

TOBIN

Derryhinch, Drumman, Derryarkin,
Ballybeg and Toar Bogs – Application
for Substitute Consent

Remedial Natura Impact Statement

September 2026



BUILT ON KNOWLEDGE

Table of Contents

1.	Introduction	1
1.1	Purpose of the Remedial NIS.....	1
1.2	Legislative and Appropriate Assessment Context	1
1.3	Application Site Background	2
1.4	Current Site Status and Rehabilitation Obligations.....	2
1.5	Assessment Framework.....	3
1.6	Remedial Appropriate Assessment Screening Report	3
2.	Statement of Authority	6
3.	Summary of remedial AASR and Assessment of Likely Significant Effects	7
3.1	Overview	7
3.2	Impact Sources and Pathways	8
4.	Description of the Project	14
5.	Characteristics of the Receiving Environment	15
5.1	Information Used to Inform the Appropriate Assessment	15
5.2	European sites	15
6.	Potential Effects of Peat Extraction Phase (June 1994 – June 2020).....	28
6.1	Overview	28
6.2	In-situ Effects.....	30
6.3	Ex-situ Effects.....	33
7.	Control Measures.....	36
7.1	Pre-IPC Licence.....	36
7.2	IPC Licence – Derrygreenagh Bog Group - P0501-01	37
8.	Assessment of Adverse Effects	39
8.1	River Boyne and River Blackwater SAC [002299]	39
8.2	River Barrow and River Nore SAC [0002162].....	56
8.3	Lough Ennell SPA [0004044]	78
8.4	River Boyne and River Blackwater SPA [0004232]	81
8.5	Conclusion of Assessment of Adverse Effects	86
9.	Likely Cumulative Impacts of the Project on European Site, In-combination with other Plans and Projects.....	87

9.1	Overview	87
9.2	Identification of other projects.....	87
9.3	In-combination Assessment	87
9.4	Conclusion	88
10.	Concluding Statement	89
11.	References	91

Appendices

Appendix A Remedial Appropriate Assessment Screening Report

List of Tables

Table 3.1: Relevant European Sites	8
Table 5.2: QIs and SSCO at River Boyne and River Blackwater SAC.....	16
Table 5.3: Threats and Pressures.....	16
Table 5.4: SCI and SSCO at River Boyne and River Blackwater SPA	20
Table 5.5: Threats and Pressures.....	20
Table 5.6: QI and SSCO at River Barrow and River Nore SAC	21
Table 5.7: Threats and Pressures.....	22
Table 5.8: SCI and SSCO at Lough Ennell SPA.....	26
Table 5.9: Threats and Pressures.....	26
Table 6.1: Summary of Potential In-situ and Ex-situ Effects on Qualifying Interests of Special Areas of Conservation.....	28
Table 6.2: Summary of Potential In-situ and Ex-situ Effects on Special Protection Areas	29
Table 8.1: Annex I Habitat QIs of the River Boyne and River Blackwater SAC [002299], Site Specific Conservation Objectives and Assessment of Potential Adverse <i>in-situ</i> Effects	40
Table 8.2: Annex II Species QIs of the River Boyne and River Blackwater SAC [002299], Site Specific Conservation Objectives and Assessment of Potential Adverse of <i>in-situ</i> and <i>ex-situ</i> Effects.....	44
Table 8.3: Annex I Habitat QIs of the River Barrow and River Nore SAC [0002162]], Site Specific Conservation Objectives and Assessment of Potential Adverse <i>in-situ</i> Effects.....	56
Table 8.4: Annex II Species QIs of the River Barrow and River Nore SAC [0002162], Site Specific Conservation Objectives and Assessment of Potential Adverse <i>in-situ</i> and <i>ex-situ</i> Effects.....	60
Table 8.5: SCIs of Lough Ennell SPA [0004044], Site Specific Conservation Objectives and Assessment of Potential Adverse Effects.....	79

Table 8.6: SCIs of River Boyne and River Blackwater SPA [0004232], Site Specific Conservation Objectives and Assessment of Potential Adverse <i>in-situ</i> and <i>ex-situ</i> Effects.....	83
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List of Figures

Figure 1.1: Boundary of the Application Site.....	5
Figure 3.1: European Sites Where Potential Effects from the Project Could Not Be Excluded in Relation to WFD SWB and LWB.....	12
Figure 3.2: European Sites in Relation to WFD Ground Water Bodies.....	13

1. INTRODUCTION

1.1 PURPOSE OF THE REMEDIAL NIS

This remedial Natura Impact Statement (remedial NIS), prepared by TOBIN on behalf of Bord na Móna Biomass Limited (the Applicant), assesses whether peat extraction and ancillary activities undertaken between 1994 and 2020 at Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs in Counties Offaly, Meath and Westmeath (hereafter referred to as the "Application Site"), have resulted in adverse effects on the integrity of European sites, either alone or in combination with other plans or projects, in view of their conservation objectives.

June 1994 is the date when the Habitats Directive was required to be transposed into Irish law, and therefore the earliest date that Appropriate Assessment (AA) would have been required, while 2020 is the year when peat extraction at all bogs comprising the Application Site ceased.

This rNIS also considers potential effect of the Project, either alone or in combination with other past, existing and reasonably foreseeable Plans and Projects. This remedial NIS has been prepared to support the Applicant's application for Substitute Consent for peat extraction and ancillary activities undertaken at the Application Site.

This remedial NIS has been prepared to inform an application for Substitute Consent to An Coimisiún Pleanála (ACP) under Section 177E of the Planning and Development Act 2000 (as amended).

1.2 LEGISLATIVE AND APPROPRIATE ASSESSMENT CONTEXT

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) came into force on 10 June 1994. This was the date by which Member States, including Ireland, were required to comply with the provisions of the Directive. Although the Habitats Directive was not fully transposed into Irish law until 1997 through the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), June 1994 represents the earliest point from which Appropriate Assessment (AA) requirements may have applied to the Project.

Section 177G of the Planning and Development Act 2000 (as amended) provides that a 'revised Natura Impact Statement'¹ prepared for a Substitute Consent application shall contain:

- *'a statement of the significant effects, if any, on the relevant European site which have occurred, or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out;*
- *details of any appropriate remedial or mitigation measures undertaken or proposed to be undertaken by the applicant to remedy or mitigate any significant effects on the environment or on the European site;*
- *details of the period of time within which any such proposed remedial or mitigation measures shall be carried out by or on behalf of the applicant'.*

¹ Section 177G of the Planning and Development Act 2000 (as amended) refers to 'revised Natura Impact Statement' with respect to Substitute Consent applications. While this terminology is used in the Act, the term 'remedial Natura Impact Statement' is used here.



This remedial NIS has been prepared to assess Bord na Móna's application for Substitute Consent and has been prepared in accordance with Part XAB of the Planning and Development Act 2000 (as amended), the Planning and Development Regulations 2001 (as amended), and relevant jurisprudence of the Court of Justice of the European Union and the Irish Courts.

This remedial NIS has also been prepared having regard to relevant guidance including the following:

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission (EC), 2021)
 - Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018)
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Department of the Environment, December 2009, amended February 2010)

1.3 APPLICATION SITE BACKGROUND

The Derryhinch, Drumman, Derryarkin, Ballybeg, and Toar Bogs form part of a larger bog group, owned and operated by the Bord na Móna, known as the Derrygreenagh Bog Group. The Application Site extends to approximately 2,637 hectares (ha) and comprises primarily of cutaway bog and bare peat, as well as partially developed bog land, a drainage network, pumping stations, local holding areas, railway lines and site entrances accessing the surrounding public road network.

Site preparation works at the Application Site including vegetation clearance and drainage insertion commenced in 1950 across all bogs. Industrial peat extraction and ancillary activities were undertaken from 1958 and continued for varying durations within the different bogs, as follows:

- Derryhinch Bog - peat extraction and ancillary activities occurred from 1958–2017;
- Drumman Bog - peat extraction and ancillary activities occurred from 1958–2018;
- Derryarkin Bog - peat extraction and ancillary activities occurred from 1958 to between 1988 and 1991;
- Ballybeg Bog - peat extraction and ancillary activities occurred from 1958–2020; and
- Toar Bog – peat extraction and ancillary activities occurred from 1958–2018.

While peat extraction ceased at different times across the individual bogs, 2020 has been adopted as a precautionary and conservative date by which peat extraction across the entire Application Site is considered to have ceased.

1.4 CURRENT SITE STATUS AND REHABILITATION OBLIGATIONS

Following the cessation of peat extraction, activities at the bogs comprising the Application Site transitioned from active peat extraction to decommissioning and site management. These activities included the removal of peat stockpiles (completed in 2021), the decommissioning of infrastructure, and ongoing management measures such as water level management, environmental monitoring, and maintenance of existing drainage and access networks.

Under the Integrated Pollution Control (IPC) Licence P0501-01 licence issued by the Environmental Protection Agency (EPA) in respect of the Derrygreenagh Bog Group, comprising Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs, Bord na Móna is required under Condition 10 to implement Cutaway Bog Decommissioning and Rehabilitation Plans.

1.5 ASSESSMENT FRAMEWORK

To provide a structured assessment framework, the remedial AASR assessed activities undertaken at the Application Site across the following distinct phases that reflect the evolution of activities at the site from active peat extraction through to future rehabilitation. The Project phases are:

- **Peat Extraction Phase (June 1994 – June 2020)**
This phase includes all works undertaken from 1994 to the cessation of peat extraction at the bogs across the Application Site, which varied between 2017 and 2020 depending on the bog. As outlined above, June 1994 is the earliest date by which AA would have been required, while 2020 is a precautionary and conservative date by which all peat extraction activity across all bogs comprising the Application Site is considered to have ceased. Some rehabilitation was also carried out in this phase at Derryarkin and Drumman. At Derryarkin, rehabilitation measures undertaken in 2001-2002, including drain-blocking and main-outfall modifications, facilitated the development of extensive wetland, fen and scrub habitats across areas of former cutaway bog. At Drumman, rehabilitation trials undertaken between 2010 and 2014, involving fertiliser applications, nursery crops and later grass-seed trials, successfully established vegetation cover and stabilised previously bare peat areas.
- **Current Phase (June 2020 – Present Day)**
This phase covers all works from the cessation of peat extraction in 2020 to the present, including the implementation of the Cutaway Bog Decommissioning Plan under Condition 10 of EPA Licence P0501-01, which to date has included infrastructure decommissioning, removal of peat stockpiles, and ongoing site management measures such as water level control, environmental monitoring, and maintenance of drainage network to support future site rehabilitation efforts.
- **Remedial Phase (Future)**
This phase comprises the future implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site, which will include measures such as hydrological restoration, habitat establishment, and ecological enhancement, aimed at supporting the long-term recovery, stabilisation, and sustainable after-use of the site following peat extraction.

1.6 REMEDIAL APPROPRIATE ASSESSMENT SCREENING REPORT

A remedial Appropriate Assessment Screening Report (remedial AASR) was prepared to assess the potential for likely significant effects arising from the Project. The remedial AASR is included in full in this NIS as Appendix A and is summarised in Section 3 of this remedial NIS.

The remedial AASR was undertaken pursuant to Section 177U of the Planning and Development Act 2000 (as amended) and assessed the potential for likely significant effects on European sites arising from peat extraction and ancillary activities undertaken at the Application Site since June 1994. The remedial AASR also considered the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans required under Condition 10 of EPA IPC Licence P0501-01.



Legend

- Application Site Boundary
- Derrygreenagh Work Location
- Towns

0 1.5 3
Kilometers

Spatial Reference Datum: IREN95 EPSG: 2157		Copyrights: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.	
A	16/09/2026	First issue	S.P B.K
Rev	Date	Description	By Chkd.

Client:

Project:
Derrygreenagh Substitute Consent

Title:
Figure 1-1:
Site Location Map

Scale @ A3: 1:80,000

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Map Ref: 12334-024-P.App.BO-OSM-TOB-A

Draft: A

2. STATEMENT OF AUTHORITY

This remedial NIS was authored TOBIN Ecologist Aaron McCormick (B.Sc. (Hons) M.Sc.) and reviewed by Senior Ecologist Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM).

Aaron is an ecologist in TOBIN's Environment and Planning (E&P) division. Aaron holds a B.Sc. (hons) degree in Marine Science from the University of Galway (formerly National University of Ireland, Galway), and an M.Sc. degree in Risk, Resilience, and Sustainability from University College Dublin. Aaron has several years of post-graduate ecological and conservation experience. His research and work experience includes studying effects of anthropogenic alteration throughout river catchments in Ireland, marine benthic ecology surveys, marine demersal and pelagic fisheries surveying, transitional and freshwater fisheries surveying, and catchment-wide climate change related temperature change studies for UCD, the Marine Institute, and Inland Fisheries Ireland. He has experience in report preparation for state organisations and is trained in the preparation of AASR, NIS, and EIAR documents.

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, NIS and Ecological Impact Assessment (EclA) reporting, and Environmental Impact Assessment Report (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.

The baseline ecological surveys undertaken were conducted by a team of suitably qualified ecologists with the necessary skills and experience to complete the required assessments.

3. SUMMARY OF REMEDIAL AASR AND ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

3.1 OVERVIEW

Site preparation works at the Application Site, including vegetation clearance and drainage installation, commenced across all bogs in 1950. These works facilitated the subsequent development of industrial peat extraction areas, with peat extraction commencing in 1958, as outlined in Section 1.3, continued for varying durations within the individual bogs.

Site preparation, peat extraction and associated ancillary activities undertaken at the Application Site from the 1950s until cessation in 2020 resulted in significant modification of the peatland environment, including drainage of the bogs, alteration of hydrological conditions, habitat loss and degradation, and the mobilisation of sediment to receiving waters. These activities altered the ecological character of the Application Site and had the potential to affect hydrologically connected aquatic habitats and species beyond the site boundary.

Since the cessation of peat extraction in 2020, activities at the Application Site have been limited to decommissioning, site management and rehabilitation preparation measures, substantially reducing the potential for ongoing effects on European sites.

For the purposes of the AA, the **Peat Extraction Phase (June 1994–June 2020)** represents the key assessment period, reflecting the timeframe during which impacts on European sites are considered to have occurred. The remedial AASR concluded that potential likely significant effects could not be excluded for several QIs and SCIs of four European sites during the Peat Extraction Phase, either alone or in-combination with other plans and projects. Accordingly, the QIs and SCIs have been brought forward for Stage 2 AA and are assessed further in this remedial NIS.

Section 3.2.1 provides a summary of the relevant impact pathways for **the Peat Extraction Phase (June 1994–June 2020)**, including hydrological, water quality, habitat loss, and disturbance pathways, and sets out the rationale for identifying these pathways as giving rise to potential likely significant effects.

Section 3.2.2 summarises the activities associated with the **Current Phase (June 2020–Present Day)**, including decommissioning, rehabilitation and routine drainage maintenance, together with the associated impact pathways. Since the cessation of peat extraction, these activities have been localised, limited in scale and substantially reduced in intensity compared to historic peat extraction activities. As concluded in the remedial AASR, they do not give rise to pathways capable of resulting in likely significant effects on European sites and, accordingly, no likely significant in situ or ex situ effects arise.

Section 3.2.3 summarises the activities associated with the **Remedial Phase (Future)**. The Remedial Phase comprises the future implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, including hydrological restoration, habitat establishment and ecological enhancement measures. The nature, scale and location of these activities were assessed in the remedial AASR, which concluded that they would not give rise to pathways capable of resulting in likely significant effects on European sites. Accordingly, likely significant effects on European sites can be excluded.

3.2 IMPACT SOURCES AND PATHWAYS

3.2.1 Peat Extraction Phase (June 1994 – June 2020)

Between 1994 and 2020, industrial peat extraction and ancillary activities at the Application Site gave rise to a range of potential impact pathways affecting European site.

The remedial AASR concluded that likely significant effects arising from activities associated with the Peat Extraction Phase between 1994 and 2020 could not be excluded for specific QIs and SCIs of four designated European sites. These "relevant" European sites are listed in Table 3.1, together with the relevant QIs and SCIs for which likely significant effects could not be excluded in the remedial AASR and which were therefore brought forward for Stage 2 AA in this remedial NIS. The locations of these relevant European sites in relation to the Application Site, as well as Water Framework Directive (WFD) Surface Water Bodies (SWBs), including River Water Bodies (RWBs) and Lake Water Bodies (LWBs), are illustrated in Figure 3.1. The relevant European sites in relation to WFD Groundwater Bodies (GWBs) are shown in Figure 3.2

Table 3.1: Relevant European Sites

Site name [Site code]	QI/ SCI for which significant effect could not be excluded	Site Distance (as the crow flies) from Application Site	References (accessed February 2026)	Year Designated
River Boyne and River Blackwater SAC [0002299]	• River Lamprey (<i>Lampetra fluviatilis</i>) [1099] • Atlantic Salmon (<i>Salmo salar</i>) [1106] • Otter (<i>Lutra lutra</i>) [1355] • Alkaline fens [7230] • Alluvial forests (<i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>) [91E0]*	9.34 km north east	(NPWS, 2021a) ²	2003
River Barrow and River Nore SAC [0002162]	• Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016] • Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] • White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092] • Sea Lamprey (<i>Petromyzon marinus</i>) [1095] • Brook Lamprey (<i>Lampetra planeri</i>) [1096] • River Lamprey (<i>Lampetra fluviatilis</i>) [1099] • Twait Shad (<i>Alosa fallax</i>) [1103] • Atlantic Salmon (<i>Salmo salar</i>) [1106]	19.56 km south	(NPWS, 2025) ³	1998

² https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002299.pdf

³ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf



Site name [Site code]	QI/ SCI for which significant effect could not be excluded	Site Distance (as the crow flies) from Application Site	References (accessed February 2026)	Year Designated
	• Otter (<i>Lutra lutra</i>) [1355] • Killarney Fern (<i>Trichomanes speciosum</i>) [1421] • Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] • Hydrophilous tall herb fringe communities [6430] • Alluvial forests (<i>Alnus glutinosa</i>, <i>Fraxinus excelsior</i>) [91E0]*			
Lough Ennell SPA [0004044]	• Pochard (<i>Aythya ferina</i>) [A059] • Tufted Duck (<i>Aythya fuligula</i>) [A061] • Coot (<i>Fulica atra</i>) [A125]	7.83 km west	(NPWS, 2024) ⁴	1995
River Boyne and River Blackwater SPA [0004232]	• Kingfisher (<i>Alcedo atthis</i>) [A229]	9.34 km north east	(NPWS, 2024) ⁵	2010

The Application Site drains to three WFD catchments:

- River Boyne Catchment (WFD Code: 07)
- Lower River Shannon Catchment (WFD Code: 25A)
- Barrow Catchment (WFD Code: 14)

The Application Site is hydrologically connected to the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA via a network of drains, streams and river waterbodies within the River Boyne catchment. The Application Site is also hydrologically connected to the River Barrow and River Nore SAC via watercourses within the Barrow catchment. Through these hydrological pathways, peat extraction and ancillary activities undertaken during the Peat Extraction Phase had the potential to alter hydrological conditions and affect water quality through the mobilisation of suspended solids, peat silt, nutrients and, on a precautionary basis, accidental hydrocarbon contamination associated with the operation of heavy machinery and peat harvesting equipment.

Consequently, it could not be excluded that such activities may have affected downstream aquatic habitats and species associated with these European sites, giving rise to potential likely significant in-situ effects (i.e. effects occurring within the boundaries of European sites) on sensitive QIs and SCIs.

