APPENDIX 6-3

AQUATIC BASELINE REPORT

Aquatic baseline report for the proposed Ballydermot Wind Farm, Co. Offaly and Co. Kildare (2026)

Prepared by Triturus Environmental Ltd. for MKO

September 2026

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by MKO on behalf of Bord na Móna (the Applicant) to conduct baseline aquatic surveys to inform EIAR preparation for the proposed Ballydermot Wind Farm (hereafter the Proposed Project) near Edenderry, Co. Offaly (**Figure 2.1**).

Undertaken on a catchment-wide scale, this report provides a baseline assessment of the aquatic ecology including fisheries and biological water quality, as well as protected species and habitats in the vicinity of the Proposed Project. Aquatic surveys were undertaken in August 2026 and would update those previously completed by Triturus in July-August 2024 (Triturus, 2024; **Appendix D**) to account for design changes and ensure ecological data validity for planning.

1.2 Development description

A full description of the Proposed Project are provided in the accompanying Environmental Impact Assessment Report (EIAR) and was used to support consenting applications.

1.3 Project referencing

As detailed in Section 1.1.1 in Chapter 1 Introduction of the accompany EIAR, for the purposes of this report, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Enhancement Areas', 'Proposed Construction Haul Routes', 'Proposed Turbine Delivery Route', 'Project Site', 'Proposed Wind Farm', 'Proposed Turbines', 'Proposed Grid Connection', 'Proposed Onsite Substation' and 'Proposed Offsite Substation'.

The Proposed Wind Farm site represents the area encompassing the Proposed Wind Farm, Proposed Enhancement Areas, the Proposed Onsite Substation and 0.5km of the Proposed Grid Connection underground electrical cabling route; this area spans a large suite of bogs, comprising of a total of 14 no, individual bog basins, which form part of the Allen Bog Group.

2. Methodology

2.1 Selection of watercourses for assessment

All freshwater watercourses which could be affected directly or indirectly by the proposed development were considered as part of the current assessment. This included those in vicinity of the proposed turbine array, access tracks and grid cable route (GCR). Thus, a total of 41 no. riverine sites and 1 no. canal site were selected for detailed aquatic assessment (see **Table 2.1, Figure 2.1**). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) and Tailte Éireann landcover mapping.

Riverine survey sites were present on the Codd River (EPA code: 14C44) and two unnamed tributaries, Cloncant Stream (14C41), Abbeylough Stream (14A01), Figile River (14F01), Lullybeg Stream (14L13), Lullymore East River (14L11) and an unnamed tributary, Clonbrown River (14C32), Ballykilleen Stream (14B25), Clonbulloge River (14C53), Ballygarrett River (14B30), Clonkeen Stream (07C36), River Boyne (07B04), Drumsru Stream (14D19), Slate River (14S01) and an unnamed tributary, Killinagh Upper Stream (14K17), Upper Ballynakill River (14U01), Brockagh River (14B73) and the Blackwood Feeder line and main line of the Grand Canal (**Table 2.1**).

A total of 12 no. sites on the Lullybeg Stream, Lullymore East River, Clonbrown River, Figile River and two unmapped (by the EPA) channels had not been previously surveyed (in 2024). These sites were primarily located at proposed access track crossings.

None of the survey sites were located within a European site. However, a single site (A3) on the Codd River was contiguous with the boundary of The Long Derries, Edenderry SAC (000925), a site designated for calcareous grassland (NPWS, 2021a). There was potential downstream hydrological connectivity (via several watercourses) with the River Barrow and River Nore SAC (002162) and Ballynafagh Bog SAC (000391),

Please note this aquatic report should be read in conjunction with the EIAR prepared for the Proposed Project.

2.2 Aquatic site surveys

Aquatic surveys were conducted on the 25th to 30th August 2026. Survey effort focused on both instream and riparian habitats at each aquatic sampling location and included a fisheries assessment (electro-fishing and or fisheries habitat appraisal), white-clawed crayfish survey, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling). Environmental DNA samples were also collected from 4 no. riverine sites. This holistic approach informed the overall aquatic ecological evaluation of each site/watercourse in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

In addition to the ecological characteristics of the sites, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation

helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form) including associated evidence of historical drainage
- Substrate type and relative condition, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition and bordering land use practices

Table 2.1 Location of 42 no. aquatic survey sites in vicinity of the proposed development

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A1	Unnamed stream	n/a	Derries	665752	729939
A2	Unnamed stream	n/a	Derries	666710	729706
A3	Codd River	14C44	Derries	666119	729187
A4	Codd River	14C44	Codd	664647	728006
A5	Cloncant Stream	14C41	Derries	666402	729057
A6	Cloncant Stream	14C41	Cushaling	663787	727511
A7	Abbeylough Stream	14A01	Kilpatrick	670827	728735
A8	Figile River	14F01	Ticknevin	666719	727796
A9	Unnamed stream	n/a	Lullybeg	667604	725885
A10a	Lullybeg Stream	14L13	Lullybeg	668325	724418
A10b	Lullymore East River	14L11	Lullybeg	667752	724098
A10c	Lullybeg Stream	14L13	Lullybeg	667103	725094
A11a	Lullymore East River	14L11	Lullybeg	667683	725577
A11b	Lullymore East River	14L11	Lullybeg	666815	725833
A12a	Lullybeg Stream	14L33	Cushaling	666165	724787
A12b	Lullybeg Stream	14L33	Cushaling	666087	724946
A13a	Clonbrown River	14C32	Cushaling	665802	723269
A13b	Clonbrown River	14C32	Cushaling	665761	723345
A13c	Clonbrown River	14C32	Cushaling	665583	723926
A13d	Clonbrown River	14C32	Cushaling	665055	725590
A14a	Figile River	14F01	Cushaling Bridge	665011	725882
A14b	Figile River	14F01	Cloncant	663529	726766
A15a*	**Figile River**	14F01	Kilcumber	661438	727522
A15b	Ballykilleen Stream	14B25	Shean	661272	727619
A16	Clonbulloge River	14C53	Clonmel	661405	723666
A17	Ballygarrett River	14B30	Clonmel	662374	723087
A18*	**Figile River**	14F01	Millgrove Bridge	659896	719047
B1	Clonkeen Stream	07C36	Cloncanon	665410	731179
B2*	**River Boyne**	07B04	Kishawanny Bridge	664528	733464

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
C1	Drumsru Stream	14D19	Barnaran	670840	724189
C2*	**Slate River**	14S01	Agar Bridge	670272	721700
G1	Killinagh Upper Stream	14K17	Allenwood South	673402	726368
G2	Grand Canal	n/a	Shee Bridge	674633	726464
G3	Upper Ballynakill River	14U01	R403 road crossing	676233	726584
G4	Unmapped channel	n/a	R403 road crossing	676949	726639
G5	Slate River	14S01	Quigley's Bridge	678787	726784
G6	Slate River	14S01	New Bridge	679415	726846
G7	Blackwood Feeder		R403 road crossing	679499	726854
G8	Slate River	14S01	R403 road crossing	679608	726864
G9	Brockagh River	14B73	Dagwelds Cross, R403	680021	726896
G10	Unmapped channel	n/a	R403 road crossing	680640	726952
G11	Unnamed stream	n/a	Black Stick Cross Roads, R403	682652	727121

***eDNA sampling** for freshwater pearl mussel, Atlantic salmon, lamprey (*Lampetra* sp.) & white-clawed crayfish

Sites G1-G11 are Proposed Grid Connection underground electrical cabling route crossings

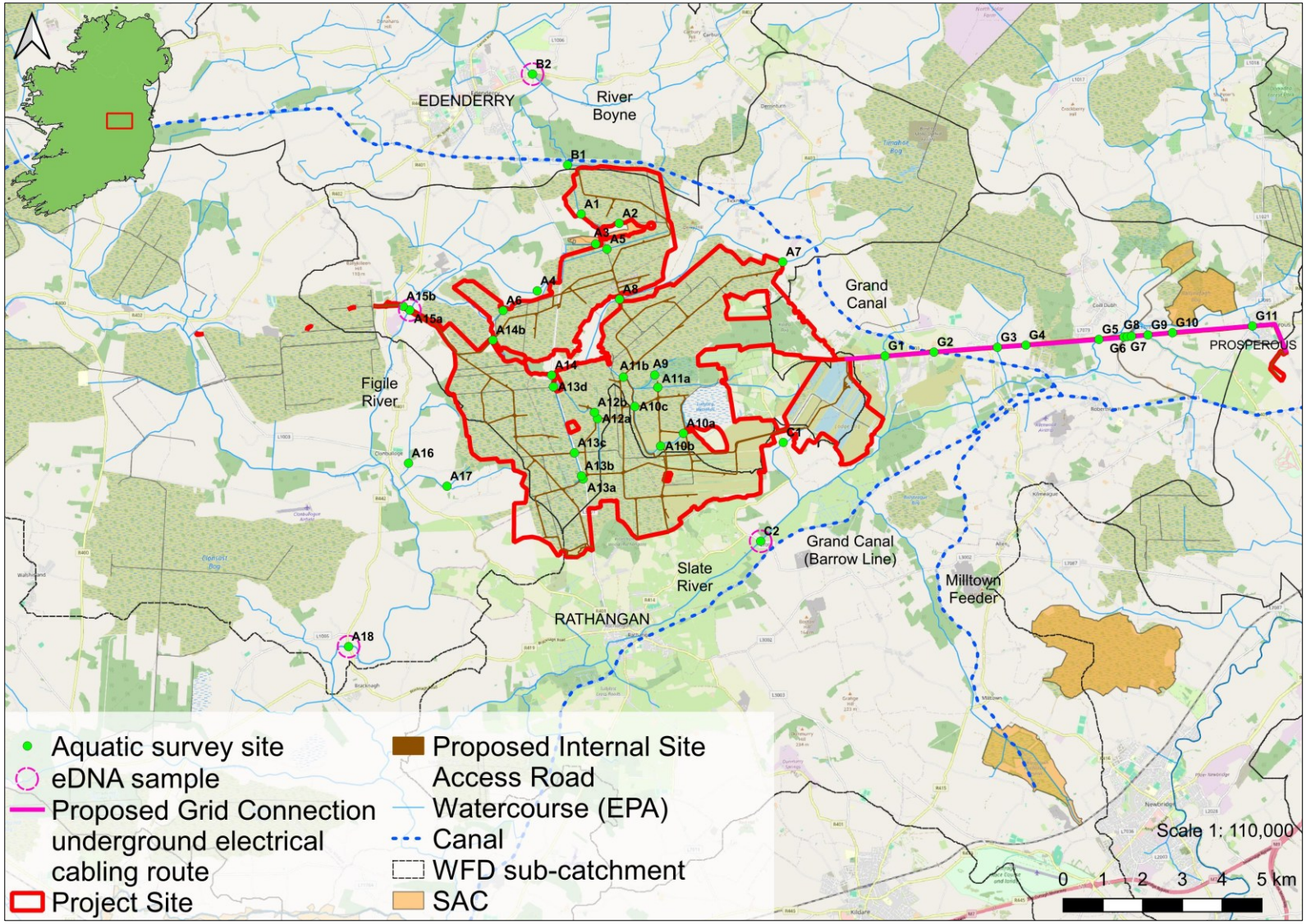


Figure 2.1 Overview of the aquatic survey sites, August 2026

2.3 Fisheries assessment (electro-fishing)

To collate a more accurate baseline, a catchment-wide approach was adopted and the electro-fishing survey was undertaken across 41 no. riverine sites (see **Table 2.1, Figure 2.1**). A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish riverine sites on the 25th to 30th August 2026 following notification to Inland Fisheries Ireland and under the conditions of a Department of Climate, Energy and the Environment (DCEE) licence. The survey was undertaken in accordance with best practice (CFB, 2008; CEN, 2003) and Section 14 licencing requirements.

Furthermore, a fisheries habitat appraisal of all aquatic survey sites was undertaken to establish their suitability and importance for salmonid, lamprey, European eel and other fish species. The baseline assessment also considered the quality of fisheries habitats within the vicinity of the survey sites. For detailed survey methodology, please refer to accompanying fisheries assessment report in **Appendix A.**

2.4 White-clawed crayfish survey

White-clawed crayfish (*Austropotamobius pallipes*) surveys were undertaken at the aquatic survey sites in August 2026 under a National Parks and Wildlife (NPWS) open national licence (C017/2026) as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland (IFI) aquatic biosecurity recommendations, the crayfish sampling started at the uppermost site(s) of each catchment or sub-catchment in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds et al. (2010). An appraisal of white-clawed crayfish habitat at each site was conducted based on physical habitat attributes (Gammell et al., 2021; Peay, 2003), water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of crayfish records within the wider survey area was completed.

2.5 Environmental DNA

To further validate site surveys and to detect potentially cryptically low populations of high conservation value aquatic species within the survey area, composite water samples were collected from the Figile River (sites A15a & A18), River Boyne (B2) and the Slate River (C2) (**Figure 2.1; Table 2.1**). These were analysed for freshwater pearl mussel (*Margaritifera margaritifera*), Atlantic salmon (*Salmo salar*), white-clawed crayfish and lamprey (*Lampetra* sp.) eDNA. The sites were strategically chosen to maximise longitudinal (instream) coverage within the survey area/catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of n=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR

replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix B** for full eDNA laboratory analysis methodology.

2.6 Biological water quality (Q-sampling)

The 41 no. riverine survey sites were assessed for biological water quality through Q-sampling in August 2026. All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per EPA methodology (Feeley et al., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley et al., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner et al. (2005) and assigned to WFD status classes (**Table 2.2**). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley et al., 2020) and other relevant taxa (i.e. Byrne et al., 2009; Nelson et al., 2011).

Table 2.2 Reference categories for EPA Q-ratings (Q1 to Q5) (Toner et al., 2005)

Q value	WFD class	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.7 Canal macro-invertebrate communities

Site G2 on the Grand Canal was sampled for macro-invertebrates via sweep netting. A standard pond net (250mm width, mesh size 500µm) was used to sweep macrophytes to capture macro-invertebrates. The net was also moved along the canal bed to collect epibenthic and epiphytic invertebrates from the substratum (as per Cheal et al., 1993). A 3-minute sampling period was employed. To ensure appropriate habitat coverage, the sampling period was also divided amongst the range of meso-habitats present at the survey site to get a representative sample for sub-habitats.

2.8 Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the survey sites, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the Flora (Protection) Order, 2022, Irish Red list for vascular plants (Wyse-Jackson et al., 2016) and or aquatic bryophytes (Hodgetts & Lockhart, 2025), or habitats corresponding to Annex I habitats, such as floating river vegetation (3260) or hydrophilous tall herb (6430).

2.9 Otter signs

The presence of otter (*Lutra lutra*) was determined through the recording of otter signs within 150m radius of each survey site. Notes on the age and location of signs (ITM coordinates) were made, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs etc.).

2.10 Aquatic ecological evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

2.11 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

3. Desktop review

3.1 Survey area

The Proposed Wind Farm site is located in an area of peatland near Clonbulloge, Co. Offaly (**Figure 2.1**). The Proposed Wind Farm site is situated in the Shannon River Basin District and within the Boyne_SC_010, Figile_SC_010, Figile_SC_020 and Slate_SC_010 river sub-catchments in hydrometric areas 7 (Boyne) and 14 (Barrow).

The watercourses in the vicinity of the Proposed Wind Farm site are typically small, historically modified lowland depositing channels (FW2; Fossitt, 2000) and drainage ditches (FW4). Land use practices within the vicinity of the Project Site were predominantly peat bogs with the wider survey area featuring land principally occupied by agriculture, with significant areas of natural vegetation and pastures (land cover data). Predominantly, the watercourses flow over areas of Carboniferous limestone and calcareous shale, and dark-grey argillaceous, cherty limestone and shale (Geological Survey of Ireland data).

3.2 Fisheries

The River Boyne is a designated salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988) and is a renowned wild brown trout (*Salmo trutta*), Atlantic salmon (*Salmo salar*) and (in its lower reaches) sea trout fishery (O'Reilly, 2009). As well as salmonids, the river is known to support lamprey (*Lampetra* sp.), European eel (*Anguilla anguilla*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and three-spined stickleback (*Gasterosteus aculeatus*) (Kelly et al., 2011a, 2011b). A number of other cyprinid species are also known from the river, including roach (*Rutilus rutilus*) and bream (*Abramis brama*), primarily in the middle to lower reaches (pers. obs.). The upper reaches, surveyed previously for the development at Kishawanny Bridge, are known to support brown trout, lamprey (*Lampetra* sp.), European eel and three-spined stickleback (Triturus, 2024; **Appendix D**).

The Slate River is one of the larger Barrow sub-catchments and covers an area of approximately 214km^2. As part of the upper Barrow system, the Slate is known to support a range of fish species including brown trout, Atlantic salmon, lamprey (*Lampetra* sp.), minnow, three-spined stickleback, roach, perch (*Perca fluviatilis*), stone loach, European eel and invasive dace (*Leuciscus leuciscus*) (Gordon et al., 2021; Delanty et al., 2017; 2021-2024 Triturus data). Whilst the Slate is a noted recreational trout fishery (O'Reilly, 2009), the Slate sub-catchment has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures (Delanty et al., 2017).

The Figile River, a major tributary of the River Barrow, drains an area of approximately 320km^2. After its confluence with the Cushina and Slate Rivers, it becomes the Black River before it enters the River Barrow at Monasterevin. The Figile is known to support Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), European eel, lamprey (*Lampetra* sp.), minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula*), roach (*Rutilus rutilus*), roach x bream hybrids, dace (*Leuciscus leuciscus*), perch (*Perca fluviatilis*), pike (*Esox lucius*), gudgeon (*Gobio gobio*), three-spined stickleback (*Gasterosteus aculeatus*) and ten-spined stickleback (*Pungitius pungitius*) (Triturus 2021-2024 data; Gordon et al.,

2021; Delanty et al., 2017). The Figile River has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

The Lullymore East River, a Figile tributary, is known to support brown trout, European eel and three-spined stickleback (Triturus 2021-2024 data). The heavily modified Cloncant Stream is known to support brown trout, minnow and three-spined stickleback (Triturus 2021-2024 data). European eel and three-spined stickleback are known from the Clonkeen Stream, a minor Boyne tributary (Triturus 2021-2024 data). The Abbeylough River, Killinagh Upper Stream and the Upper Ballynakill River are only known to support three-spined stickleback (Triturus 2021-2024 data). Previous surveys of the heavily modified Codd River, Drumsru River and Ballygarrett River did not reveal any fish species (Triturus 2021-2024 data).

The Grand Canal, crossed by the Proposed Grid Connection underground electrical cabling route, is known to support a range of coarse fish species, including perch, pike (*Esox lucius*), bream, roach, rudd (*Scardinius erythropthalmus*) and their respective hybrids, European eel and tench (*Tinca tinca*) with highly localised common carp (*Cyprinus carpio*) and brown trout (*Salmo trutta*) (IFI data; McLoone, 2011; Tierney et al., 1999; pers. obs.). Lamprey (*Lampetra* sp.) have also been recorded at a low number of locations where increased flows at lock gates provide better quality habitat (e.g. 11th lock, ROD, 2016; 7th lock, Caffrey et al., 2006; 5th lock, MKO, 2019).

3.3 Protected and rare aquatic species

A comprehensive desktop review of available data from the NPWS, National Biodiversity Data Centre (NBDC), IFI, Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), EPA and Triturus databases for the 10km grid squares containing and adjoining the Proposed Wind Farm site and Proposed Grid Connection (i.e. N61, N62, N63, N72, N73 & N82) identified a low number of records for rare and or protected aquatic species within the vicinity of the proposed development.

Numerous records for white-clawed crayfish (*Austropotamobius pallipes*) records were available within the survey area (**Figure 3.1**). On the Figile River, >20 contemporary records were available, with a lower number of records also available for the Slate River at Ford Bridge and Agar Bridge. A low number of historical crayfish records were available for the upper reaches of the River Boyne in the vicinity of Edenderry (1975 & 1985, respectively). No white-clawed crayfish were recorded during the previous 2021 or 2024 surveys for the Proposed Wind Farm site and Proposed Grid Connection (Triturus, 2024, 2021). However, environmental DNA sampling of the Figile River at Kilcumber Bridge in 2025 detected white-clawed crayfish (Triturus data).

Otter (*lutra lutra*) records were widespread throughout the relevant grid squares, with a high number of records available for the Figile River and small tributaries, including those within the Proposed Wind Farm site and within the Proposed Grid Connection infrastructure footprint (e.g., Lullybeg Stream, Cloncant Stream). A lower number of records were also available for Slate River, River Boyne and Grand Canal within the vicinity of the Proposed Wind Farm site and Proposed Grid Connection (NPWS, Triturus & NBDC data; **Figure 3.1**). Previous surveys by Triturus for the Proposed Wind Farm site and Proposed Grid Connection also recorded otter signs on the River Boyne, Codd River, Lullybeg Stream, Figile River, Clonbulloge River, Killinagh Upper Stream and the Slate River (**Figure 3.1**).

Several records were available from the Grand Canal east of the 19th lock for the nationally rare macrophyte species opposite leaved-pondweed (*Groenlandia densa*), listed on the Flora (Protection) Order, 2022. These records were from the 1992-1993 period (data not shown). No other NPWS records for macrophytes or aquatic bryophytes protected under the Flora (Protection) Order, 2022 or included on national Red lists were available for the respective grid squares.

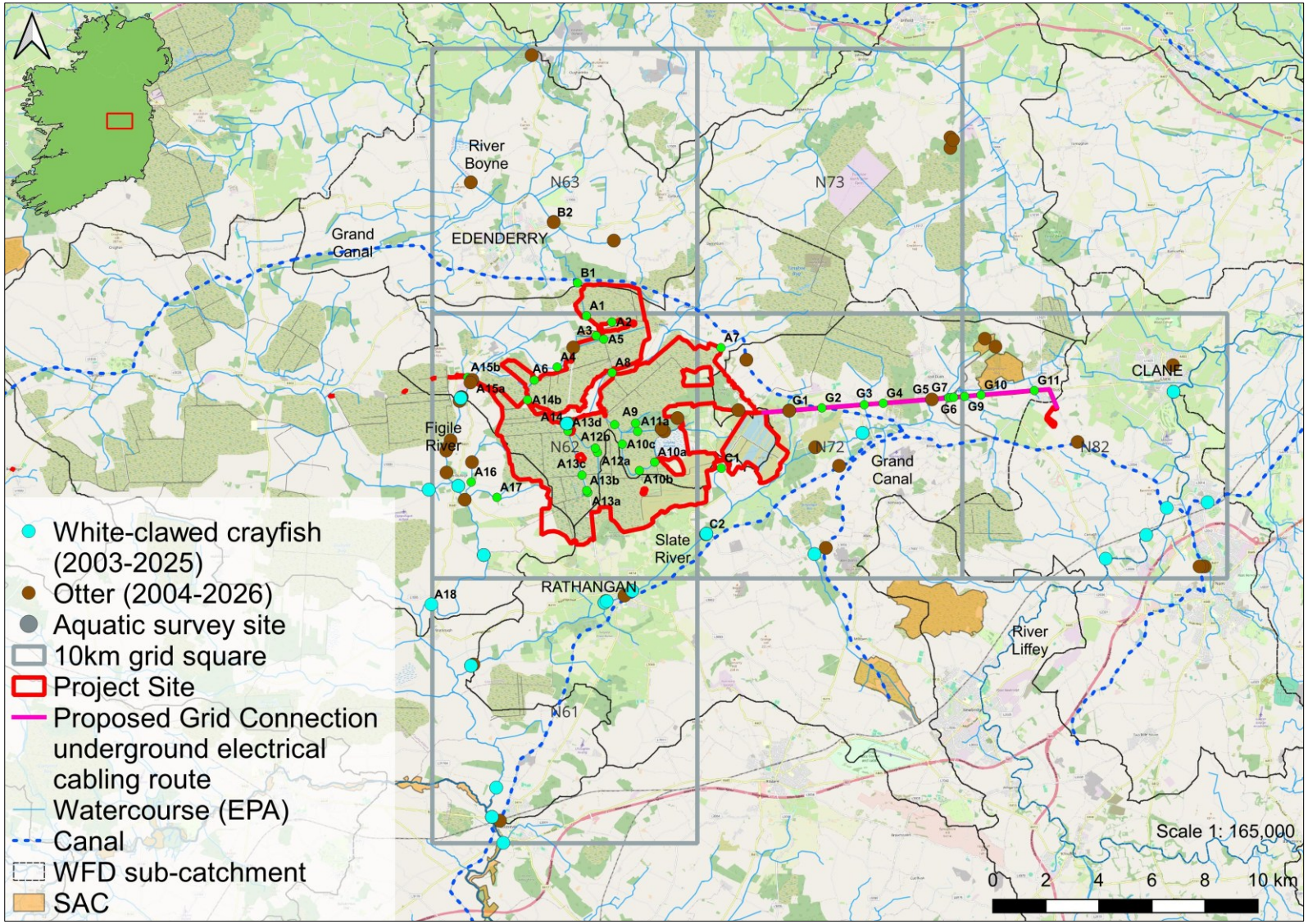


Figure 3.1 Selected rare/protected aquatic species records in vicinity of the Proposed Site (source: NPWS, NBDC, EPA & Triturus data)

4. Results of aquatic surveys

The following section summarises each of the 42 no. survey sites in terms of aquatic habitats, physical characteristics and overall value for fish and macrophyte/aquatic bryophyte communities. Biological water quality (Q-sample) results are summarised for each riverine sampling site in **Table 4.2** and presented in full in **Appendix C**. A summary of the fish species recorded at each survey site is provided in **Table 4.3**. A summary of the aquatic species and habitats of high conservation concern recorded during the surveys is provided in **Table 4.4**. An evaluation of the aquatic ecological importance of each survey site based on these aquatic surveys is provided and summarised in **Table 4.5**. Habitat codes are according to Fossitt (2000). Scientific names are provided at first mention only. Sites were surveyed in August 2026.

4.1 Aquatic survey site results

4.1.1 Site A1 – Unnamed stream, Derries

Site A1 was located on an unnamed tributary of the Codd River (no EPA code) adjoining the Proposed Wind Farm site . The lowland stream (FW2: Fossitt, 2000) had been historically straightened and deepened resulting in a homogenous deep U-shaped channel with poor hydromorphology and 3m high banks. The channel was 2m wide and 0.4m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The bed was dominated by deep peat and silt accumulations with no hard substrata. The site featured occasional various-leaved water starwort (*Callitriche platycarpa*), common water starwort (*Callitriche stagnalis*), fool's watercress (*Helosciadium nodiflorum*) and branched bur-reed (*Sparganium erectum*). Common water plantain (*Alisma plantago-aquatica*) and small pondweed (*Potamogeton berchtoldii*) were rare. The heavily modified channel was bordered by dense scrubbed-over embankments supporting grey willow (*Salix cinerea*), bramble (*Rubus fruticosus* agg.), bracken (*Pteridium aquilinum*), meadowsweet (*Filipendula ulmaria*), hedge bindweed (*Calystegia sepium*), marsh valerian (*Valeriana dioica*), marsh woundwort (*Stachys palustris*) and rosebay willowherb (*Chamaenerion angustifolium*). The Site A1 was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Three-spined stickleback (*Gasterosteus aculeatus*) was the only fish species via electro-fishing at Site A1 (**Appendix A**). The heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, absence of coarse substrata and significant siltation. Site A1 had some low value as a European eel nursery given deep glide, abundant macrophyte refugia and prey resources although the species was not recorded. Site A1 was of poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of Site A1 with prey resources and foraging opportunities limited.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A1 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.1 Representative image of Site A1 on an unnamed Codd River tributary, August 2026

4.1.2 Site A2 - Unnamed stream, Derries

Site A2 was located on an unnamed tributary of the Codd River (no EPA code) adjoining the Proposed Wind Farm site. The lowland stream (FW2) had been historically straightened and deepened resulting in a homogenous deep U-shaped channel with poor hydromorphology and 3-4m high banks. The canalised channel was 4-6m wide and 0.5-1.5m deep with low summer flows at the time of survey. The profile comprised slow-flowing glide with localised riffle and pool downstream of a pipe culvert only. The substrata were dominated by deep compacted peat with some scattered boulders. Macrophyte growth was sparse with occasional stands of bulrush (*Typha latifolia*), reed sweet-grass (*Glyceria maxima*) and small pondweed. Broad-leaved pondweed (*Portamogeton natans*) was occasional in wide, deeper sections of the watercourse. No aquatic bryophytes were recorded. The heavily modified channel was bordered by dense, scrubbed-over embankments supporting a mixture of lowland blanket bog and scrub species. These included immature grey willow, downy birch (*Betula pubescens*), deergrass (*Trichophorum germanicum*), heather (*Calluna vulgaris*), meadowsweet and bramble, and bracken. The Site A2 was bordered by extensive areas of cutover bog (PB4) with coniferous afforestation (WD4) on the south bank.

Three-spined stickleback was the only fish species recorded via electro-fishing at Site A2 (**Appendix A**). With the exception of low densities of this species, the heavily silted canalised channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, paucity of coarse substrata and significant siltation. Site A2 had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources although the species was not recorded. Site A2 was of poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of Site A2 with prey resources and foraging opportunities limited.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A2 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.2 Representative image of Site A2 on an unnamed Codd River tributary, August 2026

4.1.3 Site A3 – Codd River, Derries

Site A3 was located on the upper reaches of the Codd River (EPA code: 14C44) within the Proposed Wind Farm site. The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogenous V-shaped channel with peat banks of 6-8m in height. The channel was 1-1.5m wide but was dry at the time of survey. Epehemerality (seasonal drying) is a known issue on this watercourse (Triturus data). The substrata were dominated by sand deposits over deep compacted peat. Occasional marginal gravels and rare cobble were also present within the channel, indicating occasional water flows (e.g. in winter). No macrophytes or aquatic bryophytes were recorded. Encroachment of terrestrial herbaceous vegetation was often high with abundant great willowherb (*Epilobium hirsutum*). The scrubbed-over peat embankments supported immature grey willow, downy birch, purple moor grass (*Molinia caerulea*), heather, meadowsweet, bramble and ferns (*Dryopteris* sp.). Site A3 was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Site A3 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A3.

It was not possible to collect a biological water quality sample given the dry nature of the channel at

the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A3 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.3 Representative image of Site A3 on the Codd River, August 2026 (dry, ephemeral channel)

4.1.4 Site A4 – Codd River, Codd

Site A4 was located on the upper reaches of the Codd River (14C44) adjacent to the Proposed Wind Farm site at a farm access crossing, c. 2.5km downstream of Site A3. The lowland river (FW2) had been extensively straightened and deepened historically through pasture, resulting in a homogenous U-shaped channel with banks of 1-1.5m in height. The channel was 1.5-2m wide and was dry at the time of survey (as per previous surveys; Triturus, 2024). The bed comprised dry leaf litter and detritus over mineral soil. The heavily modified channel had narrow riparian zones supporting hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble, gorse (*Ulex europaeus*), alder (*Alnus glutinosa*) and grey willow, with ivy (*Hedera helix*) and dog rose (*Rosa canina*) in the understory. The site was bordered by improved pasture (GA1) with cutover bog (PB4) upstream.

