulica atra*)	(N06 16 26/02/23) (N07 6 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Ringed Plover (*Charadrius hiaticula*)	(N06 2 27/06/21)	Wildlife Acts - BoCCI - Amber List
Sand Martin (*Riparia riparia*)	(N06 2 27/06/21) (N16 5 31/12/11) (N06 6 10/07/21)	Wildlife Acts - BoCCI - Amber List
Bewick's Swan (*Cygnus columbianus subsp. bewickii*)	(N06 2 31/12/01)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Dunlin (*Calidris alpina*)	(N06 2 31/12/01)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Black-tailed Godwit (*Limosa limosa*)	(N06 2 31/12/01)	Wildlife Acts - BoCCI - Amber List
Common Redshank (*Tringa totanus*)	(N06 23 23/03/22) (N07 15 31/12/11) (N16 1 31/07/72)	Wildlife Acts - BoCCI - Red List
Common Goldeneye (*Bucephala clangula*)	(N06 3 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Black-headed Gull (*Larus ridibundus*)	(N06 3 31/12/11) (N07 2 20/04/19) (N16 1 29/02/84)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Barn Owl (*Tyto alba*)	(N06 4 31/07/91) (N07 1 31/07/72) (N16 2 27/12/22)	Wildlife Acts - EU Birds Directive - BoCCI - Red List

Species name	(Hectad – No. Record – Last Record Date)	Designation
Herring Gull (*Larus argentatus*)	(N06 4 31/12/11) (N07 3 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Stock Pigeon (*Columba oenas*)	(N06 5 31/07/91) (N07 9 31/12/11) (N16 3 31/07/91)	Wildlife Acts - BoCCI - Amber List
Common Pochard (*Aythya ferina*)	(N06 6 31/12/01)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Northern Shoveler (*Anas clypeata*)	(N06 7 31/12/11) (N07 2 15/02/23)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Eurasian Wigeon (*Anas penelope*)	(N06 7 31/12/11) (N07 4 09/01/23)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Greater White-fronted Goose (*Anser albifrons*)	(N07 1 29/02/84)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Great Black-backed Gull (*Larus marinus*)	(N07 1 29/02/84)	Wildlife Acts - BoCCI - Amber List
Great Cormorant (*Phalacrocorax carbo*)	(N07 1 29/02/84) (N06 7 06/08/22)	Wildlife Acts - BoCCI - Amber List
Common Starling (*Sturnus vulgaris*)	(N07 1 31/07/72) (N16 23 31/12/11) (N06 19 23/03/22)	Wildlife Acts - BoCCI - Amber List
House Sparrow (*Passer domesticus*)	(N07 15 16/04/23) (N16 20 31/12/11) (N06 14 31/12/11)	Wildlife Acts - BoCCI - Amber List
Tufted Duck (*Aythya fuligula*)	(N07 2 29/02/84)	Wildlife Acts - BoCCI - Amber List
Lesser Black-backed Gull (*Larus fuscus*)	(N07 27 16/04/23) (N06 10 10/07/21)	Wildlife Acts - BoCCI - Amber List
Common Swift (*Apus apus*)	(N07 28 31/12/11) (N16 7 31/12/11) (N06 12 14/07/22)	Wildlife Acts - BoCCI - Amber List
Great Crested Grebe (*Podiceps cristatus*)	(N07 3 31/12/11) (N06 8 28/05/22)	Wildlife Acts - BoCCI - Amber List
Mute Swan (*Cygnus olor*)	(N07 4 03/05/22) (N16 6 14/10/22) (N06 17 14/03/23)	Wildlife Acts - BoCCI - Amber List
Common Kestrel (*Falco tinnunculus*)	(N07 4 23/04/23) (N16 11 31/12/11) (N06 8 31/12/11)	Wildlife Acts - BoCCI - Amber List
Common Sandpiper (*Actitis hypoleucos*)	(N07 5 31/12/11) (N06 1 31/07/72)	Wildlife Acts - BoCCI - Amber List
Mew Gull (*Larus canus*)	(N07 5 31/12/11) (N16 1 29/02/84) (N06 6 31/12/11)	Wildlife Acts - BoCCI - Amber List
House Martin (*Delichon urbicum*)	(N07 5 31/12/11) (N16 5 31/12/11) (N06 7 31/12/11)	Wildlife Acts - BoCCI - Amber List
Little Grebe (*Tachybaptus ruficollis*)	(N07 6 31/07/91) (N16 1 31/07/72) (N06 9 31/12/11)	Wildlife Acts - BoCCI - Amber List

Species name	(Hectad – No. Record – Last Record Date)	Designation
Sky Lark (*Alauda arvensis*)	(N07 7 16/04/23) (N16 5 31/12/11) (N06 13 19/03/23)	Wildlife Acts - BoCCI - Amber List
Common Linnet (*Carduelis cannabina*)	(N07 9 31/12/11) (N16 11 31/12/11) (N06 5 31/12/11)	Wildlife Acts - BoCCI - Amber List
Red Kite (*Milvus milvus*)	(N16 1 08/02/91)	Wildlife Acts - BoCCI - Amber List
Yellowhammer (*Emberiza citrinella*)	(N16 1 29/02/84) (N06 3 31/12/01) (N16 4 31/07/91)	Wildlife Acts - BoCCI - Red List
Grey Partridge (*Perdix perdix*)	(N16 1 31/07/72)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Red Grouse (*Lagopus lagopus*)	(N16 1 31/07/72) (N06 2 05/04/19) (N07 3 30/07/20)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Hen Harrier (*Circus cyaneus*)	(N16 1 31/07/72) (N06 2 15/12/17) (N07 2 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Corn Crake (*Crex crex*)	(N16 1 31/07/72) (N06 2 31/07/91) (N07 2 31/07/91)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Common Grasshopper Warbler (*Locustella naevia*)	(N16 1 31/07/72) (N06 5 02/07/21) (N07 4 23/04/23)	Wildlife Acts - BoCCI - Amber List
European Golden Plover (*Pluvialis apricaria*)	(N16 1 31/12/11) (N06 5 31/12/11) (N07 1 29/02/84)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Common Pheasant (*Phasianus colchicus*)	(N16 18 31/12/11) (N06 14 22/11/22) (N07 18 31/12/11)	Wildlife Acts - EU Birds Directive
Barn Swallow (*Hirundo rustica*)	(N16 19 31/12/11) (N06 17 10/07/21) (N07 22 26/08/22)	Wildlife Acts - BoCCI - Amber List
Eurasian Teal (*Anas crecca*)	(N16 2 22/08/16) (N06 8 22/08/16) (N07 3 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Eurasian Curlew (*Numenius arquata*)	(N16 2 29/02/84) (N06 11 14/08/20) (N07 7 31/07/91)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Northern Lapwing (*Vanellus vanellus*)	(N16 2 29/02/84) (N06 16 04/12/22) (N07 14 26/04/23)	Wildlife Acts - EU Birds Directive - BoCCI - Red List
Whooper Swan (*Cygnus cygnus*)	(N16 3 30/11/18) (N06 78 19/03/23) (N07 42 17/04/23)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Merlin (*Falco columbarius*)	(N16 3 31/07/91) (N06 1 19/04/23)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Eurasian Woodcock (*Scolopax rusticola*)	(N16 3 31/12/11) (N06 3 14/12/22) (N07 4 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List

Species name	(Hectad – No. Record – Last Record Date)	Designation
Common Wood Pigeon (*Columba palumbus*)	(N16 30 31/12/11) (N06 21 31/12/11) (N07 29 31/12/11)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Mallard (*Anas platyrhynchos*)	(N16 4 31/12/11) (N06 19 14/03/23) (N07 12 13/04/23)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Common Kingfisher (*Alcedo atthis*)	(N16 5 29/08/22)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Common Snipe (*Gallinago gallinago*)	(N16 6 31/12/11) (N06 13 31/12/11) (N07 16 26/04/23)	Wildlife Acts - EU Birds Directive - BoCCI - Amber List
Clubmosss		
Fir Clubmoss (*Huperzia selago*)	(N06 1 18/03/21)	EU Habitats Directive
Crustacean		
Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	(N07 3 15/06/11)	Wildlife Acts - EU Habitats Directive
Flowering Plant		
Butterfly-bush (*Buddleja davidii*)	(N06 1 23/02/23)	Medium Impact Invasive Species
Japanese Knotweed (*Fallopia japonica*)	(N06 1 31/12/99) (N07 5 17/07/17)	High Impact Invasive Species | Regulation S.I. 477
Rhododendron ponticum	(N06 2 06/05/17) (N07 5 03/11/21)	High Impact Invasive Species | Regulation S.I. 477
Wall Cotoneaster (*Cotoneaster horizontalis*)	(N06 2 14/03/23)	Medium Impact Invasive Species
Canadian Waterweed (*Elodea canadensis*)	(N07 3 15/06/11) (N16 3 13/06/05)	High Impact Invasive Species | Regulation S.I. 477
Evergreen Oak (*Quercus ilex*)	(N16 1 13/06/05)	Medium Impact Invasive Species
Traveller's-joy (*Clematis vitalba*)	(N16 1 13/06/05)	Medium Impact Invasive Species
Sycamore (*Acer pseudoplatanus*)	(N16 1 13/06/05) (N07 1 19/08/22) (N16 8 24/07/08)	Medium Impact Invasive Species
Cherry Laurel (*Prunus laurocerasus*)	(N16 3 13/06/05)	High Impact Invasive Species
Insect - Butterfly		
Marsh Fritillary (*Euphydryas aurinia*)	(N16 1 13/06/05) (N06 2 14/03/23)	EU Habitats Directive

Species name	(Hectad – No. Record – Last Record Date)	Designation
Lichen		
Cladonia portentosa	(N16 1 26/08/16)	EU Habitats Directive
Mollusc		
Desmoulin's Whorl Snail (*Vertigo* (Vertigo) *moulinsiana*)	(N06 2 09/09/14) (N07 5 03/08/17)	Wildlife Acts - EU Habitats Directive
Zebra Mussel (*Dreissena* (Dreissena) *polymorpha*)	(N06 2 29/06/22) (N07 14 29/06/22)	High Impact Invasive Species | Regulation S.I. 477
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	(N06 3 01/06/13) (N07 1 03/08/72) (N16 4 22/08/17)	Medium Impact Invasive Species
Common Garden Snail (*Cornu aspersum*)	(N06 3 29/06/22) (N07 19 29/08/23) (N16 1 13/04/68)	Medium Impact Invasive Species
Geyer's Whorl Snail (*Vertigo* (Vertigo) *geyeri*)	(N07 2 04/05/06)	Wildlife Acts - EU Habitats Directive
Corbicula fluminea	(N07 2 07/06/20) (N16 1 26/08/16)	High Impact Invasive Species | Regulation S.I. 477
Clustered Earth-moss (*Ephemerum cohaerens*)	(N06 3 04/09/07)	Flora Protection Order 2015 Schedule B (Mosses)
Large White-moss (*Leucobryum glaucum*)	(N16 1 26/08/16)	EU Habitats Directive
Reptile		
Common Lizard (*Zootoca vivipara*)	(N16 1 26/08/16) (N06 3 04/09/07)	Wildlife Acts
Non-volant Mammals		
European Rabbit (*Oryctolagus cuniculus*)	(N06 1 12/10/12) (N07 4 10/08/12) (N16 1 08/04/92)	Medium Impact Invasive Species
European Otter (*Lutra lutra*)	(N06 2 17/06/10) (N07 3 14/08/11) (N16 1 02/09/10)	Wildlife Acts - EU Habitats Directive
American Mink (*Mustela vison*)	(N06 2 31/12/12) (N07 1 31/12/01)	High Impact Invasive Species | Regulation S.I. 477
Eurasian Pygmy Shrew (*Sorex minutus*)	(N16 1 27/08/16) (N06 1 27/06/19)	Wildlife Acts
Irish Stoat (*Mustela erminea subsp. hibernica*)	(N16 1 27/08/16) (N06 1 27/06/19)	Wildlife Acts - EU Habitats Directive

Species name	(Hectad – No. Record – Last Record Date)	Designation
Eastern Grey Squirrel (Sciu*rus carolinensis*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	High Impact Invasive Species | Regulation S.I. 477
Pine Marten (*Martes martes*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts - EU Habitats Directive
Eurasian Badger (*Meles meles*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts
Irish Hare (*Lepus timidus subsp. hibernicus*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts
Volant Mammals		
Daubenton's Bat (*Myotis daubentonii*)	(N06 8 02/08/21) (N07 1 11/05/17) (N16 45 25/08/21)	Wildlife Acts - EU Habitats Directive
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	(N07 24 18/07/18)	Wildlife Acts - EU Habitats Directive
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	(N16 1 27/08/16) (N06 1 27/06/19)	Wildlife Acts - EU Habitats Directive
Lesser Noctule (*Nyctalus leisleri*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts - EU Habitats Directive
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	(N16 1 27/08/16) (N06 1 27/06/19) (N16 2 31/12/12)	Wildlife Acts - EU Habitats Directive
Natterer's Bat (*Myotis nattereri*)	(N06 5 06/09/16)	Wildlife Acts - EU Habitats Directive

7.7.4 Water Framework Directive Water Body Status

The information in this section has been informed by Chapter 9 Hydrology, Hydrogeology and Water Quality of this rEIAR. Chapter 9 provides a detailed description of the hydrological, hydrogeological and water quality baseline environment of the Application Site and surrounding area.

To support the biodiversity impact assessment:

- **Section 7.7.4.1** – summarises the hydrological and hydrogeological pathways outlined in Chapter 9.
- **Section 7.7.4.2** – presents an overview of water quality across relevant water bodies.

7.7.4.1 Hydrological Pathway

7.7.4.1.1 WFD sub-catchments Influence on Surface Water

The Application Site is situated at the boundary between two WFD sub-catchments:

- Upper Shannon 26C – Covers most of the site, with surface water primarily draining into this catchment.
- Upper Shannon 26E – Extends to the south, receiving drainage from the southern part of the site.

These catchments define the flow of surface water within and around the site, impacting local rivers, streams, and lakes. The WFD ensures that water quality in these catchments is regularly monitored and assessed against ecological and chemical standards.

7.7.4.1.2 Surface Water Features and WFD Monitoring

Key surface water bodies within these catchments include:

- Shannon (Upper) and its tributaries – Located to the north and northwest of the site.
- Ballynakill River – Found north and east of the Derryadd and Derryaroge bogs.
- Lough Bannow Stream and its tributaries – Located west of Lough Bannow.
- Fallan River – Situated 1 km east of the site, draining into the River Shannon at Cloondara.
- Ledwithstown (Bilberry) River – Originates near Lough Bannow's southern boundary, flowing southwest into Lough Ree.

Each of these surface water bodies is classified under the WFD, with their water quality status assessed using EPA monitoring programs (e.g., Biological Q-Rating and chemical sampling). The WFD framework ensures that any potential water quality impacts are identified and managed.

The Upper Shannon (26E) Catchment covers an area of 581km² and is characterised by a flat landscape underlain by limestones and includes Lough Ree. Lough Ree is currently at Good ecological status.

7.7.4.1.3 Groundwater Bodies (GWB) and WFD Classification

In addition to surface waters, the Application Site is hydrologically connected to three Groundwater Bodies (GWB), all of which are classified as having 'Good' status under the WFD:

- Funshinagh (IE_SH_G_091) – A karstified aquifer with high transmissivity, allowing rapid groundwater flow, discharging into Ree Lake.
- Inny (IE_SH_G_110) – Another karstified aquifer with relatively fast groundwater movement, contributing to surface water features, including Ree Lake.
- Longford Ballinalee (IE_SH_G_149) – Underlain by poorly productive bedrock, leading to slower groundwater movement and feeding into local rivers and streams that eventually discharge into Ree Lake.

Groundwater bodies play a critical role in sustaining surface water ecosystems, as they provide baseflow to rivers and lakes. The groundwater quality standards ensure that these aquifers remain protected from contamination and excessive abstraction, maintaining their 'Good' status and supporting overall water resource sustainability.

7.7.4.2 Baseline Water Quality

7.7.4.2.1 Historic EPA Biological Q-Rating Monitoring and WFD Monitoring

The historical water quality at the Application Site is assessed using two key datasets:

1. **EPA Rivers Ecology Monitoring Results** – A 3-year rolling program evaluating biological water quality (Q Value System), based on national surveys dating back to 1971 (with publicly available data from 1992 onwards).
2. **WFD Monitoring** – Implemented in 2003 (S.I. 722/2003), replacing the EPA Rivers Ecology Monitoring program. The first WFD monitoring cycle (2010–2015) assessed all classified water bodies (rivers, lakes, groundwater, transitional, and coastal waters).

The Biological Q-Rating System evaluates river water quality under the WFD using biological surveys, classifying watercourses as follows:

- Class A – Unpolluted (Q5, 4-5, 4)
- Class B – Slightly Polluted (Q3-4)
- Class C – Moderately Polluted (Q3, 2-3)

Class D – Seriously Polluted (Q2, 1-2, 1)

7.7.4.2.2 Historical Q-Rating Data

No Q-rating data exists for 1988. The earliest EPA monitoring data available is 1992 for the Fallan River and 1999 for the Shannon River. These monitoring efforts coincide with the reduction of peat extraction at the Application Site, leading up to its cessation in 2019.

Table 7.17 presents the EPA Monitoring of Biological Quality of Waters at four key locations along the Fallan and Shannon Rivers from 1992 to 2017. The locations include:

- West of Curry Bridge on the Fallan River,
- Bridge South of Kilmore Upper on the Fallan River,
- 1 km downstream of Tarmonbarry on the Shannon River, and
- Ballyleague Bridge, Lanesborough on the Shannon River

The water quality of the Fallan River and Shannon River varied over time, with Q3-4 and Q4 ratings indicating slightly polluted to unpolluted conditions. Data availability was inconsistent

in the earlier years, particularly for the Shannon River. However, the monitoring results generally suggest that the water quality in these areas has fluctuated between slightly polluted and unpolluted states, with improvements in some years, such as 2011.

Table 7.17: EPA Monitoring of Biological Quality of Waters

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Br Lanesboro
River	Fallan	Fallan	Shannon	Shannon
Station Code	RS26F0100040	RS26F010200	RS26S021530	RS26S021600
2017	Q3-4	Q4	Q3	ND
2014	Q3-4	Q4	Q3-4	Q3
2011	Q3-4	Q4	Q4	Q3-4
2008	Q3-4	Q4	Q3-4	ND
2005	Q3-4	Q3-4	ND	Q3
2002	Q4	ND	ND	Q3
1999	Q3-4	Q3-4	ND	Q3
1996	Q3-4	Q3-4	ND	ND
1992	ND	Q3-4	ND	ND

7.7.4.2.3 WFD Monitoring

EPA Biological Q-Value monitoring data postdates 2019, with Q-Values across the monitoring stations outlined in Table 7.18. No significant change in Q-values has occurred in 2020 or 2023 (the Current Phase) in comparison to the Peat Extraction.

Q-Values within the River Fallan vary between Q3-Q4 'Slightly Polluted' status and with 'Unpolluted' status -Q4. The EPA monitoring points on the River Shannon indicate that the overall water quality in this area is Q3-'Moderately Polluted' at Lanesborough and that the water quality upstream of the Application Site is Q3-Q4 'Slightly Polluted'.

Table 7.18: Q-Values Current Phase (July 2019- Present Day)

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Br Lanesboro
River	Fallan	Fallan	Shannon	Shannon
Station Code	RS26F0100040	RS26F010200	RS26S021530	RS26S021600
2023	Q4	-	Q3-4	Q3
2020	Q3-4	Q4	Q4	Q3

7.7.4.3 Conclusion

This section provides a clear and thorough overview of the hydrological, hydrogeological, and water quality conditions, utilising both historical and current data. Historically, water quality in the area has fluctuated, but overall, the monitoring data reflects a trend toward improving conditions. While the cessation of peat extraction may have contributed to some improvements in water quality, other local activities and environmental factors are also likely influencing the changes observed. A gradual improvement in water quality is likely to occur in line with the implementation of all WFD program of measures.

7.7.5 Designated European Sites and Site of National Importance within the Likely Zone of Influence of from 1988 onwards

The following methodology was used to establish the designated sites that have the potential to be impacted by the peat extraction activities and all ancillary works:

- Initially the most up to date GIS spatial datasets for European sites and nationally designated sites and water catchments were downloaded from the NPWS website[18] and the EPA website[19] respectively at the time of preparing this report. The datasets were utilised to identify sites which could feasibly be affected by the peat extraction activities and all ancillary works.
- All European sites European sites, NHAs and pNHAs that could potentially be affected were identified using a source-pathway-receptor model.
- Review of Natura 2000 - Standard Data Form for relevant SAC[20] and SPAs[21,22].
- Information on these sites with regard to their conservation objectives is provided in Table 7.20 and Table 7.21.
- The designation features of these sites, as per the NPWS website were consulted and reviewed at the time of preparing this report.

[18] Available at www.npws.ie/protected-sites. Accessed in January 2025.
[19] Available at https://www.catchments.ie/. Accessed in February 2025.
[20] N2K IE0000440 dataforms
[21] N2K IE0004064 dataforms
[22] N2K IE0004064 dataforms

- All European sites and the QIs/SCIs for which the sites are designated, are fully described and assessed in the rAASR and the rNIS reports submitted as part of the Substitute Consent application.
- Where potential pathways for likely significant effects were identified, the site is included within the likely Zone of Influence and further assessment was undertaken.

7.7.5.1 Overview

In national legislation SACs and SPAs, designated under the EU Habitats Directive and EU Birds Directive respectively, are known as 'European Sites'. To meet the provisions of Article 6(3) of the Habitats Directive the likely significant effects and/or adverse impacts of the Project on the integrity of SACs and SPAs is fully assessed in the rAASR and rNIS report that accompany the application for Substitute Consent.

The EPA EIA Guidelines (2022) state:

- "*a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement*" but should "*incorporate their key findings as available and appropriate*".

To comply with the above guidance, this Chapter takes into account the key findings of the remedial Appropriate Assessment Screening Report (rAASR) and redial Natura Impact Statement (rNIS) prepared for Project.

In summary, the rAASR identified the European sites with potential to have been, and to be, significantly affected by Project Activities at the Application Site from June 1994 to present, as well as the implementation of future proposed rehabilitation plans for the Application Site.

June 1994 is the date when the Habitats Directive was required to be transposed into came into force in Irish law, although it was not transposed into Irish law until 1997, through the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), and Appropriate Assessment (AA) became a legal requirement, onwards. Consequently, the rAASR was required to consider activities undertaken at the Application from that point in time, June 1994.

To this end, the rAASR considered the potential effect on European sites due to activities that have been, and are to be, undertaken at the Application Site for the following distinct Project Phases:

1. **Peat Extraction Phase (June 1994 – July 2019) -** covers peat extraction and all ancillary works at the Application Site from June 1994, the date when the Habitats Directive was required to be transposed into Irish law until the cessation of peat extraction in July 2019.
2. **Current Phase (July 2019 – Present Day) –** covers the decommissioning and site management action that have been ongoing at the since peat extraction ceased.

- **Remedial Phase (Future) -** considers the planned implementation of rehabilitation measures for the Derryaroge, Derryadd and Lough Bannow Bogs, as required under Condition 10.2 of the Environmental Protection Agency (EPA) Integrated Pollution Control (IPC) Licence P0504-01, following the cessation of peat extraction.