⁴ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004044.pdf

⁵ https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004232.pdf



In addition, peat extraction activities involved the use of machinery, vehicle movements, human presence, noise generation and widespread habitat modification across the Application Site. These activities had the potential to disturb mobile species associated with European sites that may have utilised the Application Site and surrounding habitats for foraging, breeding, roosting, commuting or dispersal. Such pathways were identified for species associated with Lough Ennell SPA.

Furthermore, habitat loss and habitat degradation within the Application Site, together with deterioration in water quality within hydrologically connected watercourses, had the potential to adversely affect habitats used by mobile QI and SCI species associated with European sites. Such pathways had the potential to result in ex-situ effects (i.e. effects occurring outside the boundaries of European sites where habitats within the Application Site function as supporting habitat for species associated with a European site).

3.2.2 Current Phase (June 2020 – Present Day)

Since June 2020, activities at the Application Site have been limited to the removal of peat stockpiles, the decommissioning of infrastructure, rehabilitation measures, and the routine maintenance of existing drainage.

The cessation of peat extraction in June 2020 has significantly reduced the potential for the generation of suspended sediments and water pollution, affecting both surface water and groundwater, when compared to the Peat Extraction Phase. While activities during the Peat Extraction Phase (June 1994 – June 2020) gave rise to likely significant in-situ effects on European sites, as outlined in Section 3.2.1 above, activities during the Current Phase (June 2020 – Present Day) are not of a nature or scale that would result in the transfer of pollutants at levels capable of significantly affecting aquatic habitats or species. Accordingly, no likely significant in-situ effects on European sites are considered to have occurred, or to be occurring, as a result of activities undertaken during the Current Phase.

Similarly, while activities during the Peat Extraction Phase may have generated noise and human disturbance with the potential to result in likely significant ex-situ effects on mobile species (e.g. QI Otter and SCI bird species), activities during the Current Phase are of substantially reduced intensity and duration and frequency. Human activity at the Application Site is now infrequent, intermittent and localised, resulting in extended periods during which habitats are available for use by mobile QI and SCI species without disturbance. Consequently, past and ongoing activities during the Current Phase have not and will not lead to likely significant ex-situ effects to mobile QI and SCI species from the River Boyne and River Blackwater SAC and SPA, River Barrow and River Nore SAC and Lough Ennell SPA as they do not give rise to disturbance pathways capable of significantly affecting mobile species associated with the European sites.

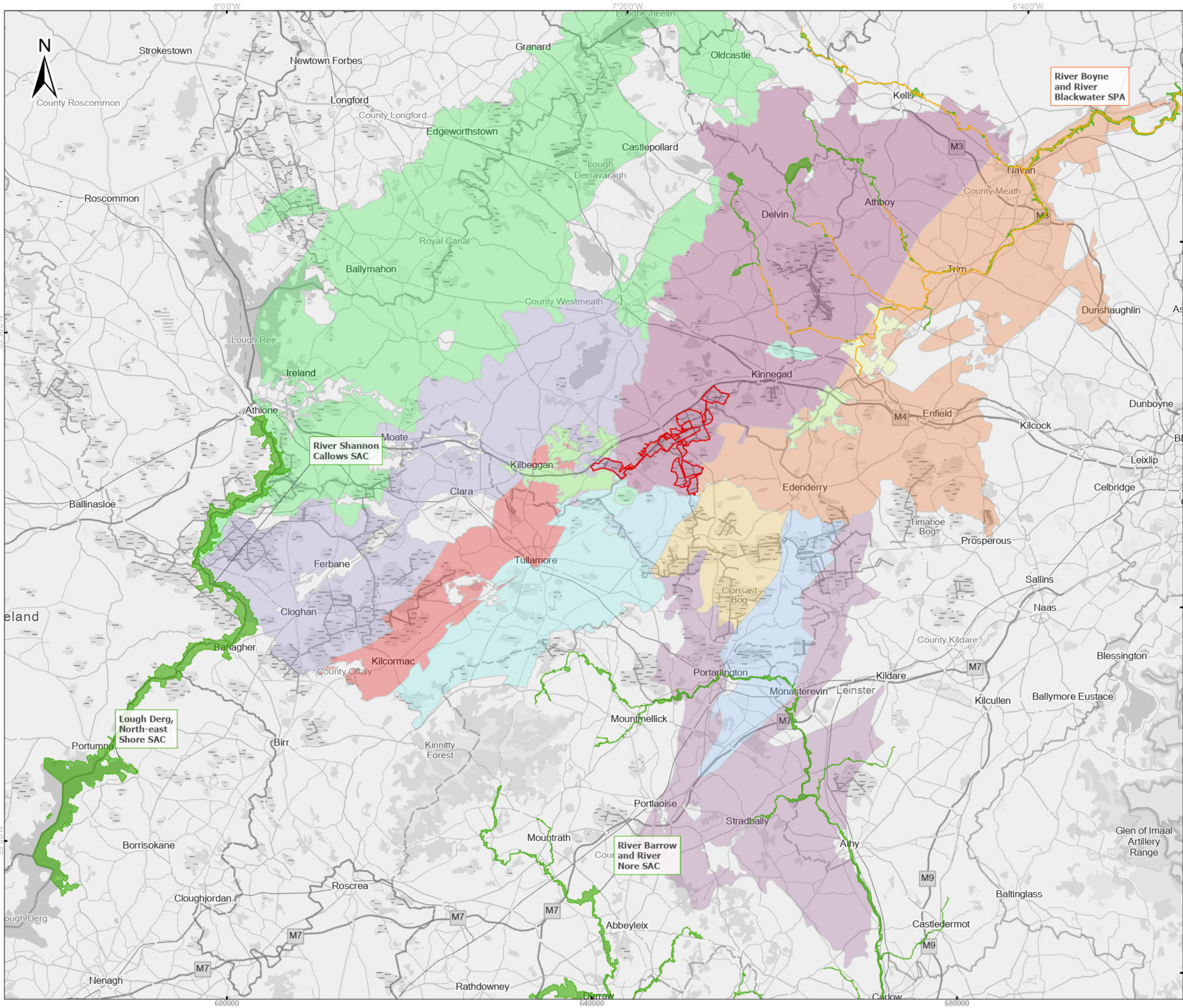
Consequently, no likely significant ex-situ effects on such species are considered to have occurred, or to be occurring, during the Current Phase and further assessment of activities associated with the Current Phase in the remedial NIS is not required.

3.2.3 Remedial Phase (Future)

Future rehabilitation activities at the Application Site during the Remedial Phase (Future) will focus on restoring site hydrological conditions, improving water retention, and facilitating habitat recovery across the bogs. These measures will reduce the potential for erosion and limit the mobilisation of sediments and nutrients to surface water and groundwaters. While minor and localised risks associated with rehabilitation works may arise, including temporary sediment mobilisation or accidental spillages associated with machinery use, any such event if they were to occur would be short-term, and localised to the immediate vicinity of the works.

Given the nature and scale of the proposed rehabilitation activities, the separation distances between the Application Site and the relevant European sites, and the presence of intervening hydrological pathways, any potential emissions would be subject to substantial dilution, dispersion and natural attenuation prior to reaching a European site. Accordingly, any changes in water quality or hydrological conditions would be imperceptible at European sites and would not be of a magnitude capable of affecting the habitats, species, supporting habitat, or ecological processes underpinning their conservation objectives. Consequently, the potential for likely significant in-situ effects on European sites can be excluded, either alone or in combination with other plans or projects.

Future rehabilitation activities at the Application Site during the Remedial Phase (Future) will focus on restoring site hydrological conditions, improving water retention, and facilitating rehabilitation across the bogs. These measures will reduce the potential for erosion and limit the mobilisation of sediments and nutrients to surface waters and groundwater. While minor and localised risks associated with rehabilitation works may arise, including temporary sediment mobilisation or accidental spillages associated with machinery use, such risks are limited in extent and duration and are not of a scale capable of affecting European sites. Any such emissions would be confined to the immediate vicinity of the works and, where hydrological pathways exist, would be subject to substantial dilution, dispersion and natural attenuation prior to reaching any European site. Furthermore, the separation distances involved and the limited scale and temporary nature of the rehabilitation activities ensure that any resulting changes in water quality or hydrological conditions would be negligible and incapable of affecting the conservation objectives, QIs or SCIs of European sites. Consequently, the potential for likely significant in-situ effects on European sites can be excluded, either alone or in combination with other plans or projects.



Éire / Ireland

Dublin

53°44'N

7°16'30'W

Legend

- Application Site Boundaries
- Special Protected Areas (SPAs)
- Special Areas of Conservation (SACs)
- WFD - Groundwater Bodies
 - Athboy
 - Bagenalstown Upper
 - Clara
 - Cushina
 - Daingean
 - Geashill
 - GWDTE-Mount Hevey Bog (SAC002342)
 - GWDTE-Raheenmore Bog (SAC000582)
 - Inny
 - Kilbeggan Gravels
 - Kilrathmurry Gravels
 - Longwood Gravels
 - Rhode
 - Trim
 - Tullamore

0 5 10 Kilometers

Spatial Reference		Copyrights:		
Datum: IRENET95		Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri		
EPSG: 2157		Community Maps contributors, Map layer		
A	28/09/2026	First issue	S.P	J.F
Rev	Date	Description	By	Chkd.

Client:

Project:

Derrygreenagh Substitute Consent

Title:

Figure 3.2:
European Sites in Relation
to WFD Ground Water Bodies

Scale @ A3: 1:380,000

Prepared by:	Checked by:	Date:
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Map Ref:	Draft:
12334-003..NIS-EU.S-GWB-TOB-A	A

4. DESCRIPTION OF THE PROJECT

To maintain consistency with the remedial AASR and avoid duplication, the Project description is not repeated in this remedial NIS. A comprehensive description of the Project is provided in Section 2 of the remedial AASR, which is included in full in this NIS as Appendix A.

This remedial NIS focuses on the detailed assessment of potential effects on QIs and SCIs of four European sites for which likely significant effects could not be excluded in the remedial AASR.

5. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

5.1 INFORMATION USED TO INFORM THE APPROPRIATE ASSESSMENT

To maintain consistency between the remedial AASR and this remedial NIS, and to avoid unnecessary duplication, information informing the Appropriate Assessment is not reproduced in detail within this document. Details of the desktop studies, baseline data collection, consultation, ecological surveys, and associated methodologies and findings are provided in the remedial AASR, which is included in full in this NIS as Appendix A

This approach ensures clarity and consistency across the assessment documentation and provides a single, comprehensive source of the information underpinning the AA.

5.2 EUROPEAN SITES

5.2.1 Overview

All QIs and SCIs at European sites were assessed within the remedial AASR. Only those QIs and SCIs for which the potential for likely significant effects could not be excluded have been carried forward to this remedial NIS.

As outlined in Section 3 above, the **Current Phase (June 2020-Present)** and the **Remedial Phase (Future)** were assessed in the remedial AASR, and no likely significant in-situ or ex-situ effects on QIs and SCIs of European sites were identified during either phase.

In contrast, the assessment identified the potential for likely significant effects, both in-situ and ex-situ, could not be excluded during the **Peat Extraction Phase (June 1994 to June 2020)**, for several QIs and SCIs of the following European sites:

- River Boyne and River Blackwater SAC [0002299]
- River Boyne and River Blackwater SPA [0004232]
- River Barrow and River Nore SAC [0002162]
- Lough Ennell SPA [0004044]

Potential likely significant in-situ effects identified during the Peat Extraction Phase relate primarily to hydrologically connected European sites and were associated with potential changes in water quality, hydrology and aquatic habitat condition arising from peat extraction and associated activities. Potential likely significant ex-situ effects relate to mobile QI and SCI species and supporting habitats utilised outside the boundaries of the European sites..

Section 5.2.2 below lists the QIs and SCIs for which potential impacts were identified, summarises the relevant conservation objectives, and outlines the key threats and environmental sensitivities affecting the European sites as detailed in Natura 2000 Standard Data form for the European sites.

5.2.2 Relevant European sites

5.2.2.1 River Boyne and River Blackwater SAC [0002299]

River Boyne and River Blackwater SAC was designated in 2003. The QIs brought forward from the remedial AASR to this remedial NIS, and their associated conservation objectives (NPWS, 2021) are presented in Table 5.1.

Table 5.1: QIs and SSCO at River Boyne and River Blackwater SAC

Qualifying Interest	Conservation Objective
River Lamprey (<i>Lampetra fluviatilis</i>) [1099]	To restore the favourable conservation condition of River Lamprey (<i>Lampetra fluviatilis</i>)
Salmon (<i>Salmo salar</i>) [1106]	To restore the favourable conservation condition of Atlantic Salmon (<i>Salmo salar</i>)
Otter (<i>Lutra lutra</i>) [1355]	To maintain the favourable conservation condition of Otter (<i>Lutra lutra</i>)
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)* [91E0]	To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)*
* indicates priority habitats under the E.U. Habitats Directive.	

5.2.2.1.1 Main Pressures and Threats

The NPWS Natura 2000 Standard Data Form⁶ for the River Boyne and River Blackwater SAC provides a description of the site, including ecological characteristics, and identifies the main threats and pressures affecting the conservation status of its qualifying interests. These threats and pressures largely relate to impacts on water quality, hydrological regime, and physical habitat structure, which are critical for the maintenance of riverine habitats and associated species (see Table 5.2).

Table 5.2: Threats and Pressures

Rank	Code	Threats and Pressures	Inside/Outside ⁷
H	E02	Industrial or commercial areas	Inside
H	E03.04	Other discharges	Inside
H	H01	Pollution to surface waters (limnic, terrestrial, marine & brackish)	Inside

⁶ <https://natura2000.eea.europa.eu/Natura2000/sdf/#/sdf?site=IE0002299&release=62> accessed June 2026

⁷ Inside = the threat/pressure occurs within the boundaries of the European site. Outside = the threat/pressure originates outside the boundaries of the European site, but may still affect its QIs, SCIs, habitats or ecological functioning.

Rank	Code	Threats and Pressures	Inside/Outside ⁷
H	I01	Invasive non-native species	Inside
H	J02.15	Other human-induced changes in hydraulic conditions	Inside
L	D01.05	Bridge, viaduct	Inside
L	G01	Outdoor sports and leisure activities, recreational activities	Inside
L	G05	Other human intrusions and disturbances	Inside
L	G05.06	Tree surgery, felling for public safety, removal of roadside trees	Inside
M	A01	Cultivation	Inside
M	A05.02	Stock feeding	Outside
M	A07	Use of biocides, hormones and chemicals	Inside
M	A08	Fertilisation	Inside
M	A10.01	Removal of hedges and copses or scrub	Inside
M	B01.02	Forest planting on open ground	Inside
M	C01.01	Sand and gravel extraction	Inside
M	D01.02	Roads, motorways	Inside
M	E01.04	Other patterns of habitation	Inside
M	E03.02	Disposal of industrial waste	Inside
M	E05	Storage of materials	Inside
M	G02.10	Other sport / leisure complexes	Inside
M	J02	human induced changes in hydraulic conditions	Inside
M	J02.10	Management of aquatic and bank vegetation for drainage purposes	Inside
M	J02.11	Siltation rate changes, dumping, depositing of dredged deposits	Inside

5.2.2.1.2 Qualifying Interests

Information on the QIs of the site for which likely significant effects could not be excluded is provided below. The information is based on the Site-Specific Conservation Objectives (SSCO) and Site Synopsis for the River Boyne and River Blackwater SAC (NPWS, 2021; NPWS, 2014).

5.2.2.1.2.1 Otter (*Lutra lutra*) [1355]

Otter is widely distributed throughout the River Boyne and River Blackwater SAC and is listed under Annex II of the Habitats Directive.

The SAC provides extensive suitable habitat for otter, including river channels, riparian vegetation, and adjacent wetlands. These habitats are used for:

- Foraging (primarily on fish)
- Resting and breeding (holts and couches along riverbanks)

Otters rely on:

- Good water quality to sustain prey populations
- Undisturbed riparian zones for shelter
- Connectivity along river corridors

Given the continuous nature of the river network within the SAC, the site forms part of a wider ecological corridor supporting otter populations at a catchment scale.

5.2.2.1.2.2 River Lamprey (*Lampetra fluviatilis*) [1099]

The River Boyne and River Blackwater SAC support populations of River Lamprey, a migratory fish species listed under Annex II of the Habitats Directive.

River Lamprey use freshwater river systems for spawning and juvenile development, with larvae (ammocoetes) inhabiting fine sediment substrates in low-flow areas. Suitable habitat includes:

- Silty or sandy substrates for burrowing larvae
- Well-oxygenated waters for adult migration and spawning

The species are sensitive to barriers to migration, water pollution, and sediment disturbance. Maintaining longitudinal connectivity of river systems and good water quality is essential for sustaining viable populations.

5.2.2.1.2.3 Atlantic Salmon (*Salmo salar*) [1106]

Atlantic Salmon is an Annex II species of the SAC, using the River Boyne and Blackwater catchment for spawning and juvenile development.

Salmon requires the following:

- Clean, well-oxygenated gravel substrates for spawning
- Unobstructed migration routes between marine and freshwater environments
- High water quality and appropriate flow regimes

The Boyne system is recognised as an important salmonid river, and the conservation of this species depends on maintaining river continuity, water quality, and suitable habitat conditions throughout the catchment.

5.2.2.1.2.4 Alkaline fens [7230]

Alkaline fens within the River Boyne and River Blackwater SAC occur in areas associated with groundwater seepage and base-rich hydrological conditions along the river floodplain. These habitats are typically found in low-lying areas adjacent to the river channel where calcareous groundwater contributes to the development of species-rich vegetation communities.

Within the SAC, alkaline fens are typically distributed along sections of the river margins and associated wetlands, where hydrological connectivity between surface water and groundwater is intact. Their ecological function is closely tied to maintaining water quality and supporting biodiversity within the wider riverine system.

In relation to the Application Site:

- The SAC includes riverine stretches that are part of a hydrologically connected catchment system.
- Any changes in groundwater or surface water quality upstream or within connected tributaries have the potential to influence alkaline fen habitats.

5.2.2.1.2.5 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicionalbae*) * [91E0]

Alluvial forests occur along stretches of the River Boyne and its tributaries, particularly in areas subject to periodic flooding. These woodlands are dominated by species such as Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*), forming riparian woodland communities that depend on regular inundation and high groundwater levels.

These forests are typically associated with floodplains, riverbanks, and low-lying wet areas where nutrient-rich alluvial soils accumulate. The habitat often includes a diverse understorey composed of shrubs, herbs, and bryophytes adapted to fluctuating moisture conditions.

Alluvial forests provide important ecological functions, including:

- Stabilisation of riverbanks and reduction of erosion
- Nutrient cycling and filtration of runoff
- Provision of habitat for a wide range of fauna

Within the SAC, these habitats are distributed along the margins of the main rivers and tributaries where natural hydrological regimes are maintained. As a priority habitat (*), their conservation is of particular importance under the Habitats Directive.

5.2.2.2 River Boyne and River Blackwater SPA [0004232]

River Boyne and River Blackwater SPA was designated in 2010. The SCI brought forward from the remedial AASR to this remedial NIS, and the associated conservation objective (NPWS, 2024) is presented in Table 5.3.

Table 5.3: SCI and SSCO at River Boyne and River Blackwater SPA

Special Conservation Interest	Conservation Objective
Kingfisher (<i>Alcedo atthis</i>) [A229]	To maintain the Favourable conservation condition of Kingfisher

5.2.2.2.1 Main Pressures and Threats

The NPWS Natura 2000 Standard Data Form⁸ for the River Boyne and River Blackwater SAC provides a description of the site, including ecological characteristics, and identifies the main pressures and threats affecting the conservation status of its qualifying interests. Given that the SPA comprises linear stretches of river channel and associated marginal habitats, the main pressures affecting the site are closely linked to water quality, hydrological conditions, and disturbance of riverbank habitats, all of which are critical to Kingfisher ecology (see Table 5.4).