Site A4 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A4.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A4 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.4 Representative image of Site A4 on the Codd River, August 2026 (dry, ephemeral channel)

4.1.5 Site A5 – Cloncant Stream, Derries

Site A5 was located on the uppermost reaches of the Cloncant Stream (14C41) at an existing bog access track crossing (pipe culvert) within the Proposed Wind Farm site. The lowland channel (FW2) had been extensively straightened and deepened historically through peatland, resulting in a deep, homogenous trapezoidal channel with poor hydromorphology and peaty banks of 4-6m in height. The stream was 1-2m wide and suffered from low summer water levels at the time of survey with no observable flows (i.e. stagnant pools of water to 0.2m depth). The substrata were dominated by deep compacted peat with scattered gravels and small boulder along the littorals originating from slumping banks. Macrophytes were limited to occasional stands of bulrush, unbranched bur-reed (*Sparganium emersum*), water mint and rare water plantain. High levels of encroachment by terrestrial grasses and herbaceous scrub was evident. The stream was lined locally dense scrub dominated by bracken and gorse with grey willow and hawthorn. Site A5 was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

No fish were recorded via electro-fishing at Site A5 (**Appendix A**). The heavily modified channel suffered from very low summer flows and was possibly ephemeral at this location. This coupled with significant siltation and downstream connectivity issues precluded resident fish. There was poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of Site A5 with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A5 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.5 Representative image of Site A5 on the Cloncant Stream, August 2026

4.1.6 Site A6 - Cloncant Stream, Cushaling

Site A6 was located on the Cloncant Stream (14C41) at an existing bog access track crossing c. 3.5km downstream of Site A5 within the Proposed Wind Farm site. The lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep, trapezoidal channel with poor hydromorphology and peat banks of 5-6m in height. The channel was 2-3m wide and 0.1-0.2m deep with a profile dominated by slow-flowing glide and occasional riffle. The substrata were dominated by compacted peat although cobbles and coarse gravels, which were highly silted (silt plumes underfoot), were present locally. Macrophytes comprised occasional common water starwort, branched bur-reed, fool's watercress and water mint. Unbranched bur-reed and water plantain were rare. No aquatic bryophytes were recorded. The riparian areas featured dense scrub dominated by bracken, gorse, bramble, grey willow and eared willow (*Salix aurita*) with herbaceous species including great willowherb, valerian and meadowsweet. Site A6 was bordered by cutover bog (PB4) and scrub (WS1) with improved pasture (GA1) upstream.

Three-spined stickleback and minnow (*Phoxinus phoxinus*) were the only fish species recorded via electro-fishing at Site A6 (**Appendix A**). With the exception of low densities of these species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. Site A6 had some low value as a European eel nursery given abundant refugia and suitable prey resources, however none were recorded. Site A6 was of poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of Site A6 with limited foraging and marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A6 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.6 Representative image of Site A6 on the Cloncant Stream, August 2026

4.1.7 Site A7 - Abbeylough Stream, Kilpatrick

Site A7 was located on the Abbeylough River (14A01) at a farm/bog access track crossing adjoining the Proposed Wind Farm site. The small lowland channel had been straightened and deepened throughout resulting in a mostly homogenous trapezoidal or deep U-shaped channel with poor hydromorphology. The stream suffered from low summer water levels at the time of survey but retained some flowing water. The stream was 2-3m wide and 0.1-0.4m deep with a profile dominated by slow-flowing glide and pool. The substrata comprised superficial gravels and scattered cobble/small boulder. Siltation was high with abundant humic deposits on the bed and deep accumulations in depositing glide. The river was typically very heavily shaded, restricting macrophytes. However, the short section directly downstream of the culvert supported some marginal reed canary grass (*Phalaris arundinacea*) and rare branched bur-reed within the channel. Aquatic bryophytes were absent. The channel was mostly tunnelled with very dense (near total) cover of grey willow, blackthorn, bramble and herbaceous scrub (very few open areas). Site A7 was bordered by improved pasture (GA1).

Three-spined stickleback and ten-spined stickleback (*Pungitius pungitius*) were the only fish species recorded via electro-fishing at Site A7 (**Appendix A**). With the exception of low densities these species, the stream at this location was of poor fisheries value given significant siltation and

hydromorphological pressures in addition to the site's location in the upper reaches of the watercourse. There was low suitability for white-clawed crayfish with none recorded. No otter signs were recorded in vicinity of Site A7 with limited foraging and marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A7 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.7 Representative image of Site A7 on the Abbeylough Stream, August 2026

4.1.8 Site A8 – Figile River, Ticknevin

Site A8 was located on the Figile River (14F01) adjacent to proposed internal site access roads (two bridges). The lowland depositing river (FW2) had been historically straightened and deepened although some instream recovery was evident. The river was 4-5m wide and 0.2-0.3m deep with locally deeper pools (up to 0.5m) upstream and downstream of the bridges. Bank heights ranged from 6-8m. The profile was dominated by slow-flowing homogenous glide and pool with riffle confined to the bridge aprons. Although mixed gravels and frequent boulder were present in vicinity of the crossings, deep humic soft sediment deposits dominated elsewhere. Siltation was high and the bed was covered in flocculant deposits (c. 70% of the bed). Outside of the bridge apron area, macrophyte cover was high with abundant reed sweet grass, occasional branched bur-reed, unbranched bur-reed, fool's watercress and common duckweed in areas of lower flows. The aquatic bryophyte *Leptodictyum riparium* was abundant on instream substrata. Cover of filamentous algae and floc was high indicating significant eutrophication pressures. The often steep banks supported intermittent mature treelines

of alder and grey willow with mature buffers of abundant nitrophilous herbaceous vegetation and bramble/bracken scrub (WS1). Site A8 was bordered by extensive areas of cutover bog (PB4) with areas of species-rich wet grassland (GS4).

Brown trout (*Salmo trutta*), minnow, stone loach (*Barbatula barbatula*) and European eel (*Anguilla anguilla*) were recorded via electro-fishing at Site A8 (**Appendix A**). Site A8 was of moderate value for salmonids with some spawning and nursery habitat in vicinity of the bridge apron. However, outside of this small area, the river was of poor value for salmonids given high rates of siltation, floc and extensive macrophyte growth in deep glide and pool habitat. However, these areas did support abundant minnow. Areas of gravel provided some lamprey spawning habitat although the humic nature of soft sediment accumulations were sub-optimal for ammocoetes and none were recorded. There was good suitability for European eel given abundant refugia given large substrata and deeper pool. Suitability also existed for white-clawed crayfish but none were recorded. Despite good foraging habitat and suitable marking areas, no otter signs were detected (but known to use Site A8; Triturus data).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and European eel, the aquatic ecological evaluation of Site A8 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.8 Representative image of Site A8 on the Figile River, August 2026

4.1.9 Site A9 - Unnamed stream, Lullybeg

Site A9 was located on an unnamed Lullymore East River tributary within the Proposed Wind Farm site. The stream (FW2) had been historically straightened and deepened resulting in a U-shaped channel with poor hydromorphology and 3-4m high banks. The channel was 1.5-2m wide and 0.05-0.1m deep with a profile of very slow-flowing glide and pool (no riffles). The stream suffered from low summer flows at the time of survey. The substrata were dominated by soft, flocculent peat with very localised cobble and gravels. Given heavy riparian shading, macrophytes were limited to occasional branched bur-reed, water mint and common duckweed in open areas. The mature riparian zones supported mature grey willow, blackthorn and downy birch with a dense scrub/fern understory. Site A9 was bordered by scrub (WS1), willow-birch woodland (WN7) and recolonising cutover bog (PB4).

Three-spined stickleback was the only fish species recorded during electrofishing at Site A9 (**Appendix A**). The species was associated with localised pooling areas, which provided limited habitat within the otherwise very shallow channel. No salmonids, lamprey species or European eel were recorded, given the very low fisheries value of the heavily silted and slow-flowing channel. Suitability for white-clawed crayfish was low and none were recorded. A potential otter holt, inactive at time of survey, was identified on the east bank between the roots of a mature sycamore (ITM 667613, 725896). There were recent mammal tracks(not otter) leading from the entrance (i.e. an inactive otter holt).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of a legally protected potential otter holt (although inactive), determined the aquatic ecological evaluation of Site A9 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.9 Representative image of Site A9 on an unnamed Lullybeg East River tributary, August 2026

4.1.10 Site A10a - Lullybeg Stream, Lullybeg

Site A10a was located on the upper reaches of the Lullybeg Stream (14L13) at a proposed internal site access road crossing within the Proposed Wind Farm site. The stream (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogenous trapezoidal channel with poor hydromorphology. The stream was 2-2.5m wide and 0.2-0.4m deep, with a flow profile dominated by very slow-flowing, shallow glide that was almost stagnant during the survey. A concrete pipe culvert was present at the downstream extent of the survey area. The substrata were dominated by flocculent silt over compacted peat, with no exposed coarse substrata present. Macrophyte cover was very high, comprising frequent tall stands of branched bur-reed interspersed with occasional water mint and encroachment of great willowherb. Fool's-water-cress was occasional in locally deeper areas. The steep banks supported dense bramble scrub (WS1), while the wider riparian corridor was dominated by dense bracken (HD1). The site was bordered by extensive areas of cutover bog (PB4).

Three-spined stickleback was the only fish species recorded via electro-fishing at Site A10a (**Appendix A**). With the exception of low densities of this ubiquitous species, the stream at this location was of poor fisheries value given significant siltation, hydromorphological and eutrophication pressures in addition to the sites' location in the upper reaches of the watercourse. There was low suitability for white-clawed crayfish with none recorded. No otter signs were recorded in vicinity of Site A10a with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2 (bad status)** (**Appendix C**). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A10a was of **local importance (lower value)** (**Table 4.5**).



Plate 4.10 Representative image of Site A10a on the Lullybeg Stream, August 2026

4.1.11 Site A10b - Lullymore East River, Lullybeg

Site A10b was located on the Lullybeg Stream (14L13) at proposed internal site access road (concrete pipe culvert), c. 0.7km downstream of Site A10a. The stream (FW2) had been extensively straightened and deepened historically, resulting in a deep, trapezoidal channel with steep banks of up to 4m in height. Summer water levels were low at the time of survey, with an imperceptible flow. The channel was 2.5-3m wide and 0.2-0.4m deep. The substrata comprised argillaceous sediments and compacted gravels and cobble, with abundant deposits of soft humic sediment. Macrophyte cover was very high, with abundant fool's-water-cress, occasional water mint and rare water forget-me-not (*Myosotis scorpioides*) and water horsetail (*Equisetum fluviatile*). No aquatic bryophytes were recorded. The steep banks supported herbaceous and scrub vegetation dominated by bramble, bracken, meadowsweet and purple loosestrife (*Lythrum salicaria*). Site A10b was bordered by scrub (WS1) adjoining bog woodland (WN7) and extensive areas of recolonising cutover bog (PB4).

Three-spined stickleback was the only fish species recorded via electro-fishing at Site A10b (**Appendix A**). With the exception of low densities of this ubiquitous species, the stream at this location was of poor fisheries value given significant siltation, hydromorphological and eutrophication pressures in addition to the sites' location in the upper reaches of the watercourse. There was low suitability for white-clawed crayfish with none recorded. No otter signs were recorded in vicinity of Site A10b with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A10b was of **local importance (lower value)** (**Table 4.5**).



Plate 4.11 Representative image of Site A10b on the Lullybeg Stream, August 2026

4.1.12 Site A10c - Lullybeg Stream, Lullybeg

Site A10c was located on the Lullybeg Stream (14L13) at a proposed internal site access road crossing c. 1.6km downstream of Site A10b. As per upstream at Site 10b, the lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a homogeneous U-shaped channel with poor hydromorphology. The channel was approximately 3m wide and 0.2m deep, with steep banks of 3-4m in height. The profile was of near-stagnant glide at the time of survey (no riffles). The substrata comprised deep, soft humic sediment over compacted peat. Macrophyte cover was very high, with abundant branched bur-reed forming dense beds across much of the channel. Water mint was occasional along the channel margins. The steep banks supported dense bramble and bracken, in addition to frequent common valerian and occasional grey willow. The site was bordered by scrub (WS1) and bog woodland (WN7) with extensive areas of recolonising cutover bog (PB4).

Three-spined stickleback was the only fish recorded at Site A10c (**Appendix A**). Site A10c of low fisheries value given the absence of perceptible flow and the deep deposits of soft sediment over compacted peat. No suitable salmonid spawning, nursery or holding habitat was present for salmonids, given significant siltation and noxious growth of instream macrophytes. The site also low suitability for eel. The soft, heavily silted substrata and absence of suitable hard refugia provided no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A10c with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given poor flows and the absence of suitable riffle areas for

sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A10c was of **local importance (lower value)** (**Table 4.5**).



Plate 4.12 Representative image of Site A10c on the Lullybeg Stream, August 2026

4.1.13 Site A11a - Lullymore East River, Lullybeg

Site A11a was located on the upper reaches of the Lullymore East River (14L11) at a proposed internal site access road crossing within the Proposed Wind Farm site. The depositing river (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogenous trapezoidal channel with poor hydromorphology. The channel was 2-3m wide and 0.1-0.2m deep with a flow profile exclusively of shallow slow-flowing glide. The bed was dominated by soft humic silt deposits up to 0.3m in depth, with rare boulder and cobble along the channel margins. Given high shading, macrophyte growth was sparse and restricted to occasional lesser duckweed (*Lemna minor*) in localised pooling areas. No aquatic bryophytes were recorded, although the liverwort *Pellia epiphylla* was frequent along the exposed muddy banks. Site A11a was located within a block of wet birch-willow woodland (WN7) with scrubby banks.

Three-spined stickleback and minnow were the only fish species recorded at Site A11a (**Appendix A**). Both species were present in low numbers. The river was considered of very low fisheries value at this location given shallow depths and dominance of deep, soft silt deposits. The absence of suitable gravel and cobble substrata precluded salmonid spawning or nursery habitat, while the homogenous channel provided very limited holding habitat for larger fish. Suitability for European eel and white-clawed crayfish was very low due to the shallow depths and limited availability of instream refugia. No otter signs were recorded in the vicinity of Site A11a with limited foraging opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A11a was of **local importance (lower value)** (**Table 4.5**).



Plate 4.13 Representative image of Site A11a on the Lullymore East River, August 2026

4.1.14 Site A11b - Lullymore East River, Lullybeg

Site A11b was located on the Lullymore East River (14L11) at a proposed amenity track crossing within the Proposed Wind Farm site. The lowland river (FW2) had been significantly straightened and deepened historically in vicinity of an existing crossing, resulting in a deep, homogeneous trapezoidal channel with poor hydromorphology. The channel was 3-4m wide and 0.2-0.4m deep, with steep peat banks of 4-6m in height. The profile comprised very slow-flowing glide, with a localised pool of up to 0.6m deep directly downstream of the culvert. The substrata comprised deep silt over compacted peat, with localised boulder beneath the culvert. Macrophyte cover was very high, with abundant beds of unbranched bur-reed throughout. Common duckweed and ivy-leaved duckweed (*Lemna trisulca*) were frequent in the near-stagnant channel, with rare water mint, water forget-me-not and common water starwort along the margins. Water plantain and branched bur-reed were occasional interspersed within unbranched bur-reed beds. No instream aquatic bryophytes were recorded, although *Pellia* sp. was occasional on exposed sections of the peat banks. The steep banks supported rank grasses, meadowsweet, bracken, purple loosestrife, silverweed (*Potentilla anserina*) and various sedges, with scattered grey willow along the bank tops. Dense bracken (HD1) was present on both sides of the channel. The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

European eel was the only fish species recorded via electro-fishing at Site A11b (**Appendix A**). Eel habitat was of poor quality given highly limited refugia (near existing bridge only). Site A11b provided some poorer quality holding habitat for adult salmonids. However, given significant modifications, high siltation and poor connectivity to downstream habitats Site A11b was of low fisheries value overall. There was very limited suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in the vicinity of Site A11b with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given poor flows and the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A11b was of **local importance (lower value)** (**Table 4.5**).



Plate 4.14 Representative image of Site A11b on the Lullymore East River, August 2026

4.1.15 Site A12a - Lullybeg Stream, Cushaling

Site A12a was located on the Lullybeg Stream (14L33) within the Proposed Wind Farm site at a proposed internal site access road crossing. The lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogeneous trapezoidal channel with very poor hydromorphology. The canalised channel was approximately 6m wide and >2m deep, with bank heights ranging from 1-2m. There was no perceptible flow at the time of survey, and the channel profile comprised deep pool. Given high average depths and peat staining, macrophyte cover was very low, with only rare brooklime (*Veronica beccabunga*) and bladderwort (*Utricularia* sp.) recorded along the channel margins. Some encroachment of rare grey willow was also growing within the channel. The banks supported abundant purple moor-grass with occasional grey willow, water mint and water

horsetail. The wider areas comprised extensive cutover bog (PB4), with localised patches of wet willow woodland (WN6) dominated by grey willow.

Electro-fishing was not undertaken at Site A12a due to the prohibitive water depths (>2m). Site A12a was of limited fisheries value given its extensively modified nature, absence of perceptible flow and very low macrophyte cover. Suitable spawning habitat for salmonids and lamprey was absent. The deep canalised channel would provide some limited habitat for European eel and coarse fish species. However, the overall value was reduced by the poor hydromorphology and limited instream refugia. Site A12a was also of low suitability white-clawed crayfish due a lack of refugia (none recorded). No otter signs were recorded in the vicinity of Site A12a with marking opportunities limited.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A12a was of **local importance (lower value)** (**Table 4.5**).



Plate 4.15 Representative image of Site A12a on the Lullybeg Stream, August 2026

4.1.16 Site A12b - Lullybeg Stream, Cushaling

Site A12b was located on the Lullybeg Stream (14L33) at an proposed internal site access road crossing within the Proposed Wind Farm site, adjacent to a historical pumping station. As per Site A12a, the lowland stream (FW2) had been extensively straightened and deepened historically. Further modifications resulted in the impoundment of the stream and a conversion to peat attenuation ponds, with very poor connectivity to downstream habitats. The survey section comprised a deep,

homogeneous channel and pond habitat with no perceptible flow and very poor hydromorphology. The channel was approximately 5m wide, with low banks of approximately 0.5m in height supporting scattered grey willow. Macrophyte cover was very low with only some rare common reed (*Phragmites australis*) confined to the channel margins. The northern riparian area comprised wet grassland (GS4) supporting purple moor-grass, silverweed, meadowsweet, water mint and various sedges. The southern riparian area supported dense willow scrub (WS1).

Electro-fishing was not undertaken at Site A12b due to the prohibitive water depths (>2m). Site A12b was of limited fisheries value given its extensively modified nature, absence of perceptible flow and very low macrophyte cover. Suitable spawning habitat for salmonids and lamprey was absent. The deep canalised channel would provide some limited habitat for European eel and coarse fish species. However, the overall value was reduced by the poor hydromorphology and limited instream refugia. Site A12b was also of low suitability white-clawed crayfish due a lack of refugia (none recorded). A very fresh otter spraint and slide to/from the water was recorded at the existing crossing (ITM 666088, 724943).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the utilisation by otter, the aquatic ecological evaluation of Site A12b was of **local importance (higher value)** (**Table 4.5**).



Plate 4.16 Representative image of Site A12b on the Lullybeg Stream, August 2026

4.1.17 Site A13a - Clonbrown River, Cushaling

Site A13a was located on the Clonbrown River (14C32), a tributary of the Figile River, at a proposed internal site access road crossing within the Proposed Wind Farm site. The lowland stream (FW2) had been culvert (concrete pipe culvert) under the bog track and was 1-3m wide and 0.5m deep with a deep silt bed of up to 1.5m. There was no perceptible flow. Bank heights ranged from 2-4m. The channel supported occasional water mint, marsh pennywort (*Hydrocotyle vulgaris*) and common duckweed. Aquatic bryophytes were not present. There was heavy encroachment of terrestrial vegetation comprising rank grasses, bog cotton (*Eriophorum angustifolium*), deergrass and various sedges. The riparian zones comprised scrub (WS1) with bramble, heather, bracken, gorse, nettle, hedge bindweed and shrubby grey willow with scattered downy birch and mature cypress (*Cupressus* sp.). Site A13a was bordered by extensive cutover bog (PB4).

Electro-fishing was not undertaken at Site A13a due to the prohibitive sediment depths and unsafe wading conditions. The deep, homogeneous channel was of low fisheries value given extensive modifications, absence of any perceptible flow, siltation pressures and heavy encroachment by terrestrial vegetation. Spawning habitat for salmonids and lamprey was absent and the deep organic silt deposits were unsuitable for lamprey ammocoetes. The site was of low value for European eel and white-clawed crayfish due to poor seasonal flows and the absence of suitable refugia. No otter signs were recorded within the vicinity of Site A13a with limited foraging or marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A13a was of **local importance (lower value)** (**Table 4.5**).



Plate 4.17 Representative image of Site A13a on the Clonbrown River, August 2026

4.1.18 Site A13b - Clonbrown River, Cushaling

Site A13b was located on the Clonbrown River (14C23) at a proposed internal site access road crossing directly downstream of Site A13a. The steep trapezoidal channel was 1m wide and 0.1-0.2m deep, with high banks of 4-5m. There was no perceptible flow at the time of survey with a profile of stagnant glide and pool. The substrata comprised soft peat with a high cover of filamentous algae. Reed sweet-grass was abundant within the channel, with rare water mint and fool's watercress. Aquatic bryophytes were not present. The eastern bank was bordered by dense scrub (WS1) comprising bramble, purple moor-grass, gorse and heather with willow and birch. Site A13b was bordered by extensive cutover bog (PB4).

Three-spined stickleback and ten-spined stickleback were the only fish species recorded via electro-fishing at Site A13b (**Appendix A**). With the exception of low densities these species, the river at this location was not of fisheries value significant siltation and hydromorphological pressures in addition to noxious macrophyte cover and instream barriers (culverts). There was low suitability for white-clawed crayfish with none recorded. No otter signs were recorded in vicinity of Site A13b with limited foraging and marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A13b was of **local importance (lower value)** (**Table 4.5**).



Plate 4.18 Representative image of Site A13b on the Clonbrown River, August 2026

4.1.19 Site A13c - Clonbrown River, Cushaling

Site A13c was located on the Clonbrown River (14C32) at an proposed amenity track crossing c. 0.6km downstream of Site A13b. As per upstream, the steep trapezoidal channel (FW2) had been extensively deepened and straightened historically. The channel was 2.5-3m wide and 0.2-0.3m deep, with high banks ranging from 2-5m. The flow profile comprised slow-flowing, almost stagnant glide. The substrata comprised soft peat with no hard substrata. Macrophyte cover was very high, with frequent reed sweet-grass and bulrush, and occasional water mint. The banks supported dense scrub comprising bramble, grey willow, bracken and birch, with more open areas dominated by purple moor-grass. Site A13c was bordered by extensive cutover bog (PB4) and the L3001 local road.

Three-spined stickleback was the only fish species recorded via electro-fishing at Site A13c (**Appendix A**). With the exception of low densities this species, the river at this location was not of fisheries value given significant siltation and hydromorphological pressures in addition to noxious macrophyte cover and instream barriers (culverts). There was low suitability for white-clawed crayfish with none recorded. No otter signs were recorded in vicinity of Site A13c with limited foraging and marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A13c was of **local importance (lower value)** (**Table 4.5**).



Plate 4.19 Representative image of Site A13c on the Clonbrown River, August 2026

4.1.20 Site A13d - Clonbrown River, Cushaling

Site A13d was located on the lower reaches of the Clonbrown River (14C32) c. 1.7km downstream of site A13c and 0.3km upstream of the Figile River confluence and within the Proposed Wind Farm site. The lowland river (FW2) had been extensively modified historically, resulting in the impoundment and conversion of its lower reaches to peat attenuation ponds, with very poor fluvial connectivity to downstream habitats. Site A13d was located at a historical pumping station and comprised a channel and pond habitat with steep banks of 5-6m in height. Water depths ranged from 1.5-3m, with a bed comprising entirely deep, soft peat and silt. The site supported abundant spiked water-milfoil (*Myriophyllum spicatum*), with frequent reed sweet-grass, occasional bulrush and water mint and rare branched bur-reed. Aquatic bryophytes were not recorded. The riparian areas supported abundant scrub comprising low growing grey willow, downy birch, bracken and gorse, with scattered heather and deer grass. Site A13d was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Electro-fishing was not undertaken at Site A13d due to the prohibitive water and sediment depths (**Appendix A**). The ponding area was of limited fisheries value, although it may support coarse fish species such as roach, pike and perch, in addition to European eel. However, poor fluvial connectivity through culverts may restrict fish passage to and from Site A13d. Site A13d was of low suitability for white-clawed crayfish given the deep soft peat and silt substrata and absence of suitable refugia, and none were recorded. No otter signs were recorded within the vicinity of Site A13d with limited marking opportunities and superior foraging habitat downstream (i.e. Figile River).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A13d was of **local importance (lower value)** (**Table 4.5**).



Plate 4.20 Representative image of Site A13d on the Clonbrown River, August 2026

4.1.21 Site A14a - Figile River, Cushaling Bridge

Site A14a was located on the Figile River (14F01) at Cushaling Bridge (L1001) within the Proposed Wind Farm site. The lowland alkaline river (FW2) had been deepened and locally straightened historically but some good instream recovery was evident despite the trapezoidal or deep U-shaped channel form. The river was 4-7m wide and varied from 0.2m to 05m deep with a profile dominated by glide with localised pool. Riffle was restricted to a small area downstream of the road crossing. The substrata comprised mixed gravels and cobbles (some calcification) in faster flowing areas. Rare larger boulders were scattered throughout the channel. Siltation was high, inclusive of flocculant deposits and moderate growth of filamentous green algae was also present. Site A14a was often heavily vegetated with macrophytes including, water mint, unbranched bur-reed, duckweed, ivy-leaved duckweed and fool's watercress. Broad-leaved pondweed was occasional. The margins supported abundant linear stands of reed sweet grass, reed canary grass and occasional iris (*Iris psuedacorus*). Larger substrata supported abundant *Leptodictyum riparium*. Freshwater sponges were present locally near the bridge. The margins were typically fenced from livestock and thus supported lush herbaceous vegetation with scattered grey willow. The site was bordered by wet grassland (GS4) with coniferous afforestation (WD4) downstream.

Pike (*Esox lucius*), perch (*Perca fluviatilis*), minnow, stone loach and invasive dace (*Leuciscus leuciscus*) were recorded via electro-fishing at Site A14a (**Appendix A**). Although supporting a good species diversity, the numbers of fish were low. Site A14a was of moderate value for salmonids with localised faster flowing glide and riffle areas providing valuable spawning and nursery habitat (rare in the river overall). Deeper glide and pool with fringing vegetation were of value as holding areas for adult

salmonids. However, no trout were recorded in the current survey (but known from site; Triturus data). Despite the presence of some good quality spawning habitat for lamprey, no ammocoetes were recorded from shallow sub-optimal humic soft sediment accumulations. Site A14a was of good suitability for both European eel and white-clawed crayfish, given the presence of suitable refugia but neither species were recorded. Invasive dace were present in low numbers in deeper glide. A single fresh otter spraint was recorded on a bridge plinth (ITM 665011, 725879). A kingfisher (*Alcedo atthis*) was observed in flight near the bridge.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given utilisation by otter, the aquatic ecological evaluation of Site A14a was of **local importance (higher value)** (**Table 4.5**).



Plate 4.21 Representative image of Site A14a on the Figile River at Cushaling Bridge, August 2026

4.1.22 Site A14b - Figile River, Cloncant

Site A14b was located on the Figile River (14F01) c. 2km downstream of Site A14a at a proposed internal site access road crossing. The lowland depositing watercourse (FW2) had been extensively deepened historically (but not straightened), resulting in a homogeneous U-shaped channel with poor hydromorphology. The river was 4-6m wide and 1.5-2m deep with 1m high banks. The profile was of slow flowing deep glide with heavily peat-stained water. The substrata comprised compacted peat, with no gravels, cobble or other hard substrata. Macrophytes included occasional yellow water lily (*Nuphar lutea*), fool's watercress, common duckweed and branched bur-reed. Aquatic bryophytes were not present. The bank littorals supported abundant reed canary grass and occasional reed sweet-

grass. Site A14b was bordered by cutover bog (PB4), semi-improved pasture (GA1) and lightly grazed wet grassland (GS4).

Electro-fishing was not undertaken at Site A14b due to the prohibitive water depths (**Appendix A**). The river at this location only provided some holding habitat for larger salmonids, with no spawning or nursery habitat. Given significant bed compaction and lack of suitable refugia Site A14b was of low suitability for white-clawed crayfish. The deep channel provided some suitability for European eel, however as with crayfish, this was impacted by bed compaction and a lack of suitable refugia (i.e. boulder, cobble). Site A14b was primarily of value for coarse species, including invasive dace. No otter signs were recorded in the vicinity of Site A14b with limited marking opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the value as a local ecological corridor, the aquatic ecological evaluation of Site A14b was of **local importance (higher value)** (**Table 4.5**).



Plate 4.22 Representative image of Site A14b on the Figile River, August 2026

4.1.23 Site A15a - Figile River, Kilcumber

Site A15a was located on the Figile River (14F01) at a proposed internal site access road crossing within the Proposed Wind Farm site, upstream of Edenderry Power Station. The lowland depositing river (FW2) had been extensively straightened and deepened historically, resulting in a deep, trapezoidal channel with poor hydromorphology. The watercourse was 5-6m wide and up to 2m deep, with steep banks of approximately 5m in height. The profile was dominated by deep, slow-flowing glide and pool

with a very short riffle area located on the bridge apron where gravels/boulders (clause 804) had been installed during previous bridge works. These were heavily silted. Apart from the hard substrata near the bridge, the rest of the channel bed comprised deep accumulations of soft sediment. Cover of filamentous algae was high (c. 70%), with extensive mats of floating algae present across the water surface, indicating significant enrichment. Macrophytes comprised frequent yellow water lily, occasional unbranched bur-reed and rare watercress (*Nasturtium officinale*). Common water starwort, water mint, fool's watercress, blue water speedwell (*Veronica anagallis-aquatica*) and rare mare's tail (*Hippuris vulgaris*) were also present. The channel margins supported occasional common reed, with frequent reed sweet-grass and reed canary-grass. The steep banks supported purple loosestrife, hedge bindweed and meadowsweet, in addition to low-growing bramble and occasional grey willow and osier (*Salix viminalis*). Aquatic bryophytes were not recorded. Riparian shading was typically very low but increased moving downstream, where scrub and treelines became more prominent. Site A15a and wider survey area upstream of the plant was fringed by low-intensity pasture (GA1), wet grassland (GS4, mostly on east bank), locally dense scrub (WS1) and seasonally inundated flood plains supporting reed swamp (FS1) and wet grassland areas (mostly on the west bank).

European eel, minnow, stone loach, pike and invasive dace were recorded via electro-fishing at Site A15a (**Appendix A**). Given prohibitive depths, electro-fishing was only possible within a small area beneath the road bridge. Site A15a was primarily of value as a coarse fish habitat, although the deep glide provided some suitable holding habitat for adult salmonids. Installed gravels were of some low value as lamprey and salmonid spawning habitat (but very heavily silted). Deep accumulations of soft, unconsolidated sediment were considered unsuitable for lamprey ammocoetes although the species was detected via eDNA sampling (**Table 4.1**), confirming their presence at and or upstream of the sampling point. Atlantic salmon eDNA was also detected (**Table 4.1**). Site A15a evidently provided very good habitat for European eel, as reflected by the high density recorded within the small area that could be effectively surveyed. Suitability for white-clawed crayfish was limited due to the heavily silted substrata and low availability of suitable refugia, and none were recorded or detected via eDNA. A single fresh otter spraint was recorded beneath the bridge. No evidence of crayfish remains were identified within the spraint.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of European eel, Atlantic salmon (eDNA) and lamprey (*Lampetra* sp., eDNA), in addition to utilisation by otter, the aquatic ecological evaluation of Site A15a was of **local importance (higher value)** (**Table 4.5**).