The rAASR concluded that:

- *Following a thorough examination, analysis, and evaluation of the relevant data concerning the Application Site and its surrounding area, this rAASR has concluded that, based on the best available scientific knowledge, objective information, and the conservation objectives of the relevant European sites, it cannot be excluded beyond reasonable scientific doubt that the peat extraction activities and ancillary works undertaken during the Peat Extraction Phase (July 1988 – July 2019) as well as Current Phase (July 2019 – Present Day), either individually or in combination with other plans and projects, may have had or may have significant effects on the integrity of these European sites. This rAASR concludes that further assessment is required to understand the full scope of potential impacts. The European sites for which risk of potential significant effects to SCIs and QIs are deemed to exist are:*

  Lough Ree SPA (004064)
  Lough Ree SAC (000440)
  Ballykenny-Fishertown Bog SPA (004101)

  In light of this, it was concluded that a remedial NIS is required to assess whether activities since 1994 to present day at the Application Site, have, had or could potentially have likely adverse effects on the integrity of the above listed European sites.
  The examination also concluded that activities proposed as for the Remedial Phase (Future) will not have, either individually or in combination with other plans and projects, significant effect on any Europena sites; consequently activities associated with the Remedial phase are screened out

The rNIS concluded prepared conclude that:

- *After a thorough examination, evaluation, and analysis, conducted in accordance with the best scientific knowledge and the conservation objectives of the European Sites, it has been determined, based on objective information, that the activities associated with Peat Extraction Phase (July 1988 – July 2019) as well as Current Phase (July 2019 – Present Day), will not adversely affect the integrity of any European Site.*

The findings of the rAAR and rNIS are considered in this Chapter. However, to align with the timeline of Bord na Móna's activities at the Application Site and the requirement to assess the potential for significant effects since 1988, which is the date when the EIA Directive was transposed into Irish law, impacts on European sites from that year onward are included in this for here. Section 7.7.5.2 explains how the timing aspects have influenced the assessment approach.

In addition to European sites, this Chapter considers effects on designated sites of national importance for biodiversity and conservation. As with European sites, the assessments of effects on national sites have taken into account both the timing of Bord na Mona's activities at the Application Site and the timing of the non-statutory listing of site in 1995. Section 7.7.5.3 explains how the timing aspects have influenced the assessment approach.

7.7.5.2 European sites – SAC and SPAs

The source-pathway-receptor model was used to identify all European sites that could potentially be affected by the Project. Figure 7.13 shows the European sites surrounding the Application Site for context. Source-pathway-receptor linkages were identified for the following European sites:

- Lough Ree SPA [Site code: 004064] (NPWS, 2022a) (date November 1995)
- Ballykenny-Fisherstown Bog SPA [Site code: 004101] (NPWS, 2022b) (date as October 1996)
- Lough Ree SAC [Site code: 000440] (NPWS, 2016c) (date January 2002)

Description of the source-pathway-receptor linkages for the SPAs and SAC is provided in Table 7.20 below. European sites located further away were also considered, but no potential source-pathway-receptor link was found that would affect any sites or species. This systematic approach ensures the assessment focuses on sites with a realistic potential for impact, based on established ecological connections or environmental pathways.

The Lough Ree SPA, Ballykenny-Fisherstown Bog SPA and Lough Ree SAC were not designated until 1995, 1996 and 2002 respectively. As a result, these sites were not part of the 1988 baseline. Table 7.19 outlines the applicable Project Phases for each of the designated sites, based on their respective designation dates.

Since the Lough Ree SPA and Ballykenny-Fisherstown Bog SPA were designated during the Current Phase (2019–present), the sites are assessed for effects during the 1) Peat Extraction Phase (1988–2019) and 2) the Current Phase (2019–present), as well as 3) the Remedial Phase (Future) of the Project.

However, the Lough Ree SAC was designated during the are only considered during the 2) Current Phase (2019 - Present), as it was designated in 2002. Consequently, the site is assessed for effects during the 2) the Current Phase (2019–present), as well as 3) the Remedial Phase (Future) of the Project.

The European sites are recognised as **Internationally Important KERs**.

Table 7.19: Applicable Phases for Designated Sites

Site	Year of Designation	Peat Extraction Phase (1988 - 2019)	Current Phase (2019 - Present)	Remedial Phase: (Future)
Lough Ree SPA	1995	Applicable (as designated in 1995)	Applicable (as designated in 1995)	Applicable (if needed*)
Ballykenny-Fisherstown Bog SPA	1996	Applicable (as designated in 1996)	Applicable (as designated in 1996)	Applicable (if needed*)
Lough Ree SAC	2002	Not applicable (not designated during Phase)	Applicable (as designated in 2002)	Applicable (if needed*)
*The need for the Remedial Phase, including an assessment of potential negative effects is evaluated in Section 0 below.				

7.7.5.3 National Sites – NHA and pNHAs

In 1995, over 1,200 proposed Natural Heritage Areas (pNHAs) were listed on a non-statutory basis, covering approximately 750,000 hectares. These sites were identified as being of national importance for biodiversity and conservation. To date, some (but not all) of these sites have been formally designated and have statutory protection under the Wildlife (Amendment) Act 2000.

The formal designation process for pNHAs commenced in 2002, when a series of sites were proposed for designation as NHAs. However, the sites were officially designated in 2004, when they received full legal protection under the Act. The pNHA that have not been formally designated, still receive consideration in planning decisions and environmental impact assessments.

Figure 7.14 shows the National designated sites surrounding the Application Site. Source-pathway-receptor linkages were identified for four pNHAs:

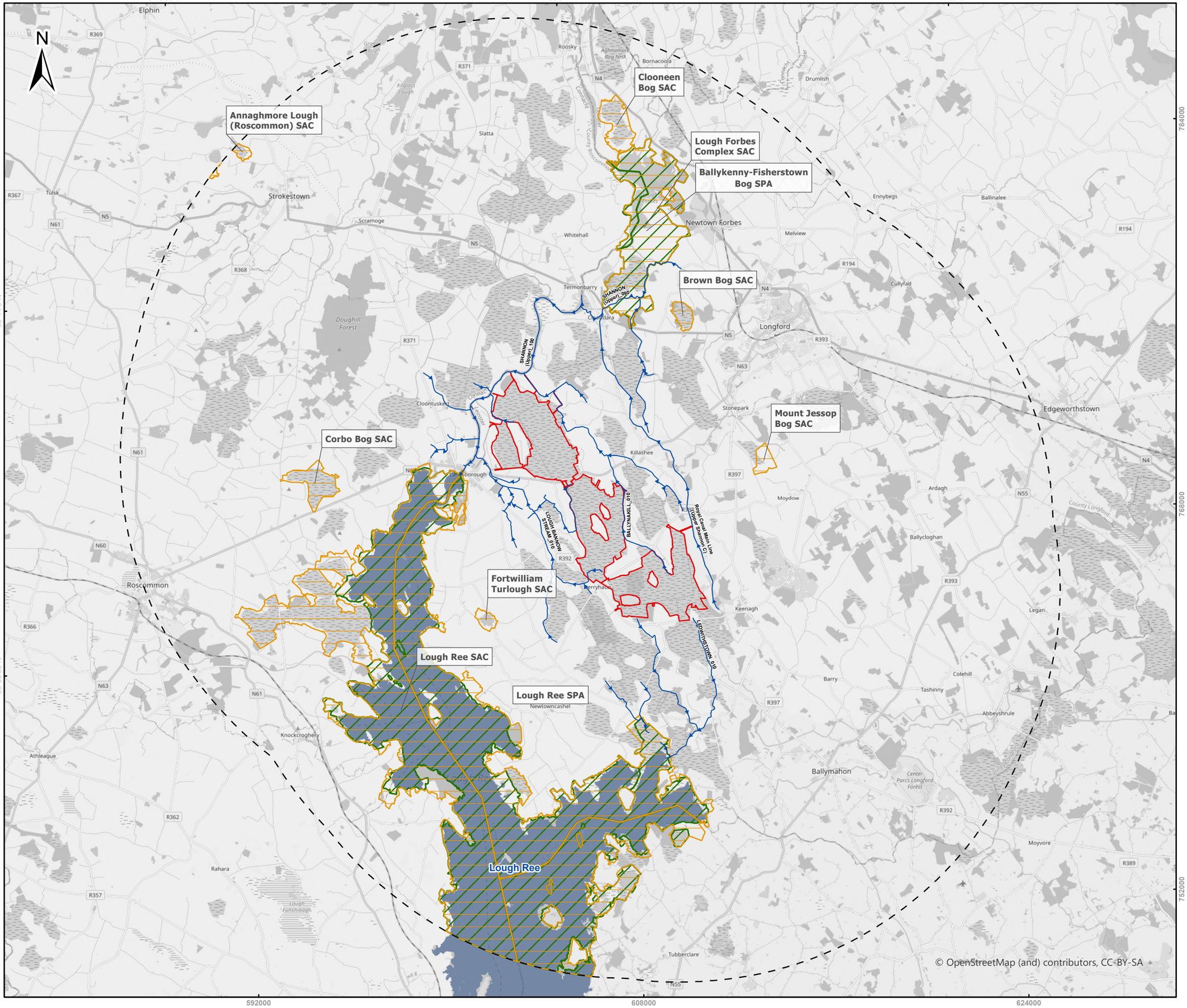
- Lough Bawn pNHA [Site code: 001819]
- Lough Bannow pNHA [Site code: 000449]
- Lough Ree pNHA [Site code: 000440]
- Derry Lough pNHA [Site code: 001444]

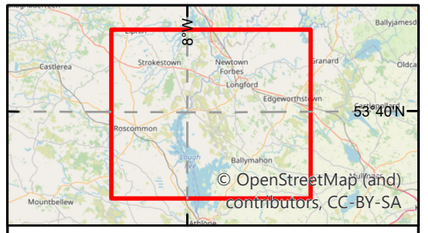
National sites located further away were also considered, but no potential source-pathway-receptor link was found that would affect any sites beyond those listed above. Since the above listed pNHAs were listed on a non-statutory basis during the Current Phase (2019–present), they are included in the assessment of effects for both the Current Phase and the Remedial Phase (Future).

For both Phases, the sites are considered **Nationally Important** KERs.

A summary of the effects for the Current Phase is presented in Section 7.8.4.3, and for the Remedial Phase (Future) in Section 7.8.5.4.

It should be noted that although Forthill Bog NHA [001448], Fortwilliam Turlough pNHA [000448], Lough Slawn pNHA [001443], and Cordara Turlough pNHA [001821] are located within the same WFD groundwater body as the proposed wind farm site (i.e. Funshinagh WFD Groundwater body), the groundwater levels at the proposed wind farm site are below the water levels at these Nationally Important sites, which would drive the groundwater flow towards the proposed wind farm site. Consequently, effects to the Nationally Important sites are screened out. In addition, while the Application Site interact the Royal Canal pNHA, no hydrological connectivity was identified between; consequently, potential effects on this site have also been screened out.





Legend

- Application Site
- 15km Zone of Influence
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- WFD - Lake Water Bodies
- WFD - River Water Bodies

0 2.5 5
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	31/03/2025	First issue	S.P	C.N
Rev	Date	Description	By	Chkd

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-13 European Sites surrounding the Application Site

Scale @ A3:	1:145,000	
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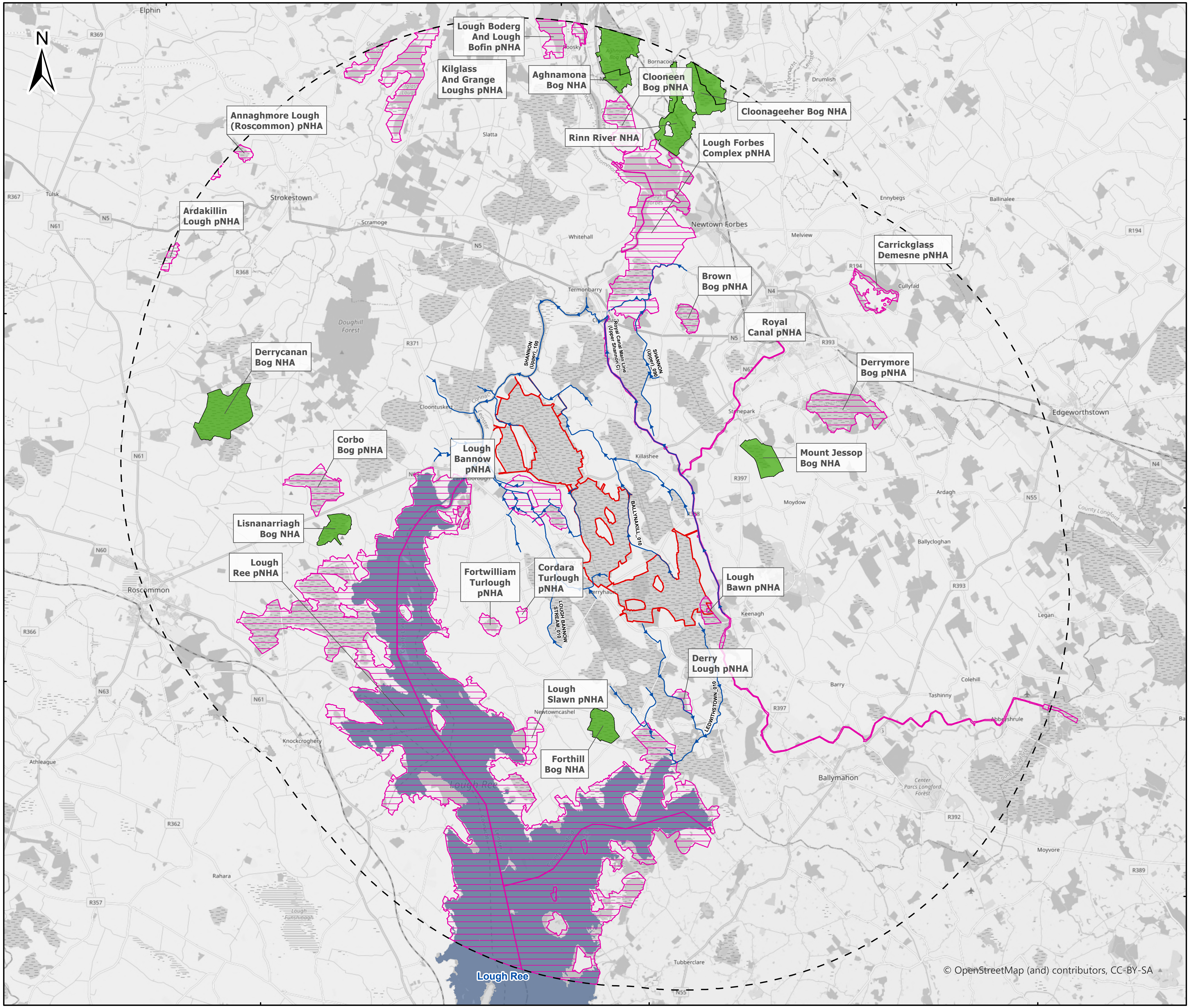
Draft: A



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7°56'0"W
7°41'10"W
N
Lough Boderg And Lough Bofin pNHA
Kilglass And Grange Loughs pNHA
Aghnamona Bog NHA
Clooneen Bog pNHA
Cloonageeher Bog NHA
Annaghmore Lough (Roscommon) pNHA
Rinn River NHA
Lough Forbes Complex pNHA
Ardakillin Lough pNHA
Carrickglass Demesne pNHA
Brown Bog pNHA
Royal Canal pNHA
Derrycanan Bog NHA
Derrymore Bog pNHA
Corbo Bog pNHA
Lough Bannow pNHA
Mount Jessop Bog NHA
Lisnanarriagh Bog NHA
Lough Ree pNHA
Fortwilliam Turlough pNHA
Cordara Turlough pNHA
Lough Bawn pNHA
Derry Lough pNHA
Lough Slawn pNHA
Forthill Bog NHA
Lough Ree
Elphin
Strokestown
Tulsk
Newtown Forbes
Termonbarry
Edgeworthstown
Roscommon
Ballymahon
Athleague
Knockcroghery
Rahara
Keenagh
Killashee
Ardagh
Moydow
Ballycloghan
Legan
Barry
Colehill
Tashinny
Abbeyshrule
Moyvore
Tubberclare
Newtowncashel
Slatta
Whitehall
Scramoge
Cloontuskert
Melview
Ennybegs
Ballinalee
Cullyfad
Stonepark
Oughill Forest
Center Parcs Longford Forest
County Longford
SHANNON (Upper)_100
SHANNON (Upper)_090
Royal Canal Main Line (Upper Shannon C)
BALLYNAKILL_010
LOUGH BANNOW STREAM_010
LEDWITHSTOWN_010
592000
608000
624000
784000
768000
752000
53°44'0"N
53°35'50"N
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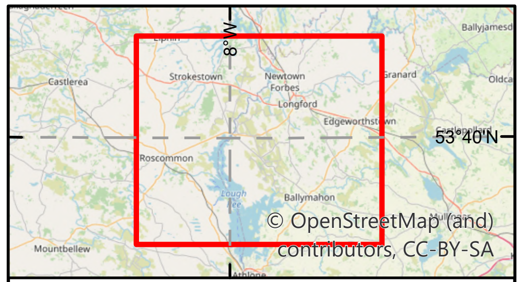

Legend

- Application Site
- 15km Zone of Influence
- proposed Natural Heritage Areas (pNHAs)
- Natural Heritage Areas (NHAs)

0 2.5 5
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-14 National Designated Sites surrounding the Application Site

Scale @ A3: 1:145,000

Prepared by: S.Pezzetta | Checked by: C.Naughton | Date: March 2025

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Map Ref: 11400-003-D.S-BUF15-TOB-A

Draft: A

Table 7.20: Identification of European sites within the Likely Zone of Influence

Site Name [Site Code] (Conservation Objectives)	Distance from Application Site (km)	Qualifying Interest/ Special Conservation Interest	Connectivity - Source-Pathway-Receptor Assessment
Lough Ree SAC [Site code: 00440] (NPWS, 2016)	0.9	• Otter *Lutra lutra* [1355] • Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] • Degraded raised bogs still capable of natural regeneration [7120] • Alkaline fens [7230] • Limestone pavements* [8240] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Bog woodland*	Following the precautionary principle, a potential pathway for effects on Otter, where they occur outside the SAC, was identified due to direct habitat loss was identified due to direct habitat loss during the Peat Extraction Phase including altered hydrology, soil degradation, and shifts in vegetation communities, may have resulted in long-lasting ecological changes, continuing to threaten habitats even beyond the cessation of extraction activities. Additionally, drainage runoff and pollutant discharge may have had sustained negative effects on aquatic habitats connected to the site, potentially impacting water quality and prey availability for Otters reliant on these ecosystems. These persistent impacts underline the need for further assessment to determine the extent of residual and ongoing effects on Otter populations and their associated habitats.. Lough Ree SAC is located within the Ree WFD lake water body, which the Application Site is hydrologically connected. There is hydrological connectivity between the Application Site and this SAC via drainage ditches and watercourses within the Application Site. Therefore, a potential pathway for indirect effects on the QIs of the SAC where they occur downstream of the Application Site was identified for both the Peat Etraction Phase and Current Phase. Potential indirect effects on the aquatic habitat QIs of this SAC deterioration may have resulted from surface and ground water quality due to run-off of pollutants, including silts and hydrocarbons. Impact to aquatic QIs have also resulted in potential negative indirect effect habitats used by Otter. Taking a precautionary approach, a potential pathway for indirect effects on the above listed QIs during the implementation of the proposed rehabilitation plans

Site Name [Site Code] (Conservation Objectives)	Distance from Application Site (km)	Qualifying Interest/ Special Conservation Interest	Connectivity - Source-Pathway-Receptor Assessment
			as a result of deterioration of water quality due to runoff of pollutants during such works was identified. This SAC is therefore within the likely Zone of Influence and following the precautionary principle the potential for significant effect on QIs exists. Further assessment was deemed to be required.
Lough Ree SPA [Site code: 004064] (NPWS, 2022)	0.9	•Little Grebe *Tachybaptus ruficollis* [A004] •Whooper Swan *Cygnus cygnus* [A038] •Wigeon *Anas Penelope* [A050] •Teal *Anas crecca* [A052] •Mallard *Anas platyrhynchos* [A053] •Shoveler *Anas clypeata* [A056] •Tufted Duck *Aythya fuligula* [A061] •Common Scoter *Melanitta nigra* [A065] •Goldeneye *Bucephala clangula* [A067] •Coot *Fulica atra* [A125] •Golden Plover *Pluvialis apricaria* [A140] •Lapwing *Vanellus vanellus* [A142] •Common Tern *Sterna hirundo* [A193] •Wetland and waterbirds [A999]	Beyond being hydrologically connected with the Lough Ree SPA (which is located within the Ree WFD lake water body), the Application Site provides suitable and potentially important habitat for the SCIs for which the European site is designated. This hydrological connection occurs through a network of drainage ditches and watercourses within the Application Site that eventually discharge into the Lough Ree system. This connectivity means that any changes in water quality, flow, or sedimentation within the Application Site could have indirectly affected the aquatic habitats within the SPA that support these SCIs. The hydrological connection between the Application Site and the Lough Ree system has existed through a network of drainage ditches and watercourses. Any past land use activities, including drainage modifications or peat extraction, may have influenced water quality, flow patterns, and sedimentation, potentially affecting the aquatic habitats within the SPA that support these SCIs. It is noted that while activities during the Current Phase are of a far lesser magnitude than those of the Peat Extraction Phase, there is a risk that runoff or pollutant discharge could have indirectly impacted the SPA. Variations in water quality, flow, or sedimentation within the site have the potential to affect the aquatic habitats that support the SCIs.. In addition to this hydrological link, the Application Site features habitat types that species for which the SPA is designated show a strong preference for. These habitats may include feeding

Site Name [Site Code] (Conservation Objectives)	Distance from Application Site (km)	Qualifying Interest/ Special Conservation Interest	Connectivity - Source-Pathway-Receptor Assessment
			grounds, roosting areas, or even nesting sites that are essential for supporting the populations of these species. The presence of such habitats within the Application Site potentially makes it an integral part of the wider ecological network that sustains the SCIs associated with the Lough Ree SPA. Therefore, any changes to the habitat structure, hydrology, or water quality within the Application Site could have potential implications for the SCIs, either directly by altering habitat suitability or indirectly by affecting the aquatic ecosystem on which these species depend. This underlines the importance of considering both hydrological connectivity and habitat provision when assessing potential impacts on the Lough Ree SPA. This SPA is therefore within the likely Zone of Influence and following the precautionary principle the potential for significant effect on SCIs exists. Further assessment was deemed to be required.
Ballykenny-Fisherstown Bog SPA [Site code: 004101] (NPWS, 2022)	4.4	• Greenland White-fronted Goose *Anser albifrons flavirostris* [A395]	Although the Ballykenny-Fisherstown Bog SPA is situated upstream and is therefore not directly affected by any hydrological or hydrogeological influences from the Application Site, the surrounding area nonetheless provides habitat that is favoured by the Greenland White-fronted Goose during the winter months. Research by Norriss and Wilson (1993) indicates that this species shows a strong preference for boglands as wintering grounds. Such bog habitats are present not only within the Application Site itself but also in the nearby landscape, offering suitable foraging and resting areas for the geese during their seasonal migrations. In the absence of specific European or Irish guidance on establishing ecological connectivity to SPAs, NatureScot (SNH, 2016) was consulted. This document offers valuable guidance on identifying ecological connectivity between development sites and SPAs, particularly considering the distances species may

Site Name [Site Code] (Conservation Objectives)	Distance from Application Site (km)	Qualifying Interest/ Special Conservation Interest	Connectivity - Source-Pathway-Receptor Assessment
			travel beyond the SPA boundaries. It includes information on the dispersal and foraging ranges of bird species frequently encountered in project assessments. NatureScot highlights that "in most cases, the core range should be used when determining whether there is connectivity between the proposal and the qualifying interests." If SPAs are located farther from the site than the core foraging distances of the species listed as a SCI, it suggests there is no likely ecological connectivity, and the SPAs would fall outside the Zone of Influence. According to NatureScot (SNH, 2016), the core foraging distances for species are typically between 5-8 km. In the case of the Greenland White-fronted Goose, the presence of favoured wintering habitats within and around the Application Site suggests that the area may play a role in supporting the local population, even without a direct hydrological connection to the SPA. Disturbance levels from activities undertaken during the Peat Extraction Phase and to a lesser extent during the Current Phase, at the Application Site could impact the availability and suitability of these habitats for the species. Therefore, although there is no direct hydrological linkage to the Ballykenny-Fisherstown Bog SPA, the potential for indirect effects on the Greenland White-fronted Goose population should be carefully considered, particularly due to the proximity of these preferred habitats within the Application Site and its surrounding area. This SPA is considered to be within the likely Zone of Influence and following the precautionary principle the potential for significant effect on SCI exists. Further assessment was deemed to be required.