Table 5.4: Threats and Pressures

Rank	Code	Threats and Pressures	Inside/Outside
H	D01.02	Roads, motorways	Outside
H	E01	Urbanised areas, human habitation	Outside
H	D01.02	Roads, motorways	Inside
H	E01.03	Dispersed habitation	Outside
M	J02	Human-induced changes in hydraulic conditions	Inside

Overall, the conservation of Kingfisher within the SPA is strongly dependent on maintaining good ecological status of the river system, including high water quality, intact riverbanks, and minimal disturbance during the breeding season.

5.2.2.2.2 Special Conservation Interest

Information on the SCI of the site for which likely significant effects could not be excluded is provided below. The information is based on the SSCO and Site Synopsis for the River Boyne and River Blackwater SPA (NPWS, 2024; NPWS, 2010).

5.2.2.2.2.1 Kingfisher (*Alcedo atthis*) [A229]

According to the Site Synopsis document for this SPA, the population of Kingfisher is of national importance, with a survey in 2010 recording 19 pairs of Kingfisher (based on 15 probable and 4 possible territories) within the River Boyne and River Blackwater SPA. A previous survey in 2008 recorded 20–22 territories along the river system⁹.

The Site Synopsis document highlights that the River Boyne and River Blackwater SPA supports a significant breeding population of Kingfisher along its river corridors.

⁸ <https://natura2000.eea.europa.eu/Natura2000/sdf/#/sdf?site=IE0004232&release=62> accessed June 2026

⁹ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004232.pdf> accessed May 2026



The species is strongly associated with these freshwater habitats, which provide suitable conditions for feeding and nesting.

The SPA is therefore considered to be of high ornithological importance, as it supports a nationally important population of Kingfisher, a species listed on Annex I of the EU Birds Directive.

5.2.2.3 River Barrow and River Nore SAC [0002162]

River Barrow and River Nore SAC was designated in 1998. The QIs brought forward from the remedial AASR to this remedial NIS, and their associated conservation objectives (NPWS, 2025) are presented in Table 5.5.

Table 5.5: QI and SSCO at River Barrow and River Nore SAC

Qualifying Interest	Conservation Objective
Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016]	To maintain the Favourable conservation condition of Desmoulin's Whorl Snail
Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029]	To restore the Favourable conservation condition of Freshwater Pearl Mussel
White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092]	To maintain the Favourable conservation condition of White-clawed crayfish
Sea Lamprey (<i>Petromyzon marinus</i>) [1095]	To restore the Favourable conservation condition of Sea lamprey
Brook Lamprey (<i>Lampetra planeri</i>) [1096]	To restore the favourable conservation condition of Brook lamprey
River Lamprey (<i>Lampetra fluviatilis</i>) [1099]	To restore the Favourable conservation condition of River lamprey
Twaite Shad (<i>Alosa fallax</i>) [1103]	To restore the favourable conservation condition of Twaite shad.
Atlantic Salmon (<i>Salmo salar</i>) (only in fresh water) [1106]	To restore the favourable conservation condition of Salmon
Otter (<i>Lutra lutra</i>) [1355]	To restore the favourable conservation condition of Otter
Killarney Fern (<i>Trichomanes speciosum</i>) [1421]	To maintain the Favourable conservation condition of Killarney Fern.
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	To maintain the Favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Qualifying Interest	Conservation Objective
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) * [91E0]	To restore the Favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)
* indicates priority habitats under the E.U. Habitats Directive.	

5.2.2.3.1 Main Pressures and Threats

The NPWS Natura 2000 Standard Data Form for the River Barrow and River Nore SAC provide a description of the site, including its ecological characteristics, and identifies the main pressures and threats affecting the conservation status of its qualifying interests. The data form highlights that the key pressures relate primarily to water quality degradation, hydrological alterations and land-use activities within the wider catchment, which are critical to maintaining the ecological integrity of the river system and its associated habitats and species (see Table 5.6).

Table 5.6: Threats and Pressures

Rank	Code	Threats and Pressures	Inside/Outside
H	A02.01	Agricultural intensification	Both
H	H01	Pollution to surface waters (limnic, terrestrial, marine & brackish)	Both
H	J02.05.02	Modification of flow patterns	Inside
H	J02.12.02	Water level changes	Inside
H	K01.01	Erosion	Inside
L	A10.01	Removal of hedges and copses or scrub	Inside
L	C01.01.01	Sand and gravel extraction in rivers	Both
L	D03.01	Shipping lanes	Inside
L	E02	Industrial or commercial areas	Outside
L	F01.01	Marine and freshwater aquaculture	Inside
L	F02.01.02	Netting	Inside
L	F02.03	Leisure fishing	Inside
M	A04.01.01	Intensive grazing	Inside
M	B02	Forest and plantation management	Both
M	B05	Logging without replanting, deforestation	Both
M	B07	Other forestry activities	Both

Rank	Code	Threats and Pressures	Inside/Outside
M	C01.03	Peat extraction	Outside
M	F02	Fishing and harvesting aquatic resources	Outside
M	I01	Invasive non-native species	Inside
M	J02	Human-induced changes in hydraulic conditions	Both
M	J02.02.01	Water abstraction from surface waters	Inside
M	J02.06	Groundwater abstraction	Inside
L	C01.03	Peat extraction	Inside
M	J03.02.01	Reduction or loss of specific habitat features	Inside
M	M01	Changes in abiotic conditions	Inside

5.2.2.3.2 Qualifying Interests

Information on the QIs of the site for which likely significant effects could not be excluded is provided below. The information is based on the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2024¹⁰).

5.2.2.3.2.1 Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]

The River Barrow and River Nore SAC supports populations of Desmoulin's Whorl Snail, a small terrestrial snail listed under Annex II of the Habitats Directive. Within the SAC, the species is associated with permanently wet, calcareous wetlands and tall-herb vegetation communities where it occupies damp emergent vegetation and areas with consistently high humidity.

Desmoulin's Whorl Snail requires stable hydrological conditions, suitable wetland vegetation structure and persistently moist habitat conditions. The species is sensitive to drainage, alterations in hydrology, habitat degradation and changes in vegetation structure that may reduce habitat suitability.

5.2.2.3.2.2 Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]

The River Barrow and River Nore SAC supports populations of Freshwater Pearl Mussel, an Annex II species associated with oligotrophic, fast-flowing river systems. Within the SAC, populations occur in the Ballymurphy, Mountain and Nore river systems where the species inhabits stable riverbed substrates comprising clean gravels and cobbles.

Freshwater Pearl Mussel requires exceptionally high-water quality, low nutrient concentrations, well-oxygenated substrates and stable hydrological conditions. The species is highly sensitive to nutrient enrichment, excessive suspended sediment, siltation, habitat modification and hydrological alterations. Its life cycle is also dependent on healthy salmonid host fish population.

¹⁰ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf> accessed May 2026



5.2.2.3.2.3 White-clawed Crayfish (*Austropotamobius pallipes*) [1092]

The River Barrow and River Nore SAC support populations of White-clawed Crayfish, a freshwater species listed under Annex II of the Habitats Directive. This species is typically associated with clean, well-oxygenated rivers and streams, where it occupies refuges under stones, within crevices and among submerged vegetation.

White-clawed Crayfish require good water quality with low levels of pollution, stable substrates such as cobble and gravel, and suitable refugia for shelter and breeding. The species is sensitive to water pollution, siltation and habitat disturbance, as well as competition from invasive crayfish species.

5.2.2.3.2.4 Sea Lamprey (*Petromyzon marinus*) [1095]

Sea Lamprey is an anadromous species, migrating from marine waters into freshwater rivers to spawn. The River Barrow and River Nore SAC provide important migratory routes and spawning habitat.

Sea Lamprey require access to unobstructed river systems, clean gravels for spawning, and suitable downstream areas for larval development. The species is particularly sensitive to barriers to migration, water quality deterioration and sedimentation, and hydrological change.

5.2.2.3.2.5 Brook Lamprey (*Lampetra planeri*) [1096]

Brook Lamprey is a resident freshwater species that completes its entire life cycle within rivers. Larvae (ammocoetes) inhabit soft sediments in low-flow areas. Suitable habitat includes fine sediment deposits in slow-flowing marginal zones, stable flow regimes, and good water quality. Brook Lamprey are vulnerable to sediment disturbance, channel modification, and pollution.

5.2.2.3.2.6 River Lamprey (*Lampetra fluviatilis*) [1099]

River Lamprey is another migratory lamprey species occurring within the SAC. Like Sea Lamprey, it requires connectivity between marine and freshwater environments for spawning.

Key requirements include, clean, well-oxygenated gravels, suitable juvenile habitat in fine sediments, and continuity of river channels. The species is sensitive to migration barriers, hydrological changes, and water pollution.

5.2.2.3.2.7 Twaite Shad (*Alosa fallax*) [1103]

Twaite Shad is an anadromous fish species that migrates upstream to spawn in freshwater reaches of rivers. The lower stretches and estuarine sections of the SAC provide important habitat.

Twaite Shad require free access along migration routes, suitable spawning habitat in shallow, flowing water over gravel, and good water quality. The species is highly sensitive to barriers, overfishing, and changes in flow regime.

5.2.2.3.2.8 Atlantic Salmon (*Salmo salar*) (only in fresh water) [1106]

Atlantic Salmon is a key species within the River Barrow and River Nore SAC, using freshwater sections of the system for spawning and juvenile development. The Site Synopsis highlights that the upper reaches of the Barrow and Nore, particularly tributaries such as the Owenass River, are especially important for salmon spawning. Salmon requires:

- Clean, well-oxygenated gravel substrates in riffle areas for spawning
- Juvenile nursery habitat, including shallow, fast-flowing waters with coarse substrate
- Natural flow regimes, supporting migration and habitat structure
- Unobstructed migration routes between marine and freshwater environments
- High water quality, with low levels of pollution and sedimentation

Juvenile salmon depend on complex in-stream habitats, including variation in flow, depth and substrate. The species is sensitive to barriers to migration, siltation of spawning gravels, water quality deterioration, and hydrological changes, including abstraction and flow regulation. The conservation of salmon populations depends on maintaining river continuity, spawning habitat integrity, and overall catchment water quality.

5.2.2.3.2.9 Otter (*Lutra lutra*) [1355]

Otter is widely distributed within the SAC and is closely associated with the extensive river network and riparian habitats. Otter habitat requirements include healthy fish populations for foraging, undisturbed riverbanks for holts and resting sites, and connectivity along watercourses. The species is sensitive to disturbance, habitat degradation, and declines in water quality.

5.2.2.3.2.10 Killarney Fern (*Trichomanes speciosum*) [1421]

Killarney Fern is a rare and sensitive plant species occurring in humid, shaded habitats within the SAC. It is typically associated with damp rock faces, ravines and wooded valleys, areas with high humidity and stable microclimate conditions. Within the SAC, these conditions are provided by sheltered river valleys and woodland habitats. The species is sensitive to changes in humidity and microclimate, loss of tree cover or shading, and physical disturbance.

5.2.2.3.2.11 Water courses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation [3260]

This habitat comprises river and stream channels supporting characteristic aquatic vegetation, including water-crowfoots (*Ranunculus* spp.), water-starworts (*Callitriche* spp.) and other submerged or floating plant species. Within the SAC, it is associated with the River Barrow, River Nore and their tributaries.

The habitat is dependent on good water quality, natural flow regimes and clean, stable river substrates. It is sensitive to nutrient enrichment, increased sedimentation, alterations to hydrology, channel modification and declines in water quality.

5.2.2.3.2.12 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]

This habitat occurs along riverbanks, floodplain margins and wetland edges within the SAC. It is characterised by tall herb vegetation in moist, nutrient-rich soils. It has a strong association with river systems and seasonal flooding. These habitats are dependent on natural hydrological processes, periodic inundation and nutrient inputs. They are sensitive to drainage and land reclamation, altered flooding regimes, nutrient enrichment, and land-use pressure.

5.2.2.3.2.13 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) * [91E0]

Alluvial forests are priority habitats found along river floodplains, dominated by species such as alder and ash. They occur on periodically flooded soils along riverbanks and floodplains within the SAC. These habitats play a key role in bank stabilisation and biodiversity support and depend on natural flooding regimes. They are sensitive to drainage, land reclamation, river modification, and changes in hydrology.

5.2.2.4 Lough Ennell SPA [0004044]

Lough Ennell SPA was designated in 1995 under Birds Directive. The SCIs brought forward from the remedial AASR to this remedial NIS, and the associated conservation objective (NPWS, 2024) and their associated conservation objectives (NPWS, 2021) are presented in Table 5.7.

Table 5.7: SCI and SSCO at Lough Ennell SPA

Qualifying Interest	Conservation Objective
Pochard (<i>Aythya farina</i>) [A059]	To restore the Favourable conservation condition of Pochard in Lough Ennell SPA.
Tufted Duck (<i>Aythya fuligula</i>) [A061]	To restore the Favourable conservation condition of Tufted Duck in Lough Ennell SPA.
Coot (<i>Fulica atra</i>) [A125]	To maintain the Favourable conservation condition of Coot in Lough Ennell SPA.
* indicates priority habitats under the E.U. Habitats Directive.	

5.2.2.4.1 Main Pressures and Threats

The NPWS Natura 2000 Standard Data¹¹ Form and Site Synopsis¹² for Lough Ennell SPA provides a description of the site, including its ecological characteristics, and identifies the main pressures and threats affecting the conservation status of its qualifying interests. The data form highlights that the key pressures relate primarily to water pollution (nutrients, chemicals), recreational disturbance, agricultural impacts and other external pressures affecting water quality, which are critical to maintaining the ecological integrity of the river system and its associated habitats and species (see Table 5.7).

Table 5.8: Threats and Pressures

Rank	Code	Threats and Pressures	Inside/Outside
H	A08	Fertilisation	Outside
H	E01	Urbanised areas, human habitation	Outside
L	F03.01	Hunting	Inside

¹¹ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004044.pdf> accessed May 2026

¹² <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004044.pdf> accessed May 2026



Rank	Code	Threats and Pressures	Inside/Outside
L	G05.01	Trampling, overuse,	Inside
M	B	Sylviculture, forestry	Outside
M	F02.03	Leisure fishing	Inside
M	G01.01	Nautical sports	Inside
M	G01.02	Non-motorized nautical sports	Outside

5.2.2.4.2 Special Conservation Interests

5.2.2.4.2.1 Pochard (*Aythya farina*) [A059]

Lough Ennell SPA is of special conservation interest for Pochard, supporting a nationally important wintering population. The Site Synopsis reports a mean peak population of 738 individuals over the period 1995/96–1999/2000.

The lake provides suitable habitat for this diving duck species, characterised by open water conditions, alkaline mesotrophic status, and abundant benthic and aquatic food resources.

As one of the most important Midland lakes for wintering waterfowl, Lough Ennell plays a key role in supporting Pochard during the non-breeding season, contributing to the site's overall ornithological importance.

5.2.2.4.2.2 Tufted Duck (*Aythya fuligula*) [A061]

Lough Ennell SPA supports a nationally important population of Tufted Duck, with a recorded mean peak of 1,303 individuals during the winters 1995/96–1999/2000.

This population represents over 3% of the all-Ireland population, highlighting the significance of the site at a national level.

The relatively shallow, open waters of the lake, combined with its productive aquatic system, provide ideal feeding conditions for this diving species. As such, the SPA is an important wintering site within the wider network of Irish wetlands.

5.2.2.4.2.3 Coot (*Fulica atra*) [A125]

The Site Synopsis identifies Lough Ennell as supporting a nationally important wintering population of Coot, with a mean peak count of 433 individuals.

Coot utilise the lake's open water and vegetated margins, which provide suitable conditions for feeding on aquatic vegetation and invertebrates. The lake's mesotrophic status and extensive wetland characteristics support these feeding requirements.

The importance of Lough Ennell for wintering waterbirds, including Coot, underpins its designation as an SPA and highlights its value within Ireland's wetland network.

6. POTENTIAL EFFECTS OF PEAT EXTRACTION PHASE (JUNE 1994 – JUNE 2020)

6.1 OVERVIEW

Section 6.2 and Section 6.3 describe the potential **in-situ** and **ex-situ** effects of the Peat Extraction Phase on the relevant QIs and SCIs. The identification and description of potential effects has been undertaken without taking account of control measures implemented during the Peat Extraction Phase, including operational procedures, environmental management measures, monitoring requirements, regulatory controls and IPC licence requirements. This approach ensures that all plausible SPR linkages and impact pathways are identified prior to consideration of the effectiveness of mitigation measures and other control measures.

During the Peat Extraction Phase, potential impact pathways included the mobilisation of suspended sediments, nutrient enrichment, hydrocarbon or other pollutant releases, alterations to drainage and hydrological regimes, and the modification of habitats used by mobile species. Potential in-situ effects relate to hydrologically connected downstream European sites where changes in water quality or hydrological conditions could affect the habitats and species for which those sites are designated. Ex-situ effects relate to mobile QI and SCI species associated with European sites that may utilise habitats within or adjacent to the Application Site for foraging, roosting, commuting, dispersal or other ecological functions, and may arise through habitat loss or degradation, disturbance, or reductions in habitat quality within supporting habitats used by those species outside European site boundaries.

Having regard to the identified source-pathway-receptor linkages and applying the precautionary principle, likely significant effects could not be excluded for certain QIs and SCIs of the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, and Lough Ennell SPA. These receptors were therefore brought forward for Stage 2 AA in this remedial NIS.

Table 6.1 and Table 6.2 below summarise the presence of potential in-situ and ex-situ effects for the relevant SACs and SPAs within the likely Zone of Influence of the Application Site and provide the basis for the detailed descriptions presented in Section 6.2 and Sections 6.3.

Table 6.1: Summary of Potential In-situ and Ex-situ Effects on Qualifying Interests of Special Areas of Conservation

European Site	In-situ Effects	Ex-situ Effects
River Boyne and River Blackwater SAC	Yes - Potential deterioration in water quality within connected watercourses during the Peat Extraction Phase. Pathway for effects on Alkaline fens [7230], Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) *[91E0], River Lamprey (<i>Lampetra fluviatilis</i>) [1099], Salmon (<i>Salmo salar</i>) [1106], Otter (<i>Lutra lutra</i>) [1355]	Yes - Potential effects on mobile QI species, River Lamprey (<i>Lampetra fluviatilis</i>) [1099], Salmon (<i>Salmo salar</i>) [1106] and Otter (<i>Lutra lutra</i>) [1355], through impacts on aquatic habitats, water quality and supporting habitats utilised outside the SAC boundary during the Peat Extraction Phase.