Plate 4.23 Representative image of Site A15a on the Figile River, August 2026

4.1.24 Site A15b - Ballykilleen Stream, Shean

Site A15b was located on the Ballykilleen Stream (14B25), a tributary of the Figile River, at a proposed internal site access road crossing. The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a homogeneous, steep U-shaped channel. The channel was approximately 3m wide, with steep banks of 2-2.5m in height. The channel was dry at the time of survey, although the bed remained wet and peaty. Extensive growth of fool's watercress was present across the damp channel bed, indicating occasional water flows. Aquatic bryophytes were limited to occasional *Pellia* sp. on exposed muddy banks. The heavily modified channel was dry as far as the confluence with the Figile River c. 200m downstream. The banks supported dense bramble, hedge bindweed, nettle and meadowsweet. Grey willow was scattered along the banks with localised Scot's pine (*Pinus sylvestris*) along the adjoining BnM track to the south. Site A15b was bordered by pasture (GA1) and Edenderry Power Station to the south.

Site A15b was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A15b.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A15b was of **local importance (lower value)** (**Table 4.5**).



Plate 4.24 Representative image of Site A15b on the Ballykilleen Stream, August 2026 (dry, ephemeral channel)

4.1.25 Site A16 - Clonbulloge River, Clonmel

Site A16 was located on the Clonbulloge River (15C53) at a local road crossing downstream of the Proposed Wind Farm site. The small lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a trapezoidal channel with poor hydromorphology and banks of 2-2.5m in height. The channel was 1.5m wide but was dry at the time of survey (as per previous surveys). The substrata comprised small boulder and large cobble, with muddy deposits along the channel margins. The muddy banks supported occasional *Pellia* sp., with rare water mint and yellow iris. The channel was heavily tunnelled by grey willow, ash (*Fraxinus excelsior*) and hawthorn, with a dense understory of bramble, ivy and dog rose. Site A16 was bordered by improved pasture (GA1) with narrow riparian buffers.

Site A16 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A16.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A16 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.25 Representative image of Site A16 on the Clonbulloge River, August 2026 (dry, ephemeral channel)

4.1.26 Site A17 - Ballygarrett River, Clonmel

Site A17 was located on the Ballygarrett River (14B30), a tributary of the Figile River, downstream of the Proposed Wind Farm site. The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a deep U-shaped channel. The channel was 3-4m wide but was dry at the time of survey with abundant poaching from cattle in the ephemeral channel. Macrophytes and aquatic bryophytes were absent, given the dry channel conditions, heavy poaching and high riparian shading. The river was lined by narrow, dense riparian treelines comprising ash, hawthorn, alder, grey willow and hazel (*Corylus avellana*). The site was bordered by heavily improved pasture (GA1).

Site A17 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site A17.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site A17 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.26 Representative image of Site A17 on the Ballygarrett River, August 2026 (dry, ephemeral channel)

4.1.27 Site A18 - Figile River, Millgrove Bridge

Site A18 was located on the lower reaches of the Figile River (14F01) at Millgrove Bridge on the R442 (a downstream control site). The lowland river (FW2) had been historically deepened but retained a semi-natural, meandering profile comprising riffle and glide sequences with localised deeper pools. The channel was 10-14m wide and 0.2-0.4m deep, with banks of approximately 2m in height. The substrata comprised partially bedded and calcified cobbles and mixed gravels, with occasional large boulders. The substrata were heavily silted. Filamentous algal cover was very high, covering approximately 70% of the riverbed, indicating significant enrichment. Macrophytes occurred in localised dense patches and comprised frequent common clubrush (*Schoenoplectus lacustris*), with occasional spiked water-milfoil, branched bur-reed and curled pondweed (*Potamogeton crispus*). Yellow water lily was rare in deeper areas. Fool's watercress and water mint occurred at the bridge abutments, while fine-leaved water-dropwort (Oenanthe aquatica) was rare along littoral areas. The bridge apron and larger instream substrata supported frequent *Fontinalis antipyretica* and *Pellia* sp., with occasional *Rhynchostegium riparioides* and *Leptodictyum riparium*. The banks supported frequent reed canary grass and reed sweet-grass. The wider riparian areas featured scattered mature sycamore, grey willow, ash and lime (*Tilia* sp.), with great willowherb and meadowsweet in the understories. Site A18 was bordered by improved pasture (GA1) with narrow riparian set-backs.

Atlantic salmon (*Salmo salar*), European eel, pike, dace, gudgeon (*Gobio gobio*), roach (*Rutilus rutilus*), stone loach and minnow were recorded via electro-fishing at Site A18 (**Appendix A**). A low number of Atlantic salmon fry were recorded, with Site A18 providing poor quality salmonid nursery and spawning habitat due to siltation and enrichment. Some good quality holding habitat for adult salmonids was present in deeper pools and glide. There was only limited suitability for lamprey given the absence of finer, clean spawning gravels. No lamprey ammocoete burial habitat was noted

although the species was detected via eDNA sampling confirming their presence at and or upstream of the sampling point (**Table 4.1**). Site A18 had some suitability as a nursery for European eel (i.e. refugia and good food resources) and a low number were recorded. Site A18 was dominated by pollution tolerant coarse fish species such as stone loach and minnow. Suitability for white-clawed crayfish was low due to very high levels of enrichment and siltation with none recorded or detected via eDNA. Mixed age otter spraint was recorded on boulders directly downstream of the bridge at the southern bank.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids (including Atlantic salmon), European eel and utilisation by otter, the aquatic ecological evaluation of Site A18 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.27 Representative image of Site A18 on the Figile River at Millgrove Bridge, August 2026

4.1.28 Site B1 - Clonkeen Stream, Cloncanon

Site B1 was located on the Clonkeen River (07C36) upstream of the culvert under the Grand Canal, adjacent to the Proposed Wind Farm site. The lowland river (FW2) had been extensively straightened and deepened historically resulting in a homogenous channel. The U-shaped channel was 3-4m wide with a bed comprised entirely of deep, humic anoxic soft sediment of depths up to 0.5m. The canalised river suffered from low summer water levels and featured only intermittent shallow pooling areas at the time of survey with no flow. Macrophytes were limited to common duckweed which was typically drying out on the now exposed silty bed. Reed sweet grass was present upstream of the survey reach. Aquatic bryophytes were not recorded. The channel was heavily shaded by dense narrow treelines and scrub of grey willow, downy birch, ash, hawthorn and blackthorn. Site B1 was bordered by

improved pasture (GA1) and the Grand Canal (FW3).

Three-spined stickleback was the only fish species recorded via electro-fishing at Site B1 (**Appendix A**). With the exception of low densities of this ubiquitous species in stagnant pools, Site B1 was not of fisheries value at the time of survey given semi-dry conditions in addition to significant siltation and hydromorphological modifications. However, low numbers of European eel have been recorded at the site previously (Triturus data). No white-clawed crayfish were recorded with suitability evidently poor given low flows and water levels. No otter signs were recorded in vicinity of Site B1 with limited foraging and marking opportunities – far superior habitat (known to be used by the species) was present in the adjacent Grand Canal.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site B1 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.28 Representative image of Site B1 on the Clonkeen Stream, August 2026

4.1.29 Site B2 - River Boyne, Kishawanny Bridge

Site B2 was located on the River Boyne (07B01) at Kishawanny Bridge. The lowland river (FW2) had been extensively modified historically, with deepening, straightening in addition to a small (board) weir upstream of the road crossing. The river was 6-10m wide and 0.2-4m deep. The profile comprised very slow flowing glide with small sections of riffles confined to the bridge aprons. Although boulder and cobble were abundant in vicinity of the apron (some mixed gravels), the substrata were dominated by deep soft sediment accumulations, often up to 0.5m in depth. Gross siltation pressures

and low flows resulted in high cover of macrophytes with abundant arrowhead (*Sagittaria sagittifolia*) and unbranched bur-reed. Common duckweed was frequent with some scattered fool's watercress and water mint. Aquatic bryophytes were limited to occasional *Leptodictyum riparium* and *Rhynchostegium riparioides* on larger boulder. The narrow riparian zones supported abundant reed canary grass and nettle. The river was shaded on the east bank by mature sycamore, poplar (*Populus* sp.) and grey willow. Site B2 was bordered by residential and industrial areas (BL3) with heavily improved pasture (GA1) downstream.

Brown trout, lamprey (*Lampetra* sp.) and three-spined stickleback were recorded via electro-fishing at Site B2 (**Appendix A**). Site B2 was of poor value for salmonids given gross siltation pressures in addition to evident eutrophication and hydromorphological pressures. These resulted in a very low density of adult trout only, with spawning and nursery habitat of very poor quality. However, Atlantic salmon are known from Site B2 (Triturus data) and were detected via eDNA sampling (**Table 4.1**). The pool immediately below the weir provided some low quality holding habitat for adult salmonids. Heavily vegetated glide and boulder zones were of good suitability for European eel; however none were recorded. Abundant organic rich soft sediment accumulations supported high densities of typically large *Lampetra* sp. ammocoetes, with some limited spawning habitat also present, although it was of low quality. These were likely brook lamprey (*Lampetra planeri*). Despite some low suitability, no white-clawed crayfish were recorded or detected via eDNA. No otter signs were recorded in vicinity of Site B2 despite the presence of several suitable marking areas and evident prey resources.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and lamprey, the aquatic ecological evaluation of Site B2 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.29 Representative image of Site B2 on the River Boyne at Kishawanny Bridge, August 2026

4.1.30 Site C1 - Drumsru Stream, Barnaran

Site C1 was located on the Drumsru Stream (25B06), a tributary of the Slate River, adjacent to the Proposed Wind Farm site. The small lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep U-shaped channel with poor hydromorphology. The stagnant channel was 3.5-4m wide and approximately 0.2m deep, with bank heights ranging from 3-4m. There was no perceptible flow at the time of survey. The substrata comprised deep, soft peat and silt. Macrophyte cover was dominated by common duckweed, which covered approximately 90% of the water's surface. Fool's watercress was locally frequent in less shaded areas. No aquatic bryophytes were recorded. The channel was heavily tunnelled by grey willow, resulting in very few open areas. The mature riparian zones supported dense scrub (WS1) comprising bramble, bracken, hedge bindweed and rosebay willowherb, with scattered alder and downy birch. Site C1 was bordered by scrub (WS1) and improved pasture (GA1), with extensive areas of cutover bog (PB4) upstream.

No fish were recorded via electro-fishing at Site C1 (**Appendix A**). The channel at this location was not of fisheries value given extensive modifications, stagnant water, absence of flows, siltation pressures and poor connectivity with downstream habitats. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site C1 with little if any foraging opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site C1 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.30 Representative image of Site C1 on the Drumsru Stream, August 2026

4.1.31 Site C2 - Slate River, Agar Bridge

Site C2 was located on the Slate River (14S01) at Agar Bridge (L7004 road). The lowland river (FW2) had been extensively straightened and deepened historically both upstream and downstream of the bridge, resulting in a characteristic trapezoidal channel with poor hydromorphology. Bank heights ranged from 4-5m. The river was 8-10m wide and 0.3-1.6m deep with a profile of deep glide and pool. Shallow riffle was present downstream of the bridge. The substrata were dominated by large boulder and cobble with localised coarse and medium gravels. These were heavily silted. Accumulations of deep silt were also present in pools and along depositing littorals. Given a high average depth, macrophytes were typically restricted to marginal areas with heterophyllous common clubrush and occasional spiked-water milfoil, branched bur-reed and fool's watercress. Yellow water lily was rare in deeper water directly downstream of the bridge. Aquatic bryophytes were limited to occasional *Fontinalis antipyretica* in isolated riffle areas. Filamentous algal cover was very high (c.70%), indicating significant enrichment. The riparian areas supported abundant reed canary grass and reed sweet grass, and occasional water mint, with a dense hedgerow of hawthorn and scattered elder along the north bank. Site C2 was bordered by heavily improved pasture (GA1) which was grazed by sheep.

Brown trout, European eel, minnow, three-spined stickleback and stone loach were recorded via electro-fishing at Site C2 (**Appendix A**). Atlantic salmon and lamprey (Lampetra sp.) were also detected via eDNA sampling, confirming their presence at and or upstream of the sampling point (**Table 4.1**). Site C2 was a poor quality salmonid nursery and spawning habitat due to historical modifications and siltation/eutrophication pressures. However, deep glide and pool provided some suitability as holding areas for adult salmonids and low numbers of adult trout were recorded. Suitability for European eel was good given ample refugia (i.e. large boulder, cobble and pool) and a single eel was recorded. Site C2 was of higher value as a coarse fish habitat. Despite an abundance of soft sediment accumulations these were mostly humic in nature and, coupled with poor flows, did not provide optimal conditions

for lamprey ammocoetes (none recorded at Site C2). Suitability for white-clawed crayfish was low and none were recorded or detected via eDNA. Despite suitable foraging habitat no otter signs were recorded in vicinity of Site C2. A kingfisher was observed flying and calling during the survey.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and European eel, the aquatic ecological evaluation of Site C2 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.31 Representative image of Site C2 on the Slate River, August 2026

4.2 Proposed Grid Connection underground electrical cabling route survey site results

4.2.1 Site G1 - Killinagh Upper Stream, Allenwood South

Site G1 was located on the Killinagh Upper Stream (14K17), a tributary of the Slate River, at the R414 road and is a Proposed Grid Connection underground electrical cabling route crossing. The lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep U-shaped channel with poor hydromorphology and banks of up to 3m in height. The stream flowed beneath the road via a masonry arch culvert and was 1.5-2m wide and 0.1.0.3m deep. The profile comprised slow-flowing glide and stagnating pool, with very limited areas of open water The substrata were dominated by silt with bedded mixed cobble, small boulder and gravels. Siltation was high, with silt plumes underfoot. Macrophyte cover was very high upstream of the crossing (but low downstream), with abundant fool's watercress and common duckweed, in addition to occasional branched bur-reed. Reed canary grass and iris encroached locally from the steep banks. No aquatic bryophytes were recorded. Downstream of the crossing, the channel was heavily shaded by a mature

treeline comprising grey willow, elder, pine (*Pinus* sp.), black poplar (*Populus nigra*) and ivy. Site G1 was bordered by improved pasture (GA1), dry meadows (GS2) and residential properties (BL3, GA2).

Three-spined stickleback was the only fish species recorded via electro-fishing at Site G1 (**Appendix A**). With the exception of low densities of this species, the heavily silted and vegetated channel was of very poor fisheries value and unsuitable for salmonids or lamprey species given the lack of flow and heavily silted (bed) conditions. Some low potential for European eel existed given connectivity to the downstream Slate River. The site was of poor suitability for white-clawed crayfish (none recorded). No otter sign was recorded in the vicinity of Site G1 with limited foraging opportunities.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G1 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.32 Representative image of Site G1 on the Killinagh Upper Stream, August 2026

4.2.2 Site G2 - Grand Canal, Shee Bridge

Site G2 was located on the Grand Canal at a Proposed Grid Connection underground electrical cabling route crossing near Shee Bridge, Allenwood. The canal at this location was mature and well-vegetated with a 10m-wide channel and depths of 1-2m. The littorals supported frequent heterophyllous common clubrush and occasional yellow lily. Mare's-tail, blue water speedwell, water plantain, amphibious bistort (*Persicaria amphibia*) and fine-leaved water dropwort (*Oenanthe aquatica*) were all occasional. The central and deeper navigation channel supported abundant submerged arrowhead and common clubrush. Small areas along exposed gravel and cobble margins supported delicate

stonewort (*Chara virgata*). The invasive macrophyte New Zealand pigmyweed (*Crassula helmsii*) was also occasional. The largely open banks supported common species of the canal corridor such as iris, meadowsweet, hedge bindweed, reed canary grass, nettle and scattered sycamore, ash and beech (*Fagus sylvatica*). Site G2 was bordered by improved grassland (GA1), dry verges (GS2) and residential properties (BL3, GA2).

Electro-fishing was not undertaken at Site G2 due to prohibitive water depths and lacustrine conditions (**Appendix A**). Site G2 was a high value coarse fish habitat (abundant nursery & spawning areas) with both roach and perch observed during the survey. The Grand Canal is also a good quality nursery area for European eel given abundant instream refugia and prey resources (small fish and invertebrates). No white-clawed crayfish were recorded during the survey but are known from the waterway (section 3.1). Despite high foraging suitability, no otter signs were recorded in the vicinity of Site G2 with limited cover for the species.

Low densities of duck mussel (*Anodonta anatina*), a species listed as 'Vulnerable' in Ireland (Byrne et al., 2009), was recorded during sweep netting. No other macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling. (**Appendix C**).

Given the location of Site G2 within the Grand Canal pNHA (002104), the aquatic ecological evaluation of Site G2 was of **national importance** (**Table 4.5**).



Plate 4.33 Representative image of Site G2 on the Grand Canal, August 2026 (west of Shee Bridge)

4.2.3 Site G3 - Upper Ballynakill River, R403 road crossing

Site G3 was located on the Upper Ballynakill River (14U09), a tributary of the Slate River, at the R403 road and is a Proposed Grid Connection underground electrical cabling route. The small lowland

stream (FW2) had been straightened and deepened historically, resulting in a trapezoidal channel with poor hydromorphology and steep banks of up to 3m in height. The swift-flowing stream was 2-3m wide and 0.05-0.1m deep, with a profile of glide and riffle. Water levels were low at the time of survey and the stream was highly turbid, with abundant silt in suspension. The substrata were dominated by heavily bedded cobble and coarse gravels with moderate to heavy siltation. Numerous roadside stormwater drains discharged to the channel and evidently contributed to localised silt loading beneath the box culvert. Macrophytes were absent given the high riparian shading. Aquatic bryophyte cover was low and limited to *Leptodictyum riparium*. The channel was heavily shaded by mature treelines dominated by beech and ash with abundant ivy. Site G3 was bordered by residential areas (BL3, GA2) with narrow riparian buffers.

Three-spined stickleback was the only fish species recorded via electro-fishing at Site G3 (**Appendix A**). With the exception of low densities of this species, the heavily silted and shallow channel was of poor value for salmonids or lamprey species given the shallow depths and heavily silted (bed) conditions. However, the value would improve under higher flows (e.g. in winter). Some low potential for European eel existed given connectivity to the downstream Slate River although none were recorded. Suitability for white-clawed crayfish was low with none recorded (paucity of accessible refugia). No otter signs were recorded in vicinity of Site G3 with foraging opportunities limited.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G3 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.34 Representative image of Site G3 on the Upper Ballynakill River, August 2026

4.2.4 Site G4 - Unmapped channel, R403 road crossing

Site G4 was located on an unmapped channel at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The small stream (FW2) had been extensively straightened and deepened historically, resulting in a steep V-shaped channel with poor hydromorphology and banks ranging from 1-4m in height. The channel was approximately 1-3m wide and 0.2m deep, with a uniform profile composed exclusively of slow-flowing glide. Riffle and pool habitat were absent. The substrata were dominated by deep deposits of soft silt, overlain locally by superficial gravels. The channel was heavily tunnelled by encroaching grey willow and hawthorn, resulting in high riparian shading and an absence of true macrophytes. However, some water mint, water horsetail and marsh pennywort grew along the margins. More open sections of bank supported dense bramble, common nettle and bindweed. Site G4 was bordered by an extensive broadleaved woodland (WD1) and willow scrub (WS1).

Three-spined stickleback was the only fish species recorded during electrofishing at the Site G4 (**Appendix A**). With the exception of low densities of this species, the shallow, slow-flowing and heavily silted channel was of poor fisheries value, with no suitability for salmonids or lamprey species. Some low suitability for European eel was present given connectivity with the downstream Slate River, although none were recorded. Suitability for white-clawed crayfish was low given the paucity of suitable refugia, with none recorded. No otter signs were recorded in the vicinity of Site G4 with foraging opportunities limited.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, this rating was tentative given the absence of suitable riffle areas for sampling (as per Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G4 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.35 Representative image of Site G4 on an unmapped channel, August 2026

4.2.5 Site G5 - Slate River, Quigley's Bridge

Site G5 was located on the upper reaches of the Slate River (14S01) at Quigley's Bridge (R403), and is a Proposed Grid Connection underground electrical cabling route crossing. The lowland river (FW2) had been historically deepened (banks to 3m) but not straightened and retained some good semi-natural characteristics. The river was 3m wide and 0.2-0.3m deep with a profile of mixed riffle, glide and pool and low summer flows at the time of survey. The substrata were dominated by heavily bedded cobble and coarse gravels with moderate to heavy siltation. Macrophyte growth was limited to localised fool's watercress with reed canary grass encroaching the channel locally. No aquatic bryophytes were recorded. The river was lined with dense hedgerows of grey willow, hawthorn and white willow (*Salix alba*) with dense bramble-dominated scrub, although many areas had been historically cleared (for agriculture). Site G5 was bordered by improved pasture (GA1). Brown trout, lamprey (*Lampetra* sp.) and stone loach were recorded via electro-fishing at site G5 (**Appendix A**). Site G5 was of some value as a salmonid nursery and spawning area given the stoney bed and broken flow patterns, although this was compromised by siltation pressures. Good quality holding habitat for adult salmonids was present in pools and bank scours with overhanging vegetation. These areas also offered some habitat for European eel although none were recorded. Soft sediment accumulations, especially within the pool directly downstream of the bridge, supported good numbers of lamprey ammocoetes, with mixed gravels providing suitable spawning habitat. The site offered some low suitability for white-clawed crayfish but none were recorded. No otter signs were recorded in the vicinity of Site G5 despite the presence of prey resources.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and lamprey, the aquatic ecological evaluation of Site G5 was of **local importance (higher value)** (**Table 4.5**).



Plate 4.36 Representative image of Site G5 on the Slate River at Quigley's Bridge, August 2026

4.2.6 Site G6 - Slate River, New Bridge

Site G6 was located on the uppermost reaches of the Slate River (14S01) at New Bridge (R403) and is a Proposed Grid Connection underground electrical cabling route crossing. Although mapped (by the EPA) as the Slate River, the main channel downstream received its current water flows from the West Coolearagh River (14W14) and not this pathway. The channel at the road crossing was 1m wide with 2m high banks and was dry at the time of the survey with a dry mud base. The channel likely only held water following heavy rainfall. The ephemeral U-shaped channel was very heavily vegetated, supporting dense wetland vegetation, including abundant yellow iris, hard rush (*Juncus inflexus*), wild angelica (*Angelica sylvestris*), meadowsweet, rank grasses and shrubby grey willow. The riparian areas supported scattered wych elm (*Ulmus glabra*), bramble and mature grey willow. Site G6 was bordered by scrub (WS1), mixed woodland (WD1) and wet grassland (GS4).

Site G6 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site G6.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G6 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.37 Representative image of Site G6 on the Slate River, August 2026 (dry, ephemeral channel)

4.2.7 Site G7 - Blackwood Feeder, R403 road crossing

Site G7 was located on the Blackwood Feeder of the Grand Canal at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The artificial channel was partially infilled during the 1940s but continues to provide an ecological link between Ballynafagh Lake and the Grand Canal, which it joins near Bonynge Bridge (NPWS, 2021b). The channel was 4-6m wide and dry at the time of survey, with no aquatic habitats present (as per previous surveys; Triturus data). The dry channel was heavily encroached by terrestrial vegetation and dense scrub. The riparian areas supported mature elder (*Sambucus nigra*), grey willow, hawthorn, sycamore, osier and ash. Site G7 was bordered by improved pasture (GA1) and residential properties (BL3, GA2).

Site G7 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site G7.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Despite an absence of aquatic habitats, given the location of the site within the Ballynafagh Lake SAC (001387), the aquatic ecological evaluation of Site G7 was of **international importance** (**Table 4.5**).



Plate 4.38 Representative image of Site G7 on the Blackwood Feeder of the Grand Canal, August 2026 (dry historical channel)

4.2.8 Site G8 - Slate River, R403 road crossing

Site G8 was located on the uppermost reaches of the Slate River (14S01) at a R403 road and is a Proposed Grid Connection underground electrical cabling route R crossing. Although mapped (by the EPA) as the Slate River, the main channel downstream received its current water flows from the West Coolearagh River (14W14) and not this pathway. The channel at the road crossing was 1m wide with 2m high banks and was dry at the time of the survey. There was an absence of a remnant channel capable of conveying water flows (i.e. the former river course is mapped by the EPA). The ephemeral U-shaped channel featured a bare earth base with bramble, nettle and grassy margins and high encroachment by ruderal and herbaceous species. The riparian zone supported mature elder, ash and hawthorn. Site G8 was bordered by residential properties (GA2, BL3) and improved pasture (GA1).

Site G8 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site G8.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G8 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.39 Representative image of Site G8 on the Slate River, August 2026 (dry historical channel)

4.2.9 Site G9 - Brockagh River, Dagwelds Cross, R403

Site G9 was located on the Brockagh River (14B73) at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The channel had likely been historically culverted underground at this location, with a shallow, dry muddy U-shaped channel of 0.5m width buried in a roadside hedgerow of dense hawthorn, blackthorn, ivy and bramble the only possible identifiable feature capable of conveying surface water. No river channel was identified following extensive searches within 150m of the proposed crossing. Site G9 was bordered by residential properties (GA2, BL3) and improved pasture (GA1).

Site G8 was not of fisheries, white-clawed crayfish or otter value given an absence of permanent aquatic habitats.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of any surface water feature, there was no applicable aquatic ecological evaluation of Site G9 (**Table 4.5**).



Plate 4.40 Representative image of Site G9 on the Brockagh River, August 2026 (dry historical channel, likely culverted underground)

4.2.10 Site G10 - Unmapped channel, R403 road crossing

Site G10 was located on an unmapped channel at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. Site G10 comprised a drainage channel approximately 3m wide, with banks ranging from 1-1.4m in height. The channel was dry at time of survey, with a damp base following overnight rainfall. The channel bed was dominated by deep deposits of soft silt/mud with abundant leaf litter and detritus, twigs and fallen branches. Macrophyte cover was low and largely restricted to the wetter areas, with occasional fool's watercress and water mint in addition to rare water horsetail - the presence of these species indicated that the channel occasional retained water. No aquatic bryophytes were recorded. Site G10 was bordered by a treeline comprising ash, sycamore and hawthorn, while more open sections supported bramble, ivy and meadowsweet. Site G10 was bordered by improved agricultural grassland (GA1) and residential properties (BL3).

Site G10 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site G10.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G10 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.41 Representative image of Site G10 on an unmapped channel, August 2026 (dry, ephemeral channel)

4.2.11 Site G11 - Unnamed stream, Black Stick Cross Roads, R403

Site G11 was located on an unnamed stream at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The channel was 1m wide and dry at the time of survey with a dry mud base. The ephemeral U-shaped channel had been realigned historically and crossed under the road via a 600m culvert. The channel was heavily shaded by Leyland cypress (*Cupressus* × *leylandii*), ash and dense bramble scrub. The channel likely only held water following heavy rainfall. The site was bordered by residential properties and amenity grassland (GA2, BL3).

Site G11 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of Site G11.

It was not possible to collect a biological water quality sample given the dry nature of the channel at the time of survey.

Given the absence of aquatic species or habitats of high conservation value, the aquatic ecological evaluation of Site G11 was of **local importance (lower value)** (**Table 4.5**).



Plate 4.42 Representative image of Site G11 on an unnamed stream, August 2026 (channel likely culverted underground)

4.3 White-clawed crayfish survey

No live white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia at any of the aquatic survey sites in August 2026. Furthermore, inspection of otter spraint at sites on the Lullybeg Stream or Figile River did not reveal the presence of crayfish remains.

As pre previous surveys, environmental DNA sampling of the Figile River, River Boyne or Slate River in August 2026 did not detect white-clawed crayfish (**Table 4.1**).

4.4 eDNA sampling

In support of previous data, no white-clawed crayfish or freshwater pearl mussel eDNA was detected in composite water samples collected from the Figile River (Sites A15a & A18), River Boyne (Site B2) or Slate River (Site C2) (0 positive qPCR replicates out of 12, respectively) (**Table 4.1; Appendix C**). These results were considered as evidence of the species' absence at and or upstream of the sampling locations.

Atlantic salmon were detected at Site A15a on the Figile River, Site B2 on the River Boyne and Site C2 on the Slate River (**Table 4.1**). All are watercourses known to support the species in low numbers. Salmon parr were recorded via electro-fishing at Site A18 on the Figile River.

Lamprey (*Lampetra* sp.) eDNA was detected at Site A15a and Site A18 on the Figile River and Site C2 on the Slate River (12 out of 12 positive qPCR replicates, respectively; **Table 4.1**). *Lampetra* sp. ammocoetes were recorded via electro-fishing at Site B2 on the River Boyne.

Table 4.1 eDNA results in the vicinity of the Proposed Wind Farm site, August 2026 (positive qPCR replicates out of 12 in parentheses)

Site	Watercourse	Freshwater pearl mussel	White-clawed crayfish	Atlantic salmon	Lamprey (*Lampetra* sp.)
A15a	Figile River	Negative (0/12)	Negative (0/12)	**Positive (1/12)**	**Positive (12/12)**
A18	Figile River	Negative (0/12)	Negative (0/12)	n/a – recorded via electro-fishing	**Positive (12/12)**
B2	River Boyne	Negative (0/12)	Negative (0/12)	**Positive (3/12)**	n/a – recorded via electro-fishing
C2	Slate River	Negative (0/12)	Negative (0/12)	**Positive (1/12)**	**Positive (12/12)**

4.5 Biological water quality & macro-invertebrates

A low number of Red listed duck mussel (*Anodonta anatina*) were recorded from the Grand Canal at Site G2. This species is classed as 'Vulnerable' in Ireland (Byrne et al., 2009) (**Plate 4.43**).

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a total of 30 no. wetted riverine sites in August 2026 (**Appendix C**). Whilst not protected, the nationally uncommon water stick insect *Ranatra linearis*, a recent discovery in Ireland (Nelson, 2018), was recorded from the Lullybeg Stream (Site A12a) and Clonbrown River (Site A13d).

In addition to Red-listed duck mussel, the Grand Canal sample (Site G2) supported a relatively low diversity of species common to well-vegetated, lacustrine habitats such as damselflies (Coenagrionidae), lake olive mayfly (*Cloeon simile*), river nerite (*Theodoxus fluviatilis*) and gastropod snails such as great pond snail (*Lymnaea stagnalis*) (**Appendix C**). The taxon richness of 13 was broadly comparable to the previous 2024 survey (18).

Biological water quality was broadly similar to the previous 2024 surveys (Triturus, 2024) with most sites being within the same WFD status classes (**Table 4.2**). With the exception of Site A10a on the Lullymore East River (see below), all riverine sites supporting aquatic habitats (29 in total) achieved **Q2-3 or Q3 (poor status)** based on an absence of group A species, an absence or low numbers of group B species and a dominance of pollution-tolerant group C and D species such as the mayfly *Baetis rhodani*, freshwater shrimp (*Gammarus duebeni*) and freshwater hoglouse (*Asellus aquaticus*) (**Appendix C**).

Site A10a on the Lullymore East River achieved **Q2 (bad status)** given the dominance of Group D *Asellus aquaticus*.

However, the ratings for the majority of survey sites (20 in total) were tentative due to poor flows and or an absence of suitable riffle areas for sampling (as per Toner et al., 2005). A total of 10 no. sites on the Codd River (Sites A3 and A4), Ballykilleen Stream (Site A15b), Clonbulloge River (Site A16), Ballygarrett River (Site A17), Slate River (Sites G6 and G8), Blackwood Feeder (Site G7), Brockagh River (Site G9), an unmapped channel (Site G10) and an unnamed stream (Site G11) were dry at the time of survey and thus could not be sampled for aquatic macro-invertebrates.



Plate 4.43 Red-listed duck mussel (*Anodonta anatina*) recorded from the Grand Canal st Site G2 in August 2026

Table 4.2 Comparison of 2024 and 2026 biological water quality (Q-ratings) at sites in vicinity of the Proposed Wind Farm site and Proposed Grid Connection.