Table 7.21: Identification of proposed Natural Heritage Areas within the Likely Zone of Influence

Site Name [Code]	Distance from Application Site (km)	Brief Description	Connectivity - Source-Pathway-Receptor Assessment
Lough Bawn pNHA [Site code: 001819]	0.0	Lough Bawn is a relatively small site composed of raised bog, fen, wet and dry woodland and freshwater marsh habitats. It is the area of fen, however, that gives this site its primary scientific interest (NPWS, 2009).	The Application Site directly intersects with the Lough Bawn pNHA, placing it within potential Zone of influence from on-site activities during all Phase of the Project. This direct overlap suggests a high potential for both direct and indirect impacts on the habitats and species present within the Lough Bawn pNHA to have occurred during the Peat Extraction and the Current Phase. These impacts arise from alterations to land use, drainage patterns, or hydrology due to site activities. Additionally, the risk of surface water runoff, sedimentation, or pollutant discharge affecting water quality within the pNHA, potentially impacting aquatic habitats and species. The physical intersection also increased the likelihood of habitat disturbance, including noise, and human presence, which could have affected sensitive species residing within the Lough Bawn pNHA. This is especially relevant if species of conservation importance or protected habitats are present in the affected areas. Given the direct overlap and the work that has occurred during the Peat Extraction and Current Phases, a detailed environmental assessment is required to evaluate all potential impact pathways. A precautionary approach is recommended to identify and implement appropriate mitigation measures, ensuring the protection and conservation of the habitats and species within Lough Bawn pNHA.
Lough Bannow pNHA [Site code: 000449]	0.1	Lough Bannow was mapped as a drying out lake and/or infilling with vegetation, as surveyed in 1907. The site is traversed by deep drains, which, adding to the local nutrient	Lough Bannow pNHA is located in close proximity to the Application Site, placing it within an area potentially influenced by activities occurring on-site. Due to its location, there is a possibility of direct and indirect impacts on the ecological features and habitats within Lough Bannow. Impacts could have arisen from surface water runoff, sedimentation, or pollution originating from the

Site Name [Code]	Distance from Application Site (km)	Brief Description	Connectivity - Source-Pathway-Receptor Assessment
		enrichment/eutrophication and land reclamation, can potentially threat the ecological value of this site (NPWS, 2009).	Application Site, particularly due to changes in drainage patterns or water quality is affected. Additionally, any changes in hydrology or groundwater flow caused by site activities could have influence the ecological balance within the pNHA. Given its immediate vicinity, Lough Bannow pNHA could also be susceptible to other disturbances, such as noise or increased human activity associated with Peat Extraction and the Current Phase, which may have impacted the flora and fauna present. This is particularly relevant if sensitive species or habitats of conservation value are located within or adjacent to the pNHA. Therefore, the close proximity of Lough Bannow pNHA to the Application Site necessitates a detailed assessment of potential impact. This includes evaluating hydrological connections, pollution risks, and disturbance factors to ensure the protection of its ecological integrity. The assessment should apply a precautionary approach to identify any potential adverse effects that have occurred on the habitats and species within Lough Bannow pNHA
Lough Ree pNHA [Site code: 000440]	0.9	Same description as Lough Ree SAC in Table 7.20.	Lough Ree pNHA is situated within the Ree WFD lake water body, to which the Application Site is hydrologically connected. The hydrological link, both in the past and present, indicates that changes in water quality or quantity originating from the Application Site have had, and continue to have, the potential to influence the ecological conditions within Lough Ree. Pollutants such as sediment, nutrients, or hydrocarbons from surface runoff or drainage pathways have entered and may continue to enter the lake system, impacting water quality and the habitats it supports. Additionally, alterations in the hydrological regime, such as changes in water flow patterns or levels due to drainage or other site activities, have affected, and could still affect, the ecological balance of Lough Ree. This is particularly significant

Site Name [Code]	Distance from Application Site (km)	Brief Description	Connectivity - Source-Pathway-Receptor Assessment
			given the lake's role in supporting various habitats and species of conservation interest. Although Lough Ree pNHA is not immediately adjacent to the Application Site, the hydrological connectivity, both past and ongoing, necessitates a detailed assessment of potential indirect impacts. Evaluating this pathway is crucial for understanding how activities at the Application Site may have impacted, and may continue to impact, the water quality and ecological integrity of Lough Ree. Therefore, the identified hydrological connection requires thorough consideration in the environmental impact assessment to ensure the protection of the habitats and species within Lough Ree pNHA
Derry Lough pNHA [Site code: 001444]	2.6	Derry Lough is a relatively small area of wet grassland, fen, fen woodland and open water. It is bounded on the east by sloping farmland and on the west by a Bord na Móna bog. The water table is kept high by the Lough Ree levels. Although the transition from lake to woodland, which has been occurring for very many years, has been accelerated by a certain amount of drainage, Derry Lough still has many interesting features, which are a valuable complement to habitats on the shores of Lough Ree (NPWS, 2009d).	Derry Lough pNHA is situated approximately 2.6 km from the Application Site and is intersected by the Ledwithstown_010 WFD river water body. This river system establishes a hydrological connection between Derry Lough pNHA and the Application Site, creating a potential pathway for indirect environmental effects. This hydrological link suggests that activities at the Application Site, such as drainage, water discharge, or pollution runoff during the Peats Extraction Phase influenced water quality and hydrological conditions within the pNHA. Pollutants, including sediments or chemicals, could be transported downstream, potentially impacting aquatic habitats and species dependent on the water body within Derry Lough pNHA. Moreover, the distance of 2.6 km indicates that while direct effects are unlikely, indirect impacts through waterborne pathways were possible. This includes potential changes in water levels, nutrient loading, or contaminant dispersal, which could have altered the ecological balance within the pNHA. The risk of indirect impacts is similar for the current phase, though to a lesser degree, due to the lower level of activity and the nature of the activities being

Site Name [Code]	Distance from Application Site (km)	Brief Description	Connectivity - Source-Pathway-Receptor Assessment
			undertaken. While some potential risks persist, the reduced intensity of the current operations means that the likelihood and magnitude of impacts are expected to be less than during the previous phase. Therefore, a thorough hydrological and ecological assessment is required to examine all possible impact pathways from the Application Site to Derry Lough pNHA.

7.7.6 Key Ecological Receptors

7.7.6.1 Peat Extraction Phase (July 1988 – July 2019)

The following tables provide a comprehensive overview of the KERs relevant to the Peat Extraction Phase of the Project.

These tables are based various studies and surveys, including the desktop study, Bord na Móna ecological surveys, river habitat surveys, and multidisciplinary field surveys conducted between 2010 and 2023.

The information includes habitats, rivers, streams, watercourses, fauna, and each evaluated for their ecological significance during the Peat Extraction Phase. The table highlights KERs relevant to the Phase and allows for a focused assessment of the potential impacts associated with the activities and changes that occurred or are anticipated.

*Table 7.22: Key Ecological Receptors – Habitats (Identified During the Desktop Study). KERs highlighted in **bold**.*

Ecological Feature	Reason for inclusion as a KER	KER
Bare Peat (BP)	Bare Peat (BP) – Local Importance (Lower Value) Represent lands where peat extraction has left the soil exposed, often resulting in barren, nutrient-poor landscapes. Over extended time, these areas can evolve into early-stage habitats, with the potential for wetland and pioneer vegetation to develop	No
Cutover Bog (PB4)	**PB4: Cutover Bog –Local Importance (Higher Value)** Represents where cutover areas have developed following decades of peat extraction, resulting in exposed gravel and clay. Despite being heavily degraded, this habitat covers a large area and provides essential shelter, breeding, and foraging opportunities for several protected species, such as the Eurasian Woodcock. Cutover bogs host a variety of wetland-adapted species and offer potential for to improve biodiversity.	**Yes**
Raised Bog (PB1)	**PB1: Raised Bog – International Importance** Found in the undisturbed parts of the bogs, are more intact, supporting rich, Sphagnum-dominated vegetation. This habitat is characterised by high plant diversity, contributing significantly to biodiversity. It represents one of the more natural habitats in the area and is important in the context of ecological rehabilitation efforts due to its condition and richness in plant species.	**Yes**

*Table 7.23: Key Ecological Receptors Habitats (based on Bord na Mona Ecological Surveys at the Application Site in 2010-2012). KERs highlighted in **bold**.*

Ecological Feature	Fossitt Code	Description	Ecological Evaluation	KER
Raised Bog Remnant	**PB1**	**Raised Bog**	**International Importance**	**Yes**
Possible Calcareous Springs	**PF1**	**Rich Fen and Flush**	**International Importance**	**Yes**
Poor Fen	**PF2**	**Poor Fen and Flush**	**Local Importance (Higher Value)**	**Yes**
Willow-dominated Scrub (in mosaic with flooded areas)	**WS1/WN6 mosaic**	**Scrub / Wet Willow-Alder-Ash Woodland**	**Local Importance (Higher Value)**	**Yes**
Permanent Open Water	**FL2**	**Acid Oligotrophic Lakes**	**Local Importance (Higher Value)**	**Yes**
Silt Ponds (Artificial Ponds)	**FL8**	**Artificial Ponds**	**Local Importance (Higher Value)**	**Yes**
Birch-dominated Scrub	**WS1**	**Scrub**	**Local Importance (Higher Value)**	**Yes**
Wet Grassland	**GS4**	**Wet Grassland**	**Local Importance (Higher Value)**	**Yes**
Riparian Areas	**FW2**	**Depositing Rivers**	**Local Importance (Higher Value)**	**Yes**
Dry Calcareous Grassland	**GS1**	**Dry Calcareous and Neutral Grassland**	**Local Importance (Higher Value)**	**Yes**
Disturbed Ground (Colt's Foot-dominated)	**ED3**	**Recolonising Bare Ground**	**Local Importance (Higher Value)**	**Yes**
Exposed Gravel	**ED1**	**Exposed Sand, Gravel, or Till**	**Local Importance (Higher Value)**	**Yes**
Temporary Open Water	**FL2 / FL8**	**Acid Oligotrophic Lakes / Artificial Ponds**	**Local Importance (Higher Value)**	**Yes**
Transition Mire and Quaking Bog	**PF3**	**Transition Mire and Quaking Bog**	**Local Importance (Higher Value)**	**Yes**
Bog Woodland	**WN7**	**Bog Woodland**	**Local Importance (Higher Value)**	**Yes**
Oak-Ash-Hazel Woodland	**WN2**	**Oak-Ash-Hazel Woodland**	**Local Importance (Higher Value)**	**Yes**

Ecological Feature	Fossitt Code	Description	Ecological Evaluation	KER
Bare Peat	ED2	Spoil and Bare Ground	Local Importance (Lower Value)	No
Pioneer Dry Heath	HH1	Dry Heath	Local Importance (Lower Value)	No
Access Routes	BL3	Buildings and Artificial Surfaces	Local Importance (Lower Value)	No
Conifer Plantation	WD4	Conifer Plantation	Local Importance (Lower Value)	No
Dense Bracken (Pteridium spp.)	HD1	Dense Bracken	Local Importance (Lower Value)	No

7.7.6.2 Designated Sites relevant to the Project Phases

As outlined in Section 7.7.5 The Lough Ree SPA and Ballykenny-Fisherstown Bog SPA were designated during the Current Phase (2019–present), the sites are assessed for effects during the 1) Peat Extraction Phase (1988–2019) and 2) the Current Phase (2019–present), as well as 3) the Remedial Phase (Future) of the Project. These sites are assigned **International Importance** and included as a KER as a potential pathway for indirect effects on these sites via water pollution and disturbance of relevant QI/SCI species was identified

As also noted in Section 7.7.5 pNHA were listed on a non-statutory basis in 1995. These sites were identified as being of national importance for biodiversity and conservation. While the above sites have not been formally designated and do not have statutory protection under the Wildlife (Amendment) Act 2000, they still receive consideration in planning decisions and environmental impact assessments. Taking a precautionary approach, the pNHAs downstream of the Application Site (as identified in Table 7.21 above) are deemed to occur within the potential Zone of Influence and are included in this Chapter as KERs (**National Importance**).

7.7.6.3 Current Phase (July 2019 – Present Day)

The following tables provide a comprehensive overview of the KERs relevant to the Current Phase of the project.

Similar to the table presented above for the Peat Extraction Phase, the list of KERs are based studies including the desktop study, Bord na Móna ecological surveys, river habitat surveys, and multidisciplinary field surveys from 2010 to 2023.

The ecological receptors, including habitats, rivers, streams, watercourses, and fauna, are assessed for their relevance and ecological importance during the Current Phase, allowing for a focused evaluation of potential impacts as activities and conditions evolve.

*Table 7.24: Key Ecological Receptors - Rivers, Streams and Watercourses (as Identified During the Desktop Study and River Habitat Surveys in June 2022). KERs highlight in **bold**.*

Ecological Feature	Reason for inclusion as a KER	KER

River, Streams, Watercourses	The assessment considers SWBs extending through and adjacent to the Application Site to the first depositional water body, where contaminants from the site are likely to settle. The connected SWBs are: • Shannon (Upper) and its tributaries • Ballynakill River • Lough Bannow Stream and its tributaries • Fallan River • Ledwithstown (Bilberry) River • Several of these SWB are hydrologically linked to the European sites and pNHAs listed in Section 7.7.5. Given this linkage, the SWB are assigned **International Importance.**	**Yes**
	FW2: Depositing/lowland rivers - Local Importance (Higher Value) • 931m - within Application Site Lowland rivers provide important ecological connectivity and contribute to hydrological processes. These rivers are integral to the local ecosystem, supporting aquatic species and forming part of the larger network of habitats that sustain biodiversity. They also establish connections with internationally important sites, adding to their ecological value	**Yes**
	FW4: Drainage ditches - Local Importance (Higher Value) • 1,233.83 km - within Application Site Despite being an artificial habitat that largely contains water of seemingly poor quality, these area serve as an important corridor that enhances habitat connectivity and supports local biodiversity.	**Yes**
	FL8: Other Artificial Lakes and Ponds - Local Importance (Higher Value) • 78.33ha - within Application Site • 0.02ha Subsite (Derryaroge Mineral Island) Despite having poor water quality, these artificial lakes and ponds frequently flood, creating valuable foraging areas, particularly for waterfowl.	**Yes**

*Table 7.25: Key Ecological Receptors – Habitats (as Identified During Multidisciplinary Surveys in August 2022 and July 2023, and Habitat Survey at Derryaroge Mineral Island (subsite) in May 2023). KERs highlighted in **bold**.*

Ecological Feature	Reason for inclusion as a KER	KER
Wetlands & Bogs, Heath Woodlands & Forests	**PB4: Cutover bog – County Importance** • 1,128.16ha within Application Site • 0.13ha Subsite (Derryaroge Mineral Island) Although this habitat is heavily degraded, it still covers a very large area and provides valuable shelter, breeding, and foraging resources for several protected species, such as the Eurasian Woodcock. Cutover bogs support a variety of wetland-adapted species and have the potential for to enhance biodiversity.	**Yes**

Ecological Feature	Reason for inclusion as a KER	KER
	PB1: Raised bog – International Importance • 52.39ha - within Application Site This habitat is characterised by high plant diversity, contributing significantly to local biodiversity. It represents one of the more natural habitats in the area and is important in the context of ecological rehabilitation efforts due to its condition and richness in plant species.	**Yes**
	Bare Peat (BP) – Local Importance (Lower Value) Nutrient-poor landscapes. Over extended time, these areas can evolve into early-stage habitats, with the potential for wetland and pioneer vegetation to develop	No
	PF3: Transition mire and quaking bog - National Importance • 7.87ha - within Application Site This habitat type is recognised as nationally important due to its rarity and unique biodiversity. Transition mires and quaking bogs provide essential wetland habitats with fluctuating water levels and specialised species that are vital for biodiversity. They also play a role in water regulation and carbon sequestration, making them crucial for environmental health.	**Yes**
	PF2: Poor fen and flush - Local Importance (Higher Value) • 4.90ha - within Application Site Poor fen and flush habitats are nutrient-poor and host a variety of specialised plant species adapted to these conditions. Despite their more limited extent, these habitats provide essential resources for wildlife and contribute to the overall biodiversity of the area	**Yes**
	PF1: Rich fen and flush - International Impartance • 0.16ha - within Application Site Rich fens and flushes are nutrient-rich, groundwater-fed wetlands that support a diverse range of plant species, including calcium-loving (calcicole) plants, sedges, mosses, and orchids. These habitats typically occur where base-rich groundwater emerges, creating conditions that favour species not found in more acidic wetlands. Rich fens are distinguished from poor fens by their higher mineral content and greater plant diversity. In a European conservation context, some rich fens, particularly those associated with Petrifying springs with tufa formation (Habitat Code: 7220) are designated as priority habitats under the EU Habitats Directive, highlighting their ecological importance and vulnerability.	**Yes**

Ecological Feature	Reason for inclusion as a KER	KER
	FS1: Reed and large sedge swamps – Local Importance (Higher Value) • 33.75ha - within Application Site Reed and large sedge swamps are significant for their ability to support breeding, shelter, and foraging habitats for waterfowl and other species. Their presence increases biodiversity and provides important ecological functions. Habitats is of particularly important to waterbird species.	**Yes**
	FP1: Calcareous springs –International Importance • 0.16ha - within Application Site/ Subsite Though limited in extent, are valuable ecosystems that support specialised plant and animal species due to their alkaline, mineral-rich waters. These springs play a crucial role in maintaining ecosystem functions and supporting species adapted to their unique conditions. As a rare habitat, some calcareous springs are considered priority conservation areas. In Europe, they are protected under the EU Habitats Directive (Habitat code: 7220) as Petrifying springs with tufa formation, highlighting their ecological importance.	**Yes**
	HD1 Dense Bracken - Local Importance (Lower Value) • 3.54ha - within Application Site • 0.17ha - Subsite(Derryaroge Mineral Island) This habitat, dominated by fast-growing bracken ferns, offers limited biodiversity but provides shelter for some wildlife, such as small mammals and birds. However, its dense growth suppresses other plant species, reducing overall plant diversity.	No
	HH1 Dry Siliceous Heath - Local Importance (Lower Value): • 1.30ha - within Application Site This habitat has limited ecological value due to its small size and low species diversity. Its restricted extent further reduces its overall biodiversity contribution.	No
	WN7: Bog woodland –Local Importance (Higher Value) • 423.73ha - within Application Site Bog woodlands are highly valuable due to their species diversity, particularly in areas where the woodland has developed in nutrient-poor, wet conditions like bogs. This habitat type provides essential shelter, foraging, and breeding resources for a variety of species. Although not qualifying for a higher valuation, this habitat displays high species diversity	**Yes**

Ecological Feature	Reason for inclusion as a KER	KER
	WS1: Scrub –Local Importance (Higher Value) • 34.99ha - within Application Site • 3.20ha - Subsite(Derryaroge Mineral Island) Scrub habitats are valuable because they provide transitional or marginal areas that offer shelter and foraging resources to many protected species. Although scrublands can be seen as early-succession habitats, they provide important ecological niches, particularly for birds and small mammals	**Yes**
	WS2: Immature woodland - Local Importance (Higher Value) • 20.26ha within Application Site • 0.01ha - Subsite(Derryaroge Mineral Island) Immature woodlands, though still developing, are vital for providing ecological functions such as shelter, food, and connectivity between other habitats.	**Yes**
	WD1: (Mixed) broadleaved woodland - Local Importance (Higher Value) • 2.01ha - within Application Site Mixed broadleaved woodlands, though small in extent in the study area, still provide critical resources for a variety of species. This type of woodland is ecologically valuable due to its diversity and ability to support both flora and fauna.	**Yes**
	WN6: Wet willow-alder-ash woodland - Local Importance (Higher Value) • 1.15ha - within Application Site Wet willow-alder-ash woodlands, provide important ecological corridors and essential resources for species adapted to wetland environments.	**Yes**
	WD2: Mixed broadleaved/conifer woodland - Local Importance (Lower Value) • 0.60ha - within Application Site Mixed broadleaved/conifer woodlands have relatively low ecological value in this context due to their limited species diversity and the dominance of conifer species. The presence of conifers, often non-native species, can suppress biodiversity by limiting the growth of other plants and species that would otherwise thrive in native broadleaved woodlands.	No
	WD3 (Mixed) Conifer Woodland - Local Importance (Lower Value) • 0.99ha – within Application Site Originally a monoculture of Lodgepole Pine, this woodland has been gradually colonised by broadleaved species like Downy Birch, Common Alder, and Willow. Although it holds more ecological value than WD4, its small size limits its overall significance in the area.	No

Ecological Feature	Reason for inclusion as a KER	KER
	WD4: Conifer plantation –Local Importance (Lower Value) • 44.39ha - within Application Site Conifer plantations, especially those dominated by monoculture planting of non-native species (such as Lodgepole Pine), tend to have lower ecological value. They are typically characterised by a lack of structural complexity and reduced species diversity.	No
	WN2: Oak-Ash-Hazel woodland –Local Importance (Lower Value) • 0.58ha - within Application Site / Subsite Oak-Ash-Hazel woodlands, though valuable in some contexts, are of lower ecological importance in this case due its limited extent and the low species diversity present. As small, fragmented patches, it does not support the full range of species typical of the habitat.	No
	WL1 Hedgerows - Local Importance (Higher Value) • 521m – within Application Site This habitat, though only locally managed, is in generally good condition and serves as an important ecological corridor for protected species. It is also noted for hosting an Invasive Alien Plant Species (IAPS).	**Yes**
	WL2 Treelines - Local Importance (Higher Value) • 1,596m - within Application Site Well-structured, these treelines provide shelter, breeding, and foraging resources for protected species. They also create essential ecological corridors that link other habitats within the study area.	**Yes**
	WS3 Ornamental/non-native shrub – 0.07ha – Local Importance (Lower Value) • 0.07ha - within Application Site Non-native ornamental shrubs offer limited biodiversity benefits. While they may provide some food or shelter for wildlife, they typically have lower ecological value and may become invasive, outcompeting native species.	No
Grasslands	**GS1: Dry calcareous and neutral grassland –International Importance** • 0.13ha - within Application Site/ Subsite Although the extent of this habitat (0.13ha) is small, its quality and the rarity of such ecosystems in the broader landscape contribute to its international significance, particularly in the context of habitat types listed under the EU Habitats Directive.	**Yes**

Ecological Feature	Reason for inclusion as a KER	KER
	GS4: Wet grassland - Local Importance (Higher Value) • 8.70ha - within Application Site • 1.51ha - Subsite (Derryaroge Mineral Island) Wet grasslands are relatively diverse habitats that support various protected species, including birds. They also contain plant species like Common Cottongrass and Sharp-flowered Rush, which contribute to the ecological rehabilitation of the area.	**Yes**
	GS3: Dry humid acid grassland – Local Importance (Higher Value) • 3.18ha - within Application Site Dry humid acid grasslands support a high diversity of plant species and provide critical foraging resources, and is important for species such as the Marsh Fritillary butterfly. These habitats play a role in maintaining local biodiversity by supporting insect populations, birds, and small mammals.	**Yes**
	GS2: Dry meadows and grassy verges Local Importance (Higher Value) • 1.65ha - within Application Site Dry meadows and grassy verges offer important resources for pollinators and protected species such as the Marsh Fritillary butterfly. Despite their restricted extent, they provide vital habitats that contribute to species diversity in the local area including Marsh Fritillary.	**Yes**
	Amenity Grassland (Improved) - Local Importance (Lower Value) • 0.30ha - within Application Site Amenity grassland, primarily managed for aesthetic or recreational purposes, has low biodiversity value due to regular mowing, fertilisation, and reseeding. These practices reduce plant diversity and limit its ability to support wildlife. While it may offer some benefits, such as food for certain birds or recreational space, its overall contribution to biodiversity is minimal	No