European Site	In-situ Effects	Ex-situ Effects
River Barrow and River Nore SAC	Yes - Potential deterioration in water quality within connected watercourses during the Peat Extraction Phase. Pathway for effects on Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016], Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029], White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092], Sea Lamprey (<i>Petromyzon marinus</i>) [1095], Brook Lamprey (<i>Lampetra planeri</i>) [1096], River Lamprey (<i>Lampetra fluviatilis</i>) [1099], Twaite Shad (<i>Alosa fallax</i>) [1103], Atlantic Salmon (<i>Salmo salar</i>) (only in fresh water) [1106], Otter (<i>Lutra lutra</i>) [1355], Killarney Fern (<i>Trichomanes speciosum</i>) [1421], Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)* [91E0].	Yes - Potential effects on mobile QI species through impacts on aquatic habitats, supporting habitats and ecological connectivity outside the SAC boundary during the Peat Extraction Phase. Pathway for effects on White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092], Sea Lamprey (<i>Petromyzon marinus</i>) [1095], Brook Lamprey (<i>Lampetra planeri</i>) [1096], River Lamprey (<i>Lampetra fluviatilis</i>) [1099], Twaite Shad (<i>Alosa fallax</i>) [1103], Atlantic Salmon (<i>Salmo salar</i>) (only in fresh water) [1106] and Otter (<i>Lutra lutra</i>) [1355]

Table 6.2: Summary of Potential In-situ and Ex-situ Effects on Special Protection Areas

European Site	In-situ Effects	Ex-situ Effects
River Boyne and River Blackwater SPA	Yes - Water quality impacts via connected watercourses could have affected aquatic habitats used by Kingfisher (<i>Alcedo atthis</i>) [A229] within the SPA.	Yes - Disturbance or degradation of foraging habitat at the Application Site may have reduced availability of suitable feeding areas for Kingfisher (<i>Alcedo atthis</i>) [A229].
Lough Ennell SPA	No - No hydrological or hydrogeological pathway was identified between the Application Site and the SPA and no likely significant in-situ effects were identified.	Yes - The Application Site may provide supporting habitat (e.g. feeding or roosting areas). Past disturbance or habitat alteration could have reduced habitat suitability for the following SCI bird species outside the SPA boundary Pochard (<i>Aythya ferina</i>) [A059], Tufted Duck (<i>Aythya fuligula</i>) [A061], Coot (<i>Fulica atra</i>) [A125].

6.2 IN-SITU EFFECTS

The Application Site is located entirely outside the boundaries of any European site; however, as identified in the remedial AASR, the Application Site is hydrologically connected via a network of drainage ditches, field drains, and receiving watercourses to a number of downstream European sites. These include the **River Boyne and River Blackwater SAC**, the **River Boyne and River Blackwater SPA** and the **River Barrow and River Nore SAC**. These connections establish a source-pathway-receptor linkage whereby water runoff resulting from peat extraction, drainage, and associated ancillary activities at the site during the Peat Extraction Phase (1994–2020) has the potential to influence water quality and hydrological conditions within European sites.

During the Peat Extraction Phase, activities at the Application Site had the potential to give rise to a range of impact pathways that could indirectly impact downstream receiving environments and European sites. Key sources of potential impact included the transport of suspended sediments, particularly fine peat particles arising from exposed peat surfaces and drainage channels. The transport of material through hydrologically connected watercourses may have resulted in elevated suspended solids in downstream waters, with consequent smothering of benthic substrates, reduced oxygenation of the water column, and potential disruption of fish spawning habitats. In addition to sediment transport, disturbance of peat soils may also have resulted in the release of nutrients, as well as increased concentrations of dissolved organic carbon. Runoff to downstream waters has the potential to result in reduced water clarity and shifts in aquatic and semi-aquatic vegetation communities.

The operation of machinery and site activities during peat extraction also presented a risk of hydrocarbon contamination through fuel handling and maintenance operations. If released to surface water drainage contaminants could have contributed to localised degradation in water quality. In addition, extensive drainage at the Application Sites for peat extraction is likely to have altered natural hydrological regimes at the site. This had the potential to increase runoff rates, modifying flow pathways, and influencing downstream discharge patterns.

Within the **River Boyne and River Blackwater SAC**, the above pathways may have resulted in downstream water quality deterioration, negatively affecting the QI species Atlantic Salmon, River Lamprey, and Otter. These QI species are highly sensitive to changes in water quality. The species, particularly during spawning and juvenile development, rely on well-oxygenated, low-turbidity waters. In addition, the SAC supports the habitat QIs Alkaline Fens and Alluvial Forests, both of which are dependent on appropriate hydrological conditions and good water quality and may therefore have been adversely affected by sediment, nutrient or other pollutant inputs arising from the Peat Extraction Phase.

The **River Barrow and River Nore SAC** represent a large and interconnected river system, within which potential impacts arising from the Application Site could have extended through hydrologically connected watercourses. Impact could have extended downstream of the Application Site through hydrologically connected watercourses. This SAC supports a wide range of Annex II species, White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad, Atlantic Salmon, Otter, Desmoulin's Whorl Snail, Freshwater Pearl Mussel and Killarney Fern, all of which are sensitive to water quality degradation and habitat modification. Sedimentation and nutrient enrichment within connected tributaries may have affected aquatic

habitats and species both locally and further along the river network. In addition, Desmoulin's Whorl Snail, Freshwater Pearl Mussel and Killarney Fern, together with the Annex I habitats Water Courses, Hydrophilous Tall Herb Fringe Communities and Alluvial Forests, may also have been affected through changes in water quality, hydrology and associated ecological processes.

For the **River Boyne and River Blackwater SPA**, the SCI species, Kingfisher, is particularly dependent on high water clarity and healthy fish populations. Deterioration in water quality during the peat extraction phase could have had indirect effects on this species by reducing prey availability and foraging efficiency.

Applying the precautionary principle and having regard to the hydrological connections between the Application Site and downstream European sites, likely significant effects on certain QIs and SCIs of the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, and River Barrow and River Nore SAC could not be excluded during the Peat Extraction Phase. These conclusions arose primarily from potential changes in water quality and hydrological conditions affecting aquatic and riparian habitats and species. In addition, for certain QIs, including Desmoulin's Whorl Snail, Freshwater Pearl Mussel and Killarney Fern, likely significant effects could not be excluded on a precautionary basis having regard to uncertainty regarding species distribution, ecological requirements, hydrological connectivity and potential indirect impact pathways

In-situ effects associated with the Peat Extraction Phase are considered further in the assessment in Section 6.2.1 below.

Since peat extraction ceased in 2020, activities undertaken at the Application Site during the Current Phase (2020-Present) have been limited to decommissioning works and routine drainage maintenance. These activities are substantially lower in intensity and extent than those associated with the Peat Extraction Phase and are undertaken within an already modified environment. While limited and localised risks remain, including the potential for accidental fuel spills associated with machinery use, the likelihood of such events occurring is low. Any emissions, if they were to occur, would be minor, highly localised and would be subject to substantial dilution, attenuation and natural filtration within the intervening hydrological network. Consequently, no credible source-pathway-receptor linkage has been identified by which these activities could give rise to likely significant effects on any European site, either alone or in combination with other plans or projects. Accordingly, no likely significant effects on the QIs or SCIs of any European site are anticipated during the Current Phase. The Current Phase was therefore screened out from further assessment in the remedial AASR.

The activities proposed as part of the Remedial Phase (Future) are focused on the rehabilitation and ecological enhancement of the Application Site. The principal objective of these works is to promote the rehabilitation of peatland functions through measures such as drain management and blocking, restoration of more natural hydrological conditions, increased water retention, and the establishment and enhancement of wetland and peatland habitats. The proposed remedial measures will help stabilise the receiving environment and reduce the potential for erosion, sediment generation and nutrient export from the site.

The remedial works will be limited in extent and duration. While the use of machinery has the potential to result in minor and localised disturbance, the works are not of a scale, nature or duration capable of resulting in significant emissions to the receiving environment. Furthermore, any minor releases would be confined to the vicinity of the works area and subject to substantial attenuation within the intervening drainage and watercourse network.

The implementation of these measures during the Remedial Phase (Future) will facilitate the rewetting of peatland areas, reduce runoff velocities and improve the site's capacity to retain water, thereby minimising the risk of sediment and nutrient mobilisation to downstream watercourses. Consequently, the potential for adverse changes in water quality within hydrologically connected receiving waters will be reduced. Given the nature and purpose of the proposed rehabilitation works, together with the embedded mitigation measures and the absence of any credible source-pathway-receptor linkage to downstream European sites, the Remedial Phase is expected to deliver environmental improvements relative to the existing baseline conditions. Accordingly, no likely significant effects on QIs or SCIs of any European site are anticipated during the Remedial Phase, either alone or in combination with other plans or projects. The Remedial Phase was therefore screened out from further assessment in the remedial AASR.

6.2.1 Impact Assessment

Without effective control and mitigation measures, peat extraction activities and associated ancillary operations undertaken during the Peat Extraction Phase (June 1994 –2020) at the Application Site had the potential to give rise to both significant in-situ and ex-situ effects on the QIs and SCIs identified above. In particular, activities associated with peat extraction, drainage management, haulage, stockpiling, and infrastructure maintenance had the potential to adversely affect downstream receiving waters through the release of suspended sediments, nutrients, hydrocarbons, and other contaminants.

Prior to the cessation of peat extraction in 2020, these activities had the potential to result in the deterioration of water quality within downstream SACs and SPAs through the mobilisation and transport of pollutants via established hydrological pathways. Elevated sediment loads could lead to the deposition of fine materials within watercourses and aquatic habitats, resulting in the smothering of aquatic vegetation and substrates, reduced water clarity, and alterations to habitat structure and ecological functioning. Similarly, nutrient enrichment and other contaminants could contribute to changes in water chemistry, potentially affecting the ecological conditions required to support QI habitats and species and SCI species. Such impacts could adversely affect aquatic communities and the species that rely on these habitats, either directly or indirectly.

The remedial AASR identified hydrological connectivity between the Application Site and a number of downstream European sites, including the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, and River Barrow and River Nore SAC. Having regard to the nature of the historic peat extraction activities, the identified source-pathway-receptor linkages, and the sensitivity of the relevant QIs and SCIs, likely significant effects could not be excluded during the Peat Extraction Phase. These conclusions arose primarily from the potential for changes in water quality and hydrological conditions to affect aquatic and riparian habitats and species associated with the downstream European sites.

In addition, for certain QIs of the River Barrow and River Nore SAC, including Desmoulin's Whorl Snail, Freshwater Pearl Mussel and Killarney Fern, likely significant effects could not be excluded on a precautionary basis. This reflected uncertainties regarding species distribution, ecological requirements, hydrological connectivity and, in some instances, the potential for indirect effect pathways. Accordingly, these QIs were carried forward for further consideration within this remedial NIS.

In the absence of appropriate control and mitigation measures, there would therefore have been potential for these impacts to undermine the conservation objectives of European sites and negatively affect their ecological integrity. However, as outlined in the following sections, a detailed assessment of in-situ ex-situ effects has been undertaken, taking account of the nature and scale of historical peat extraction activities, the pathways through which effects could occur, the sensitivity of the receiving European sites and their qualifying interests, and the mitigation measures that were implemented throughout the operational life of the site. The assessment presented in the following sections considers potential effects on water quality, hydrological connectivity, qualifying interest habitats, qualifying interest species, and supporting habitats used by mobile species associated with European sites and evaluates whether significant effects on the integrity of those sites have occurred or could reasonably be expected to occur.

6.3 EX-SITU EFFECTS

Ex-situ effects refer to impacts on QIs and SCIs occurring outside the boundaries of European sites, including impacts on habitats used by mobile species for foraging, commuting, dispersal, migration, breeding, resting or other ecological functions. Such effects may arise where activities at the Application Site influence habitats or ecological resources that contribute to the conservation objectives of a European site, notwithstanding that those habitats occur outside the European site boundary.

In the context of the Application Site, potential ex-situ effects are relevant to the **River Boyne and River Blackwater SAC, River Barrow and River Nore SAC, River Boyne and River Blackwater SPA and Lough Ennell SPA**. These effects relate to mobile QI and SCI species that may utilise habitats within the Application Site or within hydrologically connected watercourses outside the boundaries of the relevant European sites.

During the Peat Extraction Phase (1994-2020), peat extraction, drainage activities, habitat modification and associated operational activities had the potential to alter or degrade habitats utilised by mobile SAC and SPA species. Such activities may have resulted in disturbance, habitat loss, habitat degradation or reductions in habitat quality within areas used for feeding, commuting, migration, dispersal or temporary occupation. In addition, deterioration in water quality within on-site drainage features and hydrologically connected watercourses had the potential to affect aquatic habitats and prey resources utilised by mobile species outside European site boundaries.

For the **River Boyne and River Blackwater SAC and River Barrow and River Nore SAC**, mobile QI species including Otter, Atlantic Salmon, Lamprey species and Twaite Shad may have utilised habitats within hydrologically connected watercourses outside the SAC boundaries. The deterioration of water quality and habitat condition during the Peat Extraction Phase therefore

had the potential to adversely affect supporting habitats and ecological resources used by these species.

For the **River Boyne and River Blackwater SPA**, changes in water quality and associated aquatic habitats within connected watercourses may have reduced foraging opportunities for Kingfisher through effects on prey availability and habitat suitability.

Similarly, for **Lough Ennell SPA**, while no hydrological connectivity exists between the Application Site and the SPA, ex-situ effects were considered due to the potential for SCI bird species to utilise habitats within or adjacent to the Application Site for foraging, resting or dispersal.

Ex-situ effects associated with the Peat Extraction Phase are considered further in the assessment in Section 6.3.1 below.

Since peat extraction ceased in 2020, activities undertaken during the Current Phase (2020-Present) have been limited to decommissioning works and routine drainage maintenance. These activities are substantially lower in intensity and extent than those associated with peat extraction and do not give rise to habitat loss, habitat degradation, reductions in habitat quality, or disturbance of a scale, magnitude or duration capable of affecting mobile SAC or SPA species or the ecological functions for which supporting habitats may be used. Accordingly, no likely significant ex-situ effects on QIs or SCIs are anticipated during the Current Phase and this phase was screened out from further assessment in the remedial AASR.

The activities proposed as part of the Remedial Phase (Future) are focused on habitat rehabilitation, ecological enhancement and the restoration of more natural hydrological conditions. These activities are intended to improve habitat condition and ecological functioning within the Application Site and are considered not to result in significant disturbance, habitat degradation, reductions in habitat quality, or the loss of supporting ecological resources used by mobile SAC or SPA species. Accordingly, no likely significant ex-situ effects on QIs or SCIs are anticipated during the Remedial Phase, either alone or in combination with other plans or projects. The Remedial Phase was therefore screened out from further assessment in the remedial AASR. s.

6.3.1 Impact Assessment

During this phase, habitat modification, drainage, and disturbance at the Application Site may have reduced its suitability as supporting habitat for mobile species associated with both SACs and SPAs. These effects include the displacement of SPA bird species from feeding or roosting areas and a reduction in the ecological function of the site. In addition, deterioration in water quality within on-site drainage features and connected watercourses may have indirectly affected mobile SAC species, including fish and otter, through impacts on habitat condition and prey availability outside European site boundaries.

In the absence of effective mitigation and control measures, peat extraction and associated activities undertaken during the Peat Extraction Phase (1994-2020) had the potential to result in significant ex-situ effects on the QIs and SCIs identified above. In particular, habitat modification, peatland drainage, vegetation clearance, machinery operation and associated disturbance had the potential to affect habitats occurring outside European site boundaries that may have functioned as supporting ecological resources for mobile SAC and SPA species.

During the Peat Extraction Phase, the Application Site and associated hydrologically connected watercourses may have provided habitat for mobile QI and SCI species for activities such as foraging, commuting, dispersal, migration, resting and temporary occupation. Peat extraction activities had the potential to alter habitat structure and condition within these areas through drainage, habitat modification and disturbance associated with operational activities. Such changes may have reduced the suitability of habitats utilised by mobile species outside the boundaries of European sites.

In addition, deterioration in water quality within on-site drainage features and hydrologically connected watercourses had the potential to adversely affect aquatic habitats and prey resources utilised by mobile species. For SAC species associated with the River Boyne and River Blackwater SAC and the River Barrow and River Nore SAC, including Otter, Atlantic Salmon, Lamprey species and Twaite Shad, changes in water quality and habitat condition may have affected supporting habitats and ecological resources used outside the SAC boundaries. Similarly, for Kingfisher of the River Boyne and River Blackwater SPA, reductions in water quality and associated impacts on fish populations had the potential to reduce prey availability and the suitability of connected foraging habitats.

For Lough Ennell SPA, while no hydrological connection exists between the Application Site and the European site, the possibility of ex-situ effects was considered in relation to the use of habitats within and adjacent to the Application Site by mobile SCI bird species for foraging, resting or dispersal. Disturbance, habitat modification or reductions in habitat suitability during the Peat Extraction Phase therefore had the potential to affect ecological resources utilised by these species outside the SPA.

7. CONTROL MEASURES

This section summarises the operational measures, environmental controls, and management strategies implemented Bord na Móna to minimise the risk of adverse environmental effects during the **Peat Extraction Phase** (see Section 7.1). These measures were established to manage the environmental risks associated with peat extraction activities, including potential impacts on water quality, hydrology, habitats, and species. This section also introduces the IPC Licence, which was issued in 2000 and regulates emissions from the Application Site together with the environmental management measures required for its operation (see Section 7.2). The IPC Licence formed a key component of the environmental management framework during the Peat Extraction Phase, providing controls and monitoring requirements to manage potential environmental effects associated with peat extraction activities.

Throughout the **Current Phase (2020–Present)** the operational measures, environmental controls, and management strategies established by Bord na Móna and those management practices established under the IPC Licence continued. 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 7.2). The IPC Licence has been in effect during the Peat Extraction Phase since 2000.

Throughout the **Current Phase (2020–Present)**, the controls and management practices established under the IPC Licence have remained in effect since the cessation of peat extraction in June 2020 and have continued to guide site management during the Current Phase and will continue to inform activities undertaken during the **Remedial Phase (Future)**.

As demonstrated through environmental monitoring and site management experience, these measures have been effective in preventing significant adverse environmental effects and maintaining the environmental integrity of the Application Site and connected receiving environments. The same management framework will continue to inform activities undertaken during the Remedial Phase (Future), ensuring that rehabilitation works are implemented in a manner that protects water quality, supports habitat recovery, and avoids adverse effects on European sites.

7.1 PRE-IPC LICENCE

Prior to the implementation of IPC Licence conditions in 2000, Bord na Móna set in place 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. 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 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 Application Site to capture sediment from water discharge. These ponds were upgraded following a survey in 1990 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 silt 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 and ensure efficient operation. Machinery was stored, cleaned, inspected, and serviced at the Derrygreenagh Works site (referred to herein and the EIAR Chapter 4 Project Description as 'the 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.

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.

7.2 IPC LICENCE – DERRYGREENAGH BOG GROUP - P0501-01

The EPA issued an Integrated Pollution Control (IPC) Licence (P0501-01) in 2000, amended in 2012, to regulate peat extraction activities within the Derrygreenagh Bog Group, which includes Derryhinch, Drumman, Derryarkin, Ballybeg, and Toar Bogs. The IPC licence is included in the AASR in this NIS as Appendix A. The peat 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 potential environmental impacts, the IPC licence sets an emission limit value of 35mg/l for suspended solids at all surface water outfalls to regulate and mitigate potential adverse effects. To achieve compliance with this limit, the licence requires all bog drainage waters to be discharged via appropriately designed silt pond treatment systems, routine inspection and de-silting of silt ponds and drainage infrastructure, regular surface water quality monitoring, implementation of operational measures to minimise sediment mobilisation from peat extraction areas, and ongoing maintenance and upgrading of sedimentation treatment systems. These measures are specifically intended to reduce the release of suspended solids to receiving waters, thereby minimising risks associated with increased turbidity, sediment deposition, habitat smothering and deterioration in downstream water quality.

The IPC licence requires the implementation of a comprehensive environmental management and monitoring framework, including Annual Environmental Reporting (AER), surface water monitoring, de-silting programmes, suspended solids control measures, pollution prevention measures for fuels and oils, incident reporting procedures, and cutaway bog rehabilitation planning. Together, these measures provide a robust regulatory framework for controlling and monitoring the environmental effects of peat extraction activities.