			July-August 2024		August 2026	
Site no.	Watercourse	EPA code	Q-rating	WFD class	Q-rating	WFD class
A1	Unnamed stream	n/a	Q3*	Poor	Q3*	Poor
A2	Unnamed stream	n/a	Q3*	Poor	Q3	Poor
A3	Codd River	14C44	Q3*	Poor	n/a	Dry channel
A4	Codd River	14C44	Q3*	Poor	n/a	Dry channel
A5	Cloncant Stream	14C41	Q3*	Poor	Q3*	Poor
A6	Cloncant Stream	14C41	Q3-4*	Moderate	Q3	Poor
A7	Abbeylough Stream	14A01	Q3*	Poor	Q2-3*	Poor
A8	Figile River	14F01	Q3*	Poor	Q3	Poor
A9	Unnamed stream	n/a	Q3*	Poor	Q3*	Poor
A10a	Lullybeg Stream	14L13	Not previously surveyed		Q2*	Bad
A10b	Lullymore East River	14L11	Not previously surveyed		Q3*	Poor
A10c	Lullybeg Stream	14L13	Not previously surveyed		Q3*	Poor
A11a	Lullymore East River	14L11	Not previously surveyed		Q3*	Poor
A11b	Lullymore East River	14L11	Q3	Poor	Q2-3*	Poor
A12a	Lullybeg Stream	14L33	Not previously surveyed		Q3*	Poor
A12b	Lullybeg Stream	14L33	Not previously surveyed		Q3*	Poor
A13a	Clonbrown River	14C32	Not previously surveyed		Q2-3*	Poor
A13b	Clonbrown River	14C32	Not previously surveyed		Q2-3*	Poor

Site no.	Watercourse	EPA code	July-August 2024		August 2026	
			Q-rating	WFD class	Q-rating	WFD class
A13c	Clonbrown River	14C32	Not previously surveyed		Q2-3*	Poor
A13d	Clonbrown River	14C32	n/a	Dry channel	Q3*	Poor
A14a	Figile River	14F01	Q3	Poor	Q3	Poor
A14b	Figile River	14F01	Not previously surveyed		Q2-3*	Poor
A15a	Figile River	14F01	Not previously surveyed		Q3*	Poor
A15b	Ballykilleen Stream	14B25	Not previously surveyed		n/a	Dry channel
A16	Clonbulloge River	14C53	Q3*	Poor	n/a	Dry channel
A17	Ballygarrett River	14B30	Q2*	Bad	n/a	Dry channel
A18	Figile River	14F01	Q3	Poor	Q3	Poor
B1	Clonkeen Stream	07C36	Q2*	Bad	Q3*	Poor
B2	River Boyne	07B04	Q2-3*	Poor	Q2-3*	Poor
C1	Drumsru Stream	14D19	Q2-3*	Poor	Q2-3*	Poor
C2	Slate River	14S01	Q3	Poor	Q3	Poor
G1	Killinagh Upper Stream	14K17	Q3*	Poor	Q3*	Poor
G2	Grand Canal	n/a	n/a	n/a	n/a	n/a
G3	Upper Ballynakill River	14U01	Q2-3*	Poor	Q3	Poor
G4	Unmapped channel	n/a	Not previously surveyed		Q3*	Poor
G5	Slate River	14S01	Q3	Poor	Q3	Poor
G6	Slate River	14S01	n/a	Dry channel	n/a	Dry channel
G7	Blackwood Feeder	n/a	n/a	Dry channel	n/a	Dry channel
G8	Slate River	14S01	n/a	Dry channel	n/a	Dry channel
G9	Brockagh River	14B73	n/a	Dry channel	n/a	Dry channel
G10	Unmapped channel	n/a	Not previously surveyed		n/a	Dry channel
G11	Unnamed stream	n/a	n/a	Dry channel	n/a	Dry channel

* tentative Q-rating given poor/absent flows and or an absence of suitable riffle areas for sampling (Toner et al., 2005)

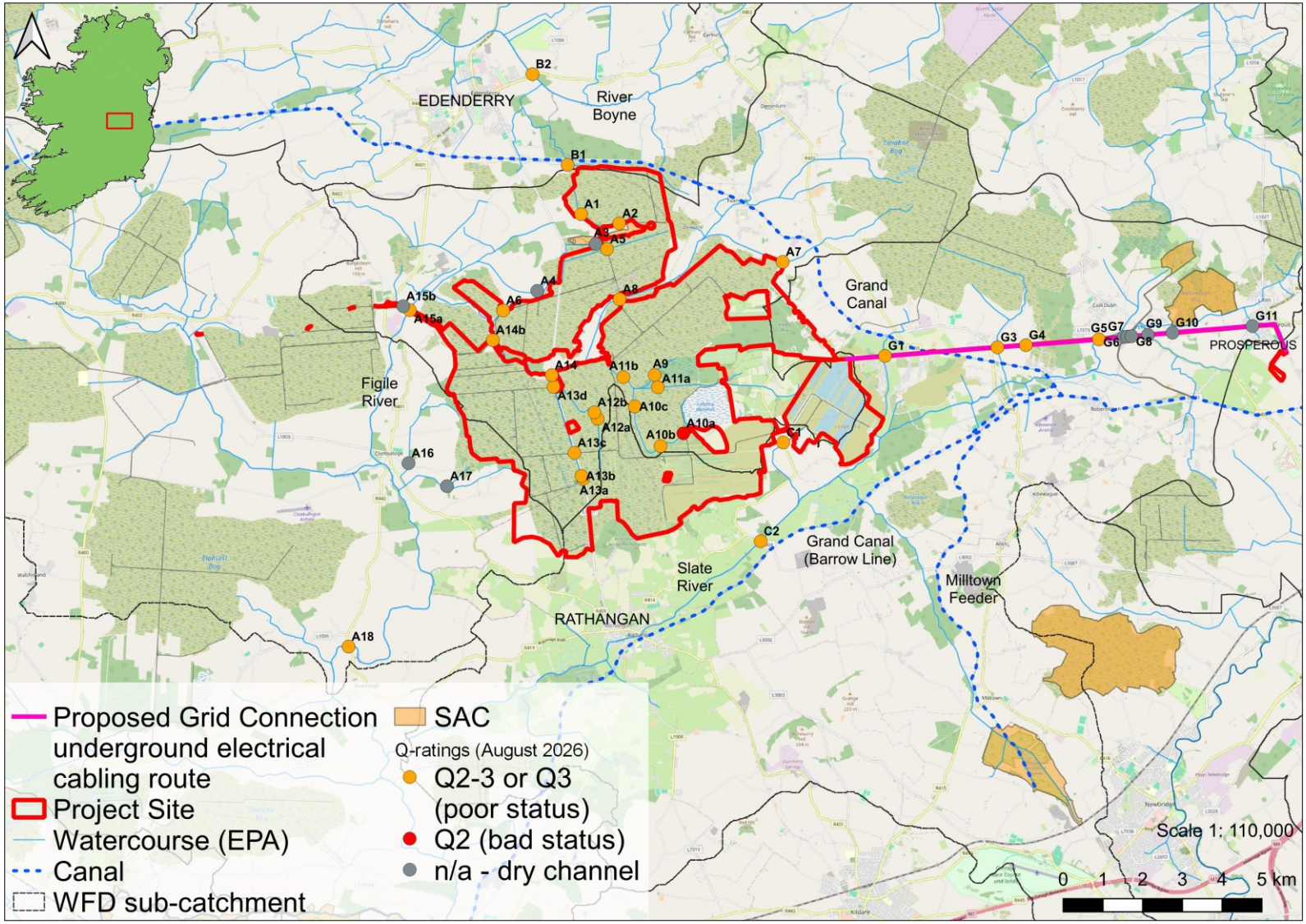


Figure 4.1 Overview of the biological water quality status in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection, August 2026

Table 4.3 Relative abundance of fish species of higher conservation value recorded via **electro-fishing** in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection, August 2026 (blank cell = none recorded)

Site	Watercourse	Atlantic salmon	Brown trout	Lamprey (*Lampetra* sp.)	European eel	Other species
A1	Unnamed stream					Three-spined stickleback
A2	Unnamed stream					Three-spined stickleback
A3	Codd River	No fish recorded – dry channel				
A4	Codd River	No fish recorded - dry channel				
A5	Cloncant Stream	No fish recorded				
A6	Cloncant Stream					Three-spined stickleback, minnow
A7	Abbeylough Stream					Three-spined stickleback, ten-spined stickleback
A8	Figile River		Medium		Low	Minnow, stone loach
A9	Unnamed stream					Three-spined stickleback
A10a	Lullybeg Stream					Three-spined stickleback
A10b	Lullymore East River					Three-spined stickleback
A10c	Lullybeg Stream					Three-spined stickleback
A11a	Lullymore East River					Three-spined stickleback, minnow
A11b	Lullymore East River				Low	
A12a	Lullybeg Stream	n/a – too deep for electro-fishing				
A12b	Lullybeg Stream	n/a – too deep for electro-fishing				
A13a	Clonbrown River	No fish recorded				
A13b	Clonbrown River					Three-spined stickleback, ten-spined stickleback
A13c	Clonbrown River					Three-spined stickleback
A13d	Clonbrown River	n/a - too deep for electro-fishing				
A14a	Figile River					Dace, perch, pike, minnow, stone loach
A14b	Figile River	n/a - too deep for electro-fishing				
A15a	Figile River				Medium	Minnow, dace, pike, stone loach
A15b	Ballykilleen Stream	No fish recorded - dry channel				
A16	Clonbulloge River	No fish recorded - dry channel				
A17	Ballygarrett River	No fish recorded - dry channel				
A18	Figile River	Low			Low	Minnow, dace, gudgeon, pike, stone loach, roach
B1	Clonkeen Stream					Three-spined stickleback
B2	River Boyne		Low	High		Three-spined stickleback

Site	Watercourse	Atlantic salmon	Brown trout	Lamprey (*Lampetra* sp.)	European eel	Other species
C1	Drumsru Stream	No fish recorded				
C2	Slate River		Low		Low	Minnow, three-spined stickleback, stone loach
G1	Killinagh Upper Stream					Three-spined stickleback
G2	Grand Canal	n/a - fisheries appraisal only				
G3	Upper Ballynakill River					Three-spined stickleback
G4	Unmapped channel					Three-spined stickleback
G5	Slate River		Medium	Medium		Stone loach
G6	Slate River	No fish recorded - dry channel				
G7	Blackwood Feeder	No fish recorded - dry channel				
G8	Slate River	No fish recorded - dry channel				
G9	Brockagh River	No fish recorded - dry channel				
G10	Unmapped channel	No fish recorded - dry channel				
G11	Unnamed stream	No fish recorded - dry channel				

Table 4.4 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of the Proposed Project, August 2026

Site	Watercourse	White-clawed crayfish	Otter signs within 150m radius	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
A1	Unnamed stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A2	Unnamed stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A3	Codd River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A4	Codd River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A5	Cloncant Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A6	Cloncant Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A7	Abbeylough Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A8	Figile River	None recorded	None recorded	Not present	None recorded	None recorded	**European eel**
A9	Unnamed stream	None recorded	**Potential** but inactive holt	Not present	None recorded	None recorded	None recorded
A10a	Lullybeg Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A10b	Lullymore East River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A10c	Lullybeg Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A11a	Lullymore East River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A11b	Lullymore East River	None recorded	None recorded	Not present	None recorded	None recorded	**European eel**
A12a	Lullybeg Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A12b	Lullybeg Stream	None recorded	**Fresh spraint**	Not present	None recorded	None recorded	None recorded
A13a	Clonbrown River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A13b	Clonbrown River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded

Site	Watercourse	White-clawed crayfish	Otter signs within 150m radius	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
A13c	Clonbrown River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A13d	Clonbrown River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A14a	Figile River	None recorded	**Fresh spraint**	Not present	None recorded	None recorded	None recorded
A14b	Figile River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A15a	Figile River	None recorded, negative eDNA	**Fresh spraint**	Not present	None recorded	None recorded	**European eel** **Atlantic salmon and lamprey (*Lampetra* sp.) detected via eDNA**
A15b	Ballykilleen Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A16	Clonbulloge River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A17	Ballygarrett River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
A18	Figile River	None recorded, negative eDNA	**Regular spraint site**	Not present	None recorded	None recorded	**Atlantic salmon, European eel** **Lamprey (*Lampetra* sp.) detected via eDNA**
B1	Clonkeen Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
B2	River Boyne	None recorded, negative eDNA	None recorded	Not present	None recorded	None recorded	**Lamprey (*Lampetra* sp.)** **Atlantic salmon detected via eDNA**
C1	Drumsru Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
C2	Slate River	None recorded, negative eDNA	None recorded	Not present	None recorded	None recorded	**Atlantic salmon and lamprey (*Lampetra* sp.) detected via eDNA**
G1	Killinagh Upper Stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G2	Grand Canal	None recorded	None recorded	Not present	None recorded	**Swan mussel (Vulnerable, Byrne et al., 2009)**	None recorded
G3	Upper Ballynakill River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G4	Unmapped channel	None recorded	None recorded	Not present	None recorded	None recorded	None recorded

Site	Watercourse	White-clawed crayfish	Otter signs within 150m radius	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
G5	Slate River	None recorded	None recorded	Not present	None recorded	None recorded	**Lamprey (*Lampetra* sp.)**
G6	Slate River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G7	Blackwood Feeder	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G8	Slate River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G9	Brockagh River	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G10	Unmapped channel	None recorded	None recorded	Not present	None recorded	None recorded	None recorded
G11	Unnamed stream	None recorded	None recorded	Not present	None recorded	None recorded	None recorded

Conservation value: White-clawed crayfish (*Austropotamobius pallipes*), Eurasian otter (*Lutra lutra*), Atlantic salmon (*Salmo salar*) & lamprey (*Lampetra* spp.) are listed under Annex II and Annex V of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). White-clawed crayfish and otter are protected under the Irish Wildlife Acts 1976-2023. Atlantic salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations and are classed as 'Vulnerable' in Ireland (King et a., 2011). European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011). Swan mussel (*Anodonta cygnea*) is listed as 'Vulnerable' in Ireland (Byrne et al., 2009).

Table 4.5 Aquatic ecological evaluation summary of the survey sites according to NRA (2009) criteria

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
A1	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value
A2	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value
A3	Codd River	14C44	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
A4	Codd River	14C44	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
A5	Cloncant Stream	14C41	Local importance (lower value)	No aquatic species or habitats of high conservation value
A6	Cloncant Stream	14C41	Local importance (lower value)	No aquatic species or habitats of high conservation value
A7	Abbeylough Stream	14A01	Local importance (lower value)	No aquatic species or habitats of high conservation value
A8	Figile River	14F01	**Local importance (higher value)**	European eel & brown trout recorded; site known to be used by otters
A9	Unnamed stream	n/a	**Local importance (higher value)**	Potential legally protected but inactive otter holt identified
A10a	Lullybeg Stream	14L13	Local importance (lower value)	No aquatic species or habitats of high conservation value
A10b	Lullymore East River	14L11	Local importance (lower value)	No aquatic species or habitats of high conservation value
A10c	Lullybeg Stream	14L13	Local importance (lower value)	No aquatic species or habitats of high conservation value
A11a	Lullymore East River	14L11	Local importance (lower value)	No aquatic species or habitats of high conservation value
A11b	Lullymore East River	14L11	Local importance (lower value)	No aquatic species or habitats of high conservation value
A12a	Lullybeg Stream	14L33	Local importance (lower value)	No aquatic species or habitats of high conservation value
A12b	Lullybeg Stream	14L33	**Local importance (higher value)**	Site utilised by otter
A13a	Clonbrown River	14C32	Local importance (lower value)	No aquatic species or habitats of high conservation value
A13b	Clonbrown River	14C32	Local importance (lower value)	No aquatic species or habitats of high conservation value

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
A13c	Clonbrown River	14C32	Local importance (lower value)	No aquatic species or habitats of high conservation value
A13d	Clonbrown River	14C32	Local importance (lower value)	No aquatic species or habitats of high conservation value
A14a	Figile River	14F01	**Local importance (higher value)**	Site utilised by otter
A14b	Figile River	14F01	**Local importance (higher value)**	High local value as an ecological corridor
A15a	Figile River	14F01	**Local importance (higher value)**	European eel recorded; site utilised by otter; Atlantic salmon & lamprey (*Lampetra* sp.) detected via eDNA
A15b	Ballykilleen Stream	14B25	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
A16	Clonbulloge River	14C53	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
A17	Ballygarrett River	14B30	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
A18	Figile River	14F01	**Local importance (higher value)**	Atlantic salmon & European eel recorded; site utilised by otter; lamprey (*Lampetra* sp.) detected via eDNA
B1	Clonkeen Stream	07C36	Local importance (lower value)	No aquatic species or habitats of high conservation value
B2	River Boyne	07B04	**Local importance (higher value)**	Lamprey (*Lampetra* sp.) & brown trout recorded; site known to be utilised by otter; Atlantic salmon detected via eDNA
C1	Drumsru Stream	14D19	Local importance (lower value)	No aquatic species or habitats of high conservation value
C2	Slate River	14S01	**Local importance (higher value)**	European eel & brown trout recorded; site utilised by otter; Atlantic salmon & lamprey (*Lampetra* sp.) detected via eDNA
G1	Killinagh Upper Stream	14K17	Local importance (lower value)	No aquatic species or habitats of high conservation value
G2	Grand Canal	n/a	**National importance**	Located within the Grand Canal pNHA (002104)
G3	Upper Ballynakill River	14U01	Local importance (lower value)	No aquatic species or habitats of high conservation value
G4	Unmapped channel	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value
G5	Slate River	14S01	**Local importance (higher value)**	Lamprey (*Lampetra* sp.) & brown trout recorded
G6	Slate River	14S01	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
G7	Blackwood Feeder	n/a	**International importance**	Absence of permanent aquatic habitats but located within the Ballynafagh Lake SAC (001387)
G8	Slate River	14S01	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
G9	Brockagh River	14B73	n/a	No aquatic species or habitats present (no surface water feature located)
G10	Unmapped channel	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)
G11	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value (dry, ephemeral channel)

Conservation value: Eurasian otter (*Lutra lutra*), Atlantic salmon (*Salmo salar*) & lamprey (*Lampetra* spp.) are listed under Annex II and Annex V of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). The breeding and resting places of otter are also protected under the Irish Wildlife Acts 1976-2023. Atlantic salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations and are classed as 'Vulnerable' in Ireland (King et a., 2011). Apart from the Inland Fisheries Acts 1959 to 2017, non-anadromous brown trout have no legal protection in Ireland although sites capable of supporting salmonid populations can be considered of at least higher local value. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

5. Discussion

The watercourses surveyed in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection were lowland channels which had almost universally been historically straightened and or deepened. Historical drainage pressures and peat escapement (siltation) had significantly reduced the quality of aquatic habitats and biological water quality on the majority of surveyed watercourses. Low summer flows further affected the quality of aquatic habitats. Water levels during the survey period were especially low following drought conditions in the summer of 2026, with July being the driest on the contemporary record and rainfall in August being well below the long term average (Met Éireann, 2026a, 2026b). This had resulted in reduced flows and water levels across the survey area, with a total of 10 no. sites dry at the time of survey in August 2026 – most of these were along the Proposed Grid Connection underground electrical cabling route . The majority of survey sites were of low aquatic value given an absence of aquatic species or habitats of high conservation value, driven by low/absent flows and siltation pressures (**Table 4.5**).

However, in keeping with previous 2024 and 2021 surveys, several species of high conservation value were recorded in the survey area, including Annex II Atlantic salmon, lamprey (*Lampetra* sp.) and otter as well as critically endangered European eel. The presence of one or more of these species resulted in the aquatic evaluation of 10 no. sites on the Figile River (A8, A14a, A14b, A15a, A18), unnamed stream (Site A9), Lullybeg Stream (Site A12b), River Boyne (Site B2) and the Slate River (Sites C2 and G5) as **local importance (higher value)** (**Table 4.5**). Site G2 on the Grand Canal was of **national importance** given its location with the Grand Canal pNHA (002104), and also supported swan mussel (*Anodonta cygnea*), a species listed as 'Vulnerable' on the Irish Red list (Byrne et al., 2009). Despite not supporting permanent aquatic habitats, Site G7 on the Blackwood Feeder was of **international importance** given its location within the Ballynafagh Lake SAC (001387), where it serves as an ecological corridor.

No rare or protected macrophytes/aquatic bryophytes, white-clawed crayfish or Annex I aquatic habitats were recorded during the current survey. A potential otter holt, inactive at the time of survey, was identified on an unnamed Lullymore East River tributary (Site A9), within the Proposed Wind Farm site. New Zealand pigmyweed(*Crassula helmsii*), an invasive aquatic plant, was recorded on the Grand Canal at Site G2 (as per 2024).

Broadly speaking, the highest value watercourses in the survey area in terms of aquatic ecology were the larger River Boyne, Figile River and Slate River which are better able to buffer against the aforementioned impacts, in addition to the Grand Canal (crossed by the Proposed Grid Connection underground electrical cabling route).

5.1 Fisheries

A typical diversity of fish species for the upper Barrow and Boyne catchments was recorded during the electro-fishing survey, with Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel, stone loach, minnow, gudgeon, pike, perch, ten-spined stickleback and three-spined stickleback captured, alongside invasive roach and dace (**Table 4.3**). The same fish assemblage was recorded in the previous 2024 surveys and are detailed in the accompanying Fisheries Assessment Report (**Appendix A**).

In keeping with previous data, salmonid populations were highly restricted in their distribution, with low to medium densities of brown trout being recorded from a total of 4 no. sites on the Figile River

(Site A8), River Boyne (Site B2) and the Slate River (Sites C2 and G5) (**Table 4.3**). Annex II Atlantic salmon were only recorded from Site A18 on the Figile River at Millgrove Bridge but were also detected via eDNA sampling on the River Boyne at Site B2 (a location known to occasionally support the species) and the Slate River at Site C2. Lamprey ammocoetes (*Lampetra* sp.) were only recorded Site B2 on the River Boyne (Kishawanny Bridge) and Site G5 on the Slate River (Quigley's Bridge), in high and medium densities, respectively. However, *Lampetra* sp. eDNA was detected at sites of the Figile River (A15a, A18) and the Slate River (C2). Critically endangered European eel were also restricted in their distribution, although more widespread than the 2024 surveys. Eel were recorded from 5 no. sites on the Figile River (Sites A8, A15a, and A18), Lullymore East River (Site A11b) and the Slate River (Site C2). Siltation, eutrophication and hydromorphological pressures were significant throughout much of the survey area and were evidently contributing to a reduction in the quality of fisheries habitat, particularly for salmonids and lamprey (**Appendix A**).

5.2 White-clawed crayfish

Despite local habitat suitability and numerous available records within the study area, including on the Figile and Slate rivers (1986-2020; **Figure 3.1**), no white-clawed crayfish were recorded during the current survey. As per the 2024 surveys (Triturus, 2024), environmental DNA sampling of the Figile, Boyne and Slate rivers also failed to detect the species in the survey area (**Table 4.1; Appendix B**). Examination of otter spraint did not reveal the presence of crayfish remains on the Figile River or Lullybeg Stream.

The limited distribution of crayfish in the survey area would appear to be reflective of not only peat harvesting and historical drainage pressures but also of the spread of crayfish plague. The Boyne catchment suffered crayfish plague outbreaks in the late 1980s (Demers et al., 2005) and in more recent years, crayfish plague has been confirmed on the Slate River in the vicinity of Rathangan (NPWS, 2019), further reducing the potential for the species. However, environmental DNA sampling of the Figile River at Kilcumber Bridge in 2025 detected white-clawed crayfish (Triturus data). Sampling of the Figile near Bracknagh in 2020 as part of the National Crayfish Plague Surveillance Programme (NCPSP) also detected crayfish. Although most crayfish records within the wider survey area are from 2015 or before (NPWS, EPA & Triturus data), it would appear a small remnant crayfish population persists in the Figile sub-catchment.

5.3 Otter signs

As per previous surveys, otter signs were scarce in the current survey. Otter spraint was recorded from a total of 4 no. sites on the Figile River (Sites A14a, A15a, and A18) and the Lullybeg Stream (Site A12b), a Figile tributary. A potential otter holt, inactive at the time of survey, was identified at Site A9 on an unnamed Lullymore East River tributary within the Proposed Wind Farm site (**Plate 4.43**).

Otters are known to be widespread in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection (**Figure 3.1**), with a preference for larger lowland channels which support superior (fish) prey resources (Hong et al., 2020; Sittenthaler et al., 2019; Scorpio et al., 2016; Reid et al., 2013; Remonti et al., 2009), such as the River Boyne, Figile River and Slate River.



Plate 5.1 Potential otter holt identified under a sycamore tree at Site A9 on an unnamed Lullybeg East River tributary, August 2026 – despite mammal signs nearby this was unsued by otters at the time of survey (i.e. inactive holt)

5.4 Non-native & invasive aquatic species

The non-native amphipod crustacean *Crangonyx* sp. was recorded from the Lullybeg Stream (Site A10a), Lullymore East River (Site A11b), Figile River (Site A18) and the Drumsru Stream (Site C1) (**Appendix C**). Whilst *Crangonyx pseudogracilis* has been known in Ireland since 1969, its Irish range has expanded in recent years (Minchin et al., 2013) and it is now well established (Baars et al., 2021). Furthermore, *Crangonyx floridanus* has recently been confirmed in the Liffey and Barrow catchments, co-occurring with *Crangonyx pseudogracilis* (Baars et al., 2021). Speciation within the *Crangonyx* genus has proven difficult (Mauvisseau et al. 2018) and could not be determined in the current survey. Although the ecological impacts of either *Crangonyx* species in Ireland remains uncertain (Baars et al., 2021) the species appears relatively benign (INVAS, 2025) and has been shown to be an important dietary component in brown trout in the River Liffey (Delanty et al., 2022).

In keeping with available data, the invasive fish species roach (*Rutilus rutilus*) (site A18) and dace (*Leuciscus leuciscus*) (Sites A14a, A15a and A18) were recorded from the Figile River. Whilst roach have been present in the wider Barrow catchment since the 1980s (Brazier, 2018), dace have colonised the Barrow catchment more recently, since the early 1990s (Caffrey et al., 2007). Roach (widespread) and dace (localised) are also known from the Grand Canal (pers. obs.). Although both species are well established in Ireland, these fish are listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011) and subject to Regulations 49 and 50 throughout the State.

The highly invasive aquatic plant New Zealand pigmyweed (*Crassula helmsii*) was recorded at Site G2 on the Grand Canal (**Plate 5.2**). The plant was also recorded at this location in 2024 (Triturus, 2024). New Zealand pigmyweed was first recorded in Ireland in 1985 (Weyl & Hackney, 1988) and would have

entered the country via the aquarium and or ornamental pond trade. The date of introduction to the Grand Canal is unknown but is thought to have been in the early 2000s (Millane & Caffrey, 2014). Despite considerable control and eradication efforts (including local dewatering & dredging) the plant has continued to spread in both the Grand and Royal Canals, as well as some Irish lakes (e.g. Plant et al., 2025). New Zealand pigmyweed is a perennial plant which can reproduce vegetatively from very small fragments and survive extended periods in damp environments, thus making control highly challenging (Millane & Caffrey, 2014). The primary impacts from this species include the displacement of native macrophytes and stoneworts (*Chara* & *Nitella* spp.). New Zealand pigmyweed is listed as an invasive species under the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374/2024) and the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011).



Plate 5.2 Example of the invasive New Zealand pigmyweed (*Crassula helmsii*) recorded on the Grand Canal at Site G2 in August 2026

5.5 Macro-invertebrates & biological water quality

Duck mussel (*Anodonta anatina*), a species listed as Vulnerable in Ireland (Byrne et al., 2009), was recorded in low densities from the Grand Canal at Site G2 (**Plate 4.43**). This large bivalve mollusc is listed as 'Vulnerable' in Ireland (Byrne et al., 2009) and the Grand Canal population (which is widespread, pers. obs.) can be considered of high conservation value. In contrast to freshwater pearl mussel (*Margaritifera margaritifera*) which require salmonids as obligate intermediate hosts to complete their life cycle, *Anodonta* sp. glochidia (swan and duck mussels) may develop in a wide range of fish species, including perch as well as cyprinids (Huber & Geist, 2017). Duck mussels demonstrate a relatively high plasticity and tolerance to different abiotic conditions and can thus be found from fast-flowing streams to lentic habitats (Zieritz & Aldridge, 2011).

Whilst not protected, the nationally uncommon water stick insect *Ranatra linearis*, a recent discovery

in Ireland (Nelson, 2018), was recorded from the Lullybeg Stream (Site A12a) and Clonbrown River (Site A13d). This species was also recorded from the Grand Canal (Site G2) in the previous 2024 surveys (Triturus, 2024) and has been identified at multiple locations on the Grand Canal in recent years; Triturus data).

None of the survey sites achieved greater than **Q3 (poor status)** and thus all failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**). None of the survey sites supported EPA Group A (most pollution tolerant) macro-invertebrate taxa (**Appendix C**). The biological water quality results were highly similar to the previous 2024 survey where all sites except one achieved ≤Q3 (**Table 4.2**). Low summer flows and extensive hydromorphological modifications often resulted in tentative Q-ratings for the survey sites, as per the guidelines of Toner et al. (2005). The biological water quality of the survey area was typically of **poor status (Q2-3 or Q3)** with significant siltation, eutrophication and hydromorphological impacts evidently contributing to a reduction in aquatic habitat quality. Arterial drainage (hydromorphological) and peat harvesting have been identified as the major pressures impacting water quality in the upper Barrow and Boyne catchments (EPA data) and this was observed during the current and previous surveys.

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7. Appendix A – fisheries report

Please see the accompanying fisheries assessment report

Fisheries assessment for the proposed Ballydermot Wind Farm, Co. Offaly and Co. Kildare (2026)

Triturus

Prepared by Triturus Environmental Ltd. for MKO

September 2026

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by MKO to undertake a baseline fisheries assessment of numerous watercourses in vicinity of the proposed Ballydermot Wind Farm (hereafter the Proposed Project) near Edenderry, Co. Offaly (**Figure 2.1**). The survey would update and expand upon those previously completed by Triturus in 2024 (Triturus, 2024; **Appendix D**).

As detailed in Section 1.1.1 in Chapter 1 Introduction of the accompany EIAR, for the purposes of this report, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Enhancement Areas', 'Proposed Construction Haul Routes', 'Proposed Turbine Delivery Route', 'Project Site', 'Proposed Wind Farm', 'Proposed Turbines', 'Proposed Grid Connection', 'Proposed Onsite Substation' and 'Proposed Offsite Substation'.

The Proposed Wind Farm site represents the area encompassing the Proposed Wind Farm, Proposed Enhancement Areas, the Proposed Onsite Substation and 0.5km of the Proposed Grid Connection underground electrical cabling route; this area spans a large suite of bogs, comprising of a total of 14 no, individual bog basins, which form part of the Allen Bog Group.

In order to gain an accurate overview of the existing and potential fisheries value of the watercourses in vicinity of the Proposed Wind Farm site and Proposed Grid Connection, an electro-fishing survey across 41 no. riverine sites was undertaken (**Table 2.1; Figure 2.1**). A fisheries appraisal of the Grand Canal at a Proposed Grid Connection underground electrical cabling route crossing was also completed. Electro-fishing helped to identify the suitability and importance of the watercourses as nurseries and habitats for salmonids, lamprey (*Lampetra* sp.) and European eel (*Anguilla anguilla*). Other species of lower conservation value were also recorded. The presence and or absence of fish populations and or associated supporting habitat would help inform impact assessment and any subsequent mitigation for the development.

Triturus Environmental Ltd. made an application under Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962, to undertake an electro-fishing survey in the vicinity of the potential watercourse crossings. The surveys were undertaken in August 2026.