Table 7.26: Key Ecological Receptors identified during the assessment – Other

Ecological Feature	Reason for inclusion as a KER	KER
Other	BL3 Buildings and Artificial Surfaces - Negligible Importance • 20.10ha - within Application Site • 4.48 - Subsite(Derryaroge Mineral Island) This artificial habitat offers minimal ecological value due to its current conditions, providing limited support for wildlife.	No
	ED2 Spoil and Bare Ground - Local Importance (Lower Value) • 12.28ha - within Application Site	No

Ecological Feature	Reason for inclusion as a KER	KER
	This habitat has low ecological value, with little vegetation cover and limited foraging or shelter opportunities for protected species.	
	ED1 Exposed Sand, Gravel, or Till – Local Importance (Lower Value) • 2.51ha - within Application Site This habitat's ecological value is low, with limited vegetation and few opportunities for protected species. However, it may support specialised plant and animal species adapted to harsh conditions.	No
	ED3 Recolonising Bare Ground - Local Importance (Lower Value) • 2.01ha - within Application Site With scarce vegetation and few foraging or shelter opportunities for protected species, this habitat holds limited ecological value.	No
	BL2 Earth Banks – Local Importance (Lower Value) • 0.60ha - within Application Site This small area supports some plant species and provides habitat for small mammals, insects, and birds, but its limited extent reduces its overall ecological value.	No

Table 7.27: Key Ecological Receptors identified during the desk study and multidisciplinary survey August 2022 and July 2023 - assessment – Fauna

Ecological Feature Species	Reason for inclusion as a KER	KER
Otter	Multidisciplinary walkover surveys confirmed the presence of Otter. While no Otter holts or couches were recorded, Otter tracks were observed near the northern boundary of Lough Bannow Bog. Considering its international designation, and the presence of a SAC designated for Otter (i.e. Lough Ree SAC) in relative proximity, Otter is considered to be a KER of **International Importance**.	**Yes**
Badger	The presence of the species were confirmed during the multidisciplinary walkover survey by the identification tracks, latrines and snuffle holes throughout the proposed wind farm site. No Badger individuals were observed. Two possibly unused Badger setts (i.e. 'D'-shaped burrows) were identified at the southern boundary of the Derryadd Bog. However, given the mentioned protection afforded by the Wildlife Act 1976 (as amended), Badger is considered a KER of **Local Importance (Higher Value)**.	**Yes**

Ecological Feature Species	Reason for inclusion as a KER	KER
Marsh fritillary	Records from 2016 reported Marsh Fritillary at Derryaroge Bog. Desk study and ecological walkover surveys carried out within the proposed wind farm sited identified areas of potentially suitable habitat for Marsh Fritillary at Lough Bannow Bog and Derryaroge Bog. Suitable habitat was not reported at Derryadd Bog. While there was availability of suitable habitat, survey effort revealed a single record at Lough Bannow Bog. Despite extensive surveys throughout the remainder of the site, including additional surveys at Derryaroge Bog, no other populations of Marsh Fritillary were recorded. The species is the listed in the Annex II of the Habitats Directive (Council Directive 92/43/EEC) and is therefore considered to be of **International Importance.**	**Yes**
Bird species (various species)	The Application Site in July 1988 would likely have supported populations of bird species similar to those present today and typical of raised bogs and cutover bog habitats. Based on the bird species recorded during survey breeding and wintering bird surveys undertaken in April 2021 and March 2022,, birds have been assigned **County Importance.** Peat extraction activities and all ancillary works are likely to have had a negative effect on bird species utilising the raised and cutover bog of the Application Site (including any areas of remnant raised bog) as a result of habitat loss, disturbance and direct mortality. Birds are included as a KER.	**Yes**
Reptiles and Amphibians	In July 1988, the Application Site likely supported reptile and amphibian populations, similar to those present today. While reptiles and amphibian were recorded during walkovers surveys, there was no evidence of populations being significant beyond a local level, and so have been assessed as being of Local Importance (lower value).	No
Irish Hare	During the multidisciplinary walkover survey, sightings of Irish Hare, as well as evidence of their presence (tracks and scat) were frequently recorded. Considering protection under the Wildlife Act 1976 (as amended) to the Irish Hare, it is considered a KER of **Local Importance (Higher Value)**	**Yes**
White-clawed Crayfish	The aquatic habitats at the sampling sites were generally unsuitable for supporting the protected, White-clawed Crayfish. There was also a lack of suitable burrowing habitat required for White-clawed Crayfish. As such there is no clear availability of suitable refuges for this species. The species is not identified here as a KER.	No

Ecological Feature Species	Reason for inclusion as a KER	KER
Birds (various species)	. Surveys undertaken between in April 2021 and March 2022, showed the Application Site support a diverse range of protected species some of which are also include in the BoCCI red and amber list. Species of note include: • Annex I (EU Birds Directive): Golden Plover, Whooper Swan, Hen Harrier, Kingfisher, Peregrine. • Red-listed: Golden Plover, Lapwing, Snipe, Redwing, Meadow Pipit, Woodcock. • Amber-listed: Whooper Swan, Hen Harrier, Ringed Plover, Skylark, Linnet, Starling. • Not listed: Buzzard, Kestrel, Peregrine, Merlin, Shoveler, Mute Swan, Dunnock, Stonechat, Blackbird, Robin, Meadow Pipit, Little Egret, Common Tern, Cormorant, Gadwall, Greylag Goose, Teal. Given the diversity and designation status of the species, the bird assemblage is identified as a KER of **International Importance**.	Yes

7.8 Assessment of Significant Effects on Biodiversity

7.8.1 'Do-Nothing' Effect

As outlined in the EPA EIA Guidelines (2022), the 'Do-Nothing Effects' refer to the projected environmental conditions if a project was not carried out.

In this context, the 'Do-Nothing' scenario assesses the potential environmental outcomes if the proposed Project were not implemented, and the site remained in its current state without further active intervention. This scenario helps illustrate the potential consequences for overall ecological health at the site if peat extraction activities and associated rehabilitation measures had not taken place. It compares the environmental trajectory of the site under these conditions to the proposed rehabilitation and management strategies.

The following sections outline the potential impacts of the 'Do-Nothing' scenario, considering two distinct situations:

- **'Do-Nothing' Scenario 1**: Assumes the Project stopped in 1988, leaving cutover bog and bare peat.
- **'Do-Nothing' Scenario 2:** Assumes that Substitute Consent is not granted. In this case, the ongoing obligations under the IPC Licence would still apply, requiring Bord na Móna to continue implementing the Cutaway Bog Decommissioning and Rehabilitation Plans. Bord na Móna's obligations under the IPC Licence remain in place regardless of the Substitute Consent process.

7.8.1.1 'Do-Nothing' Scenario 1

This 'Do-Nothing' scenario assumes the Project, as detailed in Section 4.2 of Chapter 4 – Project Description was halted in 1988. At that time, the majority of the site was already characterised by cutover bog and bare peat, with much of the bog altered by drainage and peat extraction activities.

Had the Project not proceeded from this point, the cutover bog and bare peat areas, having been drained and subject to peat extraction to the fullest extent by 1988, would have remained. It should be noted that the cutover bog and bare peat areas would have had with limited potential of natural rehabilitation without intervention. A limited area of the Application Site that had not yet been significantly affected by drainage and extraction would likely have remained as relatively intact raised bogs, supporting habitats like bog woodland, fen, and sphagnum mosses.

It should be noted that if the Project stopped as this point, over time, other land uses, such as agriculture or commercial forestry, might have been introduced, further altering the landscape. These alternative land uses are discussed in Chapter 3 – Alternatives.

Under this 'Do-Nothing' scenario, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface.

7.8.1.2 'Do-Nothing' Scenario 2

This scenario assumes that Substitute Consent is not granted. However, Bord na Móna's ongoing obligations under the IPC Licence would still apply, requiring the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans. These obligations remain in effect regardless of the outcome of the Substitute Consent process.

As peat extraction has already ceased, the site is currently characterised by areas of cutover bog and bare peat, with hydrological modifications from past drainage and extraction activities still influencing site conditions. Under this scenario, while no further development would proceed, Bord na Móna would remain responsible for decommissioning and rehabilitation measures in accordance with the IPC Licence.

These rehabilitation efforts would focus on rewetting and restoring peatland habitats, aiming to stabilise hydrology, promote the recolonisation of native vegetation, and enhance biodiversity. The decommissioning process would also involve ensuring that former operational infrastructure is appropriately managed or removed where necessary to support long-term site rehabilitation. Under Rehabilitation Plans, rehabilitation works would involve blocking drains, raising water levels, and encouraging natural recolonisation of the bog surface.

The areas of the Application Site that were less affected by past drainage and extraction activities would likely continue to support relatively intact raised bog habitats, including bog woodland, fen, and sphagnum moss communities. Rehabilitation measures will further improve these areas by enhancing water quality emission from the Application Site and expanding

suitable habitat conditions. However, under the IPC Licence, ongoing rehabilitation works would involve blocking drains, raising water levels, and encouraging natural recolonisation of the bog surface.

7.8.2 Likely Significant Effects

7.8.2.1 Overview of Effects

The primary consequences of the Project on biodiversity can be categorised as follows:

- **Habitats**: impacts on habitats including habitat loss, fragmentation, and degradation.
- **Species**: impact on biodiversity on species populations due to disturbance and habitat loss.
- **Water Quality and Aquatic Fauna and Habitats**: effects on water quality, particularly through sedimentation and altered hydrological conditions, impacting aquatic species and habitats by disrupting natural environment.

Habitats:

From the late 1940s to 1950s, drainage activities began at the bogs leading to significant alterations in bog structure and hydrology.

Industrial peat extraction had commenced at all three bogs by at least the 1965s and by 1988 was well-established across the majority of the Application Site. The drainage and active peat extraction activity underway would have caused significant habitat loss, fragmentation, and degradation. The habitat was originally raised bog, but by 1988, it had predominantly become cutover bog with significant areas of bare peat.

During the Peat Extraction Phase (July 1988 – July 2019), continued peat extraction would have hindered the natural rehabilitation of raised bog habitats, while the altered hydrological conditions limited the habitats' capacity to rehabilitate. The reduction in extraction activity from a peak level in 1988 (as described in Section 7.6.2) would have allowed some limited rehabilitation of habitats to occur in the years following 1988.

Between 2010 and 2012, habitat and species at the Application Site were surveyed, showing the predominant habitat at the bogs comprised bare peat and cutover bog, with faunal species such as small mammals, and certain bird species present. These findings, documented between 2010 and 2012, have likely remained largely unchanged into the Current Phase

During the Remedial Phase (Future), rehabilitation measures will be implemented with the aim of improving ecological condition at the site and supporting biodiversity recovery. However, as noted in the Cutaway Bog Decommissioning and Rehabilitation Plans, the rehabilitation of the site will take time (estimated to in the order of 50 years) with ongoing management efforts.

Species:

Before the commencement of the installation of drainage at the Application Site in the 1940s, the site likely supported a variety of species typical of raised bog ecosystems, including specialised flora and fauna adapted to wet, acidic, and nutrient-poor conditions, along with fauna like invertebrates, birds, and mammals, all relying on the unique conditions of the raised bog.

Peat extraction from the 1950s onward would have led to declines in species populations, particularly those dependent on specialised habitats like bogs and wetlands. As a result, species would have experienced losses, reductions in population sizes, and disruptions to their behaviour, including possible effects on breeding, feeding, and migration due to the modified conditions and the reduction of suitable habitat.

By 1988 during the Peat Extraction Phase (1988–2019), habitat loss and fragmentation would have significantly altered the natural structure of the raised bog habitats, replacing the original environment with large expanses of bare peat and cutover bog that supported relatively species impoverished flora and faunal community.

Peat extraction ceased at the Application Site in 2019. Since the cessation of peat extraction in the Current Phase (2019–present), would have allowed slow establishment of species populations, with transition habitats becoming more prevalent. However, the legacy effects of peat extraction activities would have continue to impede the site's capacity for rehabilitation

During the Remedial Phase, ongoing rehabilitation efforts aim to improve ecological condition at the site and supporting biodiversity recovery. However, as noted above the rehabilitation of the site will take time (estimated to in the order of 50 years) with ongoing management efforts.

Water Quality and Aquatic Fauna:

The commencement of the installation of drainage at the Application Site in the 1940s altered hydrological conditions, inducing changes to water flow patterns, which likely led to increased sediment runoff, degrading water quality and negatively impacting aquatic fauna.

It is possible that increased sediment runoff can reduced sunlight availability to plants and smothering habitats for aquatic species. Nutrient pollution and oxygen depletion may have further impacted the environments. Aquatic species that depend on stable wetland conditions would have faced significant changes, with poor habitat and water quality leading to population declines, reduced biodiversity,.

These potential negative impacts on hydrology and water quality would have continued to the start of peat extraction in the 1960s and beyond.

The altered hydrological conditions restricted access to critical breeding and feeding areas for aquatic species. In the Current Phase (2019–present).

During the Remedial Phase, efforts to improve water quality will be implemented. However, ongoing management to inmprove hydrological conditions and water quality.

7.8.2.2 Assessment Approach

Respectively, Sections 7.8.3, 7.8.3.4.3 and 7.8.4.4 assess the likely significant effects of the Peat Extraction Phase, Current Phase t and Remedial Phase on biodiversity. The assessment of likely significant effects examines the KERs identified in Section 7.7.6, specifically those classified as:

- International Importance
- National Importance
- Local Importance (Higher Value)

Likely significant effects are considered with respect to the following ecological aspects:

1. Habitats

2. Species
3. Water Quality and Aquatic Fauna

Residual effects (i.e. the remaining impacts after implementation of controls measures) are assessed in Section 0below. These effects are evaluated in relation to the likely significant effects, with consideration given to the ecological aspects 1, 2 and 3 outlined above.

7.8.3 Peat Extraction Phase (July 1988 – July 2019)

The following sections examine the potential likely significant effects of peat extraction and associated activities on KERs during the Peat Extraction Phase, which lasted from July 1988 until the cessation of extraction in July 2019.

By 1988, the Application Site had undergone extensive peat extraction and associated activities. All bog areas had been drained, and a network of railway infrastructure was established throughout the site. From 1988 to 2019, activities at the Application Site primarily involved peat extraction and drainage, and the establishment and removal of stockpiles. Peat was transported across the site, and there was ongoing maintenance of drainage systems, machinery, and pumping equipment.

7.8.3.1 Effects on Habitats

The following section provides an overview of the likely significant effects of peat extraction activities and all ancillary works during the Peat Extraction Phase (July 1988 to July 2019) on the remnant uncut raised bog and associated cutaway bog habitats at the Application Site.

7.8.3.1.1 Description of Effects

The main drainage works for peat extraction in part of Derryaroge Bog began in 1949 (there were some preliminary drainage works by hand carried out in 1946 – refer to Chapter 4 – Project Description Section 4.2.1), with drainage works for peat extraction at Derryadd, Lough Bannow and the remainder of Derryaroge Bog commencing in 1960.

During the Peat Extraction Phase (July 1988 – July 2019) the main activities at the Application Site have included peat extraction, drainage and vegetation clearance/stripping. These activities have been largely confined to the area already affected by the original drainage installed.

In 1988 habitats at the Application Site would have been predominantly bare peat, cutover bog and small sections of remnant raised bog. As well as these habitats, the bogs comprising the Application Site would have also likely included to varying extents the habitats reported at the Application Site between 2010–2012 during surveys undertaken by Bord na Móna ecologists. In general, outside of bare peat, cutover bog and remnant raised bog areas, the bogs shared a mosaic of habitats displaying a transition from active peat extraction to early-stage revegetation and pioneer habitats. By the time of survey in 2021 – 2022 (see Section 7.7.1.2above) the majority of the Application Site was under active extraction. At Derryaroge Bog, which had been under peat extraction since the 1960s, included areas of cutaway developing into diverse habitats including dry ridges with calcareous grassland, scrub, and small conifer plantations. Pioneer poor fen and bog woodland were also emerging. At the time of survey Lough Bannow Bog had been harvested for over 50 years. Some areas of the bog were

transitioning to early-stage revegetation and pioneer habitats, while exposed gravel ridges and successful Birch and Scots Pine growth were forming new habitats. Calcareous springs, bog woodland, and Oak-Ash-Hazel woodland were also developing. At the time of survey Derryadd Bog include areas of cutaway bog that were regenerating into calcareous grassland, scrub, and poor fens.

While the bogs showed natural vegetation succession across the cutover bog and bare peat habitats within the Application Site, there was also likely continued loss of small sections of remnant raised bog, and ongoing peat extraction and drainage activities at the bogs during this period.

As shown in Table 7.7 in Section 7.7.1 peat extraction was at its peak in 1988, covering 1,913.9ha. From this point onward, the area of extraction steadily decreased, ultimately ceasing by 2019. The transformation of the land use shows a shift from active extraction from the late 1980s's to areas out of production. By 2019, the 'Area Out of Production 'expanded to 1,921.5ha. This reduction in extraction activity allowed previously affected areas to start rehabilitate which seen the establishment of early-stage revegetation and pioneer habitat.

7.8.3.1.2 Assessment of Significance Prior to Control Measures

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The following assessment of significance of effect takes into account the KERs listed below. As outlined above, activities during the Peat Extraction Phase ongoing peat extraction hindered the natural regeneration of habitats, while altered hydrological conditions further limited their ability to regenerate. However, the decrease in extraction activities from the peak levels seen in 1988 (see Section 7.6.2) likely allowed for some limited recovery of habitats, however, more in line with natural vegetation succession, in the years leading up to the cessation of extraction in 2019. The habitat conditions and species recorded at the Application Site between 2010 and 2012 have likely remained relatively stable into the Current Phase, with slow regeneration and succession primarily due to factors such as hydrological conditions and vegetation types. The habitats were shown to be dominated by cutover bogs and bare peat, with smaller areas of more diverse habitats. Review of aerial photography of the Application Site and ecological survey undertaken at the bog between 2010 and 2012 has indicated shown some limited natural regeneration of raised bog habitats, which has been significantly influenced by historical peat extraction and drainage activities. The environmental conditions at the site and the peat extraction activities , continued to impede the rehabilitation of these habitats. While some species have gradually recolonised the area (e.g. early-stage revegetation and pioneer habitats), the overall potential for habitat rehabilitation remained constrained. These findings highlight the importance of targeted rehabilitation measures to support the recovery of these sensitive habitats. This has been assessed as **Long-term, Moderate, Negative Effects**.

No survey data for the Application Site are available for 1988. Based on aerial photography and reporting from Bord na Móna the dominant habitat types at the Application Site at that time were bare peat, cutover bog and areas of remnant raised bog.

- **Local Importance (Higher Value):**
  - PB4: Cutover Bog (area unknown)
  - PB1: Raised Bog (area unknown)

Based on habitats reported by Bord na Móna ecologists between 2010 – 2011 the following were identified as KERs:

- **International Importance**
  - PB1: Raised Bog
  - PF1: Rich Fen and Flush
- **Local Importance (Higher Value)**
  - PF2: Poor Fen and Flush
  - WS1/WN6: mosaic Scrub / Wet Willow-Alder-Ash Woodland
  - FL2: Acid Oligotrophic Lakes
  - FL8: Artificial Ponds
  - WS1: Scrub
  - GS4: Wet Grassland
  - FW2: Depositing Rivers
  - GS1: Dry Calcareous and Neutral Grassland
  - ED3: Recolonising Bare Ground
  - ED1: Exposed Sand, Gravel, or Till
  - FL2 / FL8: Acid Oligotrophic Lakes / Artificial Ponds
  - PF3: Transition Mire and Quaking Bog
  - WN7: Bog Woodland
  - WN2: Oak-Ash-Hazel Woodland

7.8.3.1.3 Control Measures

Between July 1988 and July 2019, and before June 2020 when the IPC Licence was issued, Bord na Móna implemented standard operation control measures (see Section 7.9.1). While these standard operation control measures were primarily focused on managing risk to water quality, they would have also indirectly benefited habitats.

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7.8.3.2 Effects on Water Quality and Aquatic Fauna and Habitats

The following sections assess the potential for likely significant effects on water quality and aquatic receptors including aquatic habitats (i.e. watercourses) and species identified as occurring within or likely to occur downstream of the Application Site.

7.8.3.2.1 Description of Effects

The effects on water quality are fully described in Chapter 9 – Hydrology, Hydrogeology & Water Quality of this rEIAR and are described within this Chapter in relation specifically to ecology.

The Application Site is situated between key surface water bodies within the surrounding catchments. To the east, the site is located near the Ballynakill River, which flows north and east of the Derryadd and Derryaroge bogs. To the west, the site is adjacent to the Lough Bannow Stream and its tributaries, which lie west of Lough Bannow. Additionally, other notable rivers nearby include the Shannon (Upper) to the north and northwest, the Fallan River 1 km to the east, and the Ledwithstown (Bilberry) River, which originates near Lough Bannow's southern boundary and flows southwest into Lough Ree. The existing drainage channels within the

Application Site store water and transmit it to main drains and ultimately to silt settlement ponds. Final settlement occurs in the ponds before discharging to the adjacent drains and streams.

It is also linked to three groundwater bodies:

- Funshinagh
- Inny
- Longford Ballinalee

Suspended Solids

From July 1988 until peat extraction ceased in July 2019, activities at varying intensities across the Application Site likely caused indirect water pollution impacts on aquatic habitats both within and downstream of the area. These impacts would have primarily resulted from reduced water quality in connected watercourses, which could have degraded habitats essential for aquatic fauna.

The deterioration in water quality was likely due to the release of pollutants, particularly suspended solids. This would have been most significant during the construction of drainage channels, the removal of surface vegetation, and the continued risk of peat sediment erosion through the bog's drainage network, leading to elevated concentrations of suspended solids in downstream watercourses.

Additionally, the exposure of peat to air during extraction activities would have accelerated the decomposition of organic matter, releasing dissolved nutrients, mainly ammonia, into nearby watercourses. This nutrient release could have further contributed to the decline in water quality both within and downstream of the Application Site.

As noted in Chapter 9 – Hydrology, Hydrogeology & Water Quality of this rEIAR silts ponds were fist installed in the early 1970s and were reviewed with addition ponds installed in 1978. As detailed in Chapter 4, further Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980's in response to the 1977 Water Pollution Act. All silt ponds were in place pre-1988. The use of silt ponds would have helped reduce the risk of significant deterioration in water quality due to the release of pollutants, particularly suspended solids.

No WFD data are available for the water bodies for 1988. As a result, the earliest available WFD status reports from 2007-2009 have been used to infer baseline conditions. During this monitoring period, the water quality assessments revealed varying conditions across the water bodies connected to the Application Site. For three river water bodies (Lough Bannow Stream_010, Ballynakill_010, and Ledwithstown_010) no data were available. However, the Shannon (Upper)_090 and Shannon (Upper)_100 were both classified with moderate water quality, indicating some environmental stress in these river systems. Ree Lake, a significant surface water body linked to the site, also showed moderate water quality during the same period. In contrast, the groundwater bodies associated with the Application Site (Funshinagh, Inny, and Longford Ballinalee) achieved good status, indicating that the groundwater systems remained relatively unaffected by surface activities.. Overall, the findings indicate some environmental stress in these river systems. While indirect effects cannot be definitively assigned to the works at the Application Site there is potential may have impact both surface and groundwater resources. This impact has been assessed as a **Long-term, Moderate, Negative Effect**.

Since 2000, the Application Site has been regulated by the EPA under IPC Licence Registration No. P0504-01 and has been subject to the conditions of that licence which include emission limit values for suspended solids and other nutrients. The IPC Licence goes some way to provide for enhanced management and mitigation strategies.

Accidental Leakages and Spillage of Hydrocarbons

During the Peat Extraction Phase there would also have been potential for pollution of surface water bodies and groundwater due to the accidental spillage of hydrocarbons during refuelling of machinery and plant. Discharges from wastewater systems (septic tanks) at office buildings, and at productions centres and workshops could potentially also have caused surface and groundwater contamination. There was potentially **Long-term, Indirect, Moderate, Negative Effects**.