8. ASSESSMENT OF ADVERSE EFFECTS

The following sections present detailed assessments of the potential adverse effects on the integrity of European sites arising from the Peat Extraction Phase (1994-2020). The assessment considers the relevant of the **River Boyne and River Blackwater SAC** and **River Barrow and River Nore SAC** and SCIs of the **River Boyne and River Blackwater SPA** and **Lough Ennell SPA**.

In undertaking this assessment, consideration has been given to the operational procedures, environmental management measures, monitoring requirements, regulatory controls and IPC Licence requirements that were implemented during the Peat Extraction Phase and are described in Section 7. These measures were established to manage environmental risks associated with peat extraction activities and to avoid or minimise adverse effects on water quality, hydrology, habitats and species.

The assessment focuses on determining whether any residual effects arising following implementation of the operational controls, environmental management measures and regulatory requirements applicable during the Peat Extraction Phase were capable of adversely affecting the integrity of European sites.

The assessments evaluate whether, having regard to the identified source-pathway-receptor linkages and the effectiveness of the control measures implemented during the Peat Extraction Phase, the peat extraction activities undertaken at the Application Site resulted in, or had the potential to result in, adverse effects on the integrity of any European site..

8.1 RIVER BOYNE AND RIVER BLACKWATER SAC [002299]

8.1.1 Background to QIs and Site-Specific Conservation Objectives

The River Boyne and River Blackwater SAC is located approximately 9.3 km northeast from the Application Site. The SAC is designated for its high ecological significance, encompassing extensive riverine systems and associated wetland habitats. The site comprises the freshwater stretches of the River Boyne, the River Blackwater and a number of tributaries, together with associated habitats including alkaline fens, alluvial forests, riparian woodlands, marshes, wet grasslands, and floodplain systems. These habitats support important ecological processes, contribute to hydrological integrity, and maintain water quality across the catchment.

The SAC supports a range of Annex I habitats and Annex II species of conservation importance. The QIs include alkaline fens and priority alluvial forests, as well as key aquatic and semi-aquatic species such as Atlantic Salmon, River Lamprey, and Otter. The river system also provides important spawning and nursery habitat for salmonids and supports a diversity of plant and animal communities, including wet woodland and marsh vegetation of high conservation value.

As the Application Site does not overlap with the SAC, there is no potential for direct in-situ habitat loss. However, there remains potential for indirect effects, particularly in relation to hydrological connectivity with the river system. Potential pathways for impact include deterioration in water quality, increased sedimentation, nutrient enrichment, and pollution, all of which could adversely affect sensitive habitats and species, particularly Salmon, Lamprey, and Otter. There is also potential for disturbance to mobile species associated with the river corridor.

8.1.2 Annex I Habitats - Assessment of Adverse *in-situ* Effects

Table 8.1 below presents an assessment of adverse in-situ effects to Annex I QI Habitats of the SAC in light of the conservation objectives.

Table 8.1: Annex I Habitat QIs of the River Boyne and River Blackwater SAC [002299], Site Specific Conservation Objectives and Assessment of Potential Adverse *in-situ* Effects

Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
Alkaline fens [7230]	Habitat area	The Application Site is located approximately 9.3 km from the SAC and does not overlap with any areas of Alkaline Fens [7230] habitat. Consequently, there is no potential for direct habitat loss, fragmentation, or physical disturbance to this QI. As Alkaline Fens [7230] are dependent on appropriate hydrological and hydrogeological conditions, as well as water quality, both downstream hydrological connectivity and potential hydrogeological pathways require consideration. However, groundwater flow associated with the Application Site is localised, with discharge occurring primarily to adjacent drains, streams and rivers within the intervening catchment network. Consequently, no credible hydrogeological pathway has been identified between the Application Site and the groundwater-dependent habitats of the SAC. Accordingly, consideration of potential effects is limited to indirect effects on surface water quality arising through downstream hydrological connectivity.
	Habitat distribution	
	Ecosystem function: soil nutrients	Alkaline Fens [7230] within the River Boyne and River Blackwater SAC are groundwater-dependent habitats of high conservation importance. The maintenance of their ecological integrity and characteristic vegetation communities relies on appropriate hydrological conditions and good water quality.
	Ecosystem function: peat formation	
	Ecosystem function: hydrology - groundwater level	Historically, peat extraction and associated drainage activities at the Application Site had the potential to affect receiving watercourses through the release of suspended solids, nutrients, and other pollutants. In the absence of mitigation, such effects could have resulted in deterioration of water quality within connected watercourses and, in turn, may have
	Ecosystem function: hydrology - surface water flow	
	Ecosystem function: water quality	
	Vegetation composition: community diversity	

Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
	Vegetation composition: typical brown mosses	adversely affected sensitive wetland habitats within the SAC. Elevated sediment loads could contribute to the smothering of aquatic and wetland vegetation, while nutrient enrichment could alter ecological conditions and vegetation composition within alkaline fen habitats. However, the Application Site is located approximately 9.3 km from the SAC and no groundwater flow and groundwater flow associated with the Application Site is predominantly shallow and localised, with discharge occurring primarily to adjacent drains, streams and rivers within the intervening catchment network. Consequently, no credible hydrogeological pathway has been identified by which peat extraction activities at the Application Site could have altered groundwater levels, groundwater flow regimes or groundwater quality supporting Alkaline Fens [7230] within the SAC. Accordingly, adverse effects on the conservation objective attributes relating to groundwater level, groundwater hydrology and associated ecosystem functioning can be excluded. Notwithstanding these theoretical pathways, peat extraction activities were undertaken in accordance with operational management measures designed to minimise environmental impacts. As outlined in Section 7.1, Bord na Móna implemented a range of measures to manage water quality, control sediment release, manage waste streams, and minimise potential impacts on surrounding habitats and species. In addition, the IPC Licence issued in 2000 (refer to Section 7.2) established a regulatory framework requiring compliance with environmental performance standards, including water management and monitoring requirements. The assessment is also informed by contemporary aquatic survey data which indicate that water quality within the receiving watercourses is influenced by a range of existing catchment pressures and that any emissions arising at the Application Site would be subject to substantial dilution, attenuation and dispersion within the intervening drainage and river network before reaching the SAC.
	Vegetation composition: typical vascular plants	
	Vegetation composition: native negative indicator species	
	Vegetation composition: nonnative species	
	Vegetation composition: native trees and shrubs	
	Vegetation composition: algal cover	
	Vegetation structure: vegetation height	
	Physical structure: disturbed bare ground	
	Physical structure: tufa formation	
	Indicators of local distinctiveness	
	Transitional areas between fen and adjacent habitats	



Qualifying Interest [Code]	Attribute	In-situ Effects
		Having regard to the absence of any credible hydrogeological pathway, the substantial separation distance between the Application Site and the SAC, the significant attenuation available within the receiving catchment, and the operational and regulatory controls implemented during the Peat Extraction Phase, no adverse effects on habitat area, habitat distribution, ecosystem function (including peat formation, soil nutrient status, groundwater hydrology, surface water hydrology and water quality), vegetation composition, vegetation structure, physical structure, indicators of local distinctiveness or transitional fen habitats are predicted. Accordingly, the conservation objectives for Alkaline Fens [7230] would not have been adversely affected.
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) *[91E0]	Habitat area	The Application Site is located approximately 9.3 km from the SAC and does not overlap with any areas of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) *[91E0] habitat. Consequently, there is no potential for direct habitat loss, habitat fragmentation, or physical disturbance affecting habitat area, habitat distribution or woodland size within the SAC.
	Habitat distribution	
	Woodland size	However, given the dependence of this habitat on appropriate hydrological conditions and water quality, the potential for indirect effects associated with downstream hydrological connectivity requires consideration.
	Woodland structure: cover and height	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) *[91E0] habitat at the SAC, characterised by its biodiversity and role in supporting various species. The structure and function of this habitat depend on the maintenance of appropriate hydrological conditions, including periodic flooding and high soil moisture levels, which support native tree, shrub and ground flora communities. The habitat also contributes to river corridor connectivity, providing habitat for a range of woodland, wetland and aquatic species, while also contributing to natural water
	Woodland structure: community diversity and extent	
	Woodland structure: natural regeneration	
	Hydrological regime: flooding depth/height of water table	
	Woodland structure: dead wood	



Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
	Woodland structure: veteran trees	regulation, bank stabilisation and the interception of sediments and nutrients.
	Woodland structure: indicators of local distinctiveness	The Application Site is located approximately 9.3 km from the SAC. Peat extraction activities at the Application Site would not have been capable of directly affecting flooding regimes, groundwater levels, woodland structure or other hydrological processes supporting the habitat within the SAC. Potential effects were therefore limited to indirect water quality effects arising through downstream hydrological connectivity.
	Woodland structure: indicators of overgrazing	
	Vegetation composition: native tree cover	
	Vegetation composition: typical species	
	Vegetation composition: negative indicator species	As outlined in Section 7, peat extraction activities were undertaken in accordance with operational controls, environmental management measures and, from 2000 onwards, IPC Licence requirements, including silt pond treatment systems, suspended solids emission limits, drainage management measures, water quality monitoring, de-silting programmes and pollution prevention measures. These measures substantially reduced the potential for adverse changes in downstream water quality effects. Having regard to the separation distance between the Application Site and the SAC, the absence of any direct pathway to the habitat, the attenuation available within the intervening watercourse network, and the environmental controls implemented during the Peat Extraction Phase, no adverse effects are predicted in relation to woodland size, woodland structure, hydrological regime, vegetation composition, natural regeneration, deadwood, veteran trees, indicators of local distinctiveness or any other attributes supporting the conservation objectives of the habitat. Accordingly, the conservation objectives for Alluvial Forests [91E0] would not have been adversely affected as a consequence of the Peat Extraction Phase.

8.1.3 Annex II Species - Assessment of Adverse *in-situ* and *ex-situ* Effects

Table 8.2 below presents an assessment of adverse in-situ and ex-situ effects to Annex II QI Species of the SAC in light of the conservation objectives

Table 8.2: Annex II Species QIs of the River Boyne and River Blackwater SAC [002299], Site Specific Conservation Objectives and Assessment of Potential Adverse of *in-situ* and *ex-situ* Effects

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
River Lamprey (<i>Lampetra fluviatilis</i>) [1099]	Distribution	The Application Site is not located within the SAC and there will be no direct loss, disturbance or modification of river lamprey habitat within the designated site. Potential in-situ effects could arise indirectly through deterioration of downstream water quality affecting the distribution of the species within the SAC. River lamprey may also utilise watercourses outside the SAC during different life stages; therefore, ex-situ effects on connected aquatic habitats require consideration. With the implementation of prescribed water-quality protection, sediment-control and pollution-prevention measures, no significant effects on the distribution of river lamprey within or outside the SAC are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Population structure	No direct effects on river lamprey populations are predicted as no in-channel works or habitat alteration will occur within the SAC. Potential indirect effects could arise if water-quality deterioration reduced survival of larvae, juveniles or adults. Ex-situ effects could similarly occur if habitats used by the species outside the SAC were adversely affected. Although River Lamprey is a mobile aquatic species capable of utilising hydrologically connected habitats beyond the SAC boundary, the assessment has not identified any evidence that water quality or habitat conditions within downstream watercourses were adversely affected to an extent capable of influencing the survival, recruitment or distribution of the species. Consequently, no significant impacts on population structure are predicted. This conclusion is supported by the environmental monitoring and reporting requirements of the IPC licence, including annual reporting on emissions to water, surface water quality monitoring, waste management, de-silting activities and rehabilitation progress. No evidence has been identified from the monitoring data, AERs or other compliance records to indicate any deterioration in water quality that would be capable of adversely affecting River Lamprey populations, including their recruitment, distribution or long-term viability. Consequently, no significant effects on the conservation status or population structure of the species are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Occupied habitat	There will be no direct loss or degradation of occupied river lamprey habitat within the SAC. Potential indirect in-situ effects could arise through sedimentation or pollutant inputs affecting habitat suitability in connected watercourses. River lamprey may also occupy habitats outside the SAC; therefore, ex-situ effects on connected aquatic habitats have been considered. However, peat extraction activities were undertaken in accordance with operational water-quality protection and sediment-control measures, including the use and maintenance of silt ponds, drainage management measures, regular environmental monitoring, and compliance with the requirements of the IPC Licence. These measures were designed to minimise suspended solids and other potential pollutants entering receiving watercourses. In addition, monitoring undertaken under the IPC Licence and reported through Annual Environmental Reports provides no evidence of water-quality deterioration that would be capable of adversely affecting River Lamprey habitat within hydrologically connected watercourses. Accordingly, significant effects are not considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Spawning habitat	Spawning habitat is sensitive to excessive sedimentation and water-quality deterioration. Potential in-situ and ex-situ effects could arise if sediments or contaminants entered downstream watercourses. However, with implementation of sediment-control measures and water-quality safeguards, no significant effects on spawning habitat within the SAC are considered to have occurred. This conclusion is supported by IPC licence monitoring and Annual Environmental Reporting (AERs). No evidence has been identified from monitoring data, AERs or compliance records to indicate any deterioration water quality at the Application Site that would be capable of adversely affecting river lamprey spawning habitat within the SAC. Consequently, no significant effects on the availability, quality or suitability of spawning habitat are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Juvenile habitat	Juvenile river lamprey (ammocoetes) occupy areas of fine sediment habitats and are particularly sensitive to habitat degradation and pollution. No direct impacts on juvenile habitat within the SAC will occur, with potential in-situ and ex-situ effects limited to indirect water-quality pathways. The operational controls and environmental protection measures implemented during the Peat Extraction Phase, including water-quality protection measures, sediment-control measures, the use and maintenance of silt ponds, drainage management measures, regular environmental monitoring, and compliance with the IPC Licence from 2000 onwards, minimised sediment release and protected water quality. Monitoring undertaken during the Peat Extraction Phase provides no evidence of water-quality deterioration that would have adversely affected juvenile river lamprey habitats within the SAC or within hydrologically connected habitats utilised by the species. Consequently, no significant effects on the availability, quality or suitability of juvenile habitat for river lamprey are considered to have occurred.
	Barriers to migration	The Project will not involve construction of instream structures, that could impede fish movement. Consequently, there is no potential for direct or indirect impacts on migratory pathways within the SAC or in connected watercourses outside the SAC. No effects on river lamprey migration are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Water quality	River lamprey is dependent on the maintenance of suitable water quality throughout its life cycle. Potential in-situ effects are limited to indirect impacts arising from downstream transport of sediment, nutrients or contaminants to habitats within the SAC. Potential ex-situ effects similarly relate to habitats utilised outside the SAC. With Bord na Móna's operational controls and management measures, including sediment management, surface-water protection measures, pollution prevention procedures, waste management and compliance with IPC Licence requirements, the potential for deterioration in water quality is effectively minimised. Consequently, no significant effects on water quality supporting river lamprey populations within or outside the SAC are considered to have occurred.
Salmon (<i>Salmo salar</i>) [1106]	Distribution: extent of anadromy	The Application Site is not located within the SAC and there will be no direct loss, disturbance or alteration of habitats used by Atlantic salmon during their anadromous migration. Potential in-situ effects could arise indirectly through deterioration of downstream water quality affecting migratory corridors within the SAC. Atlantic salmon may also utilise watercourses, estuarine areas and marine environments outside the SAC during different life stages; therefore, ex-situ effects on connected habitats have been considered. With the implementation of prescribed water-quality protection, sediment-control and pollution-prevention measures, no significant effects on the extent of anadromy or the distribution of migratory salmon within or outside the SAC are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Adult spawning fish	No direct effects on adult spawning salmon are predicted as no instream works or habitat alteration will occur within the SAC. Potential indirect effects could have arisen if deterioration in water quality adversely affected the condition, migration success or spawning behaviour of adult fish. Ex-situ effects could similarly occur where salmon utilise connected habitats outside the SAC. Although indirect effects on adult spawning salmon could theoretically arise through changes in downstream water quality, the assessment has not identified any evidence that water quality conditions within hydrologically connected watercourses were adversely affected to an extent capable of influencing migration success, spawning behaviour or the condition of adult fish. Accordingly, the assessment found no evidence that the Peat Extraction Phase resulted in significant adverse effects on adult spawning salmon.
	Salmon fry abundance	There will be no direct loss or degradation of salmon nursery habitat within the SAC. Potential in-situ effects could arise through sedimentation or pollutant inputs affecting habitat quality and the survival of eggs and emerging fry in connected watercourses. Atlantic salmon may also utilise habitats outside the SAC that support juvenile life stages; therefore, ex-situ effects have been considered. Appropriate site management and water-protection measures will minimise risks to aquatic habitats, and significant effects on salmon fry abundance are not considered to have occurred.
	Out-migrating smolt abundance	Potential in-situ effects are limited to indirect impacts on water quality that could affect the survival and downstream migration of smolts within the SAC. Potential ex-situ effects could similarly arise in connected watercourses used by migrating fish outside the SAC. With the implementation of operational controls and environmental protection measures, water quality will be maintained and the risk of adverse effects on smolt abundance will be minimised. Consequently, no significant effects are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Number and distribution of redds	Salmon redds are sensitive to excessive sedimentation and deterioration in water quality. No spawning habitat occurs within the Application Site and there will be no direct disturbance or alteration of redds within the SAC. Potential in-situ and ex-situ effects could arise if sediments or contaminants entered downstream watercourses and affected spawning gravels. However, with the implementation of sediment-control measures and water-quality safeguards, no significant effects on the number or distribution of redds are considered to have occurred.
	Water quality	Atlantic salmon is dependent on the maintenance of high water quality throughout all freshwater life stages. Potential in-situ effects are limited to indirect impacts arising from the downstream transport of sediment, nutrients or contaminants to habitats within the SAC. Potential ex-situ effects similarly relate to habitats utilised by salmon outside the SAC. Bord na Móna's operational controls and management measures detailed in Section 7.1, including water-quality protection measures, sediment-control measures, waste-management procedures, habitat-protection measures and compliance with IPC Licence requirements from 2000 onwards (see Section 7.2), have minimised the potential for adverse effects on downstream water quality and hydrological conditions. Accordingly, no significant effects on water quality supporting Atlantic salmon populations within or outside the SAC are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
Otter (<i>Lutra lutra</i>) [1355]	Distribution	The Application Site is not located within the SAC and there will be no direct loss, disturbance or fragmentation of habitats supporting otter within the designated site. Potential in-situ effects could arise indirectly through deterioration of downstream water quality affecting habitat suitability and prey availability within the SAC. Otters are highly mobile and utilise habitats beyond SAC boundaries; therefore, ex-situ effects on connected aquatic and terrestrial habitats require consideration. With the implementation of prescribed water-quality protection, sediment-control and pollution-prevention measures, no significant effects on otter distribution within or outside the SAC are considered to have occurred.
	Extent of terrestrial habitat	There will be no direct loss or modification of terrestrial habitat supporting otter within the SAC. Potential in-situ effects are limited to indirect changes affecting the quality of riparian habitats associated with watercourses within the SAC. Potential ex-situ effects could arise where otters utilise terrestrial habitats along connected watercourses outside the SAC. Given the absence of direct habitat encroachment and the implementation of operational controls and environmental protection measures, no significant effects on the extent or availability of terrestrial habitat are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Extent of freshwater (river) habitat	No direct impacts on river habitat utilised by otter will occur within the SAC. Potential in-situ effects are limited to indirect impacts arising from deterioration in downstream water quality or hydrological conditions. Otters also rely on river habitats outside designated sites for foraging, commuting and dispersal; therefore, ex-situ effects have been considered. Bord na Móna's 's operational controls and management measures detailed in Section 7.1 including water-quality protection measures, sediment-control measures, waste-management procedures, habitat-protection measures and compliance with IPC Licence requirements from 2000 onwards (see Section 7.2), have minimised the potential for adverse effects on downstream water quality and hydrological conditions. Accordingly, no significant effects on freshwater river habitats are considered to have occurred.
	Extent of freshwater (lake) habitat	The Project will not result in the direct loss or alteration of lake habitats used by otter within the SAC. Potential in-situ and effects are limited to indirect pathways associated with water quality. The implementation of established water-protection and pollution-prevention measures will minimise risks to aquatic habitats. Consequently, no significant effects on the extent or quality of freshwater lake habitats utilised by otter are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Couching sites and holts	No otter holts, couches or resting sites within the SAC will be directly affected by the Project. Potential indirect in-situ effects could arise if substantial changes in habitat quality reduced the suitability of supporting habitats. Otters may also utilise resting sites outside the SAC; however, no direct disturbance or habitat alteration is proposed in areas supporting such features. Given the nature and location of the Project, and the implementation of mitigation measures to protect water quality and habitat integrity, no significant effects on couching sites or holts are considered to have occurred.
	Fish biomass available	Otter conservation is dependent upon the availability of sufficient fish biomass and other prey resources. Potential in-situ effects could arise if water-quality deterioration adversely affected fish communities within the SAC. Potential ex-situ effects could similarly occur in connected watercourses utilised by foraging otters outside the SAC. Bord na Móna's operational controls and management measures detailed in Section 7.1, including water-quality protection measures, sediment-control measures, waste-management procedures, habitat-protection measures and compliance with IPC Licence requirements from 2000 onwards (see Section 7.2), have minimised the potential for adverse effects on downstream water quality and hydrological conditions. Consequently, no significant effects on fish biomass available to otter are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Barriers to connectivity	The Peat Extraction Phase included the construction and use of bridge crossings over the Yellow River and Milltown River. However, these crossings did not create barriers to otter movement, habitat connectivity or dispersal within the river corridor. No evidence has been identified that the crossings impeded access between foraging habitats, resting sites or dispersal routes within the SAC or within connected habitats outside the SAC. Accordingly, no direct or indirect barriers to connectivity are considered to have arisen as a result of the Peat Extraction Phase, and no significant effects on habitat connectivity or otter movement are considered to have occurred
	Ex-situ disturbance	Otters are highly mobile and may utilise watercourses, riparian corridors and terrestrial habitats outside the SAC for foraging, commuting and dispersal. Potential ex-situ disturbance effects could arise through noise, visual disturbance, human activity or machinery operation in areas used by otter outside the designated site. During the Peat Extraction Phase, activities were confined to the Application Site and did not involve works within watercourses or other habitats known to support significant otter resting or breeding features outside the SAC. While temporary and localised disturbance to individual otters may have occurred in the vicinity of operational activities, any such disturbance would have been restricted to the immediate area of works and would not have been of a scale, extent or duration capable of affecting the distribution, abundance or conservation status of the otter population associated with the SAC.