1.2 Fisheries (desktop review)

The River Boyne is a designated salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988) and is a renowned wild brown trout (*Salmo trutta*), Atlantic salmon (*Salmo salar*) and (in its lower reaches) sea trout fishery (O'Reilly, 2009). As well as salmonids, the river is known to support lamprey (*Lampetra* sp.), European eel (*Anguilla anguilla*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and three-spined stickleback (*Gasterosteus aculeatus*) (Kelly et al., 2011a, 2011b). A number of other cyprinid species are also known from the river, including roach (*Rutilus rutilus*) and bream (*Abramis brama*), primarily in the middle to lower reaches (pers. obs.). The upper reaches, surveyed previously for the

development at Kishawanny Bridge, are known to support brown trout, lamprey (*Lampetra* sp.), European eel and three-spined stickleback (Triturus, 2024).

The Slate River is one of the larger Barrow sub-catchments and covers an area of approximately 214km^2. As part of the upper Barrow system, the Slate is known to support a range of fish species including brown trout, Atlantic salmon, lamprey (*Lampetra* sp.), minnow, three-spined stickleback, roach, perch (*Perca fluviatilis*), stone loach, European eel and invasive dace (*Leuciscus leuciscus*) (Gordon et al., 2021; Delanty et al., 2017; Triturus data). Whilst the Slate is a noted recreational trout fishery (O'Reilly, 2009), the Slate sub-catchment has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures (Delanty et al., 2017).

The Figile River, a major tributary of the River Barrow, drains an area of approximately 320km^2. After its confluence with the Cushina and Slate Rivers, it becomes the Black River before it enters the River Barrow at Monasterevin. The Figile is known to support Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), European eel, lamprey (*Lampetra* sp.), minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula*), roach (*Rutilus rutilus*), roach x bream hybrids, dace (*Leuciscus leuciscus*), perch (*Perca fluviatilis*), pike (*Esox lucius*), gudgeon (*Gobio gobio*), three-spined stickleback (*Gasterosteus aculeatus*) and ten-spined stickleback (*Pungitius pungitius*) (Triturus 2021-2024 data; Gordon et al., 2021; Delanty et al., 2017). The Figile River has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

The Lullymore East River, a Figile tributary, is known to support brown trout, European eel and three-spined stickleback (Triturus 2021-2024 data). The heavily modified Cloncant Stream is known to support brown trout, minnow and three-spined stickleback (Triturus 2021-2024 data). European eel and three-spined stickleback are known from the Clonkeen Stream, a minor Boyne tributary (Triturus 2021-2024 data). The Abbeylough River, Killinagh Upper Stream and the Upper Ballynakill River are only known to support three-spined stickleback (Triturus 2021-2024 data). Previous surveys of the heavily modified Codd River, Drumsru River and Ballygarrett River did not reveal any fish species (Triturus 2021-2024 data).

The Grand Canal, crossed by the Proposed Grid Connection underground electrical cabling route , is known to support a range of coarse fish species, including perch, pike (*Esox lucius*), bream, roach, rudd (*Scardinius erythropthalmus*) and their respective hybrids, European eel and tench (*Tinca tinca*) with highly localised common carp (*Cyprinus carpio*) and brown trout (*Salmo trutta*) (IFI data; McLoone, 2011; Tierney et al., 1999; pers. obs.). Lamprey (*Lampetra* sp.) have also been recorded at a low number of locations where increased flows at lock gates provide better quality habitat (e.g. 11th lock, ROD, 2016; 7th lock, Caffrey et al., 2006; 5th lock, MKO, 2019).

2. Methodology

2.1 Fisheries assessment (electro-fishing)

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish riverine sites on the 25th to 30th August 2026 following notification to Inland Fisheries Ireland (IFI), under the conditions of a Department of Climate, Energy and the Environment (DCEE) licence. The electro-fishing survey was undertaken at 41 no. riverine sites (see **Table 2.1, Figure 2.1**).

Both river and holding tank water temperature was monitored continually throughout the survey to ensure temperatures of 20°C were not exceeded, thus minimising stress to the captured fish due to low dissolved oxygen levels. A portable battery-powered aerator was also used to further reduce stress to any captured fish contained in the holding tank. Salmonids, European eel and other captured fish species were transferred to a holding container with oxygenated fresh river water following capture. To reduce fish stress levels, anaesthesia was not applied to captured fish. All fish were measured to the nearest millimetre and released in-situ following a suitable recovery period.

As three primary species groups were targeted during the survey, i.e., salmonids, lamprey, and eel, the electro-fishing settings were tailored for each species. By undertaking electro-fishing using the rapid electro-fishing technique (see methodology below), the broad characterisation of the fish community at each sampling reach could be determined as a longer representative length of channel was surveyed. Electro-fishing methodology followed accepted European standards (CEN, 2003) and adhered to best practice (e.g., CFB, 2008).

2.1.1 Salmonids and European eel

For salmonid species and European eel, as well as all other incidental species, electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson et al., 2018). A total of approximately 50-75m channel length was surveyed at each survey site, where feasible, in order to gain a better representation of fish stock assemblages.

Relative conductivity of the water at each survey site was checked in-situ with a conductivity meter and the electro-fishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids and European eel to the anode without harm. For the moderate conductivity waters of the sites a voltage of 220-275v, frequency of 35-40Hz and pulse duration of 3.5-4ms was utilised to draw fish to the anode without causing physical damage.

2.1.2 Lamprey

Electro-fishing for lamprey ammocoetes was conducted using targeted quadrat-based electro-fishing (as per Harvey & Cowx, 2003) in objectively suitable areas of sand/silt, where encountered. As lamprey take longer to emerge from silts and require a more persistent approach, they were targeted at a lower frequency (30Hz) burst DC pulse setting which also allowed detection of European eel in sediment, if present. Settings for lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven & McAuley (2013). Using this approach, the anode was placed under the water's surface, approximately 10-15cm above the sediment, to prevent immobilising lamprey

ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine-mesh hand net as they emerged.

Lamprey species were identified to species level, where possible, with the assistance of a hand lens, through external pigmentation patterns and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003).

2.2 Fisheries habitat

A fisheries habitat appraisal of the 41 no. riverine and 1 no. canal sites was undertaken to establish their suitability and importance for salmonid, lamprey, European eel and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O'Grady (2006), Hendry et al. (2003), Armstrong et al. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (EA, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the riverine sites (i.e. channel profile, substrata etc.).

2.3 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

Table 2.1 Summary of 42 no. electro-fishing and fisheries appraisal sites

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A1	Unnamed stream	n/a	Derries	665752	729939
A2	Unnamed stream	n/a	Derries	666710	729706
A3	Codd River	14C44	Derries	666119	729187
A4	Codd River	14C44	Codd	664647	728006
A5	Cloncant Stream	14C41	Derries	666402	729057
A6	Cloncant Stream	14C41	Cushaling	663787	727511
A7	Abbeylough Stream	14A01	Kilpatrick	670827	728735
A8	Figile River	14F01	Ticknevin	666719	727796
A9	Unnamed stream	n/a	Lullybeg	667604	725885
A10a	Lullybeg Stream	14L13	Lullybeg	668325	724418

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A10b	Lullymore East River	14L11	Lullybeg	667752	724098
A10c	Lullybeg Stream	14L13	Lullybeg	667103	725094
A11a	Lullymore East River	14L11	Lullybeg	667683	725577
A11b	Lullymore East River	14L11	Lullybeg	666815	725833
A12a	Lullybeg Stream	14L33	Cushaling	666165	724787
A12b	Lullybeg Stream	14L33	Cushaling	666087	724946
A13a	Clonbrown River	14C32	Cushaling	665802	723269
A13b	Clonbrown River	14C32	Cushaling	665761	723345
A13c	Clonbrown River	14C32	Cushaling	665583	723926
A13d	Clonbrown River	14C32	Cushaling	665055	725590
A14a	Figile River	14F01	Cushaling Bridge	665011	725882
A14b	Figile River	14F01	Cloncant	663529	726766
A15a	Figile River	14F01	Kilcumber	661438	727522
A15b	Ballykilleen Stream	14B25	Shean	661272	727619
A16	Clonbulloge River	14C53	Clonmel	661405	723666
A17	Ballygarrett River	14B30	Clonmel	662374	723087
A18	Figile River	14F01	Millgrove Bridge	659896	719047
B1	Clonkeen Stream	07C36	Cloncanon	665410	731179
B2	River Boyne	07B04	Kishawanny Bridge	664528	733464
C1	Drumsru Stream	14D19	Barnaran	670840	724189
C2	Slate River	14S01	Agar Bridge	670272	721700
G1	Killinagh Upper Stream	14K17	Allenwood South	673402	726368
G2*	**Grand Canal**	n/a	Shee Bridge	674633	726464
G3	Upper Ballynakill River	14U01	R403 road crossing	676233	726584
G4	Unmapped channel	n/a	R403 road crossing	676949	726639
G5	Slate River	14S01	Quigley's Bridge	678787	726784
G6	Slate River	14S01	New Bridge	679415	726846
G7	Blackwood Feeder		R403 road crossing	679499	726854
G8	Slate River	14S01	R403 road crossing	679608	726864
G9	Brockagh River	14B73	Dagwelds Cross, R403	680021	726896
G10	Unmapped channel	n/a	R403 road crossing	680640	726952
G11	Unnamed stream	n/a	Black Stick Cross Roads, R403	682652	727121

* fisheries appraisal only

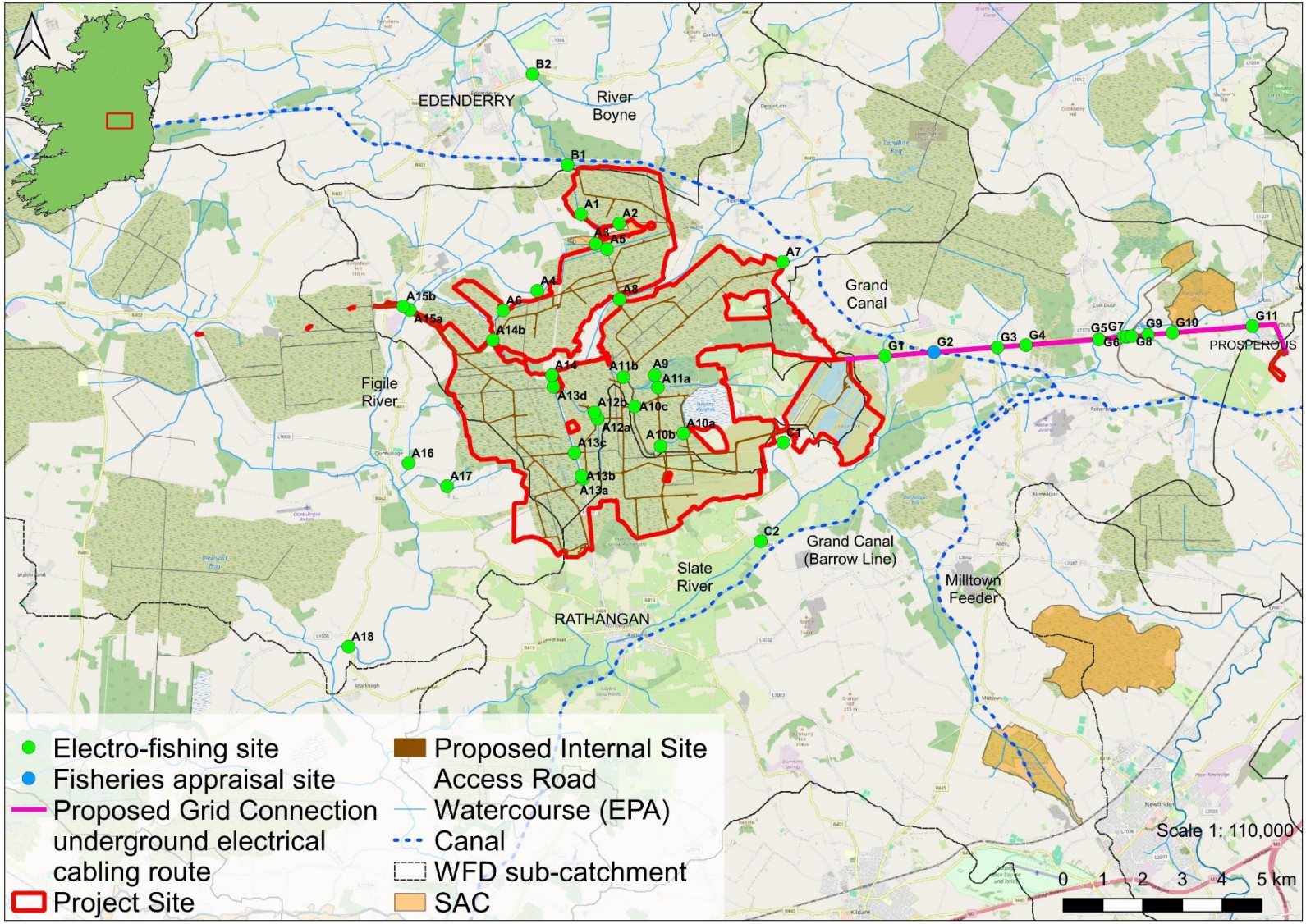


Figure 2.1 Overview of the electro-fishing & fisheries appraisal survey site locations for the Proposed Wind Farm site and Proposed Grid Connection

3. Results

A fisheries survey of 41 no. riverine and 1 no. canal sites was undertaken on Tuesday 25th to Sunday 30th August 2026 following notification to IFI. The results of the survey are discussed below in terms of fish population structure, population size and the suitability and value of the surveyed areas as nursery and spawning habitat for salmonids, European eel and lamprey species. Scientific names are provided at first mention only.

3.1 Fisheries assessment & appraisal

3.1.1 Site A1 – Unnamed stream, Derries

Three-spined stickleback (*Gasterosteus aculeatus*) (*n*=3) was the only fish species via electro-fishing at Site A1 on an unnamed tributary of the Codd River (no EPA code) adjoining the Proposed Wind Farm site (**Figure 3.1**).

The heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, absence of coarse substrata and significant siltation. The site had some low value as a European eel nursery given deep glide, abundant macrophyte refugia and prey resources although the species was not recorded.

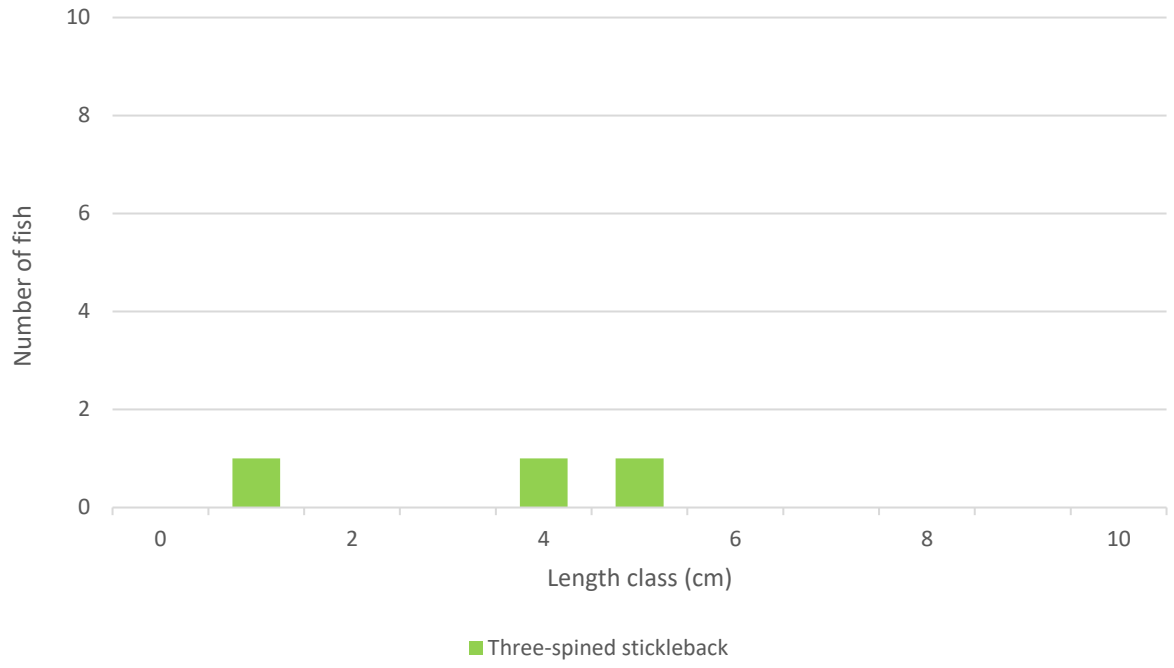


Figure 3.1 Fish length frequency distribution recorded via electro-fishing at Site A1, August 2026



Plate 3.1 Male three-spined stickleback recorded at Site A1 on an unnamed Codd River tributary, August 2026

3.1.2 Site A2 - Unnamed stream, Derries

Three-spined stickleback (*n*=4) was the only fish species recorded via electro-fishing at Site A2 on an unnamed tributary of the Codd River (no EPA code) adjoining the Proposed Wind Farm site (**Figure 3.2**).

With the exception of low densities of this species, the heavily silted canalised channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, paucity of coarse substrata and significant siltation. Site A2 had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources although the species was not recorded.

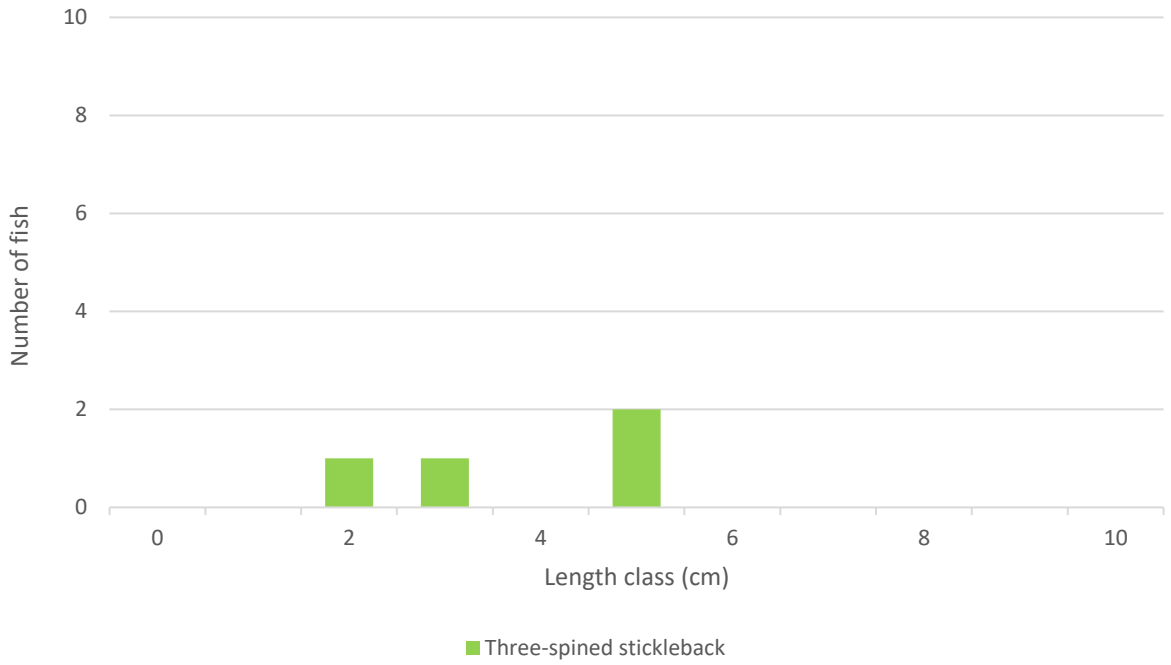


Figure 3.2 Fish length frequency distribution recorded via electro-fishing at Site A2, August 2026



Plate 3.2 Representative image of Site A2 on an unnamed Codd River tributary, August 2026

3.1.3 Site A3 – Codd River, Derries

Site A3 was located on the upper reaches of the Codd River (EPA code: 14C44) within the Proposed Wind Farm site. The channel was dry at the time of survey and was thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species.



Plate 3.3 Representative image of Site A3 on the Codd River, August 2026 (dry, ephemeral channel)

3.1.4 Site A4 – Codd River, Codd

Site A4 was located on the upper reaches of the Codd River (14C44) adjacent to the Proposed Wind Farm site at a farm access crossing. The channel was dry at the time of survey and was thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species.



Plate 3.4 Representative image of Site A4 on the Codd River, August 2026 (dry, ephemeral channel)

3.1.5 Site A5 – Cloncant Stream, Derries

No fish were recorded via electro-fishing at Site A5 on the uppermost reaches of the Cloncant Stream (14C41) at an existing bog access track crossing (pipe culvert) within the Proposed Wind Farm site. The heavily modified channel suffered from very low summer flows and was possibly ephemeral at this location. This coupled with significant siltation and downstream connectivity issues precluded resident fish.



Plate 3.5 Representative image of Site A5 on the Cloncant Stream, August 2026

3.1.6 Site A6 - Cloncant Stream, Cushaling

Three-spined stickleback (*n*=5) and minnow (*Phoxinus phoxinus*) (*n*=7) were the only fish species recorded via electro-fishing at Site A6 on the Cloncant Stream (14C41) (**Figure 3.3**).

With the exception of low densities of these species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. Site A6 had some low value as a European eel nursery given abundant refugia and suitable prey resources, however none were recorded.

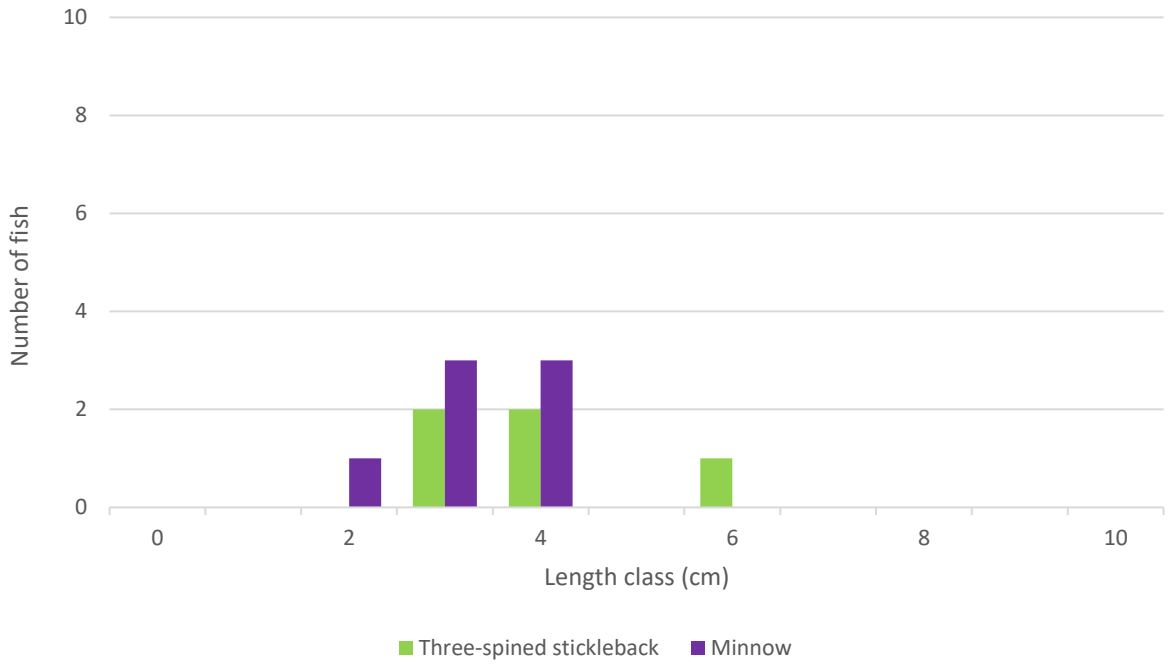


Figure 3.3 Fish length frequency distribution recorded via electro-fishing at Site A6, August 2026



Plate 3.6 Minnow and three-spined stickleback recorded at Site A6 on the Cloncant Stream, August 2026

3.1.7 Site A7 - Abbeylough Stream, Kilpatrick

Three-spined stickleback (*n*=7) and ten-spined stickleback (*Pungitius pungitius*) (*n*=3) were the only fish species recorded via electro-fishing at Site A7 on the Abbeylough River (14A01) at a farm/bog access track crossing adjoining the Proposed Wind Farm site (**Figure 3.4**).

With the exception of low densities these species, the stream at this location was of poor fisheries value given significant siltation and hydromorphological pressures in addition to Site A7's location in the upper reaches of the watercourse.

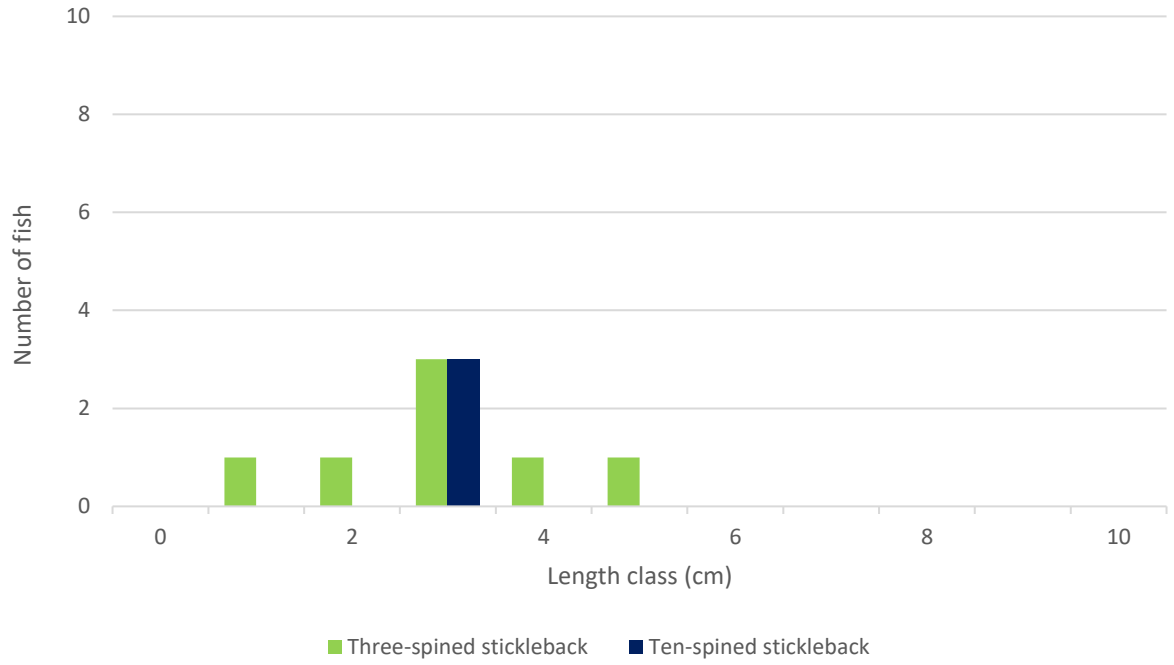


Figure 3.4 Fish length frequency distribution recorded via electro-fishing at Site A7, August 2026



Plate 3.7 Three-spined stickleback (top) and ten-spined stickleback recorded at Site A7 on the Abbeylough Stream, August 2026

3.1.8 Site A8 – Figile River, Ticknevin

Brown trout (*Salmo trutta*) (*n*=15), minnow (*n*=2), stone loach (*Barbatula barbatula*) (*n*=1) and European eel (*Anguilla anguilla*) (*n*=1) were recorded via electro-fishing at Site A8 on the Figile River (14F01) adjacent to a proposed internal site access road crossing (**Figure 3.5**).

Site A8 was of moderate value for salmonids with some spawning and nursery habitat in vicinity of the bridge apron. However, outside of this small area, the river was of poor value for salmonids given high rates of siltation, floc and extensive macrophyte growth in deep glide and pool habitat. However, these areas did support abundant minnow. Areas of gravel provided some lamprey spawning habitat although the humic nature of soft sediment accumulations were sub-optimal for ammocoetes and none were recorded. There was good suitability for European eel given abundant refugia given large substrata and deeper pool.

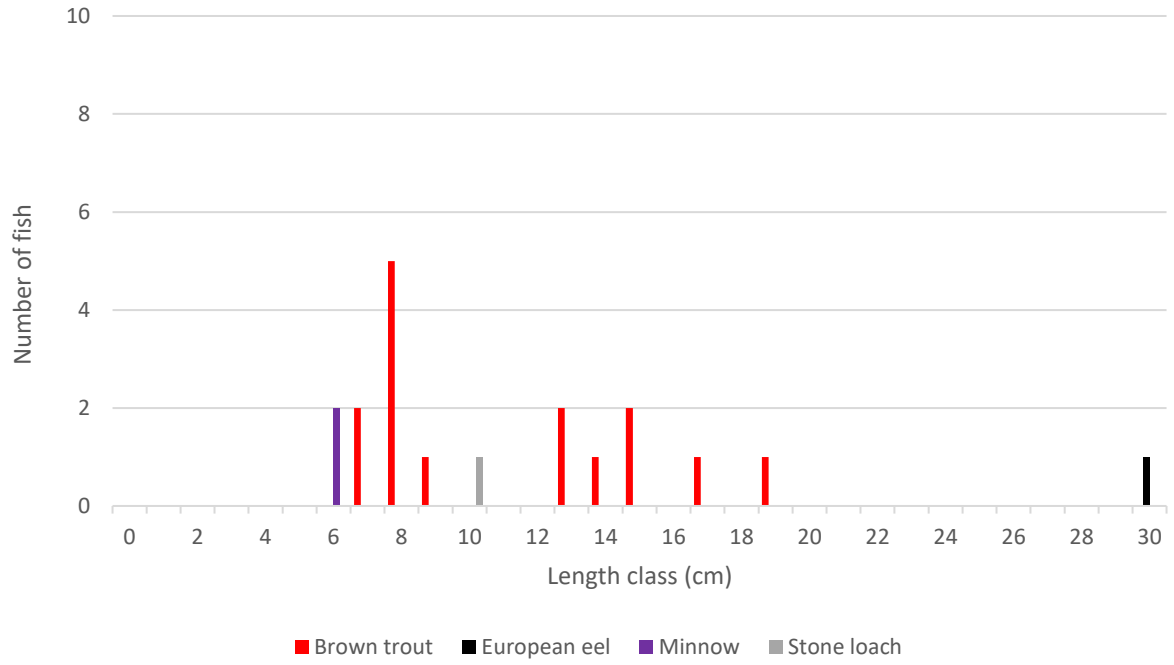


Figure 3.5 Fish length frequency distribution recorded via electro-fishing at Site A8, August 2026



Plate 3.8 Adult brown trout recorded at Site A8 on the Figile River, August 2026

3.1.9 Site A9 - Unnamed stream, Lullybeg

Three-spined stickleback (*n*=4) was the only fish species recorded during electrofishing at Site A9 on an unnamed Lullymore East River tributary within the Proposed Wind Farm site (**Figure 3.6**).

The species was associated with localised pooling areas, which provided limited habitat within the otherwise very shallow channel. No salmonids, lamprey species or European eel were recorded, given the very low fisheries value of the heavily silted and slow-flowing channel.