7.8.3.2.2 Assessment of Significance Prior to Control Measures

Prior to the implementation of mitigation measures or regulation under IPC Licence No. P0504-01, peat extraction and associated activities likely resulted in prolonged, indirect negative effects on water quality, with potentially significant indirect impact on aquatic life. These effects may have contributed to the decrease in the quality of aquatic ecosystems, with the potential for long-term ecological consequences

Based on reporting by Bord na Móna ecologists between 2010 – 2011 the following were identified as KERs:

- **Loal Importance (Higher Value)**
    - PB1: Raised Bog
    - PF1: Rich Fen and Flush
    - FL2: Permanent Open - Water Acid Oligotrophic Lakes
    - FL8: Silt Ponds Artificial Ponds
    - FL2/ FL8: Temporary Open Water - Acid Oligotrophic Lakes

The WFD status reports indicate a decline in water quality in surface water bodies connected to the site. Although the most pronounced negative impacts occurred before 1988, these issues continued throughout the peat extraction period from 1988 to 2020. However, while these timeframes coincide, it is important to note that a clear cause-and-effect relationship is not definitively established. That being said, in the absence of regulatory oversight or mitigation measures during this period, the scale of peat extraction almost certainly contributed to further degradation of water quality, affecting both surface and groundwater systems. The extraction activities likely intensified the release of pollutants, including suspended solids and nutrients, into the connected watercourses. This would have played a significant role in the persistent water quality issues observed over time, underscoring the need for better management practices to protect water resources

The absence of effective controls during this time highlights the need for rigorous regulatory measures to prevent such degradation and ensure the long-term protection of water resources. The lack of proper environmental management and mitigation measures during these years meant that watercourses connected to the site would have been particularly vulnerable to pollutants such as suspended solids and nutrient runoff. The increased presence of such contaminants would have significantly disrupted aquatic habitats, potentially leading to long-term ecological consequences.

In summary, the period of peat extraction and associated activities from July 1988 to July 2019, carried out without adequate regulatory oversight or mitigation efforts, likely resulted in long-lasting and significant negative effects on water quality. This underscores the importance of regulatory controls and mitigation measures in protecting water resources and maintaining the health of aquatic ecosystems.

In the absence of mitigation measures or regulation under the IPC Licence No. P0504-01 (which was not in place until 2020), peat extraction and associated activities likely resulted in **Long-Term, Significant, Negative** effects on water quality. While the majority of these effects would have occurred prior to 1988, the scale of peat extraction from July 1988 onward, without any mitigation in place, would likely have continued to cause significant water quality degradation.

7.8.3.2.3 Control Measures

Between July 1988 and July 2019 Bord na Móna implemented standard operation control measures (see Section 7.9.1), including drainage maintenance, silt ponds, machinery management, spill response, and waste disposal, to minimise environmental risks and protect water quality during peat extraction.

7.8.3.3 Effects on Fauna

7.8.3.3.1 Description of Effect

Peat extraction and its associated activities likely led to some habitat disruption and loss for various faunal species, such as otters, badgers and bird species. The impacts on these populations and their habitats are examined below in greater detail.

Other protected faunal species from the 1988 baseline, aside from those already mentioned, are unlikely to have experienced substantial negative effects from the peat extraction process. The habitats present at the time, including bare peat, cutover bog, and remnants of raised bog, were generally unsuitable for many mammal, reptile, or amphibian species. These areas lacked the environmental conditions necessary to support species that require more complex or mature habitats for feeding, breeding, and shelter. For instance, raised bogs are nutrient-poor and lack the structural variety that sustains diverse plant and animal life, making them less hospitable for many mammal species. The absence of rich food sources, shelters, or proper breeding sites on raised bogs means these habitats are not conducive to supporting large populations of mammals, reptiles, or amphibians. Consequently, the Application Site was unlikely to have been home to significant numbers of these species beyond a local scale.

However, sections of the Application Site that naturally regenerated into bog woodland and scrub following the cessation of peat extraction may have offered suitable habitats for species like badgers. The development of these linear landscape features, such as the emerging woodland and scrub, is the result of natural regrowth in areas of cutover bog that had previously been disturbed. These habitats, which were previously absent from the raised bog, now provide valuable foraging and commuting grounds for bat species, contributing to the local biodiversity by offering essential resources for shelter and food.

The presence of the badger was confirmed during the multidisciplinary walkover surveys by the identification tracks, latrines and snuffle holes were observed throughout the proposed wind farm site. No Badger individuals were observed. Two possibly unused Badger setts (i.e. 'D'-

shaped burrows) were identified at the southern boundary of the Derryadd Bog. Considering its seemingly frequent occurrence and protection afforded by the Wildlife Act 1976 (as amended), Badger is considered a KER of **Local Importance (Higher Value)**.

Multidisciplinary walkover surveys confirmed the presence of Otter, where several tracks identified across. While no Otter holts or couches were recorded, Otter tracks were observed near the northern boundary of Lough Bannow Bog. Considering its international designation, and the presence of a SAC designated for Otter (i.e. Lough Ree SAC) in relative proximity, Otter is considered to be a KER of **International Importance**.

The primary impact of peat extraction and associated activities during the Peat Extraction Phase was the significant disruption of natural vegetation growth and habitat succession across the Application Site. Continuous peat extraction activities hindered the establishment and development of native plant communities, preventing the formation of stable ecosystems. However, as peat extraction ceased and the site underwent natural revegetation, a diverse mosaic of cutover habitats, including areas of scrub and heath, began to be established. This habitat regeneration provided suitable conditions for a range of bird species, such as meadow pipit, snipe, and skylark, which are known to thrive in open, early-succession landscapes. Birds are considered to be a KER of **International Importance**.

Bird species inhabiting the cutover bog habitats, including skylark and meadow pipit, likely experienced disturbance effects during the Peat Extraction Phase. These impacts would have primarily resulted from the operation of peat harvesting machinery, the construction and use of railway tracks, and the establishment of works areas. The presence of ongoing industrial activity may have led to temporary displacement of some individuals, although the extent of these effects would have been largely confined to species adapted to such open, disturbed environments. With the cessation of peat extraction, disturbance levels have significantly reduced, allowing for a more stable and less disrupted habitat for avian species to recolonise and thrive.

The Marsh Fritillary butterfly, a recorded species present at the Application Site, has also benefited from these evolving habitats. The butterfly's primary food source, Devil's-bit Scabious, is beginning to recolonise areas of the site, though the availability of this plant remains limited as the habitats are still in a transitional phase since peat extraction ceased in 2019. The butterfly's survival heavily depends on the presence of this plant for its larvae, and while food sources are sparse, the habitats at the site's edges and in the cutover bog areas where Devil's-bit Scabious grows now provide some suitable conditions for the species. The peat extraction activities themselves have indirectly created environments that benefit the Marsh Fritillary, meaning that the extraction process is unlikely to have caused significant harm to the species. Considering its international designation, and the presence of a March Fritillary, the species is considered to be a KER of **International Importance**.

In summary, peat extraction and associated activities likely caused some habitat disruption, loss, and disturbance impacts for various faunal species, including Otter, Badger, bird species, and Marsh Fritillary. However, the overall effect on these populations since 1988 baseline, particularly protected species, appears to have been relatively limited in scope. Detailed assessments of these potential impacts are provided below.

7.8.3.3.2 Assessment of Significance Prior to Control Measures

Assessment of Potential Effects on Otter

Peat extraction and the associated activities likely resulted in indirect impacts on otters present within or downstream of the Application Site. The main concern was habitat degradation driven by declining water quality, with contaminants posing a significant threat to otters that rely on clean, undisturbed aquatic environments for foraging, breeding, and shelter. The potential impacts on water quality, and how these may have affected aquatic habitats, are discussed above to provide more detailed information on this issue.

In addition to water quality degradation, there was also the potential for disturbance to otters inhabiting or transiting through the Application Site during the peat extraction activities. Otters are generally crepuscular, meaning they are most active during dawn and dusk. Since the majority of the peat extraction and associated operations took place during daytime hours, the potential for significant disruption to otter activity was minimised. Their crepuscular habits meant they would likely avoid human activities during the daytime, reducing the likelihood of direct disturbance. However, the presence of machinery and other operations on-site still posed some risk, especially for otters moving through the area.

The likelihood of significant disturbance was further reduced over time since 1988 extraction activities, which were typically confined to specific operational areas. This focused approach would have reduced the extent of disturbance to otters within the site. Additionally, any temporary displacement caused by human activity would have been less severe compared to more widespread disruption during the earlier years of extraction.

The overall potential effect is deemed to be **Long-term, Moderate, Negative Effects** in the absence of control measures.

Assessment of Potential Effects on Badger

The peat extraction process likely had minimal direct effects on protected species such as badgers, as the habitats present at the baseline of 1988 and during the Peat Extraction Phase, such as bare peat, cutover bog, and remnants of raised bog, were not ideal for supporting many mammal species. These environments lack the structural diversity, food sources, and shelter necessary for larger populations of mammals like badgers, which require more complex habitats for foraging, breeding, and sheltering. Raised bogs, for instance, are nutrient-poor and often devoid of the vegetation and structural complexity that would support a variety of species. As a result, the Application Site did not likely provide suitable habitats for badgers to establish permanent populations.

However, with the cessation of peat extraction, areas of the site have naturally regenerated into new habitats, such as bog woodland and scrub. These newly formed habitats have become more suitable for a range of species, including badgers. The regeneration of these linear landscape features, which resulted from the natural regrowth of vegetation on disturbed cutover bog areas, now offers more diverse and structurally complex habitats. These emerging habitats provide valuable resources for a variety of species, including food and shelter, which could support species like badgers that require more developed environments for foraging and denning.

Specifically, the bog woodland and scrub areas now forming in these sections of the site offer important foraging grounds for badgers, as well as potential areas for denning. As these habitats continue to develop and mature, they could increasingly provide the necessary conditions for badgers to establish territories, especially since badgers are known to thrive in areas with good food availability, such as earthworms, insects, and other small invertebrates, which are commonly found in woodland and scrub habitats.

Overall, the potential effect is deemed to be **Long-term, Moderate Negative Effects**.

Assessment of Potential Effects on Irish Hare

During the multidisciplinary walkover surveys, sightings of Irish Hare were recorded, along with clear evidence of their presence, including tracks and scat. Given the legal protection afforded to the Irish Hare under the Wildlife Act 1976 (as amended), its presence on-site holds ecological significance. While the species remains relatively widespread, population declines in certain areas due to habitat loss, agricultural intensification, and predation highlight the importance of suitable refuges. The site's regenerating peatland habitats provide essential cover and foraging resources, potentially supporting a stable or breeding population.

Furthermore, in a landscape where surrounding areas may be dominated by intensive agriculture, commercial forestry, or ongoing peat extraction, this site could represent a crucial refuge. Its role in maintaining a viable hare population, particularly in a fragmented ecosystem, elevates its ecological value.

Overall, the potential effect is deemed to be **Long-term, Moderate, Negative Effects.**

Assessment of Potential Effects on Birds

During the Peat Extraction Phase, habitat loss occurred, which likely affected bird populations that used the Application Site. Since the cessation of peat extraction, areas of cutover bog have shown some signs of regeneration, allowing for limited recovery of bird biodiversity. The natural re-establishment of scrubland, heath, and early-stage vegetation has created new opportunities for nesting and foraging, although these habitats differ from the original raised bog environments

In addition to habitat loss, the peat extraction process introduced some disturbances that likely affected bird populations, that despite the reduced value at that time, may have been present within the Application Site. The operation of heavy machinery, the construction of railway tracks for transporting peat, and the establishment of work areas led to ongoing noise and human activity. These disruptions would have displaced more sensitive bird species, particularly those reliant on quiet, undisturbed environments. However, some species, such as Skylark and Meadow Pipit, are more adaptable to open landscapes and may have been more resilient. Nevertheless, frequent disturbances could have negatively affected their ability to breed and forage successfully, particularly for ground-nesting birds vulnerable to disruption during the breeding season.

Despite these impacts, it is unlikely that the Peat Extraction Phase caused any significant long-term effects on bird populations due to habitat loss, disturbance, or direct mortality. While some birds may have been affected on a local scale, many species are capable of relocating to suitable habitats nearby, reducing the severity of the impact.

Peat extraction and associated activities may also have had an indirect effect on wetland bird species, particularly those that rely on aquatic habitats both within and downstream of the site. The degradation of water quality, caused by increased sedimentation and changes in hydrology, could have negatively affected wetland habitats used for feeding and breeding. These changes may have reduced the availability of food sources such as aquatic invertebrates and plant material, impacting the foraging success of waders and waterfowl.

The potential effects on water quality, and consequently on wetland bird populations, are further outlined in the section 'Potential for impact on Watercourses and Sensitive Aquatic Species.' These impacts highlight the wider ecological consequences of peat extraction beyond direct habitat loss and disturbance, reinforcing the need for effective rehabilitation measures to improve habitat quality and support bird biodiversity in the Long-term.

By 1988 historic peat extraction and alteration of site hydrography would have already resulted in significant loss of habitat, and only certain areas within the bogs persisted in a relatively unaltered state while some the regeneration of cutover bog areas has allowed for a partial recovery of bird biodiversity. Ecology surveys undertaken at the Application Site by Bord na Móna between 2010 and 2012 recorded a diverse assemblage consisting of several species typical of bog habitats, including birds typically attracted to the wet, open areas, scrubby margins, and reedbeds found in bogs, where they find food and shelter. Some species, like the Golden Plover and Whooper Swan, were found to use the bogs, while others like the Lapwing and Snipe nest in the more stable, wet conditions that bogs provide. This diversity underlines the ecological significance of bogs as habitats for a variety of bird species. In particular, the recolonisation of scrubland, heath, and early successional vegetation has created new foraging and nesting opportunities, albeit different from those originally found in intact raised bog ecosystems.

The overall effect is deemed to be **Long-term, Moderate, Negative Effects**.

Assessment of Potential Effects on Marsh Fritillary

Records from 2016 reported Marsh Fritillary at Derryaroge Bog. Desk study and ecological walkover surveys carried out within the proposed wind farm sited identified areas of potentially suitable habitat for Marsh Fritillary at Lough Bannow Bog and Derryaroge Bog. Suitable habitat was not reported at Derryadd Bog. While there was availability of suitable habitat, survey effort revealed a single record at Lough Bannow Bog. Despite extensive surveys throughout the remainder of the site, including additional surveys at Derryaroge Bog, no other populations of Marsh Fritillary were recorded. It should be noted that peat extraction activities themselves have indirectly created environments that benefit the Marsh Fritillary, meaning that the extraction process is unlikely to have caused significant negative effect harm to the species.

The overall effect is deemed to be **Long-term Moderate Positive Effect**.

7.8.3.3.3 Control Measures

Between July 1988 and July 2019, no measures were implemented to prevent or mitigate impacts on Badgers, Irish Hares, Birds, or Marsh Fritillaries, including their habitats. While Otter terrestrial habitats also lacked specific protections, standard operation control measures set in place by Bord na Bord na Móna (see Section 7.9.1) such as silt ponds, machinery spill response, and waste disposal helped reduce impacts on aquatic habitats and the species they rely on.

7.8.3.4 Effects on European sites and pNHAs Prior to Control Measures

7.8.3.4.1 Effects on European sites

As detailed in Table 7.28 below the Lough Ree SPA, and Ballykenny-Fisherstown Bog SPA were designated in 1995 and 1996 respectively and are therefore applicable to the Peat Extraction Phase based on their respective designation dates.

The European sites are recognised as Internationally Important KERs.

Table 7.28: Applicable Phases for Designated Sites

Site	Year of Designation	Peat Extraction Phase (1988 - 2019)
Lough Ree SPA	1995	Applicable (as designated in 1995)
Ballykenny-Fisherstown Bog SPA	1996	Applicable (as designated in 1996)
Lough Ree SAC	2002	Applicable (as designated in 2002)

As a result, during the later years of the Current Phase from 1995 onwards, there is potential for indirect effects on the integrity of the European Sites as a result of disturbance and deterioration of water quality in the watercourses within and downstream of the Application Site. These rivers are hydrologically linked to the Lough Ree SAC and Lough Ree SPA which are ecologically linked to the Application Site.

Given the hydrological connection between the Application Site and the Lough Ree exists through drainage ditches and watercourses that eventually discharge into the Ree WFD lake water body.

Changes in water quality, habitat structure, or hydrology at the Application Site could have consequences for SCIs for which SPA is designated, including SCIs species such as the whooper swan, wigeon, teal, and other waterbirds. These changes could alter habitat suitability or affect the aquatic ecosystem that sustain these species. Therefore, both hydrological and habitat connectivity must be considered when assessing impacts on the SPA. Following the precautionary principle, the potential for indirect effects on this SPS has therefore been considered in this Chapter.

The Ballykenny-Fisherstown Bog SPA is located 4.4 km away and is upstream, it is not directly affected by hydrological changes at the Application Site. However, the Application Site and surrounding areas may provide wintering habitat for the Greenland White-fronted Goose, which prefers boglands as wintering grounds. Even without a direct hydrological link disturbance could impact the suitability of these areas for the species. Following the precautionary principle, the potential for indirect effects on this species.

The indirect potential impacts are assessed to have had **Long-term, Moderate, Negative Effect**.

7.8.3.4.2 Effects on pNHAs

The following pNHAs were identified as being within the likely Zone of Influence of the Project:

- Lough Bawn pNHA
- Lough Bannow pNHA
- Lough Ree pNHA
- Derry Lough pNHA

The Application Site directly intersects the Lough Bawn pNHA the Application Site. This direct intersection presents a high potential for both direct and indirect environmental impacts, particularly due to activities associated with peat extraction, land use changes, drainage modifications, hydrological alterations, and pollutant discharge. These activities can contribute to surface runoff, sedimentation, and contamination of nearby water bodies, leading to degraded water quality and habitat disruption within these pNHAs. Species of high conservation importance,

Lough Bannow pNHA is situated just 0.1 km from the Application Site. Given its proximity, there is a risk of similar impacts, including altered water quality and habitat disturbance, potentially affecting sensitive species and habitats. Lough Ree pNHA, located 0.9 km away, is hydrologically connected to the site, and changes in water quality or hydrology could impact the ecological conditions and species within this area, such as aquatic plants and waterbirds.

Derry Lough pNHA, located 2.6 km from the Application Site, is connected via the Ledwithstown_010 WFD river system, meaning indirect effects through waterborne pollution or hydrological changes are possible. These could potentially impact aquatic habitats and species dependent on the water body within Derry Lough pNHA.

Based on the above the effect on fauna is assessed as a **Long-term Moderate Negative Effect.**

7.8.3.4.3 Control Measures

Between July 1988 and July 2019, no measures were implemented to prevent or mitigate impacts on European sites and/ or pNHA. It should be noted, however, that standard operation control measures set in place by Bord na Móna helped reduce the risk of impacts on water hydrologically linked to European sites and pNHAs.

7.8.4 Current Phase (July 2019 – Present Day)

The Current Phase of the Project at the Application Site spans the period from the cessation of peat extraction in July 2019 to the present day. Once peat extraction ceased in 2019, activities focused onthe decommissioning and rehabilitation of the site in line with Condition 10 of the IPC Licence.

In January 2021, Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction at the Application Site had ceased prior to this in July 2019. Decommissioning of the peat extraction activities is currently underway across the Application Site in accordance with Condition No. 10 of the IPC Licence.

Ongoing decommissioning efforts at the Application Site currently focus on the removal of peat stockpiles, with decommissioning of other infrastructure, as outlined in Table 7.29, to follow at a later stage. As mentioned in Section 4.8.1 of Chapter 4 - Project Description, approximately 37km of permanent rail track was initially installed within the Application Site boundary, with 36km still present. To date, 1km of rail has been decommissioned and removed from the

southern section of Lough Bannow Bog. The remaining 36km of rail track will be decommissioned as part of the broader decommissioning plan for the license.

Table 7.29: Future Decommissioning for Application Site

eItem	Description	Application Site Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Relevant to All Bogs
2	Clean silt ponds	Relevant to All Bogs
3	Decommission peat stockpiles	Completed November 2022
4	Decommission or remove buildings and compounds	Relevant to All Bogs
5	Decommission fuel tanks and associated facilities	Relevant to Derryadd Bog
6	Decommission and removal of septic tanks	Relevant to Derryadd Bog
7	Decommissioning and removal of a number of existing bog pumps where suitable/necessary	Relevant to All Bogs

In addition to the decommissioning activity, rehabilitation works discussed above Bord na Móna have initiated activities under the Peatland Climate Action Scheme (PCAS)[23], also referred to as the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS). The PCAS has been implemented at the Application Site, specifically in the northern and northwestern areas of Derryaroge Bog. The primary aim of the PCAS is to optimise climate action benefits of rewetting the former industrial peat extraction sites by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. Rehabilitation works include:

- *more intensive management of water levels through drain-blocking and bunding*
- *wetlands management*
- *re-profiling that will deliver suitable hydrological conditions for development of wetlands, fens and bog habitats*
- *seeding of targeted vegetation*
- *proactive introduction of suitable peatland areas with Sphagnum moss to optimise climate action and associated benefits*

These efforts are designed to accelerate the recovery of wetland habitats and improve the ecological quality of the site.

7.8.4.1 Effects on Habitats

7.8.4.1.1 Description of Effects

Since peat extraction ended in July 2019, there has been no further degradation of the habitats at the Application Site including the remnant raised bog habitats. Some recovery has occurred, evident in the transitional habitats. Activities have been limited to carrying out rehabilitation under the PCAS, with access through existing machinery tracks. No new drainage, vegetation

[23] https://www.gov.ie/en/publication/136a7-bord-na-mona-bog-rehabilitation-scheme/

clearing, or peat harvesting has occurred, allowing some recovery to occur as evident in the transition habitats.

7.8.4.1.2 Assessment of Significance Prior to Control Measures

The removal of peat stockpiles has been carried out without contributing to further degradation, fragmentation, or loss of habitats. Access for machinery for the decommissioning activity is restricted to areas that were previously impacted by past peat extraction activities and associated works, ensuring that no new, undisturbed habitats are affected in this Phase of the Project. Additionally, no further actions, such as clearing vegetation, or extracting peat, have been undertaken in conjunction with the removal of the stockpiles.

As a result, the Current Phase of the Project has not led to any additional significant negative effects on local habitats. There has been no further loss, degradation, or fragmentation of ecosystems. The careful approach to decommissioning has ensured minimal disruption to the surrounding environment, aligning with environmental protection goals. By restricting activities to already disturbed areas and refraining from any new harmful practices, the Project is minimising its ecological footprint while maintaining the integrity of the habitat and its surrounding ecosystem.

Considering the above, it is deemed that there have been no additional likely significant effects since cessation of extraction in 2019. While the reduction extraction activity may have allowed some habitat recovery, adopting a precautionary approach, the potential effect to habitats have been assigned to be **Long-term, Moderate, Positive** to reflect the likelyrehabilitation of habitats in smaller area of the Application Site. This assessment of significance of effect takes into account the KERs listed below.

Multidisciplinary surveys conducted (see Section 7.4.3.2) identified habitats at the Application Site across various geographic levels of importance. In total, 20 habitats were recorded as KERs which included the following:

- **International Importance**
  - PB1: Raised Bog
  - PF1: Rich Fen and Flush
  - FP1: Calcareous Springs
  - GS1: Dry Calcareous and Neutral Grassland
- **National Importance**
  - PF3: Transition Mire and Quaking Bog
- **County Importance**
  - PB4 Cutover Bog
- **Local Importance (Higher Value)**
  - FW2: Depositing/Lowland Rivers
  - FW4: Drainage Ditches
  - FL8: Other Artificial Lakes and Ponds
  - PF2: Poor Fen and Flush
  - FS1: Reed and Large Sedge Swamps
  - WN7: Bog Woodland
  - WS1: Scrub
  - WS2: Immature Woodland

- WD1: Mixed Broadleaved Woodland
- WN6: Wet Willow-Alder-Ash Woodland
- WL1: Hedgerows
- WL2: Treelines
- GS4: Wet Grassland
- GS3: Dry Humid Acid Grassland
- GS2: Dry Meadows and Grassy Verges

7.8.4.1.3 Control Measures

Based on the above considerations and the approach employed to minimise disturbance, including limiting machinery access to areas previously impacted areas by past peat extraction activities and associated works, the ongoing work for the Current Phase activities is proceeding without any additional significant negative effects on the local habitats. In this regard, there is no risk of additional habitat loss, degradation, fragmentation..