8.2 RIVER BARROW AND RIVER NORE SAC [0002162]

8.2.1 Background to QIs and Site-Specific Conservation Objectives

The River Barrow and River Nore SAC is 19.56 km south of the Application Site. The SAC is designated due to its exceptional ecological value, encompassing an extensive river catchment system that includes freshwater river channels, estuarine and tidal habitats, and associated floodplains and woodlands. The site extends from the headwaters in the Slieve Bloom Mountains to the estuarine and coastal waters at Waterford Harbour, incorporating a wide range of habitats such as alluvial forests, old oak woodlands, alkaline and coastal wetlands, intertidal mudflats, salt meadows, and floating river vegetation. These habitats play a vital role in maintaining hydrological processes, water quality, and overall biodiversity across the catchment.

The SAC supports a diverse assemblage of Annex I habitats and Annex II species. The QIs include priority habitats such as Alluvial forests and petrifying springs, together with a diverse range of other aquatic, wetland, riparian and terrestrial habitats, including floating river vegetation as well as estuarine and coastal habitats. The site is also of particular importance for a wide range of protected species, including Freshwater Pearl Mussel, White-clawed Crayfish, Atlantic Salmon, Twaite Shad, three Lamprey species, Otter, and Desmoulin's whorl snail. The river system provides critical spawning and nursery habitats for fish species and supports a high diversity of flora and fauna, including numerous Red Data Book species.

As the Application Site does not overlap with the SAC, there is no potential for direct habitat loss. However, there remains potential for indirect effects, particularly due to hydrological connectivity with the wider catchment. Potential impact pathways include deterioration in water quality, increased sedimentation, nutrient enrichment, and pollution, which could adversely affect sensitive habitats and species, particularly aquatic species such as freshwater pearl mussel, salmon, and lamprey. In addition, there is potential for disturbance to mobile species, including otter and migratory fish, associated with the river corridor and estuarine environment.

8.2.2 Annex I Habitats - Assessment of Adverse *in-situ* Effects

Table 8.3 below presents an assessment of adverse in-situ effects to Annex I QI Habitats of the SAC in light of the conservation objectives.

Table 8.3: Annex I Habitat QIs of the River Barrow and River Nore SAC [0002162], Site Specific Conservation Objectives and Assessment of Potential Adverse *in-situ* Effects

Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) *91E0]	Habitat area	The Application Site is located outside the River Barrow and River Nore SAC and does not overlap with any mapped areas of alluvial woodland *91E0. Consequently, the Project will not result in the loss, reduction, fragmentation, or alteration of this habitat within the SAC. The distribution of alluvial woodland along the river corridors and
	Habitat distribution	
	Woodland size	



Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
		associated floodplains will remain unchanged, with no interruption of ecological connectivity between woodland stands. As no woodland removal, boundary changes, or direct habitat impacts are proposed, the overall extent and size of alluvial woodland within the SAC will be maintained. Furthermore, with the implementation of appropriate water-protection measures, no indirect effects on the habitat are considered to have occurred. Accordingly, no adverse effects on the habitat's area, distribution, or woodland extent are expected.
	Woodland structure: cover and height	The Project will not affect the structure, function, or composition of the alluvial woodland habitat within the River Barrow and River Nore SAC. No impacts on tree canopy development, woodland maturity, vertical structure, or the extent and diversity of woodland communities are expected to have occurred. The species-rich composition of the habitat, including its characteristic tree, shrub and ground flora layers, will remain unchanged, and the natural processes supporting the regeneration of associated woodland species, including seedling recruitment, sapling establishment and woodland succession, will continue unimpeded. The quantity, distribution and ecological function of dead wood resources, together with the condition and longevity of mature and veteran trees, will also be unaffected. Likewise, locally distinctive woodland features associated with the river-floodplain environment will be maintained, and no changes to grazing pressure are expected that could influence habitat condition.
	Woodland structure: community diversity and extent	
	Woodland structure: natural regeneration	
	Hydrological regime: flooding depth/height of water table	
	Woodland structure: dead wood	
	Woodland structure: veteran trees	
	Woodland structure: indicators of local distinctiveness	
	Woodland structure: indicators of overgrazing	
	Vegetation composition: native tree cover	
	Vegetation composition: typical species	
	Vegetation composition: negative indicator species	The habitat's hydrological requirements will remain protected, as the operational controls and environmental mitigation measures (see Section 7.1 and Section 7.2) incorporated into the Project will ensure that natural floodplain processes, groundwater conditions and water-table dynamics are not altered in a manner that could affect woodland hydrology. Furthermore, the composition and extent of native tree cover, together with the abundance and distribution of characteristic alluvial woodland species, will be maintained. Accordingly, no adverse effects



Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
		on the woodland structure, hydrological regime, vegetation composition, or the conservation objectives of the alluvial woodland habitat (91E0*) are considered to have occurred.
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	Habitat distribution	Hydrophilous tall-herb fringe communities are dependent on appropriate hydrological conditions and water quality. Historically, peat extraction activities had the potential to affect downstream watercourses through increased suspended solids, nutrient enrichment or other water-quality changes. In the absence of mitigation, such effects could have altered the ecological conditions supporting hydrophilous tall-herb fringe communities within hydrologically connected areas of the SAC. However, available monitoring data, Annual Environmental Reports, and compliance records do not indicate any deterioration in downstream water quality of a magnitude capable of adversely affecting the habitat. Furthermore, substantial dilution, attenuation and dispersion would occur within the intervening drainage and river network prior to reaching the SAC. Consequently, no adverse effects on the hydrological regime, water quality, habitat area or habitat distribution of Hydrophilous Tall Herb Fringe Communities [6430] are considered to have occurred.
	Habitat area	
	Hydrological regime: flooding depth/height of water table	The Peat Extraction Phase did not result in any direct loss, damage or deterioration of qualifying tall-herb fringe vegetation within the SAC. These habitats are dependent on the wet conditions associated with river margins and floodplain environments, and the environmental safeguards and mitigation measures incorporated into the Project will ensure that floodplain processes, water levels and soil moisture conditions remain unaltered. The assessment found no evidence that floodplain processes, water levels or soil moisture conditions supporting the habitat were altered as a consequence of the Peat Extraction Phase. Consequently, no changes to the habitat's hydrological regime are considered to have occurred. The structure of the herbaceous vegetation will also remain unchanged. Existing vegetation growth patterns, sward height and community structure will continue
	Vegetation structure: sward height	
	Vegetation composition: broadleaf herb: grass ratio	
	Vegetation composition: typical species	
	Vegetation composition: negative indicator species	



Qualifying Interest [Code]	Attribute	<i>In-situ</i> Effects
		under prevailing environmental conditions, with no impacts on the characteristic composition of tall-herb fringe vegetation. The balance between broadleaf herb species and grasses will be maintained, ensuring that the habitat continues to support its characteristic species assemblages. Similarly, the abundance and distribution of typical tall-herb species associated with nutrient-rich river margins will not be affected by the proposed activities. The assessment has not identified any mechanism by which the Peat Extraction Phase would have resulted in the introduction, establishment or spread of invasive non-native plant species within areas supporting this habitat. No direct disturbance occurred within the habitat, no habitat fragmentation or vegetation clearance occurred within the SAC, and no evidence of changes to hydrological conditions or water quality capable of facilitating the spread of invasive or other negative indicator species has been identified. Accordingly, no adverse effects on the hydrological regime, vegetation structure or vegetation composition of the habitat are considered to have occurred. Accordingly, no adverse effects on the hydrological regime, vegetation structure or vegetation composition of the habitat are considered to have occurred.

8.2.3 Annex II Species - Assessment of Adverse *in-situ* and *ex-situ* Effects

Table 8.4 below presents an assessment of adverse in-situ and ex-situ effects to Annex II QI species of the SAC in light of the conservation objectives.

Table 8.4: Annex II Species QIs of the River Barrow and River Nore SAC [0002162], Site Specific Conservation Objectives and Assessment of Potential Adverse *in-situ* and *ex-situ* Effects

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
Salmon (<i>Salmo salar</i>)[1106]	Distribution: extent of anadromy	Atlantic salmon associated with the River Barrow and River Nore SAC depend on unobstructed access between marine waters, estuarine environments and freshwater spawning and nursery habitats throughout the catchment. The Application Site is located outside the SAC and does not intersect any migration routes used by Atlantic salmon. No works are proposed that would alter channel morphology, impede fish passage or affect connectivity between marine and freshwater environments. Consequently, no adverse effects on the extent of anadromy or the distribution of Atlantic salmon within the River Barrow and River Nore SAC are considered to have occurred. The only potential pathway for impact relates to the indirect transfer of suspended solids, nutrients or contaminants to downstream watercourses; potential effects are assessed below.
	Adult spawning fish	Adult salmon require suitable water quality and unrestricted access to spawning reaches within the SAC river network. The Application Site does not contain spawning habitat and is sufficiently separated from the SAC that no direct effects on adult fish are possible. The assessment therefore focuses on whether Project-related activities could indirectly affect habitats used by spawning adults through downstream hydrological connections. The implementation of established environmental management measures, including sediment controls and water-quality safeguards, will minimise the potential for changes in water quality within receiving waters. As a result, conditions supporting adult migration, spawning behaviour and reproductive success will be maintained. No adverse effects on adult spawning salmon are considered to have occurred.
	Salmon fry abundance	Juvenile salmon occupy shallow, well-oxygenated freshwater habitats where they are sensitive to sedimentation and reduced water quality. The Application Site does not

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		overlap with the SAC and therefore no direct impacts will occur to any nursery habitats associated. Potential indirect effects could arise if water quality in downstream habitats was adversely affected. However, the Project incorporates a range of controls designed to prevent sediment losses and protect receiving waters. These measures will ensure that habitats supporting salmon fry within the River Barrow and River Nore SAC retain the environmental conditions necessary for growth and survival. Accordingly, no significant effect on salmon fry abundance is considered to have occurred.
	Out-migrating smolt abundance	Smolts depend upon river continuity and suitable water quality during downstream migration from freshwater nursery areas to the marine environment. No barriers, diversions, culverts or instream infrastructure will be constructed as part of the Project and therefore no direct effects on migratory pathways will occur. The Project operates under established environmental management procedures that minimise the risk of water-quality deterioration in downstream receiving waters. Consequently, migration conditions for smolts within the SAC catchment will remain unaffected. No adverse effects on the abundance or successful migration of smolts are considered to have occurred.
	Number and distribution of redds	Salmon redds occur in clean gravel substrates within suitable spawning reaches. The Application Site does not contain spawning habitat and there will be no direct disturbance to spawning gravels within the SAC. In principle, excessive sediment inputs could affect redd quality and egg survival. However, sediment-control measures and drainage management procedures will minimise the risk of sediment transport to downstream watercourses. Therefore, the location, abundance and distribution of redds within the River Barrow and River Nore SAC are not considered to have been affected by the Project.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Water quality	The conservation status of Atlantic salmon is intrinsically linked to the maintenance of good ecological and chemical water quality throughout all freshwater life stages. The Project has no direct interaction with salmon habitats; however, downstream hydrological connections require consideration of indirect effects. The environmental protection measures outlined in Section 7.1, combined with long-term regulatory controls and IPC Licence compliance as outlined in Section 7.2, are specifically designed to protect receiving waters from excessive sediment, pollutants and other contaminants. Consequently, the Project is not expected to result in any deterioration in water quality that could affect Atlantic salmon populations within the River Barrow and River Nore SAC. No adverse effects on this attribute considered to have occurred.
Otter (<i>Lutra lutra</i>) [1355]	Distribution	Otter is a QI of the River Barrow and River Nore SAC and occurs throughout suitable aquatic and riparian habitats within the catchment. The Application Site is located outside the SAC and therefore no direct effects on the distribution of otter within the SAC will occur. Otters may utilise habitats within and surrounding the Application Site for commuting and foraging. Drainage ditch maintenance, channel modification and associated habitat management activities may result in localised habitat alteration outside the SAC. However, given the wide-ranging nature of the species, the availability of suitable habitat within the wider catchment and the limited extent of Project-related activities, these changes are not considered likely to affect the distribution of the otter population associated with the River Barrow and River Nore SAC. The implementation of established environmental management measures, including sediment controls and water-quality safeguards, will minimise the potential for indirect effects on downstream aquatic habitats and prey resources. Consequently, no adverse effects on this attribute are considered to have occurred.
	Extent of terrestrial habitat	Otters rely on riparian vegetation, scrub, wet grassland and other terrestrial habitats

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		for commuting, resting and access to holts. The Application Site does not overlap with terrestrial habitat within the SAC and no direct loss or degradation of terrestrial habitat within the SAC will occur. Drainage ditch maintenance, channel modification and associated habitat management activities within the Application Site may result in localised alteration of terrestrial habitat used by otters outside the SAC. However, these effects are limited in extent relative to the availability of suitable habitat within the wider catchment and are not considered likely to affect the extent or functionality of terrestrial habitat supporting the SAC population. Consequently, no adverse effects on this attribute are considered to have occurred.
	Extent of freshwater (river) habitat	Otters depend on rivers, streams and associated riparian corridors for foraging and movement. No activities associated with the Project will occur within freshwater river habitat forming part of the River Barrow and River Nore SAC and therefore no direct impacts will occur. Activities within the Application Site may result in localised modification of freshwater habitats outside the SAC. Potential indirect effects could arise if water quality in downstream receiving waters were adversely affected. However, the implementation of established environmental management measures, including sediment controls and water-quality safeguards, will minimise the potential for changes in water quality within receiving waters. Consequently, the extent and functionality of freshwater river habitat supporting the SAC otter population will remain unaffected. No adverse effects on this attribute are expected to have occurred.
	Extent of freshwater (lake) habitat	Otters use lakes and associated shoreline habitats for foraging and shelter. The Project will not result in the loss or modification of lake habitats associated with the River Barrow and River Nore SAC. Furthermore, no pathway exists whereby the Project could adversely affect the extent or quality of freshwater lake habitat available to otter within the SAC. Consequently, no adverse effects on this attribute are considered to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Couching sites and holts	Couching sites and holts provide important resting, breeding and sheltering locations for otters. No couching sites or holts within the River Barrow and River Nore SAC will be directly affected by the Project. Habitat management and drainage maintenance activities within the Application Site could affect locations used for temporary shelter outside the SAC. However, any such effects would be localised and confined to non-designated habitats. Given the availability of alternative suitable habitat within the surrounding landscape and the implementation of appropriate ecological safeguards, no adverse effects on couching sites and holts associated with the SAC population are considered to have occurred.
	Fish biomass available	Fish comprise the principal prey resource for otter and are dependent upon suitable aquatic habitat and water quality. The Project has no direct interaction with aquatic habitats within the SAC. Potential indirect effects could arise if sediment or contaminants entered downstream watercourses and affected fish communities. The implementation of established environmental management measures, including sediment controls and water-quality safeguards (see Section 7.1) and measure required for IPC Licence compliance as outlined in Section 7.2, will minimise the risk of water-quality deterioration and associated impacts on aquatic ecology. Consequently, fish biomass available to support otter populations will remain unaffected. No adverse effects on this attribute are considered to have occurred.
	Barriers to connectivity	Otters require connectivity along watercourses and riparian corridors to access feeding, breeding and resting habitats. The Peat Extraction Phase included the construction and use of bridge crossings over the Yellow River and Milltown River. However, these crossings did not create barriers to otter movement, The bridges did not introduce any barriers that would impede otter movement within the wider catchment. While drainage maintenance and channel modification activities may temporarily alter habitat conditions within the Application Site, ecological connectivity



Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		for otter will be maintained. Consequently, no adverse effects on connectivity between habitats utilised by the River Barrow and River Nore SAC otter population are considered to have occurred.
	Ex-situ disturbance	Otter is a highly mobile species that regularly exploits aquatic, riparian and adjacent terrestrial habitats beyond SAC boundaries for feeding, movement and dispersal. Potential ex-situ effects may arise through disturbance associated with machinery operation, human presence, noise or visual activity in habitats utilised by the species outside the designated site. During the Peat Extraction Phase, activities were restricted to the Application Site and did not involve direct intervention within watercourses or locations known to support important otter breeding or resting features beyond the SAC boundary. Although individual otters may have experienced limited and temporary disturbance in proximity to operational activities, any such effects would have been localised and short-term in nature and would not have been sufficient to adversely affect the distribution, abundance or conservation status of the SAC population.
White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092]	Distribution	White-clawed crayfish are dependent upon suitable freshwater habitats with good water quality and appropriate instream refugia. The Application Site is located outside the River Barrow and River Nore SAC and therefore, no direct effects on the distribution of white-clawed crayfish within the SAC will have occurred. Potential indirect effects could have arisen through deterioration in downstream water quality. However, the environmental protection measures outlined in Section 7.1, together with long-term regulatory controls and IPC Licence compliance outlined in Section 7.2, ensured that downstream aquatic habitats remained protected. Consequently, no adverse effects on the distribution of white-clawed crayfish within the SAC are considered to have occurred.
	Population structure: recruitment	Successful recruitment depends on suitable water quality, substrate conditions and



Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		refuge availability. The Project will not directly affect crayfish habitat within the SAC. The implementation of established environmental management measures, including sediment controls and water-quality safeguards, will minimise the potential for adverse effects on downstream habitats. Accordingly, no adverse effects on recruitment or population structure are considered to have occurred.
	Negative indicator species	The conservation objective for this attribute seeks to prevent increases in invasive or undesirable species that could adversely affect white-clawed crayfish habitats. The Project will not introduce or facilitate the spread of negative indicator species within the SAC. Therefore, no adverse effects on this attribute are considered to have occurred.
	Disease	Crayfish plague represents a significant pressure on White-clawed Crayfish populations. The Project did not involve activities that are considered a vector for the introduction or spread of crayfish plague or other diseases affecting white-clawed crayfish populations. The principal activities comprised peat extraction, drainage management and associated ancillary works within a terrestrial peatland environment. Accordingly, no credible source-pathway-receptor linkage has been identified by which the Project could have introduced or spread crayfish plague or other diseases affecting White-clawed Crayfish populations. Consequently, no adverse effects on this attribute are considered to have occurred
	Water quality	White-clawed crayfish require high-quality freshwater habitats and are particularly sensitive to pollution events and excessive sedimentation. The implementation of established environmental management measures, including sediment controls and water-quality safeguards outlined in Section 7.1, together with long-term controls and IPC Licence compliance outlined in Section 7.2,



Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		minimised the risk of adverse effects on receiving waters. Accordingly, no adverse effects on water quality supporting the SAC crayfish population are considered to have occurred.
	Habitat quality: heterogeneity	White-clawed Crayfish require heterogeneous habitats incorporating stones, cobbles, earthen banks, aquatic vegetation, gravel, tree roots and organic debris to provide shelter and refugia for all life stages. The Project will not directly affect these habitats within the SAC and no pathway exists whereby Project-related activities could alter habitat structure, refuge availability or substrate diversity within occupied watercourses. Consequently, habitat heterogeneity within the River Barrow and River Nore SAC will remain unaffected and no adverse effects on this attribute are predicted. This conclusion is further supported by the environmental monitoring and reporting requirements of the IPC Licence, including routine monitoring of emissions to water, surface water quality assessments, de-silting programmes and annual environmental reporting. No evidence has been identified from the available monitoring data, AERs or compliance records to indicate that activities at the Application Site resulted in sustained sediment loading, excessive siltation or substrate deposition within downstream receiving waters at levels capable of reducing habitat heterogeneity, infilling refugia, or adversely affecting the habitat conditions. Consequently, no adverse effects on this attribute are considered to have occurred.
Sea Lamprey (<i>Petromyzon marinus</i>) [1095] Brook Lamprey (<i>Lampetra planeri</i>) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099]	Distribution: extent of anadromy	Sea Lamprey and River Lamprey require unobstructed migration between marine and freshwater habitats to complete their life cycles, while Brook Lamprey depend on connectivity between spawning and juvenile habitats within freshwater systems. The Application Site is located outside the River Barrow and River Nore SAC and the Project will not introduce barriers to fish passage, alter channel morphology, or affect

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		connectivity within watercourses supporting lamprey populations. Consequently, no direct effects on migration routes or species distribution considered to have occurred. The only potential pathway for impact relates to indirect effects on downstream water quality and are assessed below.
	Population structure of juveniles	Juvenile lamprey requires suitable nursery habitats characterised by stable fine sediments, adequate water quality and suitable flow conditions. The Application Site does not contain nursery habitats associated with the SAC and therefore no direct effects on juvenile lamprey are considered to have occurred. Potential indirect effects could arise if excessive sediment inputs or contaminants reached downstream habitats. However, the implementation of established environmental management measures, including sediment controls and water-quality safeguards outlined in Section 7 minimised the potential for adverse downstream effects. As a result, the environmental conditions required to support juvenile lamprey recruitment, growth and survival will be maintained. No adverse effects on juvenile population structure are considered to have occurred.
	Juvenile density in fine sediment	Lamprey ammocoetes spend several years burrowed within fine sediment deposits in suitable river reaches. Excessive sedimentation, erosion or contamination of these habitats could adversely affect juvenile densities. The Project did not directly affect lamprey nursery habitats within the SAC. Furthermore, the implementation of established environmental management measures, including sediment controls and water-quality safeguards outlined in Section 7 minimised sediment mobilisation and transport to downstream receiving waters. Consequently, the quality and suitability of fine sediment habitats supporting juvenile lamprey will remain unaffected and no

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		adverse effects on juvenile density are considered to have occurred.
	Extent and distribution of spawning habitat	Juvenile habitat availability is dependent upon suitable sediment composition and water quality. The measures outlined in Section 7.1 and Section 7.2 ensured maintenance of downstream habitat quality. Consequently, no adverse effects on this attribute are considered to have occurred.
	Availability of juvenile habitat	Juvenile habitat availability is dependent upon suitable sediment composition and water quality. The measures outlined in outlined in Section 7.1 and Section 7.2 will ensure maintenance of downstream habitat quality. Consequently, no adverse effects on this attribute are considered to have occurred.
Twaite Shad (<i>Alosa fallax</i>) [1103]	Distribution: extent of anadromy	Twaite shad rely upon unobstructed migration between marine and freshwater environments. The Project did not alter migration routes, river continuity or fish passage conditions. The only potential pathway for impact relates to water quality; however, mitigation measures outlined in Section 7.1 and Section 7.2 ensured that no adverse effects on the extent of anadromy are considered to have occurred.
	Population structure: age classes	The conservation of all age classes depends upon suitable water quality and habitat conditions. The Project did not directly interact with habitats supporting twaite shad. Environmental protection measures outlined in Section 7 minimised any risk to downstream habitats. Consequently, no adverse effects are considered to have occurred.
	Extent and distribution of spawning habitat	No spawning habitat were affected by Peat Extraction. Measures outlined in Section 7 prevented adverse effects on downstream habitats. Consequently, spawning habitat distribution remained unaffected.
	Water quality: oxygen levels	Twaite shad are sensitive to reductions in dissolved oxygen concentrations. The implementation measures in Section 7, including sediment controls and water-quality safeguards, together with IPC Licence compliance, ensures that receiving

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		water quality is maintained. No adverse effects on this attribute are considered to have occurred.
	Spawning habitat quality: Filamentous algae; macrophytes; sediment	Suitable spawning habitat requires stable gravel substrates with very little fine material and limited filamentous algal (macroalgae) and macrophyte growth. The implementation of established environmental management measures, including sediment controls and water-quality safeguards outlined in Section 7, minimised water quality and sediment inputs to downstream watercourses. Consequently, spawning habitat quality within the River Barrow and River Nore SAC remained unaffected, and stable gravel substrates were maintained free from excessive fine sediment, filamentous algal growth and macrophyte growth. No adverse effects on this attribute are considered to have occurred.
Killarney Fern (<i>Trichomanes speciosum</i>)[1421]	Distribution	Killarney Fern is known to occur at a limited number of locations within the River Barrow and River Nore SAC, comprising three gametophyte colonies and one sporophyte colony. No direct or indirect pathway exists whereby the Project could affect the known locations supporting the species. Furthermore, no credible pathway has been identified by which activities at the Application Site could affect the environmental conditions supporting either the known populations of the species or suitable habitat within the SAC. While the possibility of additional undocumented populations cannot be entirely excluded, no evidence has been identified to indicate that suitable habitat supporting the species occurs within areas that could be affected by the Project. Consequently, the distribution of Killarney Fern within the River Barrow and River Nore SAC will be maintained and no adverse effects on this attribute are considered to have occurred. This conclusion is supported by the absence of any credible source-pathway-receptor linkage between the Application Site and the known Killarney Fern locations within the SAC. No mechanism has been identified by

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		which peat extraction activities could have altered the specialised habitat conditions required by the species, including the humid and sheltered microclimatic conditions associated with its supporting habitat.
	Population size	The conservation objective for this attribute is to maintain at least three gametophyte colonies and at least one sporophyte colony containing more than 35 fronds. The Project did not result in habitat loss, disturbance, hydrological changes or alterations to environmental conditions at known Killarney Fern locations. Consequently, no adverse effects on the population size of Killarney Fern within the River Barrow and River Nore SAC are considered to have occurred.
	Population structure: juvenile fronds	The maintenance of a viable population structure requires the continued presence of sporophytes, unfurling fronds, juvenile sporophytes and gametophytes. The Project did not affect habitat conditions supporting any life stage of Killarney Fern within the SAC. Accordingly, the environmental conditions necessary to maintain the existing population structure remained unchanged and no adverse effects on this attribute are considered to have occurred.
	Habitat extent	The QI is associated shaded rock crevices, caves and gullies, typically beneath a well-developed woodland canopy. The Project did not result in the loss, alteration or fragmentation of suitable habitat supporting known Killarney Fern populations within the River Barrow and River Nore SAC. Furthermore, no loss of woodland canopy occurred at or near known locations. Consequently, habitat extent remained unchanged and no adverse effects on this attribute are considered to have occurred.
	Hydrological conditions: visible water	Killarney Fern requires permanently damp conditions, with colonies occurring in dripping or seeping habitats where water is visible. The Project did not alter hydrological conditions, groundwater regimes or surface water inputs associated at the known



Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		Killarney Fern locations within the SAC. Consequently, the hydrological conditions necessary to maintain visible water at all occupied locations remained unaffected and no adverse effects on this attribute are considered to have occurred.
	Hydrological conditions: humidity	Killarney Fern requires consistently humid microclimatic conditions and is sensitive to drying. The presence of desiccated fronds or gametophyte mats may indicate unsuitable environmental conditions. The Project did not alter the humidity regime or microclimatic conditions at known Killarney Fern locations within the SAC. Consequently, no increase in desiccation of Killarney Fern colonies is expected to have occurred and no adverse effects on this attribute are considered to have occurred.
	Light levels: shading	Killarney Fern requires stable shading conditions provided by surrounding topography, rock features and woodland canopy cover. As described above, the Project did not affect woodland canopy cover or alter shading conditions at known Killarney Fern locations within the River Barrow and River Nore SAC. Consequently, light levels will remain unchanged and no adverse effects on this attribute are considered to have occurred.
	Invasive species	The conservation objective for this attribute is to ensure that invasive species remain absent or under control within habitats supporting Killarney Fern. Ecological surveys undertaken at the Application Site recorded only a limited number of invasive non-native plant species, comprising localised occurrences of Japanese Knotweed, Cherry Laurel and Butterfly-bush, indicating that invasive species are not widespread within the Application Site. The Project assessment has not identified any pathway by which the Peat Extraction Phase would have facilitated the introduction or spread of invasive non-native species within this habitat. The activities undertaken did not involve

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		vegetation planting, habitat restoration, soil importation, earthworks within the SAC, or other disturbance activities typically associated with the introduction or dispersal of invasive plant species. In addition, no changes to hydrological conditions or water quality capable of promoting the establishment or spread of invasive species within qualifying tall-herb fringe vegetation were identified. Consequently, no adverse effects on this attribute are considered to have occurred.
Desmoulin's Whorl Snail (<i>Vertigo moulinsiana</i>) [1016]	Distribution: occupied sites	Desmoulin's Whorl Snail is known from a limited number of locations within the River Barrow and River Nore SAC. The Project will not directly affect any known occupied sites and no direct habitat loss, disturbance or modification will occur. However, this QI was brought forward to the remedial NIS on a precautionary basis due to uncertainty regarding the full distribution of the species within the SAC and the potential for additional undocumented populations to occur in suitable wetland habitats. In particular, the species may be associated with wet habitat types, including hydrophilous tall herb fringe communities [6430]. Following the detailed assessment, including a review of AERs, no evidence has been identified to indicate that activities at the Application Site adversely affected wet habitats including 6430. Accordingly, it has been concluded that no adverse effects on this attribute are considered to have occurred.
	Population size: adults	The Project did not directly affect known populations of Desmoulin's Whorl Snail. Although the species was screened into the remedial NIS on a precautionary basis due to uncertainty regarding its distribution within the SAC, no evidence has been identified that the environmental conditions required to support the species were adversely affected. Consequently, no adverse effects on adult population size are expected to have occurred.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Population density	Population density is dependent on the availability of suitable wetland habitat and the maintenance of appropriate hydrological conditions. While the species was included in the remedial NIS as a precautionary measure due to uncertainty regarding its distribution and potential association with habitats screened in for assessment, no evidence has been identified that habitat conditions supporting the species were adversely affected. Accordingly, no adverse effects on population density considered to have occurred.
	Area of occupancy	The Project did not result in the loss or fragmentation of habitat occupied by Desmoulin's Whorl Snail. Although the possibility of additional undocumented populations within the SAC could not be excluded at screening stage, detailed assessment has not identified any adverse effects on suitable habitat. Consequently, no adverse effects on area of occupancy are considered to have occurred
	Habitat quality: vegetation	Desmoulin's Whorl Snail depends on wetland vegetation communities providing suitable humidity, structure and support for the species. Although the species was screened into the remedial NIS on a precautionary basis because it may be associated with habitats for which potential impact pathways could not initially be excluded, no evidence has been identified that vegetation composition or habitat quality within suitable habitats was adversely affected. Accordingly, no adverse effects on this attribute considered to have occurred.
	Habitat quality: soil moisture levels	The species requires consistently moist habitat conditions. While uncertainty regarding species distribution warranted further assessment, no evidence has been identified that activities at the Application Site adversely affected hydrological conditions within suitable habitats supporting the species. Consequently, no

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		adverse effects on soil moisture conditions considered to have occurred.
Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029]	Distribution: Ballymurphy	Known Freshwater Pearl Mussel populations within the River Barrow and River Nore SAC occur upstream of the principal hydrological pathways linking the Application Site to the SAC. However, the species was brought forward to the remedial NIS on a precautionary basis due to its dependence on host fish species, particularly Atlantic Salmon, and because likely significant effects on Atlantic Salmon could not be excluded at screening stage. Following detailed assessment, no evidence has been identified that activities at the Application Site adversely affected Freshwater Pearl Mussel populations or their host fish populations. Consequently, no adverse effects on this attribute are considered to have occurred
	Distribution: Mountain Distribution: Nore Population size: Ballymurphy Population size: Mountain Population size: Nore Population structure: recruitment Population structure: adult mortality. Ballymurphy Population structure: adult mortality. Mountain Population structure: adult mortality. Nore	Successful recruitment and adult survival are dependent on suitable habitat conditions, good water quality and the availability of host fish. While Freshwater Pearl Mussel was carried forward for assessment due to the potential for indirect effects on Atlantic Salmon, no evidence has been identified that host fish availability, environmental conditions necessary to support recruitment, or water quality conditions relevant to adult survival were adversely affected. Furthermore, no pathway has been identified by which activities at the Application Site could have resulted in increased mortality of adult mussels. Accordingly, no adverse effects on recruitment, adult survival, or the long-term viability of the Freshwater Pearl Mussel population are considered to have occurred.
	Suitable habitat: extent	The Project did not result in direct habitat loss within the SAC. Freshwater Pearl Mussel was brought forward for detailed assessment due to the potential for indirect effects via host fish populations. Following detailed assessment, no evidence has been identified that suitable mussel habitat was adversely affected. Consequently, no

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		adverse effects on habitat extent or condition are considered to have occurred.
	Suitable habitat: condition Water quality: macroinvertebrates and phytobenthos (diatoms) Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants) Substratum quality: sediment Substratum quality: oxygen availability Hydrological regime: flow variability Fringing habitat: area and condition	Suitable habitat condition, water quality, substratum quality (including filamentous algae, macrophytes, sediment and oxygen availability), hydrological regime and fringing habitat are intrinsically linked and collectively determine the capacity of a river system to support Freshwater Pearl Mussel populations and their host fish species. Freshwater Pearl Mussel was brought forward to the remedial NIS on a precautionary basis, not because of a direct pathway to known mussel populations, but because potential effects on Atlantic Salmon, the principal host fish species, could not be excluded at screening stage. The detailed assessment has not identified any evidence that activities at the Application Site adversely affected water quality, flow conditions, substrate composition, oxygen availability, riparian habitat condition or other environmental factors required to support Freshwater Pearl Mussel habitat within the River Barrow and River Nore SAC. This conclusion is supported by a review of the environmental monitoring data, Annual Environmental Reports (AERs) and compliance records generated under the IPC Licence, including routine monitoring of emissions to water and surface water quality assessments. No evidence has been identified from these records to indicate water-quality impacts, excessive sedimentation, algal proliferation, hydrological alteration or other changes of a magnitude capable of adversely affecting Freshwater Pearl Mussel habitat or its host fish populations. Accordingly, no adverse effects are considered to have occurred in relation to suitable habitat condition, water quality (including macroinvertebrates and phytobenthos), substratum quality, oxygen availability, hydrological regime, or fringing habitat supporting Freshwater Pearl Mussel within the River Barrow and River Nore SAC.

Qualifying Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Host fish	Freshwater Pearl Mussel relies on suitable populations of host fish, principally Atlantic Salmon, to complete its life cycle. This attribute formed the principal reason the species was screened into the remedial NIS. Following detailed assessment of Atlantic Salmon, no evidence has been identified that activities at the Application Site adversely affected host fish populations, their migration, recruitment or long-term viability. Furthermore, the Annual Environmental Reports and associated compliance monitoring undertaken under the IPC Licence do not indicate water-quality impacts capable of affecting Atlantic Salmon populations within the catchment. Accordingly, no adverse effects on host fish availability for Freshwater Pearl Mussel are considered to have occurred.

8.3 LOUGH ENNELL SPA [0004044]

8.3.1 Background to SCIs and Site-Specific Conservation Objectives

Lough Ennell SPA, located 7.83 km west of the Application Site, is designated due to its importance as a wetland site supporting significant populations of wintering waterbirds. The site comprises a large, shallow, mesotrophic limestone lake and associated wetland habitats, which play a key role in maintaining ecological function, supporting biodiversity, and providing important foraging and roosting areas for bird species. The SCIs for this SPA are Pochard, Tufted Duck, and Coot, as well as wetland and waterbirds more generally.

The site supports nationally important populations of these species, along with internationally significant numbers of non-migratory Mute Swan, and regularly holds a wider assemblage of wintering waterbirds, including species listed on Annex I of the Birds Directive such as Golden Plover. Lough Ennell is therefore of high ornithological significance at both national and international levels.

As the Application Site does not overlap with the SPA, there is no potential for direct habitat loss within the designated site. Furthermore, as the SPA is located upstream of the Application Site, there is no potential for in situ effects on the qualifying interests (species and habitats) of the European site. However, there remains potential for indirect ex situ effects on qualifying species through hydrological connectivity and disturbance pathways where watercourses associated with the Application Site are utilised by these species. Potential impacts could include deterioration in water quality, increased nutrient loading, and disturbance to sensitive bird species, particularly during the wintering period when the SPA supports large aggregations of waterfowl.

8.3.2 Assessment of Adverse *ex-situ* Effect

Table 8.5 below presents an assessment of adverse ex-situ effects to SCI species of the SPA in light of the conservation objectives.