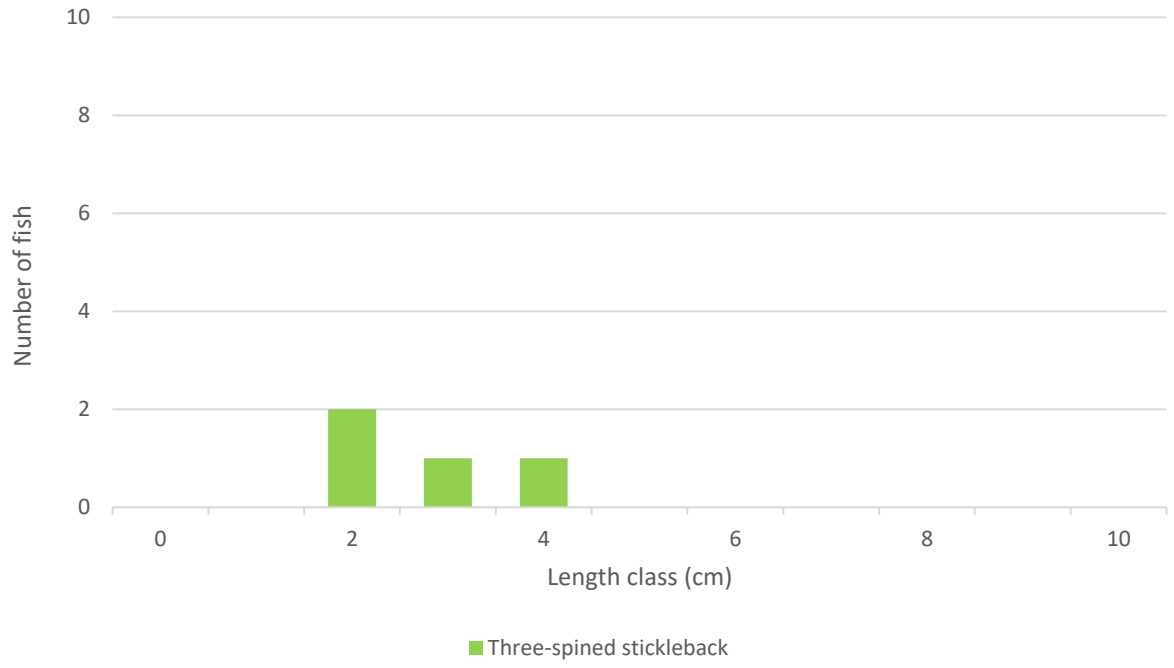


Figure 3.6 Fish length frequency distribution recorded via electro-fishing at Site A9, August 2026



Plate 3.9 Representative image of Site A9 on an unnamed Lullybeg East River tributary, August 2026

3.1.10 Site A10a - Lullybeg Stream, Lullybeg

Three-spined stickleback (*n*=4) was the only fish species recorded via electro-fishing at Site A10a on the upper reaches of the Lullybeg Stream (14L13) at a proposed internal site access road crossing within the Proposed Wind Farm site (**Figure 3.7**).

With the exception of low densities of this ubiquitous species, the stream at this location was of poor fisheries value given significant siltation, hydromorphological and eutrophication pressures in addition to Site 10a's location in the upper reaches of the watercourse.

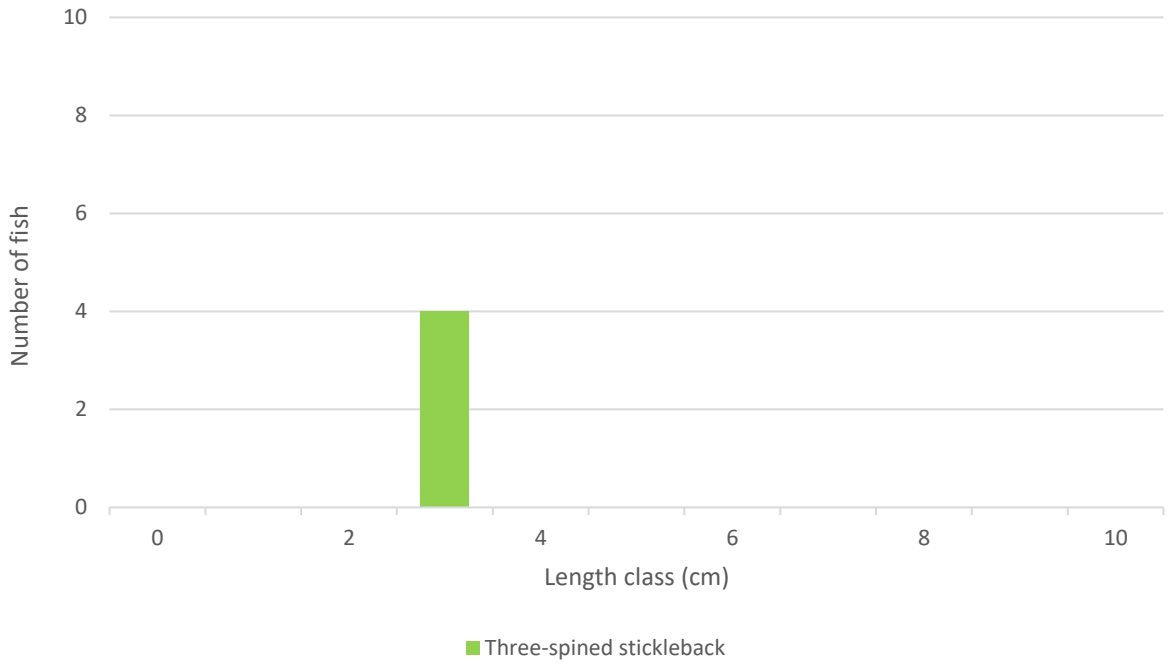


Figure 3.7 Fish length frequency distribution recorded via electro-fishing at Site A10a, August 2026



Plate 3.10 Representative image of Site A10a on the Lullybeg Stream, August 2026

3.1.11 Site A10b - Lullymore East River, Lullybeg

Three-spined stickleback (*n*=3) was the only fish species recorded via electro-fishing at Site A10b on the Lullybeg Stream (14L13) at a proposed internal site access road (concrete pipe culvert), c. 0.7km downstream of Site A10a (**Figure 3.8**).

With the exception of low densities of this ubiquitous species, the stream at this location was of poor fisheries value given significant siltation, hydromorphological and eutrophication pressures in addition to Site 10b's location in the upper reaches of the watercourse.

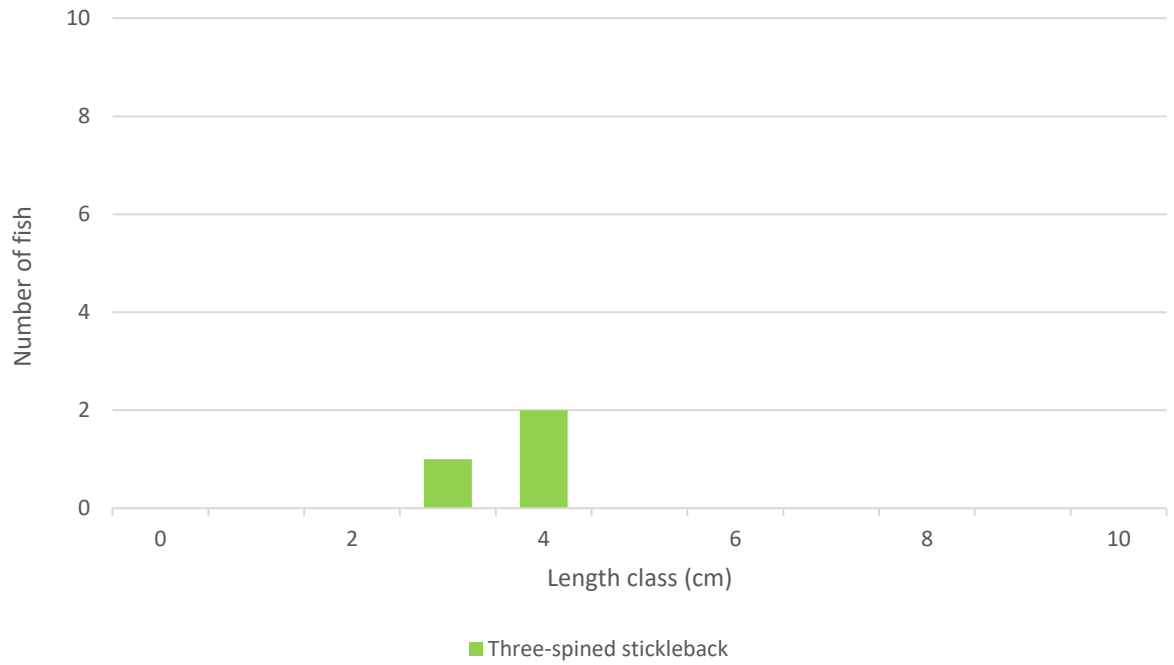


Figure 3.8 Fish length frequency distribution recorded via electro-fishing at Site A10b, August 2026



Plate 3.11 Representative image of Site A10b on the Lullybeg Stream, August 2026

3.1.12 Site A10c - Lullybeg Stream, Lullybeg

Three-spined stickleback (*n*=9) was the only fish recorded at Site A10c on the Lullybeg Stream (14L13) at a proposed internal site access road crossing c. 1.6km downstream of Site A10b (**Figure 3.9**).

Site A10c had low fisheries value given the absence of perceptible flow and the deep deposits of soft sediment over compacted peat. No suitable salmonid spawning, nursery or holding habitat was present for salmonids, given significant siltation and noxious growth of instream macrophytes. site 10c also had low suitability for eel.

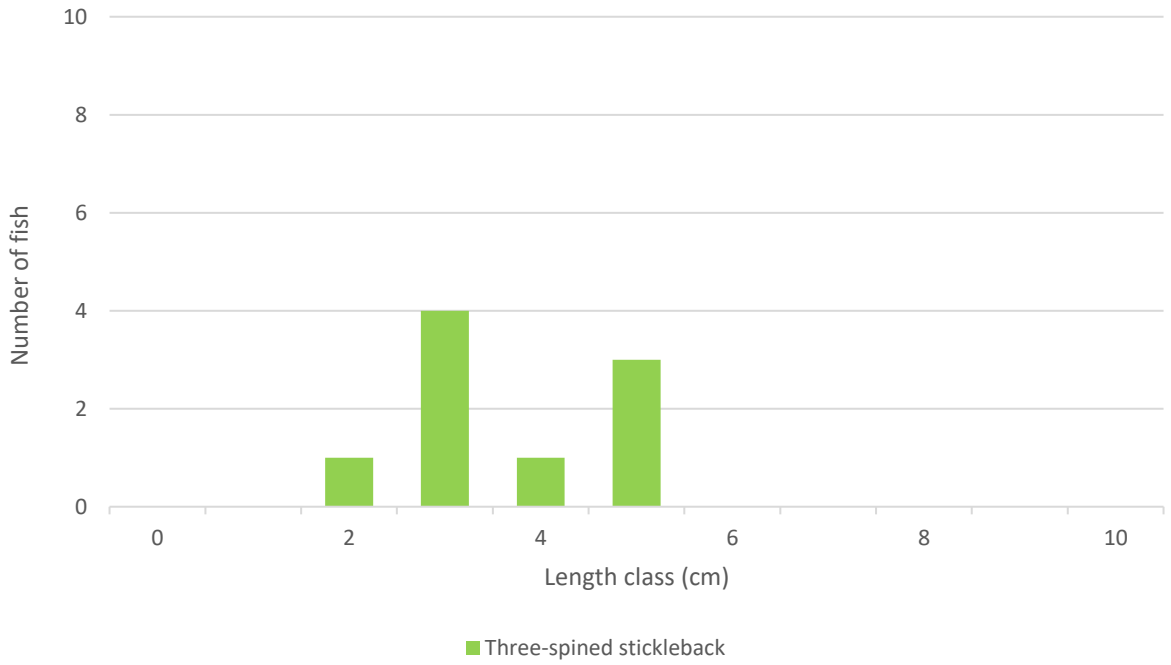


Figure 3.9 Fish length frequency distribution recorded via electro-fishing at Site A10c, August 2026



Plate 3.12 Representative image of Site A10c on the Lullybeg Stream, August 2026

3.1.13 Site A11a - Lullymore East River, Lullybeg

Three-spined stickleback (*n*=2) and minnow (*n*=3) were the only fish species recorded at Site A11a on the upper reaches of the Lullymore East River (14L11) at a proposed internal site access road crossing within the Proposed Wind Farm site (**Figure 3.10**). Both species were present in low numbers.

The river was considered of very low fisheries value at this location given shallow depths and dominance of deep, soft silt deposits. The absence of suitable gravel and cobble substrata precluded salmonid spawning or nursery habitat, while the homogenous channel provided very limited holding habitat for larger fish. Suitability for European eel was very low due to the shallow depths and limited availability of instream refugia.

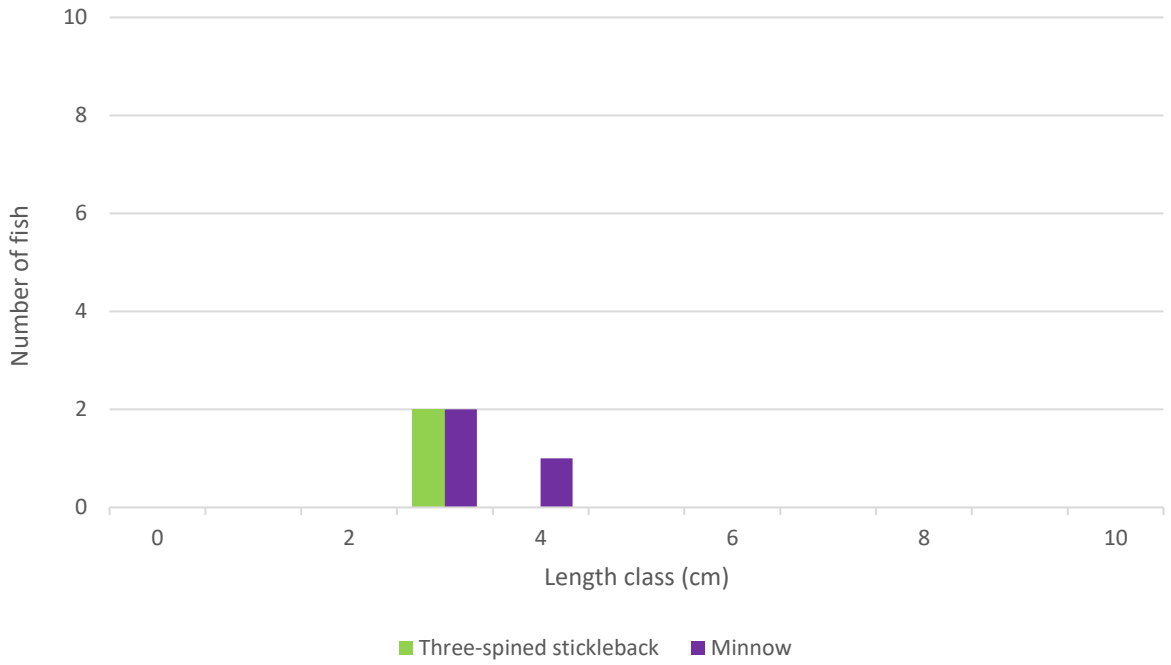


Figure 3.10 Fish length frequency distribution recorded via electro-fishing at Site A11a, August 2026



Plate 3.13 Minnow and three-spined stickleback recorded at Site A11a on the Lullymore East River, August 2026

3.1.14 Site A11b - Lullymore East River, Lullybeg

European eel (*n*=1) was the only fish species recorded via electro-fishing at Site A11b on the Lullymore East River (14L11) at a proposed amenity track crossing within the Proposed Wind Farm site (**Figure 3.11**).

Eel habitat was of poor quality given highly limited refugia (near existing bridge only). Site A11b provided some poorer quality holding habitat for adult salmonids. However, given significant modifications, high siltation and poor connectivity to downstream habitats Site A11b was of low fisheries value overall.

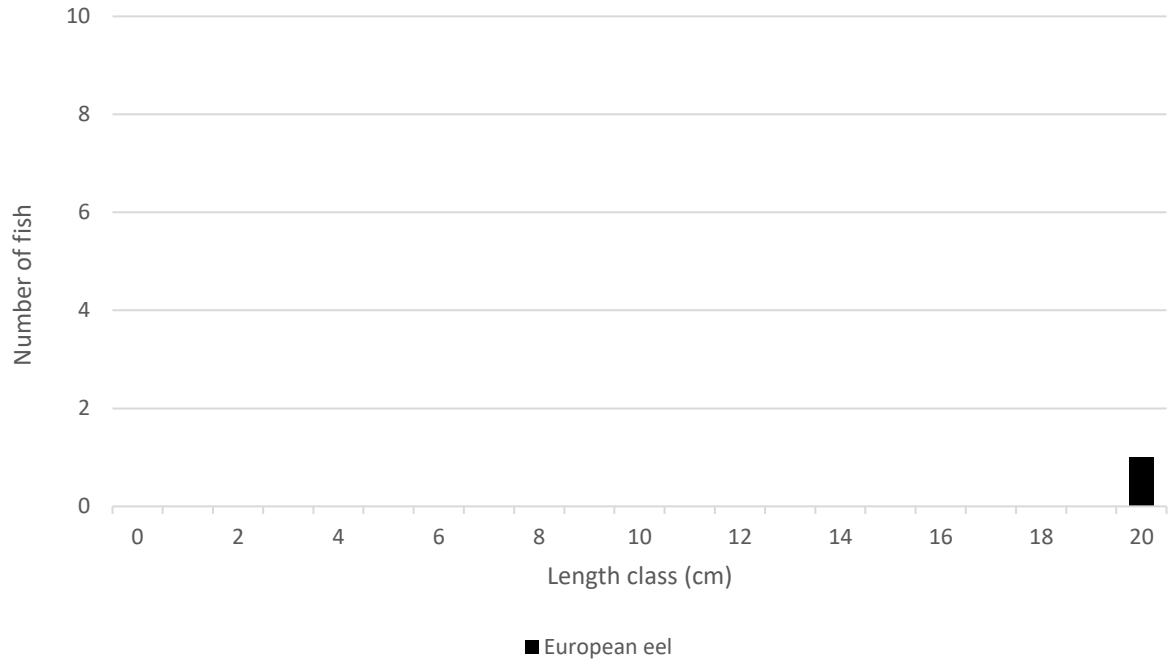


Figure 3.11 Fish length frequency distribution recorded via electro-fishing at Site A11b, August 2026



Plate 3.14 Representative image of Site A11b on the Lullymore East River, August 2026

3.1.15 Site A12a - Lullybeg Stream, Cushaling

Electro-fishing was not undertaken at Site A12a on the Lullybeg Stream (14L33) within the Proposed Wind Farm site at a proposed internal site access road crossing due to the prohibitive water depths (>2m). Site A12a was of limited fisheries value given its extensively modified nature, absence of perceptible flow and very low macrophyte cover. Suitable spawning habitat for salmonids and lamprey was absent. The deep canalised channel would provide some limited habitat for European eel and coarse fish species. However, the overall value was reduced by the poor hydromorphology and limited instream refugia.



Plate 3.15 Representative image of Site A12a on the Lullybeg Stream, August 2026

3.1.16 Site A12b - Lullybeg Stream, Cushaling

Electro-fishing was not undertaken at Site A12b on the Lullybeg Stream (14L33) at an existing and proposed internal site road crossing within the Proposed Wind Farm site, adjacent to a historical pumping station due to the prohibitive water depths (>2m). Site A12b was of limited fisheries value given its extensively modified nature, absence of perceptible flow and very low macrophyte cover. Suitable spawning habitat for salmonids and lamprey was absent. The deep canalised channel would provide some limited habitat for European eel and coarse fish species. However, the overall value was reduced by the poor hydromorphology and limited instream refugia.



Plate 3.16 Representative image of Site A12b on the Lullybeg Stream, August 2026

3.1.17 Site A13a - Clonbrown River, Cushaling

Electro-fishing was not undertaken at Site A13a on the Clonbrown River (14C32), a tributary of the Figile River, at a proposed internal site access road crossing within the Proposed Wind Farm site due to the prohibitive sediment depths and unsafe wading conditions. The deep, homogeneous channel was of low fisheries value given extensive modifications, absence of any perceptible flow, siltation pressures and heavy encroachment by terrestrial vegetation. Spawning habitat for salmonids and lamprey was absent and the deep organic silt deposits were unsuitable for lamprey ammocoetes. Site A13a was of low value for European eel due to poor seasonal flows and the absence of suitable refugia.



Plate 3.17 Representative image of Site A13a on the Clonbrown River, August 2026

3.1.18 Site A13b - Clonbrown River, Cushaling

Three-spined stickleback (*n*=4) and ten-spined stickleback (*n*=1) were the only fish species recorded via electro-fishing at Site A13b on the Clonbrown River (14C23) at a proposed internal site access road crossing directly downstream of Site A13a (**Figure 3.12**).

With the exception of low densities these species, the river at this location was not of fisheries value significant siltation and hydromorphological pressures in addition to noxious macrophyte cover and instream barriers (culverts).

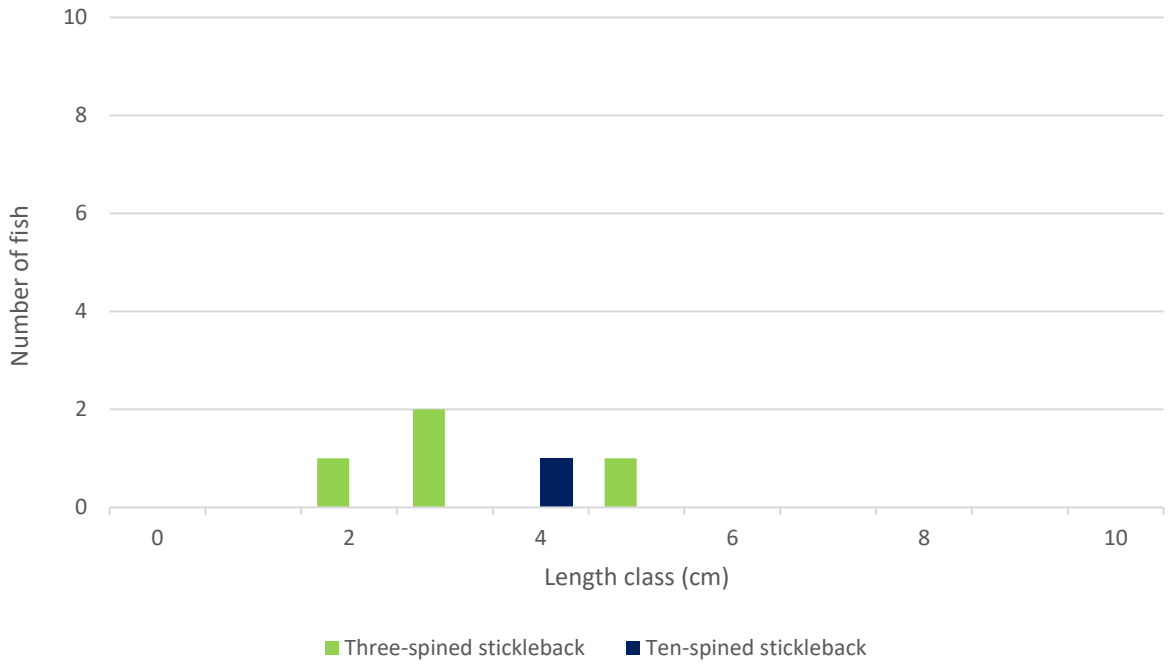


Figure 3.12 Fish length frequency distribution recorded via electro-fishing at Site A13b, August 2026



Plate 3.18 Three-spined (top) and ten-spined stickleback recorded at Site A13b on the Clonbrown River, August 2026

3.1.19 Site A13c - Clonbrown River, Cushaling

Three-spined stickleback (*n*=3) was the only fish species recorded via electro-fishing at Site A13c on the Clonbrown River (14C32) at a proposed amenity track crossing c. 0.6km downstream of Site A13b (**Figure 3.13**).

With the exception of low densities this species, the river at this location was not of fisheries value given significant siltation and hydromorphological pressures in addition to noxious macrophyte cover and instream barriers (culverts).

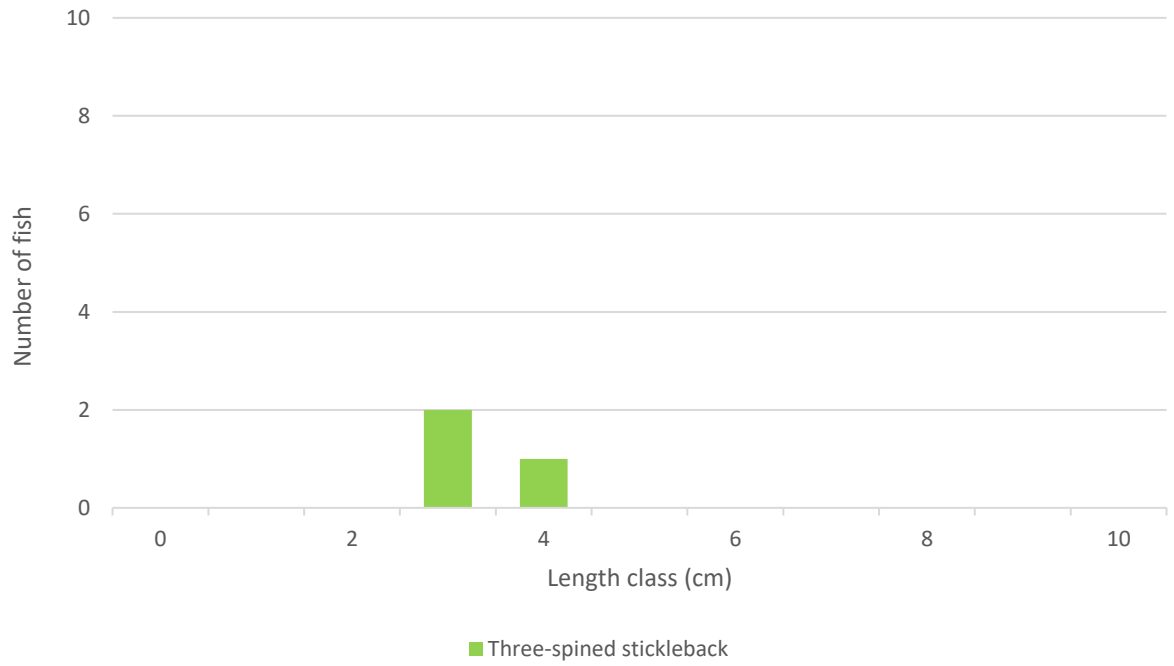


Figure 3.13 Fish length frequency distribution recorded via electro-fishing at Site A13c, August 2026



Plate 3.19 Representative image of Site A13c on the Clonbrown River, August 2026

3.1.20 Site A13d - Clonbrown River, Cushaling

Electro-fishing was not undertaken at Site A13d on the lower reaches of the Clonbrown River (14C32) c. 1.7km downstream of Site A13c and 0.3km upstream of the Figile River confluence. This was due to the prohibitive water and sediment depths. The ponding area was of limited fisheries value, although it may support coarse fish species such as roach, pike and perch, in addition to European eel. However, poor fluvial connectivity through culverts may restrict fish passage to and from Site A13d.



Plate 3.20 Representative image of site A13d on the Clonbrown River, August 2026

3.1.21 Site A14a - Figile River, Cushaling Bridge

Pike (*Esox lucius*) (*n*=2), perch (*Perca fluviatilis*) (*n*=4), minnow (*n*=4), stone loach (*n*=1) and invasive dace (*Leuciscus leuciscus*) (*n*=2) were recorded via electro-fishing at Site A14a on the Figile River (14F01) at Cushaling Bridge (L1001) (**Figure 3.14**).

Although supporting a good species diversity, the numbers of fish were low. Site A14a was of moderate value for salmonids with localised faster flowing glide and riffle areas providing valuable spawning and nursery habitat (rare in the river overall). Deeper glide and pool with fringing vegetation were of value as holding areas for adult salmonids. However, no trout were recorded in the current survey (but known from site; Triturus 2021-2024 data). Despite the presence of some good quality spawning habitat for lamprey, no ammocoetes were recorded from shallow sub-optimal humic soft sediment accumulations. Site A14a was of good suitability for European eel given the presence of suitable refugia but none were recorded. Invasive dace were present in low numbers in deeper glide.

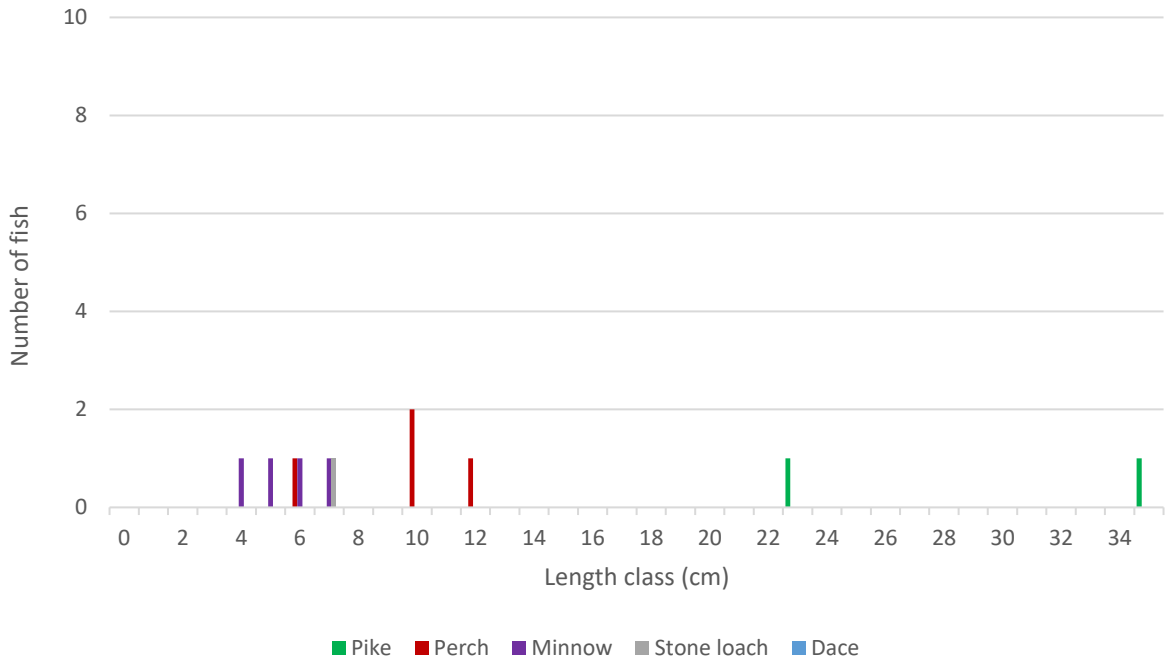


Figure 3.14 Fish length frequency distribution recorded via electro-fishing at Site A14, August 2026



Plate 3.21 Juvenile pike recorded at Site A14a on the Figile River at Cushaling Bridge, August 2026

3.1.22 Site A14b - Figile River, Cloncant

Electro-fishing was not undertaken at Site A14b on the Figile River (14F01) c. 2km downstream of Site A14a at a proposed internal site access road crossing due to the prohibitive water depths. The river at this location only provided some holding habitat for larger salmonids, with no spawning or nursery habitat. The deep channel provided some suitability for European eel but the habitat was impacted

by bed compaction and a lack of suitable refugia (i.e. boulder, cobble). The deep water site was primarily of value for coarse species, including invasive dace.



Plate 3.22 Representative image of Site A14b on the Figile River, August 2026

3.1.23 Site A15a - Figile River, Kilcumber

European eel (*n*=13), minnow (*n*=2), stone loach (*n*=5), pike (*n*=1) and invasive dace (*n*=1) were recorded via electro-fishing at Site A15a on the Figile River (14F01) at a proposed internal site access road crossing within the Proposed Wind Farm site, upstream of Edenderry Power Station (**Figure 3.15**).

Given prohibitive depths, electro-fishing was only possible within a small area beneath the road bridge. Site A15a was primarily of value as a coarse fish habitat, although the deep glide provided some suitable holding habitat for adult salmonids. Installed gravels were of some low value as lamprey and salmonid spawning habitat (but very heavily silted). Deep accumulations of soft, unconsolidated sediment were considered unsuitable for lamprey ammocoetes although the species was detected via eDNA sampling (**Appendix B**), confirming their presence at and or upstream of the sampling point. Atlantic salmon eDNA was also detected (**Appendix B**). Site A15a evidently provided very good habitat for European eel, as reflected by the high density recorded within the small area that could be effectively surveyed.