Bord na Móna standard operation control measures (see Section 7.9.1) which are primarily focused on managing risk to water quality would have also indirectly benefited habitats.

From June 2020 when the IPC Licence control measures (see Section 7.9.2) was issued, a suite of additional control measures to further manage risk to water quality, would have also indirectly benefited habitats.

7.8.4.1.4 Description of Effect

Since the cessation of peat extraction at the Application Site in July 2019, the potential for the release of suspended sediments and the pollution of water quality, including both watercourses and groundwater, has been greatly reduced. With the cessation of peat extraction, there has been a noticeable decline in the overall disturbance to the bogs. This reduced disturbance will have a positive knock-on effect reducing risk of suspended solids emissions in water runoff, and so water quality has likely improved. As well as reducing the risk of sediment pollution, the significant reduction in the machinery and plant operations on site lowers the chances of accidental spills or the discharge of pollutants into nearby water bodies. This reduction in operational activity ensures that there is a far lesser likelihood of contaminants being introduced to the environment compared to when peat extraction was ongoing.

Throughout the Current Phase of the Project, the site continues to operate under the same existing drainage systems that were in use during the Peat Extraction Phase. These systems include field drains, main drains, silt ponds, and discharge outlets, which have been designed to manage water flow and minimise any adverse impacts on the quality of receiving waters. Because the drainage systems remain unchanged, the volume of water being discharged from the site to nearby surface watercourses will be comparable to the discharge volumes observed during the Peat Extraction Phase. This consistency in water management ensures that there is no significant increase in pollution risk due to the change in activities at the site.

Although peat extraction has stopped, there are still some limited activities on site that involve the use of machinery and plant. These activities, while minimal, inherently carry a risk of accidental spillage, particularly of hydrocarbons. Such spills could potentially affect the water

quality of nearby watercourses or groundwater. In addition, the office buildings at the Mountdillion Works are still occupied, and wastewater from the septic tanks remains a potential source of contamination. If not properly managed, these discharges could affect both surface water and groundwater, posing a risk to the surrounding aquatic environment. However, it is important to note that these risks are much lower in the Current Phase compared to the Peat Extraction Phase, due to the reduced scale of activities, fewer machines, and a smaller workforce on site.

The Application Site has been subject to regulatory oversight by the EPA since 2000, operating under the conditions outlined in the IPC Licence P0504-01. As noted above this licence includes specific emission limit values for various pollutants, including suspended solids and other nutrients, which are regularly monitored to ensure compliance. The review of AERs since 2019 has shown that there have been no exceedances for suspended solids emission limits. This demonstrates that the site has consistently adhered to the regulatory requirements, effectively managing water quality and minimising environmental risks.

In addition to these water quality considerations, this impact assessment also considers the potential effects of the Project on aquatic species. The Project has been designed in such a way that it does not have any direct impact on the habitats of these species. This means there is minimal risk of disturbance to their ecosystems as a result of the ongoing activities. The only potential pathway for any effects to occur would be through water pollution, which could affect both the habitats and the species themselves. However, as outlined in this section, the measures in place to manage water quality ensure that the risk of pollution is minimised, and therefore the potential for negative impacts on aquatic species remains low.

Overall, while there are inherent risks associated with ongoing activities on site, such as the possibility of accidental spills or wastewater discharges, these risks are significantly lower in the Current Phase of the Project compared to previous Phases. Stringent ongoing regulatory compliance, coupled with the careful management of water and waste, has helped minimise the potential for additional negative environmental impacts, particularly concerning water quality and aquatic species.

7.8.4.1.5 Assessment of Significance Prior to Control Measures

Without the implementation of control measures and the regulation of activities at the Application Site under the IPC licence, there would be a potential for the Current Phase of the Project to result in a Long-Term, Significant, Negative Effect on water quality. These measures and regulations are crucial in preventing any significant deterioration of water quality, and their absence could have led to more severe environmental consequences. Regulation of activities at the Application Site is required under the IPC licence, and is strictly adhered to by Bord na Móna. The reduction extraction activity has likely resulted in effects on aquatic ecosystem there is potential that effects legacy of extraction activity on water quality persist. Considering this, and adopting a precautionary approach, the potential effect to habitats have been assigned to be **Long-term, Moderate, Negative.**

7.8.4.1.6 Control Measures

Collectively the Bord na Móna standard operation control measures and IPC Licence control measures set in place under the IPC Licence in 2000 are primarily focused on managing risk to water quality would have directly benefited aquatic habitats and fauna.

7.8.4.2 Effects on Fauna

The effects on fauna during the Current Phase of the Project would primarily involve the potential reduction in the quality of aquatic habitat and associated supporting fauna, particularly in areas within and downstream of the Application Site. Additionally, the operation of plant and machinery on site could have caused disturbances to faunal species, including Otter and various bird species.

However, as outlined above with respect to the risk of likely significant effects on water quality and the habitats, the risk of effect on species are expected to be of a much lesser scale compared to the Peat Extraction Phase. This is due to the reduced levels of plant, machinery, and workers on site during the Current Phase, which has led to a decrease in the potential for significant environmental impacts.

Similarly, the likely significant effects on fauna, including Badger, birds, Irish Hare and Otter, as a result of disturbance and displacement are also anticipated to be of a smaller magnitude due to the lower volume of plant, machinery, and workers operating on site.

The cessation of peat extraction would have reduced impact for the faunal KERs. The assessment of effects of fauna is presented below:

Assessment of Potential Effects on Otter

Long-term, Slight, Negative Effects

Assessment of Potential Effects on Badger

Long-term, Slight Negative Effects

Assessment of Potential Effects on Irish Hare

Long-term, Slight, Negative Effects

Assessment of Potential Effects on Birds

Long-term, Slight, Negative Effects.

Assessment of Potential Effects on Marsh Fritillary

Long-term Moderate Positive Effect

7.8.4.3 Effects on European sites and pNHAs Prior to Control Measures

7.8.4.3.1 Effects European sites

As detailed in Table 7.30 below the Lough Ree SPA, Ballykenny-Fisherstown Bog SPA and Lough Ree SAC were respectively designated in 1995, 1996 and 2002 and based on their designation dates are applicable to the Current Phase.

The European sites are recognised as Internationally Important KERs

Table 7.30: Applicable Phases for Designated Sites

Site	Year of Designation	Peat Extraction Phase (1988 - 2019)
Lough Ree SPA	1995	Applicable (as designated in 1995)
Ballykenny-Fisherstown Bog SPA	1996	Applicable (as designated in 1996)
Lough Ree SAC	2002	Applicable (as designated in 2002)

Nature of potential impacts on Lough Ree SPA (004064) and Ballykenny-Fisherstown Bog SPA (004101) during the Peat Extraction Phase shares similarities with those anticipated during the Current Phase. However, it is important to note that the overall level of impact has significantly decreased due to the cessation of peat extraction activities at the beginning of the Current Phase in 2019.

The cessation of peat extraction has led to a substantial reduction in the risk of likely significant effects on these European sites. This reduction is primarily attributed to the lower volume of site activity, including fewer operational heavy machinery, vehicles, and workers, which in turn has reduced the potential sources of disturbance and to species from SPA that may be using the Application Site.

Furthermore, with the cessation of extraction, the input of suspended sediments, nutrients, and other pollutants into hydrologically connected watercourses has decreased, thereby lowering the likelihood of indirect effects on aquatic ecosystems and water-dependent habitats. Similarly, reduced on-site disturbances have helped mitigate ecological stressors on key avian species, such as the whooper swan, wigeon, teal, and Greenland White-fronted Goose, which rely on these sites for foraging and roosting.

As a result of these changes, the potential indirect impacts via hydrological and ecological pathways have declined. During the Peat Extraction Phase, the indirect potential impacts were assessed as Long-term Moderate Negative due to likely persistent nature of the habitat and water quality pressures.

However, in the Current Phase, the cessation of extraction and associated activities has resulted in a reduction of these potential impacts to **Long-term, Slight, Negative Effects**, reflecting the diminished scale and intensity of environmental pressures on these protected European sites.

7.8.4.3.2 Effects on pNHAs

The potential impacts on nearby pNHAs during the Peat Extraction Phase were largely driven by potential habitat disturbance, hydrological alterations, and potential degradation of water quality. These effects are comparable to those anticipated during the Current Phase. However, the overall impact has significantly reduced due to the cessation of peat extraction activities in 2019.

In the Current Phase, the absence of ongoing extraction activities has substantially reduced environmental pressures, leading to a notable decline in the potential for significant effects on these pNHAs. With fewer disturbances from machinery, workers, and drainage modifications, the risk of indirect effects, such as sedimentation or waterborne pollution, has lessened. Consequently, the impact has been assessed as **Long-term, Slight, Negative Effects** indicating a lower but still present potential for residual effects on habitat quality, species distribution, and ecological connectivity within these protected natural areas.

7.8.4.4 Control Measures

From 2010 onwards and for the remainder of the Current Phase, activities at the Application Site continued to operate in accordance with the requirements set forth by the IPC licence, specifically concerning the quality and quantity of surface water discharge. The control measures implemented to manage discharges are summarised in Section 7.9.2below. These measures are designed to ensure that all discharges meet the necessary environmental standards, minimising any potential additional negative impacts on surrounding watercourses and groundwater.

It should be noted that standard operation control measures implemented for operation by Bord na Móna implemented, including drainage maintenance, silt ponds, machinery management, spill response, and waste disposal (see Section 7.9.1), continued throughout the Current Phase to minimise environmental risks and protect water quality during these this Phase.

7.8.5 Remedial Phase (Future)

In order to fulfil the requirements of Condition 10.2 of IPC Licence (Ref. P0504-01), Bord na Móna must develop a Cutaway Bog Decommissioning and Rehabilitation Plan to facilitate the long-term rehabilitation of the licensed bogs. To this end, the Bord na Móna has developed plans for Derryaroge, Derryadd, and Lough Bannow Bogs. Under the plans, a phased rehabilitation approach is proposed to meet IPC Licence obligations is proposed.

These plans are the focus of Phase 3 of the Remedial Phase (Future) of the Project. The plans detail a phased approach to implementing measures that will ensure the permanent rehabilitation of the bogs in compliance with Condition 10.2 of IPC Licence (Ref. P0504-01). A summary of the key objectives and actions of the plan is provided in Chapter 4 – Project Description. The plans are presented in full in Chapter 4 - Project Description – Appendix 4.3.

The Remedial Phase will be a crucial stage in the transition of the former peat extraction areas toward ecological recovery, with a primary focus on implementing the rehabilitation strategies outlined in the Cutaway Bog Decommissioning and Rehabilitation Plans. The ultimate objective of these plans is to achieve environmental stabilisation, ensuring that the cutaway bogs are placed on a long-term trajectory toward becoming naturally functioning peatland ecosystems.

This transformation will involve a combination of active rehabilitation measures and natural colonisation processes, working in tandem to promote the gradual re-establishment of diverse peatland habitats. While environmental stabilisation is expected to be achieved in the short to medium term, achieving fully functional wetland and peatland ecosystems will be a long-term process, typically taking between 30 to 50 years. This extended timeframe accounts for the slow

accumulation of organic material, the development of hydrological equilibrium, and the natural succession of plant communities toward species typically associated with peat-forming habitats.

A key component of the rehabilitation strategy will be natural colonisation, which involves allowing native vegetation to gradually establish itself on the exposed peat surfaces. This process is expected to play a vital role in stabilising bare peat areas, reducing the risk of erosion and surface runoff, and improving overall biodiversity. However, in some areas where natural colonisation is insufficient or too slow, targeted interventions such as re-vegetation with appropriate peatland species may be necessary to accelerate the process.

One of the central rehabilitation strategies will be re-wetting, which involves restoring the natural hydrology of the bog by blocking drainage channels and constructing cell bunds to retain water. This will help raise and maintain water levels closer to the peat surface, a critical factor in facilitating peat formation and reducing carbon losses from the exposed peat layers.

Before the rehabilitation plans are finalised and submitted to the EPA for approval, baseline ecological surveys will be conducted to assess:

- The current extent of natural colonisation across the site.
- The potential for targeted re-vegetation in areas where natural regeneration is limited.
- Opportunities for rewetting and hydrological restoration to enhance habitat conditions.
- Site-specific measures needed to ensure long-term environmental stabilisation.

The main hydrological objective of the rehabilitation process will be to maintain water levels as close as possible to the peat surface, while avoiding the formation of extensive open water bodies, which may be unsuitable for peatland vegetation. Re-wetting and controlled water level management will help accelerate the development of vegetation cover, enhancing biodiversity, reducing erosion, and ultimately supporting the re-establishment of a self-sustaining peatland ecosystem.

By implementing these rehabilitation strategies in a phased and adaptive manner, the Remedial Phase will ensure that the cutaway bogs can transition toward a sustainable and ecologically valuable state, contributing to broader conservation efforts, carbon sequestration, and ecosystem service enhancement.

According to the Cutaway Bog Decommissioning and Rehabilitation Plans, it is unlikely that the majority of the site will develop into active raised bog similar to the priority EU Habitats Directive Annex I habitat in the foreseeable future (approximately 50 years). Furthermore, only a small portion of the bog is expected to support Sphagnum-rich habitats in this timeframe. However, re-wetting across the entire site will improve overall habitat conditions, fostering a broader mosaic of peatland habitats suited to the local environmental conditions.

7.8.5.1 Effects Habitats

7.8.5.1.1 Description of Effect

The Rehabilitation Plans for the Application Site aim to enhance the ecological integrity of the peatland by implementing a combination of active rehabilitation measures and facilitating natural colonisation. These efforts will focus on the cutaway and bare peat habitats within the Application Site, promoting long-term environmental stability and biodiversity recovery. The rehabilitation strategy will integrate a suite of techniques, including targeted re-wetting, drain-

blocking, and passive ecological succession, to encourage the natural regeneration of peatland habitats.

Given the degraded state of certain areas within the site, the approach will prioritise stabilising bare peat, restoring natural hydrological conditions, and fostering vegetational succession. By carefully managing water levels and facilitating plant colonisation, the rehabilitation process will not only mitigate further environmental degradation but also create conditions that support the gradual recovery of a functional and diverse peatland ecosystem.

Natural Colonisation and Vegetational Succession

A key component of the rehabilitation strategy is natural colonisation, which will play a central role in the environmental stabilisation of bare peat areas. This process involves the spontaneous establishment of native plant species, which contribute to erosion control, nutrient cycling, and habitat formation. Vegetational succession will further support ecosystem recovery, as pioneering species establish themselves and create conditions that allow more complex plant communities to develop over time.

The gradual accumulation of organic material from plant growth will improve soil stability, increase carbon sequestration, and enhance overall habitat resilience. While natural colonisation is expected to be the primary driver of vegetation recovery, it will be complemented by active interventions, particularly in areas where environmental degradation is more pronounced.

Re-Wetting Strategy and Hydrological Management

A major focus of the rehabilitation effort is the re-wetting of the cutaway peatland, where feasible, to restore natural hydrological conditions. The overarching goal is to maintain water levels as close as possible to the peat surface while preventing the formation of large open-water bodies. This approach is essential for accelerating the re-vegetation process, fostering the establishment of a protective vegetation cover, and reducing carbon emissions associated with peat oxidation.

Re-wetting will be achieved through a widespread targeted drain-blocking programme, which will be implemented strategically across the cutaway. Where feasible, field drains will be blocked to encourage water retention and create optimal conditions for peatland regeneration. The intensity of these measures will vary depending on the existing state of the habitat.

- **Targeted drain-blocking**
  - More intensive drain-blocking interventions will be carried out in areas of bare peat where natural regeneration is slow, as these locations require greater hydrological intervention to support the establishment of vegetation.
- **Selective drain-blocking:**
  - In regions where habitats have already started to establish, less intensive interventions will be employed to maintain hydrological stability without disrupting ongoing natural succession.

Additional wetland management techniques will be utilised to refine water control, including blocking outfalls to prevent excessive drainage and installing overflow pipes to regulate water levels. These measures will help prevent unintended flooding while ensuring that the peatland retains sufficient moisture to support ecological recovery.

7.8.5.1.2 Assessment of Significance Prior to Control Measures

The implementation of the proposed rehabilitation plans is expected to result in a **Long-term, Significant, Positive Effect** on the habitats currently present within the Application Site. By enhancing hydrological conditions, encouraging vegetation recovery, and increasing habitat diversity, these efforts will play a crucial role in strengthening the ecological resilience of the site. While a complete transformation into an active raised bog is unlikely in the foreseeable future, the rehabilitation measures will set the stage for long-term habitat improvement and biodiversity enhancement.

A central aspect of the rehabilitation process is the continuation of natural vegetation succession, which will drive the gradual recolonisation of bare peat areas. Over time, this will lead to the establishment of a more diverse and structured habitat mosaic, supporting a greater variety of plant and animal species. The return of vegetation will not only enhance habitat quality but also contribute to ecosystem functions such as carbon sequestration, soil stabilisation, and hydrological regulation.

Re-wetting, where implemented, will further improve the ecological condition of the site by restoring natural water levels and creating conditions conducive to the development of wetland and peat-forming vegetation. The process of stabilising water levels will help reduce peat oxidation, limit carbon loss, and support the gradual formation of self-sustaining ecosystems. However, the transition to a fully functional, stable habitat will require time, as ecosystem recovery is a slow and complex process influenced by multiple environmental factors.

7.8.5.1.3 Control Measures

The proposed rehabilitation works at the Application Site will be carried the overarching aim of achieving environmental stabilisation. Through careful planning, the use of appropriate machinery, the restriction of activities to designated zones, and ongoing environmental monitoring, the Project will ensure that no loss or degradation of habitat occurs. These best practice measures will facilitate the successful rehabilitation of the peatland while maintaining the ecological integrity of the site, ultimately supporting long-term sustainability and biodiversity enhancement.

7.8.5.2 Effects on Water Quality and Aquatic Fauna and Habitats

7.8.5.2.1 Description of Effect

The implementation of the rehabilitation plans for the Application Site represents a critical step in the long-term ecological improvement at the site. Through a combination of drain blocking, peat field reprofiling, targeted rewetting, and natural colonisation, the plans aim to stabilise degraded peatland areas while promoting significant water quality improvements.

By continuing the use of silt ponds during the early stages of rehabilitation and implementing robust environmental monitoring, the Project will ensure that water quality is safeguarded throughout the rehabilitation process. Scientific research confirms that rewetted peatlands contribute to long-term reductions in nutrient pollutants, and the strategies adopted at the Application Site align with best practices for peatland conservation.

Although minor risks remain, particularly concerning machinery-related hydrocarbon spills and wastewater discharges, these risks are substantially lower than those present during previous peat extraction activities. Stringent risk mitigation measures will be in place to prevent contamination, ensuring that the site transitions smoothly toward a self-sustaining, ecologically stable state.

Ultimately, the rehabilitation efforts at the Application Site will contribute to peatland conservation, biodiversity enhancement, and improved hydrological function, reinforcing the vital role of peatlands in climate regulation, carbon sequestration, and water purification.

7.8.5.2.2 Assessment of Significance prior to Control Measures

In the absence of appropriate mitigation measures, there is a potential for the rehabilitation operations at the Application Site to lead to a Long-Term Moderate Negative Effect on water quality. This risk arises from the nature of the rehabilitation activities, which may disturb the site's natural conditions. For example, the use of machinery for drain blocking, peatland reprofiling, and re-wetting could temporarily alter the site's hydrology and expose bare peat surfaces, leading to increased runoff of sediments and nutrients into nearby water systems. These disturbances may result in elevated suspended solids in runoff, which could degrade water quality by affecting water clarity and harming aquatic ecosystems. Additionally, as the peatlands are re-wetted, the disturbance could lead to the release of stored nutrients, such as nitrogen and phosphorus, which might contribute to eutrophication in downstream water bodies if not effectively managed. However, all operation during the Remedial Phase will be subject to required control measures.

It is important to recognise that the rehabilitation efforts are focused on improving natural peatland processes. Over time, and with proper management, the long-term effect of the rehabilitation plan is expected to reverse these initial impacts. Once the bogs are fully re-wetted, they will have improved hydrological conditions, resulting in greater water retention. This will reduce the amount of runoff and the potential for sediment mobilisation. The process of vegetation recolonisation, although gradual, will further stabilise the peat surface and contribute to reducing the output of both nutrients and silt. As the site transitions into a naturally functioning peatland, it will be more efficient at sequestering carbon, filtering nutrients, and stabilising the surrounding ecosystem. Thus, the long-term outcome of the proposed rehabilitation plans has the potential to yield a **Long-Term, Significant, Positive Effect** on water quality, as the peatlands will gradually become self-regulating, reducing nutrient and sediment leaching into the surrounding environment.

Given the reduced scale and small-scale nature of the operations required for the rehabilitation plans, the likelihood of significant negative effects on water quality is minimal. The activities at the site will be carefully managed to ensure that any short-term disturbances are contained and minimised. Since the operations are not large in scale and are focused on rehabilitation of peatland function, there is a low risk of significant degradation of water quality. While there may be temporary increases in suspended solids and nutrient levels during the initial phases of rehabilitation, these impacts are expected to be short-lived and not lead to significant long-term effects on water quality. Therefore, no significant negative effects on water quality are anticipated in the absence of mitigation, particularly as the rehabilitation progresses and the site moves towards a more stable and self-sustaining ecological state.

7.8.5.3 Effects on Fauna

Natural recolonisation of the bogs will form the basis for the proposed rehabilitation plans. The habitats which have developed on the cutaway bogs to date following cessation of peat extraction include heath, scrub and woodland habitats and it is likely these habitats will also establish with time on drier areas of the cutover bog where natural vegetation colonisation is allowed to proceed. These habitats provide cover and nesting habitat for a range of bird species. They also provide areas of linear habitat with connectivity to the wider landscape and therefore provide suitable foraging and commuting habitat for bat species and other small mammals. Woodland and scrub also provide areas of potential Badger habitat within the Application Site.

Potential for impacts in species identified as KERs in Section 7.7.6above are considered.

The proposed rehabilitation activities for the site will primarily take place during daytime hours, which aligns with the general behaviour patterns of the mammal including otters, badgers, hares, and various bird species. These species are either more active during dawn and dusk or have specific activity periods that are less likely to overlap with the daytime work. As such, the Project activities are expected to minimise potential disturbance to these species.

Previous studies, including those by Green and Green (1997), as well as findings from the National Otter Survey of Ireland (2010/2012) (NPWS, 2013), have shown that while some level of disturbance may occur, it generally does not result in long-term harm to wildlife. This is also supported by other research, including work by Bailey and Rochford (2006), which suggests there is no consistent, significant impact of human disturbance on the occurrence of species.

The rehabilitation work will involve a short-term presence of machinery and personnel, which will be much lower in volume compared to the past peat extraction activities. While there may be some temporary disturbance to local wildlife, including species such as hares, birds, and others, the impact is expected to be minimal. The site itself is primarily characterised by artificial drainage channels and other non-optimal habitats for many of the species in question. Therefore, while disturbance may cause slight, temporary disruption, it is unlikely to have significant effects on the species present.