Although Lough Ennell SPA is not hydrologically or hydrogeologically connected to the Application Site, ex-situ effects have been considered because the Application Site and associated wetlands and waterbodies may provide supporting habitat for mobile SCI species associated with the SPA. Surveys undertaken for the Project recorded Pochard, Tufted Duck and Coot within the wider survey area. While no evidence was identified to indicate that the Application Site supports a significant proportion of the populations associated with Lough Ennell SPA, it is recognised that individuals of these SCI species may utilise habitats adjacent to Application Site 9 in particular quarry ponds for foraging, resting or dispersal. Accordingly, the potential for ex-situ effects on these species has been considered in the assessment.

Accordingly, the assessment of ex-situ effects considers whether the Project could indirectly affect habitats potentially used by these species through changes in water quality, aquatic food resources, disturbance levels or ecological connectivity. Particular consideration has been given to the potential for downstream effects on habitats that may function as ancillary foraging, resting or movement areas for SCI populations associated with Lough Ennell SPA.

Table 8.5: SCIs of Lough Ennell SPA [0004044], Site Specific Conservation Objectives and Assessment of Potential Adverse Effects

Special Conservation Interest [Code]	Attribute	<i>Ex-situ</i> Effects
Pochard (<i>Aythya farina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125]	Winter population trend	The Application Site lies outside Lough Ennell SPA; however, the Site and the watercourses associated with it may provide potentially suitable habitat for wintering waterbirds, including Pochard, Tufted Duck and Coot. Targeted bird surveys undertaken as part of the assessment did not record these SCI species. Nevertheless, applying the precautionary principle, it is assumed that individuals associated with the Lough Ennell SPA populations may periodically utilise habitats within the wider surrounding landscape, including habitats occurring within or adjacent to the Application Site. Potential ex-situ effects were therefore considered in relation to any changes in habitat quality arising from activities undertaken during the Peat Extraction Phase. However, no evidence has been identified from site surveys, environmental monitoring records, AERs or compliance documentation to indicate that activities at the Application Site resulted in impacts on habitats of a magnitude capable of adversely affecting habitats that may be used by these species outside the SPA boundary. Furthermore, no credible source-pathway-receptor linkage has been identified between the Application Site and Lough Ennell SPA. Consequently, no adverse effects on the winter population trend of Pochard, Tufted Duck or Coot are considered to have occurred.

Special Conservation Interest [Code]	Attribute	<i>Ex-situ</i> Effects
	Winter spatial distribution Disturbance at wintering site	Pochard, Tufted Duck and Coot may utilise suitable wetland and open-water habitats within the wider landscape surrounding Lough Ennell SPA. While the Application Site may provide occasional supporting habitat for individual birds, the Project is located outside the SPA and did not give rise to disturbance within the designated wintering site itself. Furthermore, the Project did not result in the loss, degradation or fragmentation of habitats of a scale capable of influencing the distribution of wintering SCI populations associated with the SPA. Project activities were not of a nature, scale, magnitude or duration capable of causing disturbance that would affect wintering waterbirds or their use of supporting habitats. Consequently, no adverse effects on the winter spatial distribution of the SCI species, or disturbance at the wintering site, are considered to have occurred.
	Barriers to connectivity and site use	The Application Site and associated wetlands may form part of a wider landscape used by mobile waterbirds when moving between feeding, resting and roosting locations. Accordingly, it is assumed on a precautionary basis that SCI species associated with Lough Ennell SPA may occasionally utilise habitats within the wider area. While the Peat Extraction Phase included the construction of bridge crossings over the Milltown River and Yellow River, these structures would not have impeded the movement of mobile waterbird species or altered connectivity between feeding, resting and roosting habitats. Consequently, no adverse effects on connectivity or site use by SCI species associated with Lough Ennell SPA have been identified.
	Forage spatial distribution, extent and abundance	Pochard, Tufted Duck and Coot depend on the availability of aquatic vegetation, aquatic invertebrates and other wetland food resources. While the Application Site may

Special Conservation Interest [Code]	Attribute	<i>Ex-situ</i> Effects
		have provided suitable supporting habitat for foraging individuals, no evidence has been identified that activities at the Application Site adversely affected the distribution, extent or abundance of foraging resources available to these species. This conclusion is supported by the environmental monitoring and reporting requirements of the IPC Licence, including water quality monitoring and Annual Environmental Reports, which do not indicate adverse impacts on downstream water quality or aquatic habitats. Consequently, no adverse effects on forage spatial distribution, extent or abundance are considered to have occurred.
	Roost spatial distribution and extent	Given the mobility of Pochard, Tufted Duck and Coot, occasional use of habitats within the wider landscape surrounding the Application Site cannot be entirely excluded. However, the Application Site does not provide extensive or important roosting habitat for these species and any use is likely to be infrequent and opportunistic in nature. Furthermore, the Project did not result in the loss, degradation or fragmentation of habitats that could function as supporting roosting habitat, nor were any disturbance pathways identified that would influence roost selection or use. Consequently, the spatial distribution and extent of roosting habitat available to SCI species are considered to have remained unchanged and no adverse effects on this attribute are considered to have occurred.

8.4 RIVER BOYNE AND RIVER BLACKWATER SPA [0004232]

8.4.1 Background to SCIs and Site-Specific Conservation Objectives

The River Boyne and River Blackwater SPA is located 9.34 km north-east of the Application Site. The SPA is designated due to its importance as a linear riverine system supporting key bird species of conservation interest. The site comprises sections of the River Boyne and River Blackwater, along with several tributaries and associated riparian habitats, including river channels and marginal vegetation. These habitats provide important ecological functions, including nesting, foraging, and commuting corridors for bird species.

The SPA is designated for its population of Kingfisher, a species listed on Annex I of the EU Birds Directive. The site supports a nationally important population of Kingfisher, with multiple breeding territories recorded along the river system.

In addition to Kingfisher, a range of other wetland and riparian bird species utilise the site, including Mute Swan, Teal, Mallard, Grey Heron, and Sand Martin, further contributing to its ornithological value.

As the Application Site does not overlap with the SPA, there is no potential for direct habitat loss. However, there remains potential for indirect in-situ and ex-situ effects to the species, particularly through hydrological pathways and disturbance. Potential impacts include deterioration in water quality, increased sedimentation, and disturbance to Kingfisher, particularly during the breeding season, which could affect nesting and feeding behaviour along the river corridors.

8.4.2 Assessment of Adverse *in-situ* and *ex-situ* Effects

Table 8.6 below presents an assessment of adverse in-situ and ex-situ effects to SCIs of the SPA in light of the conservation objectives.

The Application Site is located outside the River Boyne and River Blackwater SPA and there is no direct overlap with designated Kingfisher breeding habitat within the SPA. Targeted ecological surveys undertaken at the Application Site and associated watercourses did not record Kingfisher. However, applying the precautionary principle, it is recognised that Kingfisher is a highly mobile species and that suitable aquatic habitats at watercourses connected to the Application Site, may occasionally be utilised by individual birds associated with the wider SPA population for foraging and movement throughout the catchment.

Accordingly, the assessment considers both in-situ and ex-situ effects. Potential in-situ effects relate to indirect impacts on downstream aquatic habitats through changes in water quality, while ex-situ effects relate to potential impacts on habitats outside the SPA that may be used by Kingfisher associated with the designated population. Particular consideration has been given to the potential for deterioration in water quality, reductions in fish availability, disturbance, habitat degradation, or impediments to ecological connectivity that could affect the species' conservation attributes.

As set out in the assessment in Table 8.6 below, the principal pathway by which effects could arise is through changes in water quality affecting aquatic habitats and associated prey resources. However, the water-quality protection measures, sediment-control measures, drainage management procedures, pollution-prevention controls, and environmental management measures described in Section 7.1 and Section 7.2 will ensure the protection of receiving waters and the maintenance of habitat quality within connected watercourses. The Project will not result in the loss of breeding habitat, alteration of nesting features, fragmentation of habitat, or barriers to movement. Consequently, no adverse effects on the population size, productivity, spatial distribution, foraging resources, habitat connectivity, or breeding success of Kingfisher associated with the River Boyne and River Blackwater SPA are expected to have occurred.

Table 8.6: SCIs of River Boyne and River Blackwater SPA [0004232], Site Specific Conservation Objectives and Assessment of Potential Adverse *in-situ* and *ex-situ* Effects

Special Conservation Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
Kingfisher (<i>Alcedo atthis</i>) [A229]	Population size	The Application Site is located outside the River Boyne and River Blackwater SPA and no breeding Kingfisher territories were recorded during targeted surveys of the Site or associated watercourses. Nevertheless, applying the precautionary principle, it is recognised that suitable aquatic habitats including those leading from the SPA connected to the Site may occasionally be utilised by individual Kingfishers associated with the wider SPA population. Potential effects would be limited to indirect changes in habitat quality affecting foraging opportunities within habitats used outside the SPA. The implementation of the water-quality protection measures, sediment-control measures and pollution-prevention procedures detailed in Section 7.1 and 7.2 will maintain the suitability of connected aquatic habitats. Consequently, no adverse effects on the population size of Kingfisher associated with the SPA are considered to have occurred.
	Productivity rate	Kingfisher productivity is dependent upon successful breeding, suitable nesting habitat and the availability of sufficient prey resources during the breeding season. Potential indirect effects could only arise if reductions in water quality affected fish populations within habitats used for foraging. Given the environmental protection measures incorporated into the Project and the absence of any direct pathway to the SPA itself, no impacts on breeding success or productivity are considered to have occurred.
	Spatial distribution of territories	The Project will not alter the availability of breeding habitat within the SPA nor affect the suitability of aquatic habitats potentially used by Kingfisher outside the SPA. No habitat fragmentation or loss of ecological function will occur. Accordingly, the existing distribution of Kingfisher territories along the River Boyne and River Blackwater system is expected to remain unchanged.

Special Conservation Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
	Extent and quality of nesting banks and other suitable nesting features	Kingfishers require vertical earth banks and similar features suitable for nest excavation. The Project will not involve works affecting riverbanks, watercourse morphology or nesting features within the SPA or within any connected habitats. No direct or indirect effects on the availability, extent or quality of nesting habitat are therefore considered to have occurred.
	Forage spatial distribution, extent, abundance and availability Water quality	Kingfisher relies on healthy fish populations and good water quality to forage effectively. Although the species was not recorded during targeted surveys, the Site's associated drainage network and watercourses may provide potentially suitable foraging habitat within the wider landscape. Water quality is a key determinant of habitat suitability for Kingfisher, as it influences both prey abundance and foraging efficiency, with the principal potential impact pathway being the movement of suspended solids, nutrients or contaminants into downstream watercourses. The Project incorporates established water-quality protection measures, including sediment-control measures, drainage management procedures, waste-management controls and ongoing compliance with IPC Licence requirements, as outlined in Section 7.1 and 7.2. These measures will minimise the risk of adverse effects on receiving waters and prevent deterioration of aquatic habitat quality. Consequently, fish availability, the suitability of aquatic habitats for foraging, and overall water quality will remain unchanged. No adverse effects on Kingfisher foraging habitat or this conservation attribute are therefore considered to have occurred.
	Barriers to connectivity	Kingfishers regularly move between nesting, foraging and resting locations along river corridors. While the Peat Extraction Phase included the construction of bridge crossings over the Milltown River and Yellow River, these structures would not have impeded the movement of mobile waterbird species or altered connectivity between feeding, resting and roosting habitats. Consequently, no adverse effects on connectivity or site use by SCI species associated with Lough Ennell SPA have been identified.



Special Conservation Interest [Code]	Attribute	<i>In-situ</i> and <i>Ex-situ</i> Effects
		Habitat connectivity within the wider catchment will therefore be maintained and no adverse effects on this attribute are considered to have occurred.
	Disturbance to breeding sites	The Application Site is located outside the SPA and no activities are proposed in proximity to known breeding locations. The Project will not generate disturbance of a magnitude, duration or proximity capable of affecting breeding Kingfisher associated with the SPA. Consequently, no adverse effects on breeding-site disturbance are considered to have occurred.

8.5 CONCLUSION OF ASSESSMENT OF ADVERSE EFFECTS

The comprehensive assessment of the available data, including an assessment of scientific literature, and conservation objectives, it is clear that no significant negative adverse effects have occurred or will occur on the integrity of any European site as a result of the Peat Extraction Phase (June 1994 – June 2020) at the Application Site.

Before the implementation of IPC Licence conditions in 2000, Bord na Móna implemented standard operating procedures and best practices which have been set in place for the entire Peat Extraction Phase, to manage environmental risks from peat extraction, particularly regarding suspended solids and contamination, ensuring the protection of water quality, and minimise the risk of noise disturbance. These pre-IPC Licence measures were successful in managing the risk of impact on water quality and noise disturbance, and no significant adverse effects are expected to have occurred to the River Barrow and River Nore SAC, or to the Lough Ennell SPA in the years after the designation of the sites in 1998, and 1995 respectively.

In 2000, the EPA issued IPC Licence P0501-01 for the Derrygreenagh Bog Group, introduced a comprehensive framework of environmental controls, monitoring requirements, sediment management measures and pollution prevention procedures. These controls remained in place throughout the remainder of the Peat Extraction Phase and were supported by routine environmental monitoring and annual reporting. Having regard to the implementation of these measures, the ongoing regulatory oversight provided through the IPC Licence, and the absence of evidence from Annual Environmental Reports, compliance records or environmental monitoring data indicating significant deterioration in downstream water quality, it is reasonable to conclude that peat extraction activities did not result in significant adverse effects on water quality.

Bord na Móna's operating procedures and best practices, and measures to meet IPC Licence conditions, have, collectively, ensured that the integrity of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA (which were designated in 2003 and 2010) has not been compromised.

Conclusion

Based on a thorough evaluation of the available evidence, it can be confidently stated that there is no risk of adverse effects on the integrity of any European Site as a result of the Peat Extraction Phase of the Project.

9. LIKELY CUMULATIVE IMPACTS OF THE PROJECT ON EUROPEAN SITE, IN-COMBINATION WITH OTHER PLANS AND PROJECTS

9.1 OVERVIEW

The Appropriate Assessment process requires consideration of whether the effects of the Peat Extraction Phase, either alone or in combination with other plans or projects, could adversely affect the integrity of European sites in view of their conservation objectives. In-combination effects may arise where impacts from the Peat Extraction Phase interact with impacts from other activities, plans or projects within the relevant catchments or ecological networks to produce cumulative effects on QIs or SCIs.

With regard to plans, it was concluded that, given their nature and alignment with environmental protection objectives, the plans are not likely to give rise to significant negative effects on European sites, either alone or in combination with the Project (see Section 4.2 of the remedial AASR). Consequently, they were screened out as requiring further assessment in this remedial NIS.

Consistent with the findings of the remedial AASR presented in this NIS as Appendix A, the potential for in-combination effects is relevant only to the Peat Extraction Phase (1994-2020). The Current Phase (2020-Present) and Remedial Phase (Future) were screened out from further assessment in the remedial AASR as no likely significant effects on any European site were identified for either phase, either alone or in combination with other plans or projects.

9.2 IDENTIFICATION OF OTHER PROJECTS

In considering the potential for in-combination effects, regard has been given to existing and historical land uses and activities, including agricultural activities, forestry operations, peat extraction activities, wastewater discharges, infrastructure projects, urban development and other authorised developments which may influence water quality, hydrology or supporting habitats associated with the European sites assessed in this remedial NIS.

9.3 IN-COMBINATION ASSESSMENT

The screening undertaken in the remedial AASR identified the potential for effects on downstream European sites primarily through pathways relating to sediment mobilisation, nutrient enrichment, hydrocarbon contamination and alterations to hydrological conditions.

A detailed description of these pathways has been presented in Section 6.2 and Section 6.3, while an assessment of adverse effects taking account of the operational procedures, environmental management measures, monitoring requirements, regulatory controls, IPC Licence requirements, environmental monitoring data, AERs and compliance records associated with the Application Site has been provided in Section 8.

The assessment in Section 8 has not identified any evidence that activities undertaken during the Peat Extraction Phase contributed to significant deterioration in downstream water quality. It has also not identified evidence of significant hydrological alteration, widespread habitat degradation, or reductions in habitat availability for mobile species.

No other environmental changes capable of adversely affecting the integrity of the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, or Lough Ennell SPA were identified.

Furthermore, no evidence has been identified from the available monitoring data, AERs, compliance records or other environmental documentation to indicate that activities at the Application Site combined with other plans or projects to give rise to effects of a nature, magnitude, extent or duration capable of adversely affecting the conservation objectives or ecological integrity of any European site.

9.4 CONCLUSION

Having regard to the findings of the detailed assessment, the environmental monitoring record for the Application Site, the requirements of the IPC Licence and the absence of evidence of significant adverse environmental effects, it is concluded that the Peat Extraction Phase, either alone or in combination with other plans or projects, has not adversely affected the integrity of any European site in view of its conservation objectives.

10. CONCLUDING STATEMENT

This remedial NIS provides an assessment of potential adverse effects on European Sites.

As outlined above, the River Boyne and River Blackwater SAC [002299], River Barrow and River Nore SAC [002162], Lough Ennell SPA [004044], and River Boyne and River Blackwater SPA [004232] were designated in 2003, 1998, 1995 and 2010, respectively. At the time of designation, peat extraction and associated activities were well established at the Application Site, resulting in a landscape dominated by cutover bog and bare peat.

Since 2000, the Application Site has been regulated by the EPA under IPC Licence Registration No. P0501-01 and has been subject to the conditions of that licence. 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 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, and potential transport of nutrients/contaminants, contributing to downstream pollution. The IPC licence requires the submission of an AER detailing emissions to water, waste management, resource consumption, air emissions, surface water monitoring, de-silting programmes, and bog rehabilitation progress.

A review of the available AERs and associated monitoring data, environmental monitoring records and associated compliance documentation obtained from the EPA, no evidence was identified of significant water-quality impacts attributable to peat extraction activities at the Application Site. In light of the environmental controls implemented under the IPC licence, the ongoing regulatory oversight of the EPA, and the monitoring information available for the site, it is considered that peat extraction activities did not give rise to significant adverse effects on downstream water quality.

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 peat extraction activities and all associated works at the Application Site during the Peat Extraction Phase have not adversely affected the integrity of any European Site. This conclusion holds true both in isolation and in combination with other plans or projects.

The assessment considered numerous factors, including the potential impacts on habitat quality, species populations, and ecosystem functions. The findings indicate that the measures in place are sufficient to prevent any significant negative effects on the designated conservation areas. Furthermore, the proposed rehabilitation plans are designed to enhance the ecological value of the site, ensuring that any potential risks are mitigated effectively.

Additionally, the proposed rehabilitation efforts are expected to contribute positively to the ecological value of the site and surrounding area, enhancing habitat conditions for protected species and restoring natural hydrological functions. These measures align with broader conservation goals, ensuring that any effects from past activities are mitigated and that future ecological integrity is maintained.

In summary, the assessment has found no evidence that activities undertaken at the Application Site have adversely affected, or are likely to adversely affect, the conservation objectives or ecological integrity of any European site. Having regard to these controls, the available environmental monitoring and compliance records, and the absence of evidence of significant adverse effects, it is concluded that the integrity of the relevant European sites has been maintained. Furthermore, the proposed rehabilitation measures will support improved hydrological and ecological functioning within the Application Site and are not considered to give rise to adverse effects on any European site, either alone or in combination with other plans or projects..

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Appendix A REMEDIAL APPROPRIATE ASSESSMENT SCREENING REPORT