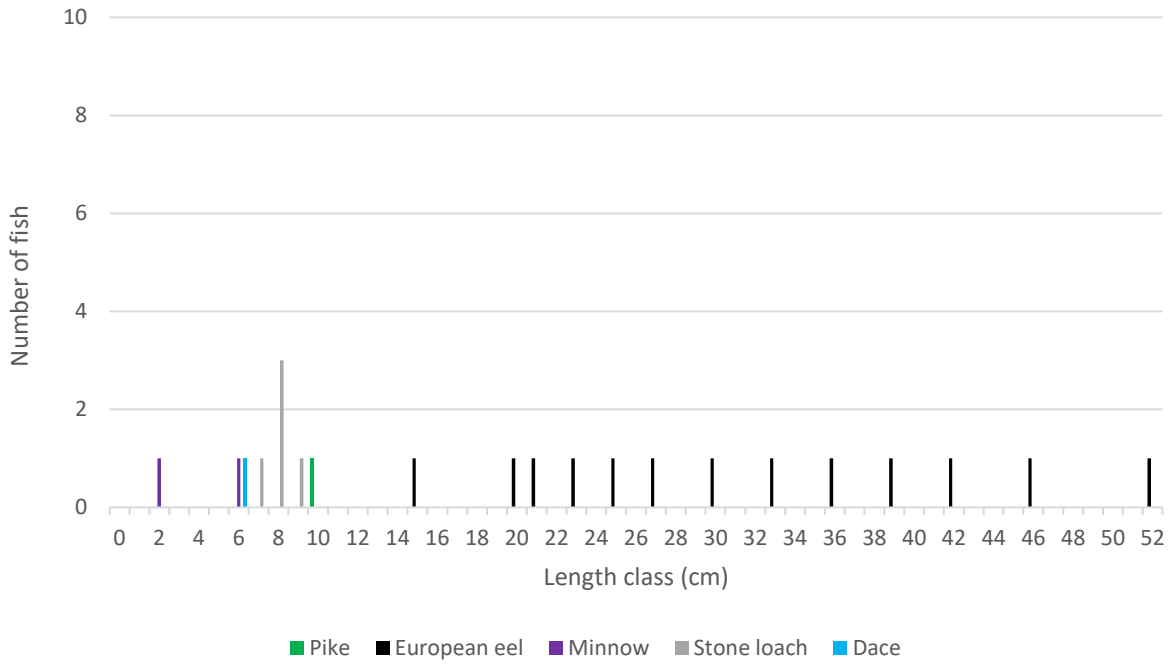


Figure 3.15 Fish length frequency distribution recorded via electro-fishing at Site A15a, August 2026



Plate 3.23 Adult European eel recorded at Site A15a on the Figile River, August 2026

3.1.24 Site A15b - Ballykilleen Stream, Shean

Site A15b was located on the Ballykilleen Stream (14B25),a tributary of the Figile River, at a proposed internal site access road = crossing. The channel was dry as far as the confluence with the Figile River c. 200m downstream and was thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species.



Plate 3.24 Representative image of Site A15b on the Ballykilleen Stream, August 2026 (dry, ephemeral channel)

3.1.25 Site A16 - Clonbulloge River, Clonmel

The channel was dry at the time of survey and was thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish.



Plate 3.25 Representative image of Site A16 on the Clonbulloge River, August 2026 (dry, ephemeral channel)

3.1.26 Site A17 - Ballygarrett River, Clonmel

The channel was dry at the time of survey and was thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish.



Plate 3.26 Representative image of Site A17 on the Ballygarrett River, August 2026 (dry, ephemeral channel)

3.1.27 Site A18 - Figile River, Millgrove Bridge

Site A18 was located on the R442 (a downstream control site). The lowland river (FW2) had been historically deepened but retained a semi-natural, meandering profile comprising riffle and glide sequences with localised deeper pools. The channel was 10-14m wide and 0.2-0.4m deep, with banks of approximately 2m in height. The substrata comprised partially bedded and calcified cobbles and mixed gravels, with occasional large boulders. The substrata were heavily silted. Filamentous algal cover was very high, covering approximately 70% of the riverbed, indicating significant enrichment. Macrophytes occurred in localised dense patches and comprised frequent common clubrush (*Schoenoplectus lacustris*), with occasional spiked water-milfoil, branched bur-reed and curled pondweed (*Potamogeton crispus*). Yellow water lily was rare in deeper areas. Fool's watercress and water mint occurred at the bridge abutments, while fine-leaved water-dropwort (*Oenanthe aquatica*) was rare along littoral areas. The bridge apron and larger instream substrata supported frequent *Fontinalis antipyretica* and *Pellia* sp., with occasional *Rhynchostegium riparioides* and *Leptodictyum riparium*. The banks supported frequent reed canary grass and reed sweet-grass. The wider riparian areas featured scattered mature sycamore, grey willow, ash and lime (*Tilia* sp.), with great willowherb and meadowsweet in the understories. Site A18 was bordered by improved pasture (GA1) with narrow riparian set-backs.

Atlantic salmon (*Salmo salar*) (*n*=3), European eel (*n*=2), pike (*n*=6), dace (*n*=25), gudgeon (*Gobio gobio*) (*n*=2), roach (*Rutilus rutilus*) (*n*=2), stone loach (*n*=20) and minnow (*n*=41) were recorded via electro-fishing at Site A18 on the lower reaches of the Figile River (14F01) at Millgrove Bridge (**Figure 3.16**).

A low number of Atlantic salmon fry were recorded, with Site A18 providing poor quality salmonid nursery and spawning habitat due to siltation and enrichment. Some good quality holding habitat for adult salmonids was present in deeper pools and glide. There was only limited suitability for lamprey given the absence of finer, clean spawning gravels. No lamprey ammocoete burial habitat was noted although the species was detected via eDNA sampling confirming their presence at and or upstream of the sampling point (**Appendix B**). Site A18 had some suitability as a nursery for European eel (i.e. refugia and good food resources) and a low number were recorded. Site A18 was dominated by pollution tolerant coarse fish species such as stone loach and minnow.

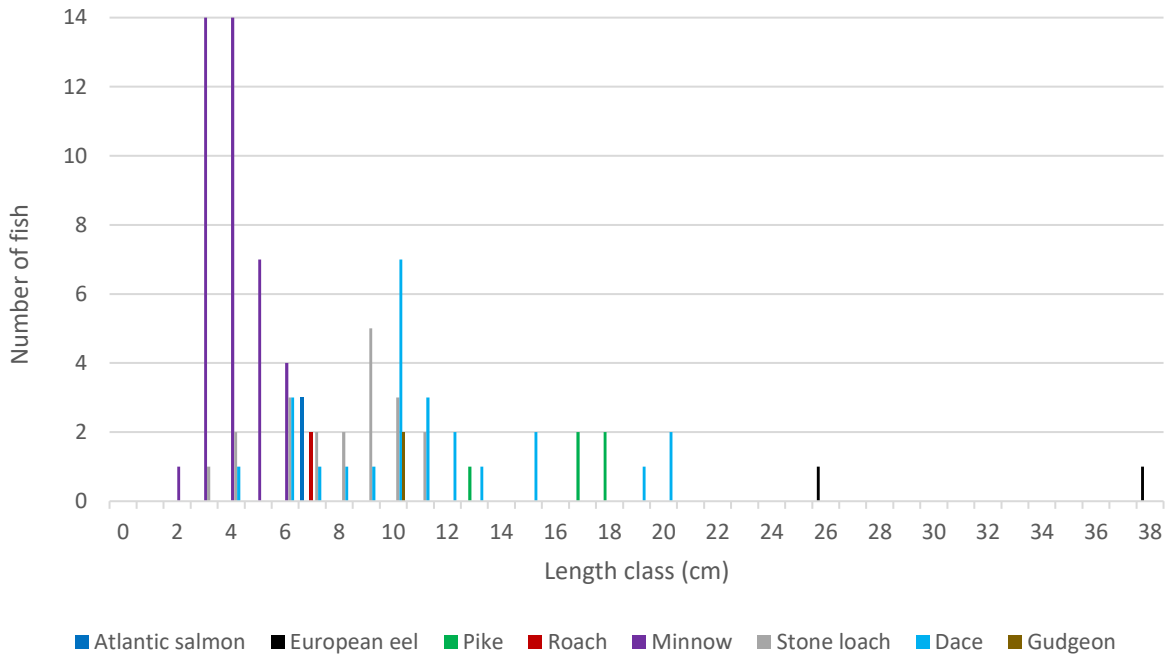


Figure 3.16 Fish length frequency distribution recorded via electro-fishing at Site A18, August 2026



Plate 3.27 Atlantic salmon parr recorded at Site A18 on the Figile River at Millgrove Bridge, August 2026



Plate 3.28 Dace (bottom) and juvenile pike recorded at Site A18 on the Figile River at Millgrove Bridge, August 2026

3.1.28 Site B1 - Clonkeen Stream, Cloncanon

Three-spined stickleback (*n*=5) was the only fish species recorded via electro-fishing at Site B1 on the Clonkeen River (07C36) upstream of the culvert under the Grand Canal, adjacent to the Proposed Wind Farm site (**Figure 3.17**).

With the exception of low densities of this ubiquitous species in stagnant pools, Site B1 was not of fisheries value at the time of survey given semi-dry conditions in addition to significant siltation and hydromorphological modifications. However, low numbers of European eel have been recorded at Site B1 previously (Triturus data).

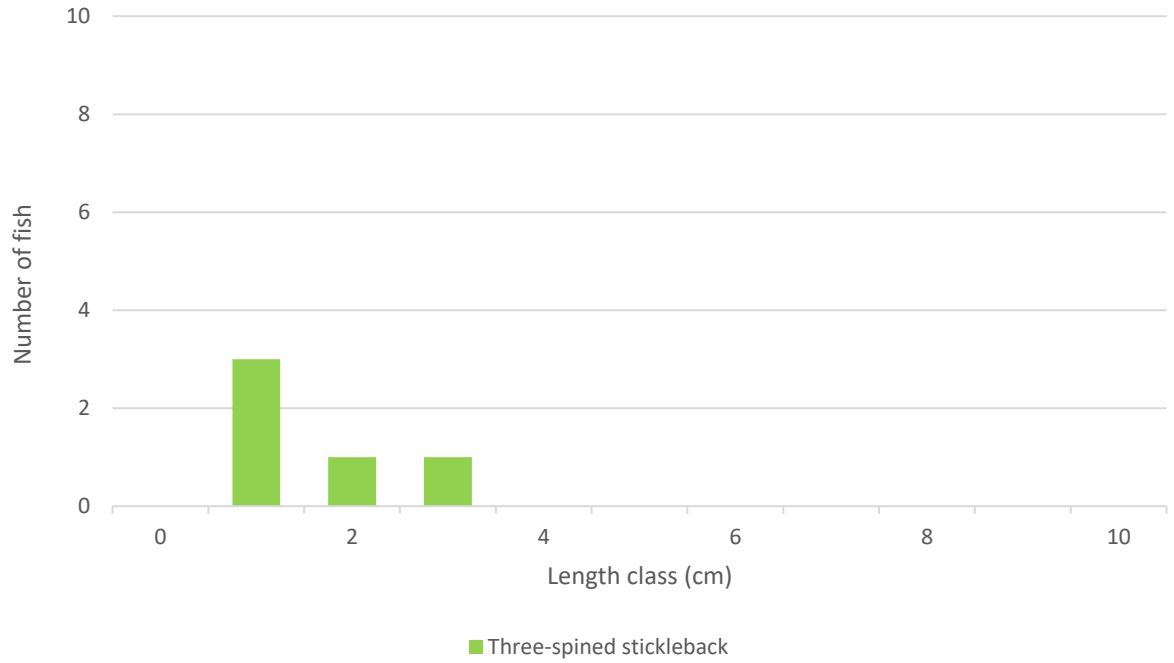


Figure 3.17 Fish length frequency distribution recorded via electro-fishing at Site B1, August 2026



Plate 3.29 Representative image of Site B1 on the Clonkeen Stream, August 2026

3.1.29 Site B2 - River Boyne, Kishawanny Bridge

Brown trout (*n*=2), lamprey (*Lampetra* sp.) (*n*=33) and three-spined stickleback (*n*=4) were recorded via electro-fishing at Site B2 on the River Boyne (07B01) at Kishawanny Bridge (**Figure 3.18**).

Site B2 was of poor value for salmonids given gross siltation pressures in addition to evident eutrophication and hydromorphological pressures. These resulted in a very low density of adult trout only, with spawning and nursery habitat of very poor quality. However, Atlantic salmon are known from Site B2 (Triturus 2021 data) and were detected via eDNA sampling (**Appendix B**). The pool immediately below the weir provided some low quality holding habitat for adult salmonids. Heavily vegetated glide and boulder zones were of good suitability for European eel, however none were recorded. Abundant organic rich soft sediment accumulations supported high densities of typically large *Lampetra* sp. ammocoetes, with some limited spawning habitat also present, although it was of low quality. Given the location in the upper Boyne catchment, these were likely brook lamprey (*Lampetra planeri*).

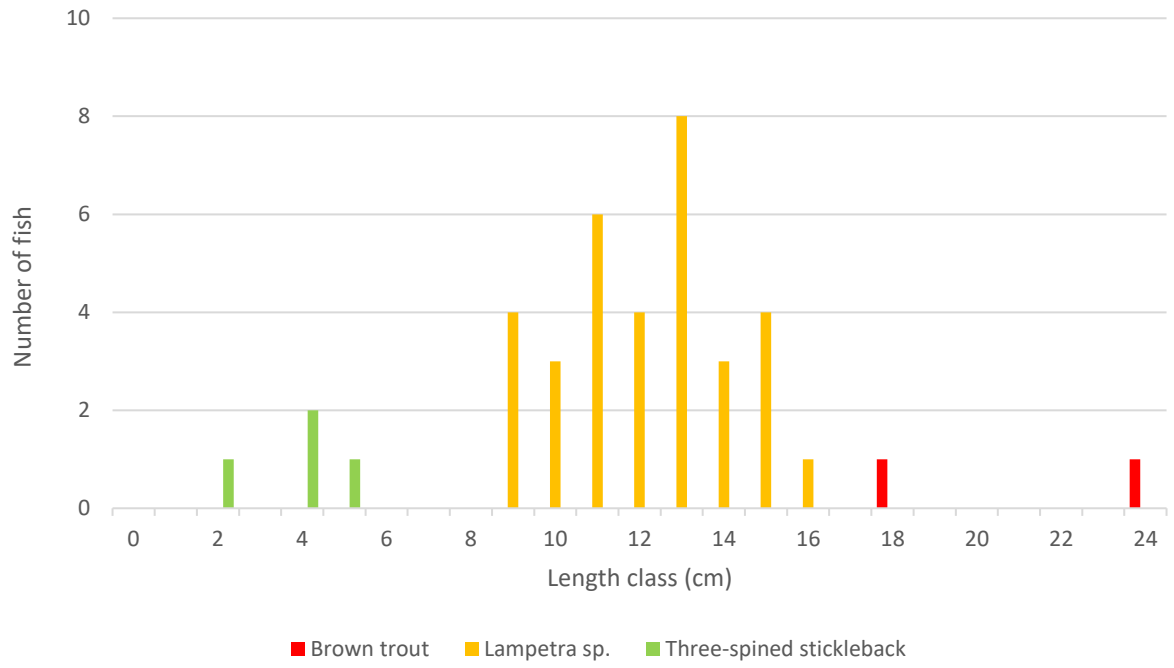


Figure 3.18 Fish length frequency distribution recorded via electro-fishing at Site B2, August 2026



Plate 3.30 Large *Lampetra* sp. ammocoete (likely brook lamprey, *L. planeri*) recorded at Site B2 on the River Boyne at Kishawanny Bridge, August 2026

3.1.30 Site C1 - Drumsru Stream, Barnaran

No fish were recorded via electro-fishing at Site C1 (on the Drumsru Stream (25B06), a tributary of the Slate River, adjacent to the Proposed Wind Farm site**.** The channel at this location was not of fisheries value given extensive modifications, stagnant water, absence of flows, siltation pressures and poor connectivity with downstream habitats.



Plate 3.31 Representative image of Site C1 on the Drumsru Stream, August 2026

3.1.31 Site C2 - Slate River, Agar Bridge

Brown trout (*n*=7), European eel (*n*=1), minnow (*n*=3), three-spined stickleback (*n*=1) and stone loach (*n*=13) were recorded via electro-fishing at Site C2 on the Slate River (14S01) at Agar Bridge (L7004 road). (**Figure 3.19**).

Site C2 was a poor quality salmonid nursery and spawning habitat due to historical modifications and siltation/eutrophication pressures. However, deep glide and pool provided some suitability as holding areas for adult salmonids and low numbers of adult trout were recorded. Suitability for European eel was good given ample refugia (i.e. large boulder, cobble and pool) and a single eel was recorded. Site C2 was of higher value as a coarse fish habitat. Despite an abundance of soft sediment accumulations these were mostly humic in nature and, coupled with poor flows, did not provide optimal conditions for lamprey ammocoetes (none recorded).

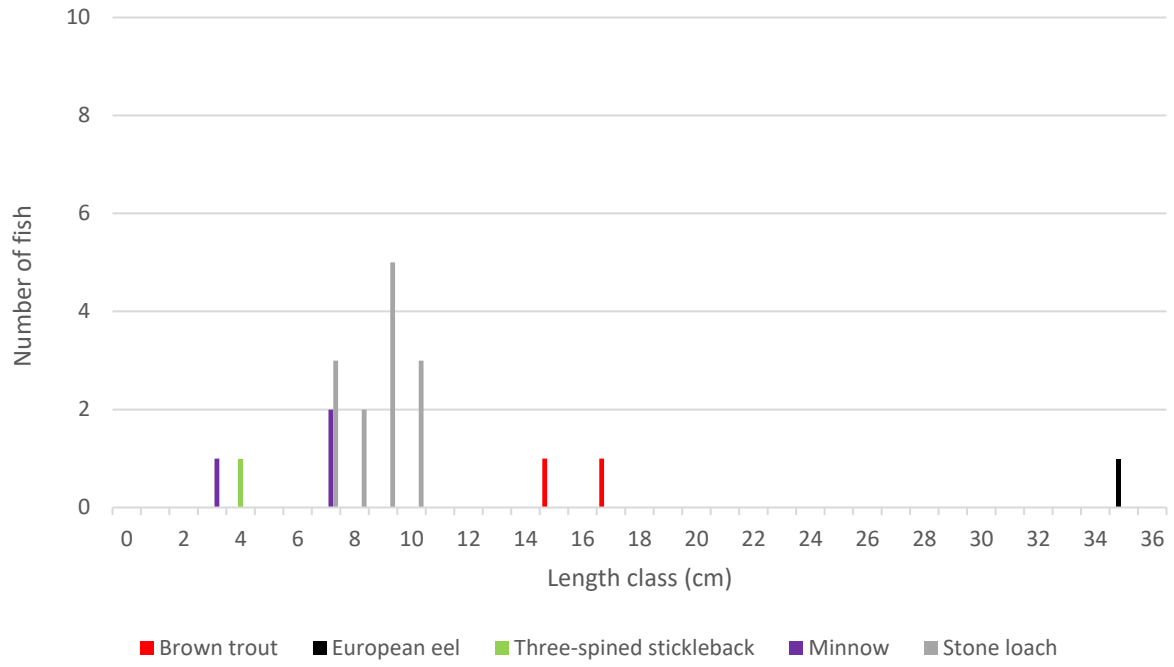


Figure 3.19 Fish length frequency distribution recorded via electro-fishing at Site C2, August 2026



Plate 3.32 Mixed cohort brown trout recorded at Site C2 on the Slate River, August 2026

3.1.32 Site G1 - Killinagh Upper Stream, Allenwood South

Three-spined stickleback (*n*=6) was the only fish species recorded via electro-fishing at Site G1 on the Killinagh Upper Stream (14K17), a tributary of the Slate River, at the R414 road and is a Proposed Grid Connection underground electrical cabling route crossing (**Figure 3.20**).

With the exception of low densities of this species, the heavily silted and vegetated channel was of very poor fisheries value and unsuitable for salmonids or lamprey species given the lack of flow and heavily silted (bed) conditions. Some low potential for European eel existed given connectivity to the downstream Slate River.

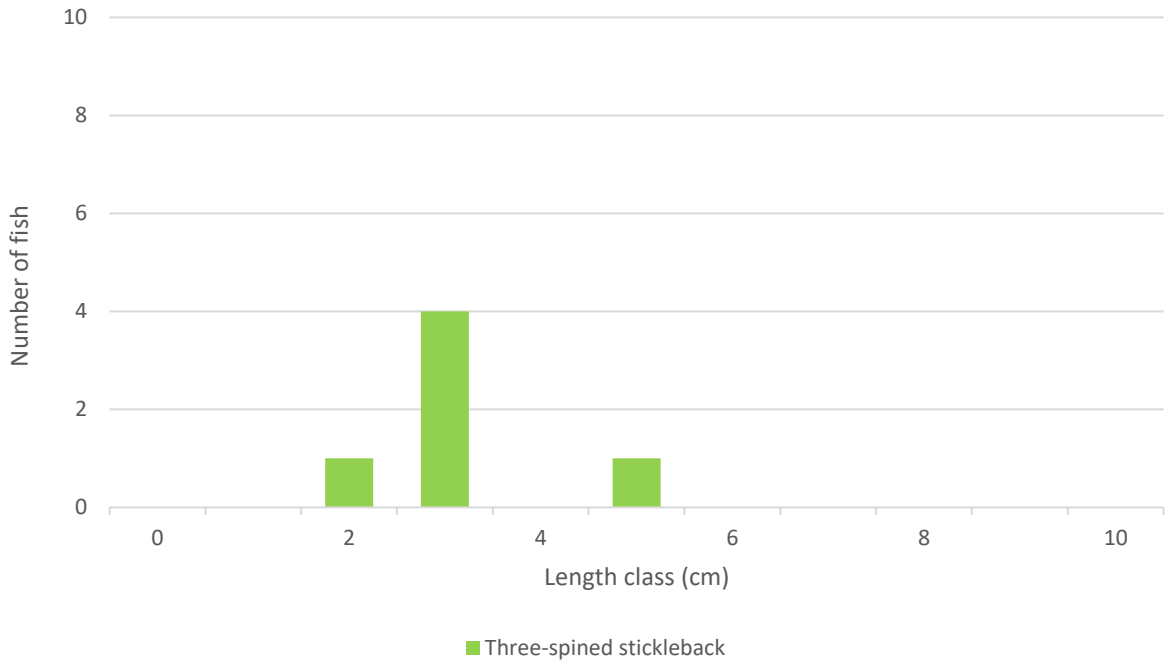


Figure 3.20 Fish length frequency distribution recorded via electro-fishing at Site G1, August 2026



Plate 3.33 Representative image of Site G1 on the Killinagh Upper Stream, August 2026

3.1.33 Site G2 - Grand Canal, Shee Bridge

Site G2 was located on the Grand Canal at a Proposed Grid Connection underground electrical cabling route crossing near Shee Bridge, Allenwood. Electro-fishing was not undertaken at Site G2 due to prohibitive water depths and lacustrine conditions. However, Site G2 was a high value coarse fish habitat (abundant nursery & spawning areas) with both roach and perch observed during the survey.

The Grand Canal is also a good quality nursery area for European eel given abundant instream refugia and prey resources (small fish and invertebrates).



Plate 3.34 Representative image of Site G2 on the Grand Canal, August 2026 (west of Shee Bridge)

3.1.34 Site G3 - Upper Ballynakill River, R403 road crossing

Three-spined stickleback (*n*=12) was the only fish species recorded via electro-fishing at Site G3 on the Upper Ballynakill River (14U09), a tributary of the Slate River, at the R403 road and Proposed Grid Connection underground electrical cabling route crossing (**Figure 3.21**).

With the exception of low densities of this species, the heavily silted and shallow channel was of poor value for salmonids or lamprey species given the shallow depths and heavily silted (bed) conditions. However, the value would improve under higher flows (e.g. in winter). Some low potential for European eel existed given connectivity to the downstream Slate River although none were recorded.

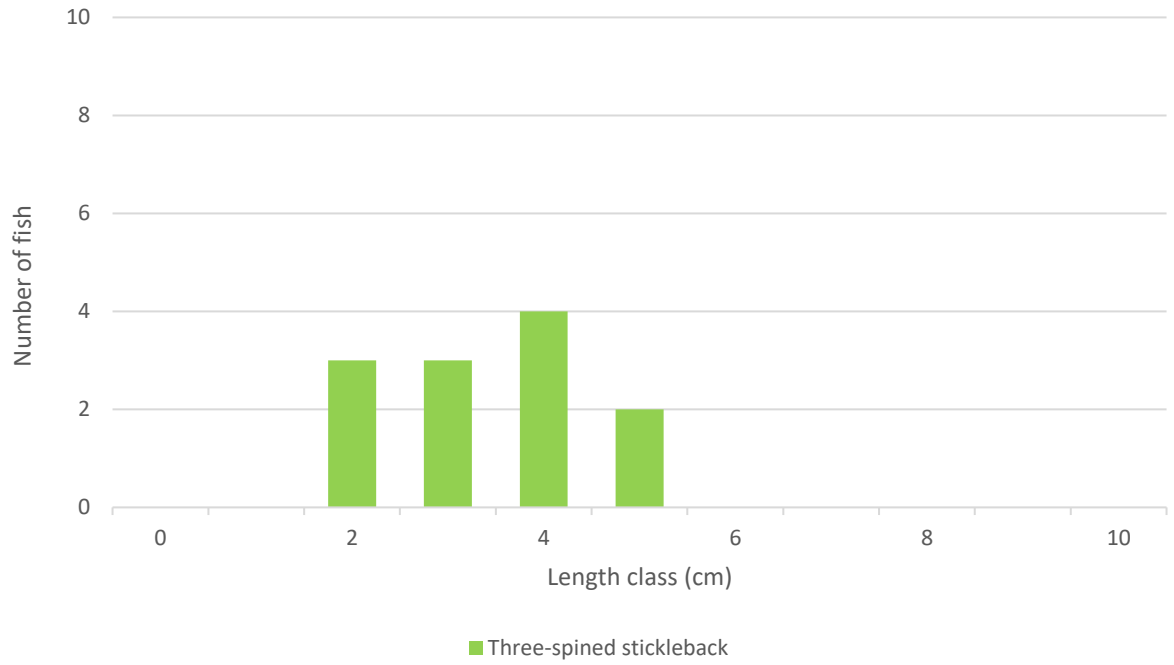


Figure 3.21 Fish length frequency distribution recorded via electro-fishing at Site G3, August 2026



Plate 3.35 Representative image of Site G3 on the Upper Ballynakill River, August 2026

3.1.35 Site G4 - Unmapped channel, R403 road crossing

Three-spined stickleback (*n*=7) was the only fish species recorded during electrofishing at the Site G4 on an unmapped channel at the R403 road and Proposed Grid Connection underground electrical cabling route crossing (**Figure 3.22**).

With the exception of low densities of this species, the shallow, slow-flowing and heavily silted channel was of poor fisheries value, with no suitability for salmonids or lamprey species. Some low suitability for European eel was present given connectivity with the downstream Slate River, although none were recorded.

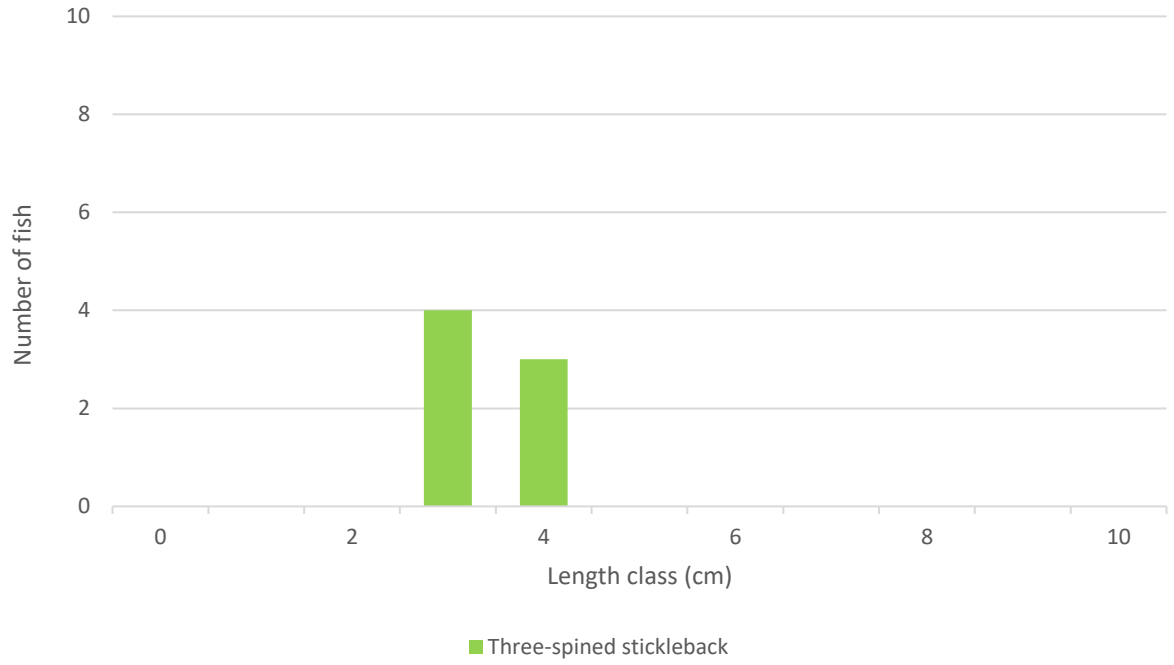


Figure 3.22 Fish length frequency distribution recorded via electro-fishing at Site G4, August 2026



Plate 3.36 Representative image of Site G4 on an unmapped channel, August 2026

3.1.36 Site G5 - Slate River, Quigley's Bridge

Brown trout (*n*=15), lamprey (*Lampetra* sp.) (*n*=19) and stone loach (*n*=8) were recorded via electro-fishing at Site G5 on the upper reaches of the Slate River (14S01) at Quigley's Bridge (R403), a Proposed Grid Connection underground electrical cabling route crossing (**Figure 3.23**).

Site G5 was of some value as a salmonid nursery and spawning area given the stoney bed and broken flow patterns, although this was compromised by siltation pressures. Good quality holding habitat for adult salmonids was present in pools and bank scours with overhanging vegetation. These areas also offered some habitat for European eel although none were recorded. Soft sediment accumulations, especially within the pool directly downstream of the bridge, supported good numbers of lamprey ammocoetes, with mixed gravels providing suitable spawning habitat.