Overall, the rehabilitation plan is not expected to lead to any significant, long-term effects on the species utilising the site, and the potential for impacts during the Remedial Phase will be limited. Thus, the long-term outcome of the proposed rehabilitation plans has the potential to have **Long-Term, Moderate, Positive** effect on fauna**.**

7.8.5.4 Effects on European sites and pNHAs

The rehabilitation plans will have a net positive impact on the peatland ecosystem and its associated biodiversity. Given the nature of the proposed interventions including primarily drain-blocking and facilitating natural recolonisation, there is a risk of temporary habitat loss. However, the Project is expected to significantly enhance habitat diversity and functionality over time within the Application Site, aiming to establish more stable and self-sustaining ecosystems. The rehabilitation works will strengthen the long-term resilience of the peatland ecosystem, promoting natural vegetation succession and increasing habitat diversity, particularly in areas currently dominated by bare peat. Over time, these degraded landscapes will transform into ecologically valuable habitats, supporting a wider range of plant and animal species, including potential bird species. The habitats may offer suitable foraging and resting

areas for the SCI species for which the Ballykenny-Fisherstown Bog SPA is designated, Greenland White-fronted Goose during the winter months. The Residual Effects of implementing the rehabilitation plans are assessed as **Long-Term, Moderate, Positive.**

The implementation of the rehabilitation plans, as outlined for the Remedial Phase, is expected to have a significant positive impact on downstream surface water hydrology, overall water quality, and aquatic fauna. As water retention improves and sediment transport decreases through the rehabilitation efforts, habitat conditions for aquatic life will stabilise. This will, in turn, enhance the ecological integrity of the surrounding water systems, including those connected to sensitive areas such as The Lough Ree SAC and SPA, as well as the nearby pNHAs. Consequently, the Residual Effects of implementing the rehabilitation plans are considered to be a **Long-Term, Moderate, Positive**.

7.8.5.5 Control Measures

The existing drainage systems and silt control measures currently in place at the Application Site will remain operational during the initial stages of the rehabilitation plans. These measures are especially crucial during this early phase, as there is a potential for entrainment of suspended solids in surface waters, particularly during activities such as drain blocking and other earth-moving operations. As the rehabilitation work progresses, these temporary disturbances to the peat surface could increase the risk of sediment mobilisation, which may be carried away in surface runoff, impacting the water quality of nearby watercourses.

To mitigate these potential effects, silt ponds will continue to operate throughout this period, effectively trapping and filtering any suspended solids before they can be released into the surrounding environment. These ponds will function as sediment retention basins, ensuring that runoff water is effectively treated before it leaves the site, reducing the risk of sedimentation and pollution in downstream aquatic systems. As stipulated in the IPC Licence, the silt ponds will be regularly inspected and maintained to ensure that they are operating at full efficiency. This includes routine cleaning, monitoring of storage capacity, and maintenance of inlet and outlet systems to prevent overflow or blockage. Furthermore, to prevent any risk of contamination, no remedial works will be carried out during periods of prolonged rainfall or when there are unfavourable weather conditions that could exacerbate the mobilisation of sediments or affect the effectiveness of the silt control measures.

7.9 Control Measures

This section summarises the standard operation control measures and management strategies undertaken by Bord na Móna to reduce the risk of environmental impact during operations (Section 7.9.1). These actions and strategies are currently in place the Current Phase and will continue as standard practice throughout the Remedial Phase.

This section also introduces the IPC Licence that was issued in 2000. The IPC License covers all emissions from the Project and its environmental management (see Section 7.9.2). The IPC Licence has been in effect during the Current Phase since 2000.

It should be noted that the control measures described here are not taken into account in the initial assessment of effects of the Project on biodiversity in Section 7.8- Assessment of

Significant Effects on Biodiversity; they are only considered when evaluating the Residual Impact on biodiversity (see Section 7.10- Residual Effects).

7.9.1 Pre-IPC Licence

Prior to the imposition of EPA regulation in 2000, Bord na Móna set in place standard operating procedures and best practice during operations that managed the environmental risks associated with peat extraction, specifically in relation to suspended solids and potential contamination. The company implemented a series of operational actions and strategies to minimise the environmental impact of their activities, ensuring that water quality in the surrounding areas remained protected.

One of the key measures involved the regular maintenance and cleaning of internal drainage systems across the Application Site. Bord na Móna employed draglines and excavators to clear the drains, ensuring they remained efficient in channelling water and preventing sediment buildup. This regular upkeep played a crucial role in maintaining the integrity of the drainage network and preventing blockages that could lead to water quality issues.

Additionally, silt ponds were strategically placed across the site to capture sediment from water discharge. These ponds were upgraded in the mid-1980s to enhance their capacity and effectiveness, ensuring that the sediment capture process was as efficient as possible. To prevent any overflow or sediment buildup within the ponds, Bord na Móna conducted desludging operations twice annually, ensuring that sediment levels were kept under control.

In terms of machinery management, Bord na Móna established robust maintenance procedures to minimise the risk of equipment-related contamination. Machinery was stored, cleaned, and inspected regularly at the Mountdillon Works to ensure it operated in optimal condition. This not only helped prevent any malfunctions that could lead to contamination but also reduced the risk of pollutants being introduced into the environment.

Refuelling operations were primarily carried out at the Mountdillon Works, which was equipped with procedures to mitigate the risk of accidental spills. In the event of a spill, Bord na Móna had emergency response procedures in place, which included isolating the spill to prevent it from entering drains or watercourses. Absorbent materials were also used to soak up any spilled hydrocarbons, further reducing the potential for environmental damage.

Furthermore, Bord na Móna implemented rigorous waste management practices to ensure that all waste materials, including hydrocarbons and other potentially hazardous substances, were safely stored and disposed of. The company worked with licensed contractors to ensure that waste was handled and disposed of in accordance with environmental regulations, further minimising the risk of contamination.

Taken together, these measures helped to reduce the risk of environmental contamination from peat extraction activities. While there were still inherent risks associated with such operations, Bord na Móna's diligent efforts to manage water quality and mitigate potential contaminants played an essential role in protecting the surrounding ecosystem.

7.9.2 IPC Licence – Mountdillon Bog Group - P0504-01

The EPA issued an Integrated Pollution Control (IPC) Licence (P0504-01) in 2000, amended in 2012, to regulate peat extraction activities within the Mountdillon Bog Group, which includes

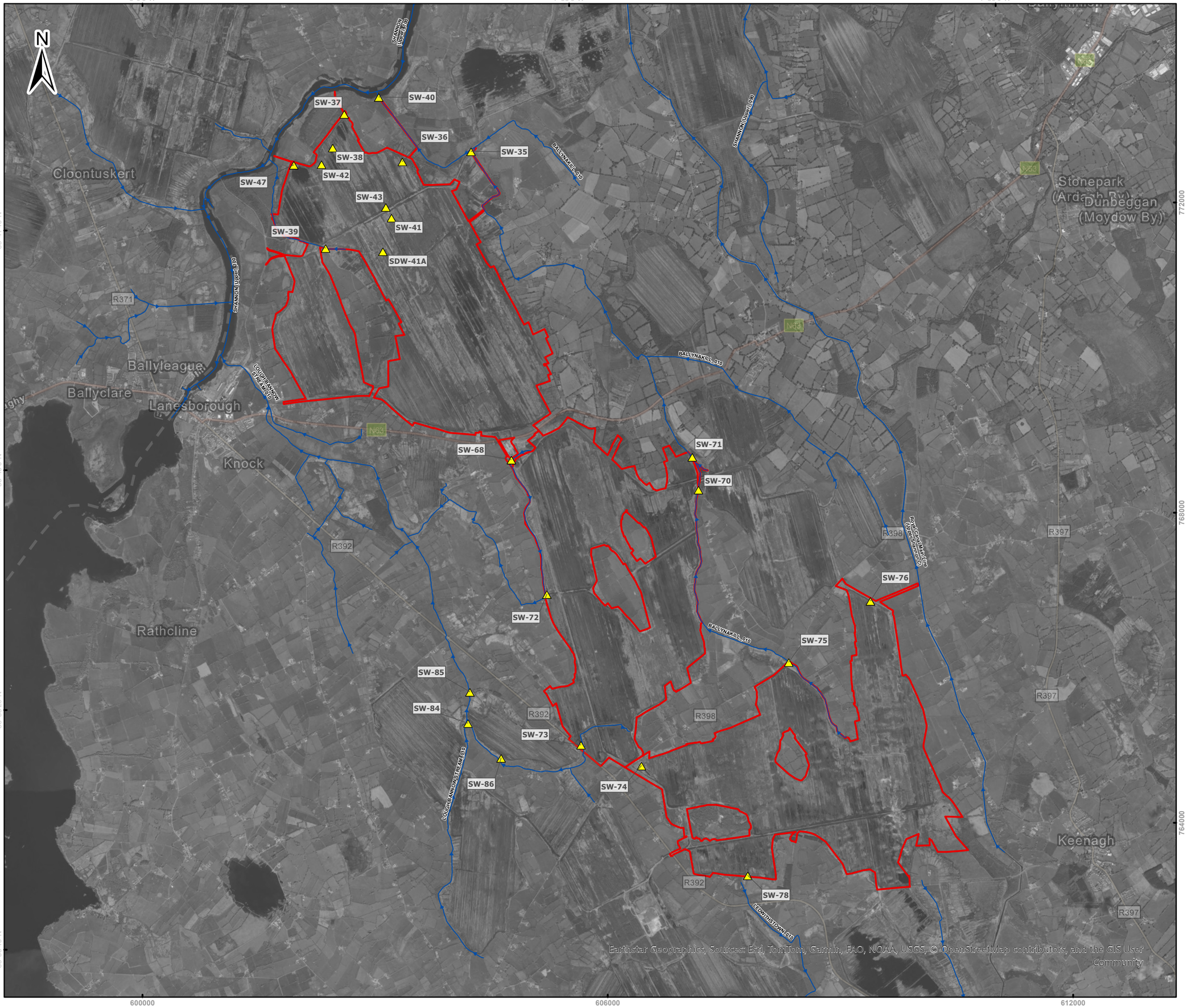
Derryaroge, Derryadd, and Lough Bannow bogs. The IPC licence is included in Chapter 4 - Project Description – Appendix 4.1. . The IPC licence primarily focuses on controlling and monitoring emissions to water. Given the nature of the activity, peat extraction has significant potential to increase suspended solids (SS) in surface water due to soil disturbance, drainage, and sediment runoff. The extraction process exposes bare peat surfaces, which are highly susceptible to erosion and washout, especially during heavy rainfall. This can lead to:

- **Increased turbidity**, reducing water quality and affecting aquatic life.
- **Deposition of fine sediments**, which can smother fish spawning areas and invertebrate habitats.
- **Potential transport of nutrients/contaminants**, contributing to downstream pollution

Given these environmental concerns, the IPC licence sets an emission limit value of 35 mg/l for suspended solids at all surface water outfalls to regulate and mitigate potential adverse effects.

The IPC licence requires the submission of an Annual Environmental Report (AER) detailing emissions to water, waste management, resource consumption, air emissions, surface water monitoring, de-silting programmes, and bog rehabilitation progress. the licence Also requires regular visual inspections and maintenance of silt ponds, upgrades to sedimentation pond treatment systems, and installation of oil interceptors for surface water discharges from workshop areas.

A review of 21 AERs revealed no exceedances of the emission limit value for suspended solids to water over a 12-year monitoring period. However, inconsistencies in sampling locations were noted, with some sites situated at discharge points or settling ponds rather than natural streams. Data from 25 surface water sampling stations relevant to the Application Site were analysed, covering an irregular monitoring period from 2010 to 2022, to ensure an accurate assessment of water quality impacts associated with the peat extraction activities. The locations of the 25 surface water sampling stations are shown in Figure 7.15 while monitoring results are presented in Table 7.31.



Legend

- Application Site
- Mountdillon Bog Group SW Sample Locations
- WFD - River Water Bodies

0 1 2
Kilometers

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	31/03/2025	First issue	S.P	C.N

Client: Bord na Móna

Project: Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent

Title: Figure 7-15 Surface Water Monitoring Locations Within, or at the Vicinity, of the Application Site

Scale @ A3: 1:45,000

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Map Ref: 11400-004-SW.M.L-S.BO-TOB-A

Draft: A

Table 7.31: EPA Streams and WFD River Water Bodies Associated with the IPC Licence P0504-01 for the Application Site, and Monitored Variables

Year	Ref	Trimester	Stream Name	Stream Code	WFD River Water Body	pH	SS	TS	NH_3	TP	COD
2010	SW-94	Q1	-	-	-	7.6	5	240	0.29	0.05	39
		Q2	-	-	-	5	22	216	2.51	0.08	53
		Q3	-	-	-	7.8	5	242	0.4	0.05	95
		Q4	-	-	-	7.5	5	270	0.52	0.05	60
	SW-95	Q1	-	-	-	7.5	5	193	0.33	0.05	66
		Q2	-	-	-	7.8	9	299	0.24	0.05	66
		Q3	-	-	-	7.5	5	226	0.08	0.05	68
		Q4	-	-	-	7.4	5	212	0.51	0.05	81
2011	SW-94	Q1	-	-	-	7.5	11	-	0.43	0.07	46
		Q2	-	-	-	7.6	7	-	0.52	0.05	64
		Q3	-	-	-	7.6	21	-	0.38	0.05	86
		Q4	-	-	-	7.6	5	-	0.16	0.05	39
	SW-95	Q1	-	-	-	7.4	11	-	0.52	0.05	84
		Q2	-	-	-	7.8	13	-	0.81	0.05	52
		Q3	-	-	-	7.5	19	-	0.35	0.05	98
		Q4	-	-	-	7.5	5	-	0.52	0.05	72
2012	SW-94	Q1	-	-	-	7.6	5	342	0.47	0.08	16
		Q2	-	-	-	7.8	5	316	0.24	0.05	41
		Q3	-	-	-	7.4	5	214	0.31	0.05	73
		Q4	-	-	-	7.4	5	300	0.48	0.05	59
	SW-95	Q1	-	-	-	7.6	5	240	0.5	0.05	49
		Q2	-	-	-	7.9	5	330	0.44	0.05	32
		Q3	-	-	-	7.4	10	210	0.21	0.09	79
		Q4	-	-	-	7.4	15	242	0.94	0.05	92

Year	Ref	Trimester	Stream Name	Stream Code	WFD River Water Body	pH	SS	TS	NH_3	TP	COD
2013	SW-68	Q1	Rappareehill	26R40	Lough Bannow Stream_010	8	6	282	0.68	0.05	56
2015	SW-37	Q1	-	-	-	7.6	5	304	0.96	0.05	63
	SW-38	Q1	-	-	-	7.5	5	400	0.27	0.05	45
	SW-40	Q2	Ballynakill_26	26B22	Shannon (Upper)_100	No Flow					
	SW-41	Q2	-	-	-	No Flow					
	SDW-41A	Q2	-	-	-	No Flow					
	SW-42	Q2	-	-	-	7.6	5	240	0.14	0.14	60
	SW-43	Q2	-	-	-	8	5	387	0.2	0.05	24
	SW-47	Q3	-	-	-	7.3	5	164	1.3	0.05	63
2016	SW-35	Q3	Ballynakill_26	26B22	Ballynakill_010	6.7	6	150	0.07	0.46	115
	SW-36	Q4	-	-	-	7.5	12	420	2.9	0.01	58
	SW-68	Q1	Rappareehill	26R40	Lough Bannow Stream_010	7.8	5	353	0.43	0.07	40
	SW-70	Q1	Ballynakill_26	26B22	Ballynakill_010	7.5	5	242	0.16	0.05	50
	SW-71	Q2	Ballynakill_26	26B22	Ballynakill_010	7.7	5	350	0.02	0.05	37
	SW-76	Q2	-	-	-	7.8	5	372	0.34	0.05	31
	SW-78	Q2	-	-	-	7.8	5	418	0.02	0.05	37
2017	SW-72	Q1	Rappareehill	26R40	-	7.8	8	362	0.58	0.05	59
		Q3	Rappareehill	26R40	-	7.6	5	256	0.43	0.06	67
	SW-73	Q1	Derrygeel	26D77	-	7.7	12	349	1.1	0.05	52
	SW-74	Q1	-	-	-	7.9	7	306	0.29	0.05	52
	SW-78	Q2	-	-	-	7.8	5	296	0.3	0.05	23
	SW-85	Q3	Lough Bannow stream	26L12	Lough Bannow Stream_010	7.4	5	340	0.12	0.05	93

Year	Ref	Trimester	Stream Name	Stream Code	WFD River Water Body	pH	SS	TS	NH_3	TP	COD
	SW-86	Q3	Derrygeel	26D77	-	7.7	12	324	0.15	0.05	91
2018	SDW-41A	Q4	-	-	-	0.05	12	410	1.5	0.05	77
	SW-35	Q4	Ballynakill_26	26B22	Ballynakill_010	7.4	5	398	0.35	0.05	58
	SW-36	Q4	-	-	-	7.1	5	210	0.39	0.05	77
	SW-37	Q4	-	-	-	7.2	5	338	0.57	0.05	63
	SW-38	Q4	-	-	-	7.6	5	490	1.1	0.05	62
	SW-39	Q4	Kilnacarrow	26K64	Shannon (Upper)_100	7.4	5	242	1	0.05	78
	SW-40	Q4	Ballynakill_26	26B22	Shannon (Upper)_100	5.7	5	286	0.77	0.05	54
	SW-41	Q4	-	-	-	7	5	364	0.69	0.05	51
	SW-42	Q4	-	-	-	7.2	5	240	0.11	0.05	91
	SW-43	Q4	-	-	-	7.6	5	425	0.1	0.05	79
	SW-47	Q4	-	-	-	No flow					
2019	SW-68	Q1	Rappareehill	26R40	Lough Bannow Stream_010	7.3	5	225	0.08	0.05	90
	SW-70	Q1	Ballynakill_26	26B22	Ballynakill_010	6.3	5	128	0.58	0.05	56
	SW-71	Q1	Ballynakill_26	26B22	Ballynakill_010	7.5	5	252	0.26	0.05	41
	SW-74	Q2	-	-	-	6.7	16	276	0.02	0.12	97
	SW-75	Q2	Ballynakill_26	26B22	Ballynakill_010	6.8	5	184	0.25	0.05	25
	SW-76	Q2	-	-	-	7.7	5	302	1.5	0.05	20
	SW-78	Q4	-	-	-	7.5	12	283	1.36	0.05	40
	SW-84	Q2	Derrygeel	26D77	Lough Bannow Stream_010	No flow					
2020	SW-72	Q1	Rappareehill	26R40		7.6	2	150	0.023	0.05	37
	SW-85	Q1	Lough Bannow Stream	26L12	Lough Bannow Stream_010	7.7	8	305	0.011	0.05	43

Year	Ref	Trimester	Stream Name	Stream Code	WFD River Water Body	pH	SS	TS	NH_3	TP	COD
	SW-86	Q1	Derrygeel	26D77	-	8.1	2	435	0.193	0.05	45
2021	SDW-41A	Q2	-	-	-	6.5	2	131	0.592	0.05	72
	SW-35	Q2	Ballynakill_26	26B22	Ballynakill_010	8	2	310	0.046	0.05	45
	SW-36	Q2	-	-	-	7.7	11	389	0.766	0.06	53
	SW-37	Q2	-	-	-	6.6	2	165	0.43	0.05	80
	SW-38	Q2	-	-	-	7.3	2	164	0.042	0.05	70
	SW-39	Q2	Kilnacarrow	26K64	Shannon (Upper)_100	No Flow					
	SW-40	Q2	Ballynakill_26	26B22	Shannon (Upper)_100	7.4	2	242	0.025	0.05	64
	SW-41	Q2	-	-	-	5.7	3	101	0.251	0.05	84
	SW-42	Q2	-	-	-	7.4	2	173	0.042	0.05	54
	SW-43	Q2	-	-	-	No Flow					
	SW-47	Q2	-	-	-	7.7	2	279	0.073	0.11	63
	SW-68	Q3	Rappareehill	26R40	Lough Bannow Stream_010	7.6	3	503	0.494	0.05	64
	SW-70	Q3	Ballynakill_26	26B22	Ballynakill_010	7.7	2	402	0.227	0.05	78
	SW-71	Q3	Ballynakill_26	26B22	Ballynakill_010	7.8	2	359	0.204	0.05	70
	SW-73	Q4	Derrygeel	26D77	-	No Flow					
	SW-74	Q4	-	-	-	7.7	3	415	0.085	0.05	74
	SW-75	Q4	Ballynakill_26	26B22	Ballynakill_010	7.9	2	276	0.144	0.05	69
	SW-76	Q4	-	-	-	7.7	2	376	0.1	0.05	84
	SW-84	Q4	Derrygeel	26D77	Lough Bannow Stream_010	7.4	3	167	0.097	0.05	90
2022	SW-72	Q3	Rappareehill	26R40	-	7.3	13	344	0.135	0.05	55
	SW-78	Q2	-	-	-	7.9	2	298	0.118	0.05	46

Year	Ref	Trimester	Stream Name	Stream Code	WFD River Water Body	pH	SS	TS	NH_3	TP	COD
	SW-85	Q3	Lough Bannow Stream	26L12	Lough Bannow Stream_010	7.4	7	191	0.129	0.05	55
	SW-86	Q3	Derrygeel	26D77	-	6.6	3	134	0.085	0.05	48

*SS – Suspended Solids; TS – Total Solids; NH_3 – Ammonia; TP – Total Phosphorus; COD – Chemical Oxygen Demand

7.10 RESIDUAL EFFECTS

7.10.1 Peat Extraction Phase (July 1988 – July 2019)

7.10.1.1 Habitats

The ongoing peat extraction activities and all ancillary works from July 1988 to June 2019 are considered to have had a Long-term, Moderate, Effect on the bog habitats at the Application Site, which were already highly modified from their natural state. The effect was considered Moderate as the habitats were already degraded and fragmented through drainage and peat extraction in the surrounding area, and the acrotelm[24] removed from much of the Application Site. Based on the above, Residual Effects are unchanged at **Long-term, Moderate, Negative**.

7.10.1.2 Water Quality and Aquatic Fauna

By 1988, peat extraction and ancillary activities were well-established at the site. While EPA Q-values varied throughout the Peat Extraction Phase, no consistent decline in surface water quality was observed between 1988 and 2019. Despite no clear decline, based on the risk of effect in the absence of control measures the potential effects were deemed as Long-term Significant Negative Effect.

Standard operating procedure and best practice during operations that managed the environmental risks associated with peat extraction, specifically in relation to suspended solids and potential contamination. Based on these control measures above the Residual Effects are reduced to **Long-Term, Moderate, Negative.**

7.10.1.3 Effects on Fauna

With the exception of standard operation measures which focused on minimising risk to water, no other specific measures were set in place during this Phase.

In the absence of operational control measures the effect was assessed as Long-term, Moderate, Negative. The effects of habitat loss for fauna were primarily indirect, resulting from environmental changes such as the direct habitat removal and indirect deterioration of water quality, which are assessed above.

The standard operation measures which are primarily focused on managing risk to water quality would have also reduced indirect effect due to water deterioration. The overall Residual Effect

[24] Acrotelm is active layer of bog where water, nutrients, and gases like oxygen are exchanged freely, and biological processes such as plant growth and decomposition occur,

of fauna following the implementation of standard operating procedures remains unchanged at **Long-term, Moderate, Negative**.

7.10.1.4Effects on European site and pNHAs

Effects in the absence of control measures the potential effects were deemed as Long-term Moderate, Negative.

The long-term nature of the effect of hydrological changes means that even with mitigation, there is still a risk of sediment runoff, nutrient release, or other ecological disturbances that could continue to affect water quality and habitat integrity. Given these considerations, the Residual Effect remains at Long-term, Moderate, Negative.

7.10.2 Current Phase (July 2019 – Present Day)

7.10.2.1Habitats (Habitat Loss, Fragmentation, Degradation)

There has been no additional loss, degradation or fragmentation of habitat as a result of the Current Phase of the Project. With the cessation of peat extraction activity has allowed regeneration from the natural regrowth of vegetation on disturbed cutover bog areas now offering more diverse and structurally complex habitats, and so the Residual Effect is Long-term, Moderate, Positive.

When the operational controls and measures, the Residual Effect remains unchanged at Long-term, Moderate, Positive.

7.10.2.2Water Quality and Aquatic Fauna

EPA Q-values, which measure surface water quality, fluctuated throughout the Peat Extraction Phase, with available monitoring data showing no discernible trend (positive or negative) in Q-values in downstream surface watercourses since the cessation of peat extraction July in 2019. Results suggest that increased regulation under the IPC Licence did not lead to significant downstream water quality improvements. This is primarily due to the presence of other activities within the catchment area that also influence water quality, as well as the fact that the baseline water quality before and during peat extraction remained relatively stable, without substantial deterioration.

With the implementation of standard operating procedures and IPC Licence control measures, the effect downstream surface water quality is reduced to **Long-term, Slight, Negative**.

7.10.2.3Effects on Fauna

During the Current Phase of the Project, the impact on local fauna has remained relatively limited, with the primary concern being the potential degradation of habitats that support various species. These include Otters, Badger, Irish and other species that rely on stable water quality and suitable habitat conditions. The most affected areas would be those within and downstream of the Application Site, where project-related activities could have influenced.

In addition to potential aquatic habitat disturbances, the presence and operation of plant and machinery on-site may have caused disruptions to terrestrial and avian species. Otters, which rely on undisturbed riparian environments, could have been subject to minor disturbances, while a range

of bird species may have experienced short-term behavioural changes due to increased human activity, noise, and movement of equipment. However, these effects are expected to have been minimal and transient in nature.

Given the scale and specific nature of activities undertaken during this Phase, no significant or long-term adverse effects on fauna are anticipated. The implementation of appropriate mitigation measures, such as controlled site operations, habitat preservation efforts, and noise reduction strategies, has further minimised the risk of ecological disruption. Additionally, the reduction in plant, machinery, and workforce activity compared to the more intensive Peat Extraction Phase has contributed to an overall decrease in potential disturbances to wildlife and their habitats.

Any minor disturbances that may have occurred are considered to be short-lived and of negligible impact, ensuring that the integrity and stability of the local ecosystems remain largely unaffected. Continued monitoring and adherence to best environmental practices will further support the conservation of biodiversity in and around the Application Site

In the absence of control measures the effect is assessed as Long-term, Slight, Negative. As the standard operation measures are primarily focused on managing risk to water quality the Residual Effects remain unchanged.

7.10.2.4Effects on European site and pNHAs

In the absence of control measures the effect is assessed as Long-term, Slight, Negative. As the standard operation measures are focused on managing risk to water quality that will benefit the Eurpean sites and pNHA the Residual Effects is reduced to Long-term, Not Significant, Negative .

7.10.3 Remedial Phase (Future)

7.10.3.1Habitats

The implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans is a crucial step in restoring the ecological integrity of the peatland areas within the Application Site. These plans are designed to stabilise previously disturbed peatland, reducing erosion, preventing further habitat loss, and promoting the gradual recovery of ecosystem functions. By re-wetting and re-vegetating cutaway bogs, the rehabilitation efforts will help enhance hydrological stability, reduce carbon loss, and support the regeneration of semi-natural habitats.

One of the most significant benefits of these measures is their ability to improve water quality over the long term. By reinstating natural drainage patterns and minimising runoff carrying suspended sediments and nutrients into nearby watercourses, the plans will mitigate historic water quality impacts linked to peat extraction activities. This, in turn, will benefit downstream aquatic habitats, including designated conservation sites that are hydrologically connected to the Application Site.

Overall, the implementation of these rehabilitation efforts is expected to result in a **Long-term, Significant, Positive** effect on the habitats within the Application Site. These improvements will support biodiversity recovery, facilitate the return of key species, and contribute to the broader environmental sustainability of the area.

7.10.3.2Water Quality and Aquatic Fauna

The implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans is a critical step in restoring the ecological integrity of the peatland areas within the Application Site. Over time, they will become wetter, enhancing their capacity to retain water and reducing runoff. As the landscape evolves, natural vegetation will gradually recolonise the area. This rehabilitation process will lead to a substantial decline in silt and nutrient output, contributing to improved water quality in downstream surface watercourses.

Given these expected changes, the long-term impact of the rehabilitation measures during the Remedial Phase is considered to be a Moderate Positive Indirect Effect on downstream surface water hydrology, overall water quality, and aquatic fauna. As water retention improves and sediment transport decreases, habitat conditions for aquatic life will stabilise, fostering biodiversity and enhancing the ecological integrity of the surrounding water systems. As such the Residual Effects of the implementation of the rehabilitation plans for the Remedial Phase is considered to be a **Long-term, Moderate, Positive, Indirect Effect** on downstream surface water hydrology and water quality and aquatic fauna.

7.10.3.3Fauna

The potential impacts of the Remedial Phase of the Project on local fauna are primarily linked to positive changes in habitat conditions for species.

Many species, including ground-nesting birds, mammals relying on the existing landscape for foraging, breeding, and shelter, will benefit from the action proposed under the Rehabilitation Plans. Improvement in vegetation cover, water levels, and or land stability during the rehabilitation process will be beneficial to these species by modifying their habitat availability and structure.

As rehabilitation efforts progress, the wetter conditions and increased vegetation cover will create more diverse habitat structures, supporting the return of species adapted to peatland and wetland environments. Bird species, particularly waders and waterfowl, may benefit from the establishment of open-water areas, while scrub and woodland regrowth will provide nesting and foraging opportunities for passerines and raptors. Additionally, the stabilisation of soil and reduction in human activity following the Remedial Phase will further enhance the suitability of the site for wildlife.

Given these anticipated changes on terrestrial species or bird populations are expected. Instead, the long-term ecological rehabilitation of the site is likely to provide **Long-term, Moderate, Positive, Indirect Effect**, supporting biodiversity recovery and improving habitat quality for a variety of species

7.10.3.4 European Sites and pNHAs

The rehabilitation plans will positively impact the peatland ecosystem by enhancing habitat diversity and functionality through interventions like drain-blocking and natural recolonisation. While there may be temporary habitat loss, the plans aim to create stable, self-sustaining ecosystems that support a wider range of species. Species that may benefit include Greenland White-fronted Goose of the Ballykenny-Fisherstown Bog SPA.

Additionally, the plans will improve downstream surface water hydrology, water quality, and aquatic habitats, benefiting surrounding sensitive areas like the Lough Ree SAC and SPA. The overall Residual Effect is a **Long-Term, Moderate, Positive, Indirect Effect**.

7.11 CUMULATIVE AND IN-COMBINATION EFFECTS

An evaluation of the potential cumulative and in-combination effects of peat extraction activities and all associated works at the Application Site was conducted, taking into account of historical, existing and proposed **plans** and **projects** in the surrounding area. This assessment specifically examined the combined effects on Key Ecological Receptors (KERs), as identified in Section 7.7.6.

7.11.1 Assessment of Plans

The review of relevant plans focused on evaluating policies and objectives that have the potential for impacting biodiversity cumulatively with the peat extraction and associated activities at the Application Site. The sources of information on such policies and objectives were:

- Objectives relevant to ecology and biodiversity in:
  - Longford County Development Plan 2021–2027[25]
  - Longford County Development Plan 2015–2021[26]
  - Longford County Development Plan 2009–2015[27]
  - Longford County Development Plans dated from 1990 onwards. Chapter 5 – Planning Policy Section 5.5.3.1 of the rEIAR provides a brief summary of the historic plans.
- Relevant policies in Ireland's 4th National Biodiversity Action Plan 2023-2030 (DoCHG, 2024).

This assessment aimed to determine how existing regulatory frameworks support ecological preservation and mitigate potential environmental impacts. In addition to biodiversity-focused policies, the review examined objectives related to peatland conservation and sustainable land use practices, particularly those that influence the maintenance and enhancement of surface water quality.

To provide a structured summary of the findings, an overview of relevant plans and their key environmental considerations is presented in Table 7.32. This table outlines how various planning documents incorporate conservation principles, highlighting their relevance to biodiversity protection, peatland management, and water quality preservation. The insights gained from this review contribute to a broader understanding of the policy landscape influencing land-use decisions and environmental management in areas of ecological sensitivity.

A detailed review of the Development Plans was conducted, including examining policies related to biodiversity conservation and the protection of SACs, SPAs, NHAs, and pNHAs. This assessment

[25] https://www.longfordcoco.ie/services/planning/longford-county-development-plan-2021-2027/volume-1-compressed.pdf. Accessed January 2025.
[26] https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/development-plan-2015-2021/. Accessed January 2025.
[27] https://www.longfordcoco.ie/services/planning/previous-plans-county-town-local-area-/county-development-plan-2009-2015/. Accessed January 2025

aimed to determine how these policies apply to historical and ongoing land-use activities within the Application Site and their alignment with broader environmental objectives. The peat extraction activities, which took place between 1988 and 2019 at varying levels of intensity across different sections of the bog, were carefully evaluated in this context. Based on this analysis, these activities are not considered to be in conflict with the relevant policies and objectives outlined in the Development Plans.

The implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site is expected to yield significant ecological benefits, contributing positively to biodiversity and environmental conditions at the site. Additionally, the rehabilitation of the bog will enhance ecosystem functions, including carbon sequestration and water retention, further supporting regional conservation efforts. The effects of the Cutaway Bog Decommissioning and Rehabilitation Plans are discussed above.

Beyond benefits, the rehabilitation plans also has the potential to generate positive effects on nearby sites that are hydrologically connected to the Application Site. The restoration of natural hydrological conditions is expected to improve water quality, reduce sedimentation, and enhance habitat conditions for aquatic and wetland species. By minimising habitat fragmentation and mitigating historical environmental disturbances, the rehabilitation process will contribute to broader conservation objectives. These anticipated outcomes align closely with the policies and objectives outlined within the Development Plans, reinforcing commitments to sustainable land management, biodiversity protection, and ecological resilience.

Table 7.32: Assessment of Plans

Plan	Objectives	Assessment
Longford County Development Plan 2021–2027	The following provide summary of key relevant County Policy Objectives (CPOs) listed in Chapter 12 - Natural Heritage and Environment • **General Natural Heritage Protection** ▪ **CPO 12.1 - 12.4:** Protect and enhance biodiversity, habitats, landscapes, and geological sites. Promote public awareness and conduct habitat mapping. • **Protection of Designated Sites** ▪ **CPO 12.5 - 12.14:** Safeguard SACs, SPAs, NHAs, and proposed NHAs. Ensure developments comply with Appropriate Assessment (AA) and EU conservation laws. Establish buffer zones and undertake habitat surveys. • **Conservation of Wetlands, Turloughs, and Watercourses** ▪ **CPO 12.29 - 12.33:** Protect wetlands from degradation and require mitigation measures for developments near sensitive water habitats. Prevent unauthorized drainage of wetlands. • **Peatland Conservation** ▪ **CPO 12.50 - 12.55:** Conserve designated peatlands and support National Peatlands Strategy. Work with stakeholders for sustainable peatland management and require planning permission for wetland modifications. • **Trees, Woodlands, and Hedgerows** ▪ **CPO 12.72 - 12.81:** Protect and expand tree cover, hedgerows, and native woodlands.	The peat extraction activities, along with ancillary works, were carried out at varying levels of intensity at the Application Site during the Peat Extraction Phase (July 1988 to July 2019). The overall environmental impacts on biodiversity were considered to be limited in extent to the Application and not significant enough to breach the Policies and Objectives outlined in the County Development Plans, which aim to protect biodiversity, conserve habitats, and safeguard designated areas. During the Current Phase (July 2019 – Present), the activities at the Application Site have been compliant with the environmental safeguards specified in these Policies and Objectives, ensuring that no adverse effects have occurred on biodiversity, or European sites and pNHAs. The implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans will lead to substantial ecological improvements across the Application Site. These efforts will rehabilitate habitats, enhance water retention and quality, and support the recovery of local biodiversity. The long-term positive effects on both terrestrial and aquatic environments, including improved conditions for fauna and surrounding sensitive areas, highlight the significant environmental benefits of this phase. The overall impact is expected to be positive, supporting the sustainability and ecological integrity of the Application Site and European sites and pNHAs into the future.

	Enforce Tree Preservation Orders (TPOs) and promote community forestry projects. • **Invasive Species Management** ▪ **CPO 12.82 - 12.85**: Implement control measures, increase public awareness, and require invasive species management in development projects. • **Biodiversity and Nature Conservation** ▪ **CPO 12.57 - 12.70:** Support national biodiversity plans, require ecological assessments for developments, and promote habitat restoration, wildlife corridors, and native planting initiatives	The Cutaway Bog Decommissioning and Rehabilitation Plans align with and actively support the Policies and Objectives outlined in the County Development Plans. These plans are designed to restore and enhance local biodiversity, improve water quality, and rehabilitate degraded habitats, all of which are key priorities in the County's environmental policies. By focusing on habitat rehabilitation, water retention, and the long-term ecological sustainability of the Application Site, the rehabilitation efforts are fully consistent with the County's objectives for biodiversity conservation, habitat protection, and the safeguarding of designated sites. The implementation of these plans will contribute positively to the goals set forth in the County Development Plans, ensuring the continued preservation and enhancement of the natural environment
Longford County Development Plan 2015–2021	Longford County's Development Plan 2015-2021 includes several objectives aimed at conserving and enhancing biodiversity. Policies and plans highlight the County's commitment to environmental sustainability. The Longford County Council Biodiversity Action Plan Discussion Paper outlines the steps needed to develop a comprehensive biodiversity strategy. This aligns with the National Biodiversity Action Plan and includes securing funding, forming a biodiversity working group, and engaging the public in consultations to ensure effective implementation. Additionally, the Longford County Council Climate Action Plan 2024-2029 sets out key biodiversity goals, such as promoting nature-based climate solutions, protecting green infrastructure, and restoring peatlands. Specific actions include appointing a Biodiversity Officer, implementing a Local Biodiversity Action Plan, and continuing efforts to control invasive species.	

	These initiatives demonstrate Longford County's commitment to integrating biodiversity considerations into its planning and development strategies.	
Longford County Development Plan 2009–2015	The Longford County Development Plan 2009-2015 outlines several objectives aimed at protecting and enhancing the county's biodiversity and natural heritage. Key objectives include: • **Protection and Enhancement:** Safeguarding and improving biodiversity, encompassing wildlife (flora and fauna), habitats, landscapes, and natural resources such as water. • **Appropriate Management:** Encouraging proper management and enhancement of the county's natural heritage. • **Public Access and Awareness:** Promoting access to and understanding of natural heritage areas. • **Geological Conservation:** Protecting significant geological and geomorphological sites, including those proposed as Natural Heritage Areas (NHAs). • **Habitat Mapping and Wetland Survey:** Collaborating with the National Parks and Wildlife Service to develop habitat mapping and conduct wetland surveys. • **Protection of Designated Sites:** Safeguarding sites designated under national and European legislation, such as SACs and SPAs.	
Ireland's 4th National Biodiversity Action Plan (NBAP) for 2023-2030	Five strategic objectives to guide biodiversity conservation efforts: 1. **Adopt a Whole of Government, Whole of Society Approach to Biodiversity**: This objective emphasizes the need for collective action across all sectors of government and society to effectively address biodiversity challenges. 2. **Meet Urgent Conservation and Restoration Needs**: Focusing on immediate actions required to conserve and	Ireland's 4th National Biodiversity Action Plan (NBAP) for 2023-2030 set out objectives to address conservation and restoration needs. During the Current Phase (July 2019 – Present), activities at the Application Site has been in compliance with the policies and objectives outlined in the NBAP, ensuring that no

	restore Ireland's biodiversity, this objective aims to halt further loss and promote recovery of vital ecosystems. 3. **Secure Nature's Contribution to People**: Recognizing the essential services that nature provides, this objective seeks to ensure the sustainable use of natural resources, benefiting both people and the environment. 4. **Enhance the Evidence Base for Action on Biodiversity**: This objective highlights the importance of strengthening scientific research and data collection to inform effective biodiversity policies and actions. 5. **Strengthen Ireland's Contribution to International Biodiversity Initiatives**: Aiming to bolster Ireland's role in global biodiversity efforts, this objective focuses on active participation and contribution to international conservation initiatives. These objectives collectively aim to deliver transformative changes in how Ireland values and protects its natural heritage. The NBAP also introduces a public sector duty on biodiversity, as mandated by the Wildlife (Amendment) Act 2023. This legislation requires all public service bodies, including government departments, agencies, and local authorities, to integrate biodiversity considerations into their plans, policies, and programs, and to report on their progress.	adverse effects have occurred on biodiversity or European sites and pNHAs. Looking forward, the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans will contribute substantially to achieving several of the NBAP's strategic objectives. These plans will rehabilitate habitats, enhance water retention and quality, and support the recovery of local biodiversity. The long-term positive effects on both terrestrial and aquatic environments, including improved conditions for fauna and surrounding sensitive areas, highlight the significant environmental benefits of this phase. The overall impact is expected to be positive, supporting the sustainability and ecological integrity of the Application Site, while aligning with national goals for biodiversity conservation.

7.11.2 Assessment of Projects

A list of the projects and plans incorporated into this cumulative impact assessment is provided in this rEIAR in Chapter 2 – Methodology.

In assessing the projects in Tables 2.3 to 2.5 the potential cumulative effects of their interactions, as well as any in-combination impacts arising from their spatial and temporal overlap with the activities at the Application Site, have been considered to understand their potential combined impact.

7.11.2.1 Peat Extraction Phase

The potential cumulative and combined effects of the Peat Extraction Phase of the Project, along with other relevant activities and projects at the Application Site, are considered below. This includes peat extraction activities and all associated ancillary works that occurred before 1988. Additional details on activities and developments included in the cumulative assessment can be found in Section 2.9 of Chapter 2. The projects considered during the Peat Extraction Phase between 1988 until July 2019 are detailed in Chapter 2, Table 2-3.

During the Peat Extraction Phase (July 1988 – July 2019), extraction activities and ancillary works were carried out at varying levels of intensity across the Application Site. These activities caused environmental impacts, particularly on habitats and water quality, but these effects remained largely confined to the site. The overall impact on biodiversity was considered limited in extent, with no significant adverse effects extending beyond the immediate area.

7.11.2.2 Given the spatial extent of environmental impacts from activities at the Application Site, the cumulative in-combination effects of the Project with other projects have been assessed. Based on this assessment, no significant cumulative effects with other projects are anticipated to have occurred. Current Phase

The projects considered in relation to the potential for cumulative effects during the Current Phase, from August 2019 until present day, are detailed in Table 2-4.

There are a number of applications for renewable energy projects including solar farms, battery energy storage systems, substations, grid uprate works applied for during the Current Phase. The location of these projects are outside the Application and therefore do not result in potential for significant cumulative effects during the Current Phase.

Harmony Solar Longford Ltd. has obtained planning permission for the construction of an underground 33kV grid connection cable, which passes through Derryaroge Bog. Construction is currently underway on this cable which crosses sections of the Derryaroge Bog. There is a potential for a slight adverse cumulative effect during the construction of the cable route within the Application Site due to the temporary stripping of soils and excavations needed for cable trenching.

7.11.2.3 Remedial Phase

Future use of lands at the Application Site

The future use of the lands within the Application Site is expected to be managed as separate and standalone projects. These projects are therefore considered for the purpose of this application. It is anticipated that the lands will be developed for renewable energy projects in the future, alongside enhanced rehabilitation efforts on the bogs as part of the Peatland Climate Action Scheme[28,29] (PCAS), where relevant.

In combination, the Peatland Climate Action Scheme (PCAS) and the Decommissioning and Rehabilitation Plans will have a positive effect on the Application Site. The rehabilitation efforts under both plans will work synergistically to restore and enhance the peatland habitats, improve biodiversity, and promote better water management. The PCAS will support the long-term environmental sustainability of the site, while the Decommissioning and Rehabilitation Plans will address any remaining impacts from previous peat extraction activities. Together, these initiatives will lead to a more resilient and ecologically diverse landscape, fostering positive long-term environmental outcome. **Derryadd Wind Farm**

The future development of lands for renewable energy, identified as the Derryadd Wind Farm, will be subject to a separate planning consent application. This application will include an EIAR that will assess the implementation of rehabilitation measures at the Application Site in conjunction with the construction, operation, and decommissioning of the proposed wind farm.

The future development of the Derryadd Wind Farm and the ongoing rehabilitation of the Application Site represent a shift toward sustainable land use, marking the transition from historical peat extraction to climate-positive initiatives. Together, these projects are expected to have positive in-combination effects, reinforcing national and EU commitments to biodiversity conservation and climate action.

As the peatland rehabilitation progresses under the Decommissioning and Rehabilitation Plan, habitats within the Application Site will begin to recover, creating a more stable and ecologically rich landscape. This restoration effort will work in tandem with the proposed wind farm, which will provide a source of renewable energy while minimising its environmental footprint. The careful design and placement of wind turbines will ensure that biodiversity gains from the rehabilitation process are not compromised, allowing both projects to coexist harmoniously.

Beyond biodiversity, the combined impact of these initiatives will enhance water retention and improve hydrological conditions across the site. The restoration of peatland ecosystems will help regulate water flow, reducing runoff and filtering pollutants, which in turn supports the long-term sustainability of both the wind farm and the surrounding environment.

Crucially, both projects contribute to climate action. Together, they will transform the landscape into a hub for renewable energy and ecological restoration, demonstrating how former extraction sites can be repurposed for environmental and societal benefit.

With no significant cumulative effects anticipated, the combined implementation of these projects will reinforce Ireland's ambitions for a low-carbon future, delivering long-term benefits for biodiversity, water quality, and climate resilience.

[28] Information available at: https://www.bnmpcas.ie/. Accessed January 2025

[29] Information available at: https://cieem.net/wp-content/uploads/2021/05/The-Peatlands-Climate-Action-Scheme-%E2%80%93-New-developments-in-peatland-rehabilitation.pdf. Accessed January 2025

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7.12 CONCLUSION

Peat extraction and associated activities were well established at the Application Site in 1988, resulting in a landscape dominated by cutover bog and bare peat. The majority of the area consisted of exposed bare peat, with small patches of early-stage scrub, woodland, and pioneer vegetation beginning to emerge in some locations. By 1988, extensive drainage, habitat fragmentation, and the removal of surface vegetation had already occurred.

Given the extent of these modifications, the Peat Extraction Phase from 1988 to the present is unlikely to have caused any additional significant negative effects on the site's habitats, flora, or fauna. By this stage, the original ecosystem had already been heavily degraded, with many species displaced due to habitat loss and fragmentation. Bird populations, in particular, were affected as the extraction reduced the opportunity for habitats which may have supported nesting and foraging grounds to establish. While some species may have adapted to the changing environment, As peat extraction activity decreased over time, natural vegetation began to regenerate on the disturbed cutover bog areas, resulting in the development of more diverse and structurally complex habitats. Since 2019, the Current Phase of the Project has been operating under the conditions of IPC Licence No. P0504-01, which has been in place since 2000. The licence establishes strict environmental safeguards, including operational and monitoring requirements, controls on emissions to air and water, waste management protocols, and measures for bog rehabilitation. These regulations are designed to mitigate environmental harm and, where possible, contribute to ecosystem recovery. With a substantial reduction in activities during this Phase and the enforcement of licence conditions, there is no evidence to suggest that significant adverse effects on biodiversity have occurred.

Looking ahead, the Remedial Phase of the Project will focus on rehabilitating the site by implementing rewetting and revegetation measures, facilitating the process of natural succession. As outlined in this Chapter, these efforts will promote the regeneration of peatland habitats, enhancing biodiversity and ecological functions. Over time, this rehabilitation will result in a Long-term Significant Positive Effect, on habitat quality and species diversity on the Application Site overall. Additionally, the rewetting of the bog will aid in restoring hydrological balance, reducing peat oxidation, and improving water retention. These improvements will have positive downstream effects, as confirmed in Chapter 9 - Hydrology, Hydrogeology, and Water Quality, ultimately contributing to the long-term environmental recovery.

7.13 REFERENCES

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