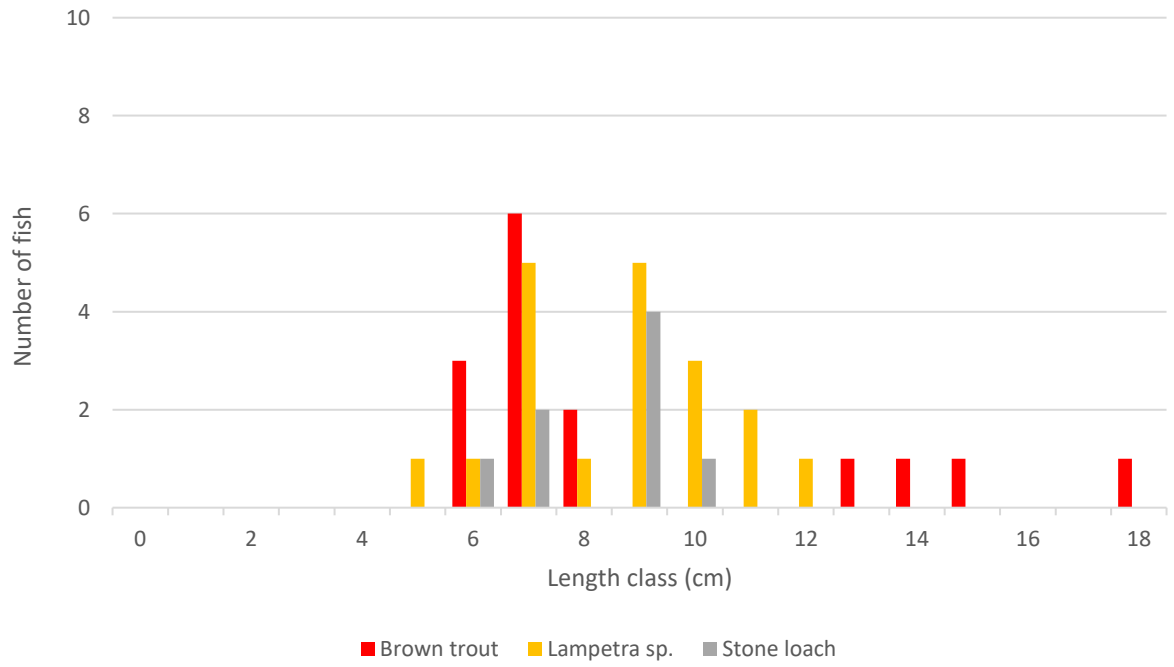


Figure 3.23 Fish length frequency distribution recorded via electro-fishing at Site G5, August 2026



Plate 3.37 Juvenile brown trout recorded at Site G5 on the Slate River at Quigley's Bridge, August 2026

3.1.37 Site G6 - Slate River, New Bridge

Site G6 was located on the uppermost reaches of the Slate River (14S01) at New Bridge (R403), a Proposed Grid Connection underground electrical cabling route crossing. Although mapped (by the EPA) as the Slate River, the main channel downstream received its current water flows from the West Coolearagh River (14W14) and not this pathway. The channel at the road crossing was dry at the time of the survey and thus not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish.



Plate 3.38 Representative image of Site G6 on the Slate River, August 2026 (dry, ephemeral channel)

3.1.38 Site G7 - Blackwood Feeder, R403 road crossing

Site G7 was located on the Blackwood Feeder of the Grand Canal at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The artificial channel was partially infilled during the 1940s and was dry at the time of survey, with no aquatic habitats present (as per previous surveys). The dry channel was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality precluded the presence of resident fish.



Plate 3.39 Representative image of Site G7 on the Blackwood Feeder of the Grand Canal, August 2026 (dry historical channel)

3.1.39 Site G8 - Slate River, R403 road crossing

Site G8 was located on the uppermost reaches of the Slate River (14S01) at a R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. Although mapped (by the EPA) as the Slate River, the main channel downstream received its current water flows from the West Coolearagh River (14W14) and not this pathway. The channel at the road crossing was dry at the time of the survey and was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish.



Plate 3.40 Representative image of Site G8 on the Slate River, August 2026 (dry historical channel)

3.1.40 Site G9 - Brockagh River, Dagwelds Cross, R403

Site G9 was located on the Brockagh River (14B73) at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The channel had likely been historically culverted underground at this location, with a shallow, dry muddy U-shaped channel of 0.5m width buried in a roadside hedgerow. Site G8 was not of fisheries value given an absence of permanent aquatic habitats.



Plate 3.41 Representative image of Site G9 on the Brockagh River, August 2026 (dry historical channel, likely culverted underground)

3.1.41 Site G10 - Unmapped channel, R403 road crossing

Site G10 was located on an unmapped channel at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. Site G10 comprised a drainage channel that was dry at the time of survey. Site G10 was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species.



Plate 3.42 Representative image of Site G10 on an unmapped channel, August 2026 (dry, ephemeral channel)

3.1.42 Site G11 - Unnamed stream, Black Stick Cross Roads, R403

Site G11 was located on an unnamed stream at the R403 road and is a Proposed Grid Connection underground electrical cabling route crossing. The channel was 1m wide and dry at the time of survey with a dry mud base. The ephemeral U-shaped channel was not of fisheries value given an absence of permanent aquatic habitats capable of supporting fish species. Known ephemerality (also dry in 2024; Triturus data) precluded the presence of resident fish.



Plate 3.43 Representative image of Site G11 on an unnamed stream, August 2026 (channel likely culverted underground)

Table 3.1 Fish species densities per m^2 recorded, August 2026 (values in **bold** represent the highest densities recorded for each species, respectively)

Site	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic salmon	Brown trout	Lampetra sp.	European eel	Minnow	Stone loach	Dace	Roach	Pike	Perch	Gudgeon	Three-spined stickleback	Ten-spined stickleback
A1	Unnamed stream	10	160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000
A2	Unnamed stream	5	80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000
A3	Codd River	n/a - dry channel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A4	Codd River	n/a - dry channel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A5	Cloncant Stream	5	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A6	Cloncant Stream	5	50	0.000	0.000	0.000	0.000	**0.140**	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000
A7	Abbeylough Stream	5	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	**0.075**
A8	Figile River	10	250	0.000	0.060	0.000	0.004	0.008	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A9	Unnamed stream	5	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.000
A10a	Lullybeg Stream	5	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.000
A10b	Lullymore East River	5	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.000
A10c	Lullybeg Stream	5	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.000
A11a	Lullymore East River	5	90	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000
A11b	Lullymore East River	10	100	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A12a	Lullybeg Stream	n/a - too deep for electro-fishing		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A12b	Lullybeg Stream	n/a - too deep for electro-fishing		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A13a	Clonbrown River	n/a - too deep for electro-fishing		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Site	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic salmon	Brown trout	Lampetra sp.	European eel	Minnow	Stone loach	Dace	Roach	Pike	Perch	Gudgeon	Three-spined stickleback	Ten-spined stickleback
A13b	Clonbrown River	5	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.040
A13c	Clonbrown River	5	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.000
A13d	Clonbrown River	n/a - too deep for electro-fishing		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A14a	Figile River	10	250	0.000	0.000	0.000	0.000	0.016	0.004	0.008	0.000	0.008	**0.016**	0.000	0.000	0.000
A14b	Figile River	n/a - too deep for electro-fishing		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A15a	Figile River	5	75	0.000	0.000	0.000	**0.173**	0.027	**0.067**	0.013	0.000	0.013	0.000	0.000	0.000	0.000
A15b	Ballykilleen Stream	n/a - dry channel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A16	Clonbulloge River	n/a - dry channel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A17	Ballygarrett River	n/a - dry channel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
A18	Figile River	10	300	**0.010**	0.000	0.000	0.007	0.137	0.067	**0.083**	**0.007**	**0.020**	0.000	**0.007**	0.000	0.000
B1	Clonkeen Stream	5	20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000
B2	River Boyne	10	180	0.000	0.011	**11 per m^2**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000
C1	Drumsru Stream	5	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
C2	Slate River	10	350	0.000	0.020	0.000	0.003	0.009	0.037	0.000	0.000	0.000	0.000	0.000	0.003	0.000
G1	Killinagh Upper Stream	5	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.000
G2	Grand Canal	n/a - fisheries appraisal		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G3	Upper Ballynakill River	5	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.300**	0.000
G4	Unmapped channel	5	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.280	0.000
G5	Slate River	10	150	0.000	**0.100**	9.5 per m^2	0.000	0.000	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Site	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic salmon	Brown trout	Lampetra sp.	European eel	Minnow	Stone loach	Dace	Roach	Pike	Perch	Gudgeon	Three-spined stickleback	Ten-spined stickleback
G6	Slate River	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G7	Blackwood Feeder	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G8	Slate River	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G9	Brockagh River	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G10	Unmapped channel	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
G11	Unnamed stream	n/a - dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 3.2 Relative abundance of fish species of higher conservation value recorded via **electro-fishing** in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection , August 2026 (blank cell = none recorded)

Site	Watercourse	Atlantic salmon	Brown trout	Lamprey (*Lampetra* sp.)	European eel	Other species
A1	Unnamed stream					Three-spined stickleback
A2	Unnamed stream					Three-spined stickleback
A3	Codd River	No fish recorded – dry channel				
A4	Codd River	No fish recorded - dry channel				
A5	Cloncant Stream	No fish recorded				
A6	Cloncant Stream					Three-spined stickleback, minnow
A7	Abbeylough Stream					Three-spined stickleback, ten-spined stickleback
A8	Figile River		Medium		Low	Minnow, stone loach
A9	Unnamed stream					Three-spined stickleback
A10a	Lullybeg Stream					Three-spined stickleback
A10b	Lullymore East River					Three-spined stickleback
A10c	Lullybeg Stream					Three-spined stickleback
A11a	Lullymore East River					Three-spined stickleback, minnow
A11b	Lullymore East River				Low	
A12a	Lullybeg Stream	n/a – too deep for electro-fishing				
A12b	Lullybeg Stream	n/a – too deep for electro-fishing				
A13a	Clonbrown River	No fish recorded				
A13b	Clonbrown River					Three-spined stickleback, ten-spined stickleback
A13c	Clonbrown River					Three-spined stickleback
A13d	Clonbrown River	n/a - too deep for electro-fishing				
A14a	Figile River					Dace, perch, pike, minnow, stone loach
A14b	Figile River	n/a - too deep for electro-fishing				
A15a	Figile River				Medium	Minnow, dace, pike, stone loach
A15b	Ballykilleen Stream	No fish recorded - dry channel				
A16	Clonbulloge River	No fish recorded - dry channel				
A17	Ballygarrett River	No fish recorded - dry channel				
A18	Figile River	Low			Low	Minnow, dace, gudgeon, pike, stone loach, roach
B1	Clonkeen Stream					Three-spined stickleback
B2	River Boyne		Low	High		Three-spined stickleback

Site	Watercourse	Atlantic salmon	Brown trout	Lamprey (*Lampetra* sp.)	European eel	Other species
C1	Drumsru Stream	No fish recorded				
C2	Slate River		Low		Low	Minnow, three-spined stickleback, stone loach
G1	Killinagh Upper Stream					Three-spined stickleback
G2	Grand Canal	n/a - fisheries appraisal only				
G3	Upper Ballynakill River					Three-spined stickleback
G4	Unmapped channel					Three-spined stickleback
G5	Slate River		Medium	Medium		Stone loach
G6	Slate River	No fish recorded - dry channel				
G7	Blackwood Feeder	No fish recorded - dry channel				
G8	Slate River	No fish recorded - dry channel				
G9	Brockagh River	No fish recorded - dry channel				
G10	Unmapped channel	No fish recorded - dry channel				
G11	Unnamed stream	No fish recorded - dry channel				

Conservation value: Atlantic salmon (*Salmo salar*) and lamprey (*Lampetra* spp.) are listed under Annex II and Annex V of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). Atlantic salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations and are 'Vulnerable' in Ireland (King et al., 2011). With the exception of the Inland Fisheries Acts 1959 to 2017, brown trout and coarse fish species have no legal protection in Ireland. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

Table 3.3 Comparison of fish species recorded via electro-fishing in 2024 and 2026 at locations in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection

		Fish species recorded	
Site no.	Watercourse	July-August 2024	August 2026
A1	Unnamed stream	Three-spined stickleback	Three-spined stickleback
A2	Unnamed stream	Three-spined stickleback	Three-spined stickleback
A3	Codd River	No fish recorded	No fish recorded
A4	Codd River	No fish recorded - dry channel	No fish recorded - dry channel
A5	Cloncant Stream	Not previously surveyed	No fish recorded
A6	Cloncant Stream	No fish recorded	Three-spined stickleback, minnow
A7	Abbeylough Stream	Three-spined stickleback	Three-spined stickleback, ten-spined stickleback
A8	Figile River	Brown trout, three-spined stickleback	Brown trout, European eel, minnow, stone loach
A9	Unnamed stream	No fish recorded	Three-spined stickleback
A10a	Lullybeg Stream	Not previously surveyed	Three-spined stickleback
A10b	Lullymore East River	Not previously surveyed	Three-spined stickleback
A10c	Lullybeg Stream	Not previously surveyed	Three-spined stickleback
A11a	Lullymore East River	Not previously surveyed	Three-spined stickleback, minnow
A11b	Lullymore East River	Brown trout, European eel, three-spined stickleback	European eel
A12a	Lullybeg Stream	Not previously surveyed	Too deep for electro-fishing
A12b	Lullybeg Stream	Not previously surveyed	Too deep for electro-fishing
A13a	Clonbrown River	Not previously surveyed	No fish recorded
A13b	Clonbrown River	Not previously surveyed	Three-spined stickleback, ten-spined stickleback
A13c	Clonbrown River	Not previously surveyed	Three-spined stickleback
A13d	Clonbrown River	Too deep for electro-fishing	Too deep for electro-fishing
A14a	Figile River	Brown trout, minnow, perch, pike, roach, stone loach	Dace, perch, pike, minnow, stone loach
A14b	Figile River	Not previously surveyed	Too deep for electro-fishing
A15a	Figile River	Not previously surveyed	European eel, minnow, dace, pike, stone loach
A15b	Ballykilleen Stream	No fish recorded - dry channel	No fish recorded - dry channel
A16	Clonbulloge River	No fish recorded - dry channel	No fish recorded - dry channel
A17	Ballygarrett River	No fish recorded - semi-dry channel	No fish recorded - dry channel
A18	Figile River	Atlantic salmon, brown trout, minnow, dace, gudgeon, pike, stone loach	Atlantic salmon, European eel, minnow, dace, gudgeon, pike, stone loach, roach
B1	Clonkeen Stream	Three-spined stickleback	Three-spined stickleback
B2	River Boyne	Brown trout, lamprey (*Lampetra* sp.), European eel	Brown trout, lamprey (*Lampetra* sp.), three-spined stickleback
C1	Drumsru Stream	No fish recorded	No fish recorded
C2	Slate River	Atlantic salmon, brown trout, stone loach, dace, minnow	Brown trout, European eel, minnow, three-spined stickleback, stone loach
G1	Killinagh Upper Stream	Three-spined stickleback	Three-spined stickleback
G2	Grand Canal	Fisheries appraisal only	Fisheries appraisal only

Site no.	Watercourse	Fish species recorded	
		July-August 2024	August 2026
G3	Upper Ballynakill River	Three-spined stickleback	Three-spined stickleback
G4	Unmapped channel	Not previously surveyed	Three-spined stickleback
G5	Slate River	Brown trout	Brown trout, lamprey (*Lampetra* sp.), stone loach
G6	Slate River	No fish recorded - dry channel	No fish recorded - dry channel
G7	Blackwood Feeder	No fish recorded - dry channel	No fish recorded - dry channel
G8	Slate River	No fish recorded - dry channel	No fish recorded - dry channel
G9	Brockagh River	No fish recorded - dry channel	No fish recorded - dry channel
G10	Unmapped channel	Not previously surveyed	No fish recorded - dry channel
G11	Unnamed stream	No fish recorded - dry channel	No fish recorded - dry channel

4. Discussion

4.1 Pressures on fisheries habitat

The watercourses surveyed in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection were lowland channels which had almost universally been historically straightened and or deepened. Historical drainage pressures and peat escapement (siltation) had significantly reduced the quality of fisheries habitats on the majority of surveyed watercourses. Historical straightening and deepening of watercourses damages habitat and hydromorphological heterogeneity, encourages sediment deposition and invariably results in an irreparable reduction in fisheries potential, particularly for salmonids and lamprey (O'Grady et al., 2017, O'Grady, 2006).

Low summer flows further affected the quality of fisheries habitats. Water levels during the survey period were especially low following drought conditions in the summer of 2026, with July being the driest on the contemporary record and rainfall in August being well below the long term average (Met Éireann, 2026a, 2026b). This had resulted in reduced flows and water levels across the survey area, with a total of 10 no. sites dry at the time of survey in August 2026 (compared with 6 no. sites in the 2024 survey). Intermittent flows result in degraded fisheries habitat, particularly due to high thermal stress (O'Briain et al., 2020, 2019, 2017) but also deoxygenation pressures. In light of the above, many sites were of low fisheries value with 17 no. (wetted) sites supporting either no fish or ubiquitous stickleback species only (**Table 3.2**). Nevertheless, several fish species of high conservation value were recorded in the survey area.

4.2 Fish species & distributions

A typical diversity of fish species for the upper Barrow and Boyne catchments was recorded during the electro-fishing survey, with Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel, stone loach, minnow, gudgeon, pike, perch, ten-spined stickleback and three-spined stickleback captured, alongside invasive roach and dace (**Table 3.1, 3.2**). The same fish assemblage was recorded in the previous 2024 surveys (**Table 3.3**).

4.2.1 Salmonids

In keeping with previous data, salmonid populations were highly restricted in their distribution, with low to medium densities of brown trout being recorded from a total of 4 no. sites on the Figile River (A8), River Boyne (B2) and the Slate River (C2, G5) (**Table 3.2**). Annex II Atlantic salmon were only recorded from Site A18 on the Figile River at Millgrove Bridge although the species is also known from the Slate River (e.g. Triturus, 2024). Indeed, salmon were detected through eDNA sampling of the Slate River at Site C2 as well as the River Boyne at Site B2 (**Appendix C**). Salmonid populations were invariably dominated by adult year classes with low abundances present. Siltation and eutrophication pressures were significant throughout much of the survey area and were evidently contributing to a reduction in the quality of fisheries habitat. Spawning and nursery habitat was especially limited on the survey watercourses. Although supporting the most significant salmonid populations in the survey area, both the Figile and Slate rivers have been identified among the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

4.2.2 Lamprey

Lamprey ammocoetes (*Lampetra* sp.) were only recorded Site B2 on the River Boyne (Kishawanny Bridge) and Site G5 on the Slate River (Quigley's Bridge), in high (11 per m^2) and medium (9 per m^2) densities, respectively. *Lampetra* sp. eDNA was also detected at Sites A15a and A18 on the Figile as well as Site C2 on the Slate River (**Appendix C**), confirming their presence at and or upstream of these sampling points. A similarly limited distribution of lamprey has been recorded in the survey area previously (Triturus, 2024, 2021), reflecting the generally poor quality of lamprey habitat. Given the location of the survey sites in the upper Barrow and Boyne catchments, and frequent impassable instream barriers, any lamprey recorded would be brook lamprey (*Lampetra planeri*) (*Lampetra* speciation of juvenile life stages is not reliable in the field).

Owing to their relatively small morphologies, *Lampetra* species such as brook lamprey require clean, fine gravels in which to dig their redds (Dawson et al., 2015; Rooney et al., 2013; Lasne et al., 2010; Kelly & King, 2001) although areas may also include fractions of sand, larger gravels, and cobble (Nika & Virbickas, 2010). Spawning habitat in the vicinity of the Proposed Wind Farm site and Proposed Grid Connection was sparse and of poor quality due to significant (peat) siltation pressures (as outlined above). Furthermore, lamprey ammocoetes require the deposition of fine, organic-rich sediment ≥5cm in depth in which to burrow and mature (Aronsuu & Virkkala, 2014; Goodwin et al., 2008; Gardiner, 2003). Peat-dominated substrata (i.e., humic deposits), such as those typically found in the vicinity of the Proposed Wind Farm site , do not provide suitable burial/burrowing habitat complexity or structure for ammocoetes given their invariably fine and flocculent nature (pers. obs.).

4.2.3 European eel

European eel are 'critically endangered' in Ireland (King et al., 2011) and on a global scale (Pike et al., 2020). As observed previously, eel were also restricted in their distribution, although more widespread than the 2024 surveys. Eel were recorded from 5 no. sites on the Figile River (Sites A8, A15a, A18), Lullymore East River (A11b) and the Slate River (C2) (**Table 3.1, 3.2**), although suitability was noted elsewhere including on sites too deep for backpack electro-fishing (e.g. Grand Canal, Lullybeg Stream, Clonbrown River). Better quality eel habitat was generally confined to the larger watercourses with higher flow rates and superior habitat heterogeneity/recovery, as well as the Grand Canal. Similar to salmonids, European eel habitat is also degraded by arterial drainage by virtue of a reduction or removal of instream refugia required by the species (Laffaille et al., 2003) and more optimal areas of channel (e.g. boulder zones) were highly localised in vicinity of the Proposed Wind Farm site. This was exemplified by the high density of eel recorded on the Figile River at Site A15a, where installed boulders/gravels were present (i.e. very rare habitat in the watercourse).

Eel penetration into the upper Barrow and Boyne catchments is invariably low, primarily due to a high number of aforementioned instream barriers and the large distances between the survey area and marine habitats which restricts their distribution (Matondo et al., 2021; Degerman et al., 2019; Chadwick et al., 2007).

4.2.4 Other species

In keeping with available data, invasive roach (*Rutilus rutilus*) (Site A18) and dace (*Leuciscus leuciscus*) (Sites A14a, A15a and A18) were recorded from the Figile River. Whilst roach have been present in the

wider Barrow catchment since the 1980s (Brazier, 2018), dace have colonised the Barrow catchment more recently, since the early 1990s (Caffrey et al., 2007). Roach and dace are also known from the Grand Canal (pers. obs.). Although both species are well established in Ireland, these fish are listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011) and subject to Regulations 49 and 50 throughout the State.

As outlined above, salmonid numbers were typically very low in the survey area. The broad shift from salmonid populations to fish communities dominated by pollution- and silt-tolerant cyprinid species (including minnow & stone loach) would be expected in light of significant biological water quality pressures in the survey area (Kelly et al., 2007), in addition to historical drainage and hydromorphological modifications.



Plate 4.1 The Figile River at Millgrove Bridge (Site A18) was one of the better sites for salmonids in the survey area but featured a very high cover of filamentous algae and high siltation, significantly damaging nursery and spawning habitat

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8. Appendix B – eDNA lab report

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Contact:	Triturus Environmental Ltd
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eDNA Report

Technical Report

SureScreen Scientifics

Triturus

Folio No: 4280-2026
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SureScreen Scientifics

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK3907	Site A15a - Figile River - Ballydermot		Atlantic salmon (Salmo salar)	Pass	Positive	1
			Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
			Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
			White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0
FK26 0833	Site A18 - Figile River - Ballydermot		Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
			Freshwater pearl mussel (Margaritifera	Pass	Negative	0

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		margaritifera)			
		White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0
FK4027	Site B2 - River Boyne - Ballydermot	Atlantic salmon (Salmo salar)	Pass	Positive	3
		Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
		White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0
FK26 0825	Site C2 - Slate River	Atlantic salmon (Salmo salar)	Pass	Positive	1
		Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
		Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
		White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0

Matters affecting result: none

Reported by:Vanessa Hind

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Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check: Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

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9. Appendix C – Macro-invertebrates & biological water quality

Table 9.1 Macro-invertebrate Q-sampling results for riverine sites A1-A13a, August 2026

Group	Family	Species	A1	A2	A5	A6	A7	A8	A9	A10a	A10b	A10c	A11a	A11b	A12a	A12b	A13a	EPA group
Ephemeroptera	Baetidae	*Alainites muticus*				3		6							1			**B**
Trichoptera	Beraeidae	*Beraeodes minutus*													1			**B**
Trichoptera	Goeridae	*Silo pallipes*						1										**B**
Trichoptera	Limnephilidae	*Limnephilus lunatus*	1										4					**B**
Trichoptera	Limnephilidae	sp. indet.							4									**B**
Trichoptera	Sericostomatidae	*Sericostoma personatum*							6				6					**B**
Odonata	Calopterygidae	*Calopteryx splendens*				4								1				**B**
Odonata	Coenagrionidae	sp. indet.	2	3							2	5		1	18	10		**B**
Odonata	Libellulidae	*Sympetrum* sp.															6	**B**
Ephemeroptera	Baetidae	*Baetis rhodani*						17										**C**
Ephemeroptera	Ephemerellidae	*Serratella ignita*						16										**C**
Ephemeroptera	Baetidae	*Cloeon simile*														1		**C**
Ephemeroptera	Caenidae	*Caenis horaria*													2			**C**
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*				2		28			21							**C**
Coleoptera	Dytiscidae	Dytiscidae larva							2	3				1				**C**
Coleoptera	Dytiscidae	*Hydroporus angustatus*														2		**C**
Coleoptera	Dytiscidae	*Hyphydrus ovatus*												1				**C**
Coleoptera	Dytiscidae	*Ilybius fuliginosus*	1		1	1				1		1						**C**
Coleoptera	Dytiscidae	*Nebrioporus depressus*						1										**C**
Coleoptera	Dytiscidae	*Stictotarsus duodecimpustulatus*										1						**C**
Coleoptera	Elmidae	*Elmis aenea*				10		3			15		19					**C**
Coleoptera	Elmidae	*Limnius volckmari*				1							1					**C**
Coleoptera	Gyrinidae	*Gyrinus substriatus*	1	1														**C**
Coleoptera	Gyrinidae	*Orectochilus villosus*				1		1										**C**
Coleoptera	Gyrinidae	sp. indet.										3						**C**

Group	Family	Species	A1	A2	A5	A6	A7	A8	A9	A10a	A10b	A10c	A11a	A11b	A12a	A12b	A13a	EPA group
Coleoptera	Halipliidae	*Brychius elevatus*							3									**C**
Coleoptera	Halipliidae	*Haliplus ruficollis*		1	2											3		**C**
Coleoptera	Halipliidae	*Haliplus* sp.							1						4			**C**
Coleoptera	Halipliidae	sp. indet.							1									**C**
Coleoptera	Hydrophilidae	*Anacaena globulus*			1													**C**
Coleoptera	Hydrophilidae	*Laccobius minutus*			1											1		**C**
Crustacea	Gammaridae	*Gammarus duebeni*			4	3	3	42	12		5		20	5	1			**C**
Diptera	Simuliidae	sp. indet.				2		20										**C**
Diptera	Chironomidae	Non-*Chironomus* spp.		3			1		5			2						**C**
Gastropoda	Bithnyiidae	*Bithynia tentaculata*	3				6					1						**C**
Gastropoda	Lymnaeidae	*Lymnaea stagnalis*				2						3			2			**C**
Gastropoda	Planorbidae	*Bathyomphalus contortus*	1		1													**C**
Gastropoda	Planorbidae	*Planorbarius corneus*									4							**C**
Gastropoda	Planorbidae	*Planorbis planorbis*	1	2	1						1			8		3		**C**
Hemiptera	Corixidae	*Hesperocorixa linnaei*					2											**C**
Hemiptera	Corixidae	*Hesperocorixa sahlbergi*										4		1				**C**
Hemiptera	Corixidae	*Sigara* sp.												1				**C**
Hemiptera	Corixidae	sp. indet.		1												1		**C**
Hemiptera	Gerridae	sp. indet.	5	1	1	1	1	3	1									**C**
Hemiptera	Hydrometridae	*Hydrometra stagnorum*			1		1											**C**
Hemiptera	Nepidae	*Nepa cinerea*										4						**C**
Hemiptera	Nepidae	*Ranatra linearis*													2			**C**
Hemiptera	Notonectidae	*Notonecta viridis*										2				2		**C**
Hemiptera	Veliidae	*Velia caprai*							4									**C**
Hirudinidae	Piscicolidae	sp. indet.				1	1											**C**
Crustacea	Asellidae	*Asellus aquaticus*	2	1		5	20	3	4	89	19	6	15	39	1	9	4	**D**
Crustacea	Crangonyctidae	*Crangonyx* sp.								5				7				**D**

Group	Family	Species	A1	A2	A5	A6	A7	A8	A9	A10a	A10b	A10c	A11a	A11b	A12a	A12b	A13a	EPA group
Gastropoda	Lymnaeidae	*Ampullacaena balthica*		2										1			1	**D**
Hirudinidae	Glossiphoniidae	sp. indet.					13											**D**
Megaloptera	Sialidae	*Sialis lutaria*		6													1	**D**
Mollusca	Sphaeriidae	sp. indet.	1	5					4			3			2	2		**D**
Diptera	Chironomidae	*Chironomus* spp.	1	1					6			3			3	4	1	**E**
Gastropoda	Tateidae	*Potamopyrgus antipodarum*									3		10	2				**n/a**
Abundance			**19**	**27**	**13**	**36**	**48**	**141**	**53**	**98**	**70**	**38**	**75**	**68**	**37**	**38**	**13**	
Q-rating			Q3*	Q3	Q3*	Q3	Q2-3*	Q3	Q3*	Q2*	Q3	Q3*	Q3*	Q2-3*	Q3*	Q3*	Q2-3*	
WFD status			Poor	Poor	Poor	Poor	Poor	Poor	Poor	Bad	Poor	Poor	Poor	Poor	Poor	Poor	Poor	

* tentative Q-rating given the absence of suitable riffle areas for sampling (Toner et al., 2005)

Table 9.2 Macro-invertebrate Q-sampling results for riverine sites A13a-G5, August 2026

Group	Family	Species	A13b	A13c	A13d	A14a	A14b	A15a	A18	B1	B2	C1	C2	G1	G3	G4	G5	EPA group
Ephemeroptera	Baetidae	*Alainites muticus*				3		2							1			**B**
Trichoptera	Limnephilidae	*Halesus radiatus*				1												**B**
Trichoptera	Limnephilidae	*Limnephilus lunatus*														1		**B**
Trichoptera	Limnephilidae	sp. indet.					1										1	**B**
Trichoptera	Sericostomatidae	*Sericostoma personatum*															11	**B**
Hemiptera	Aphelocheiridae	*Aphelocheirus aestivalis*				5			4									**B**
Odonata	Aeshnidae	sp. indet.		1														**B**
Odonata	Calopterygidae	*Calopteryx splendens*				3		1	2				4					**B**
Odonata	Coenagrionidae	sp. indet.	1		12			1		2			1					**B**
Ephemeroptera	Baetidae	*Baetis rhodani*			7	30		6	14				5		23			**C**
Ephemeroptera	Ephemerellidae	*Serratella ignita*				5	3		1				8		3		1	**C**
Ephemeroptera	Baetidae	*Centroptilum luteolum*						6										**C**
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*			1	22			11				24					**C**
Trichoptera	Polycentropodidae	*Polycentropus kingi*				1		5	3									**C**
Coleoptera	Dytiscidae	Dytiscidae larva	1		1													**C**
Coleoptera	Dytiscidae	*Graptodytes pictus*					1											**C**
Coleoptera	Dytiscidae	*Hydroporus tessellatus*								1								**C**
Coleoptera	Dytiscidae	*Ilybius fuliginosus*	1		1						2							**C**
Coleoptera	Dytiscidae	*Nebrioporus depressus*									1							**C**
Coleoptera	Dytiscidae	*Rhantus grapii*										1						**C**
Coleoptera	Dytiscidae	*Stictotarsus duodecimpustulatus*						1										**C**
Coleoptera	Elmidae	*Elmis aenea*				1	1	3			6		1		14			**C**
Coleoptera	Elmidae	*Limnius volckmari*													3			**C**
Coleoptera	Gyrinidae	*Gyrinus substriatus*									1			1	1	1		**C**
Coleoptera	Gyrinidae	*Orectochilus villosus*				1		1										**C**

Group	Family	Species	A13b	A13c	A13d	A14a	A14b	A15a	A18	B1	B2	C1	C2	G1	G3	G4	G5	EPA group
Coleoptera	Gyrinidae	sp. indet.				1	1	2										C
Coleoptera	Halipliidae	*Brychius elevatus*								1	3							C
Coleoptera	Halipliidae	*Haliplus lineatocollis*								1								C
Coleoptera	Halipliidae	sp. indet.								1								C
Coleoptera	Hydraenidae	*Hydraena gracilis*					1											C
Coleoptera	Hydrophilidae	*Anacaena lutescens*										1						C
Coleoptera	Hydrophilidae	*Enochrus ochropterus*			1													C
Coleoptera	Hydrophilidae	*Enochrus coarctatus*			1													C
Coleoptera	Hydrophilidae	*Laccobius bipunctatus*			1													C
Crustacea	Gammaridae	*Gammarus duebeni*	11			46		2	3		3		7	13	38	21	22	C
Diptera	Simuliidae	sp. indet.			3	4			1			1			14			C
Diptera	Chironomidae	Non-*Chironomus* spp.					2							1	1		1	C
Gastropoda	Bithnyiidae	*Bithynia tentaculata*							1	2	1						1	C
Gastropoda	Lymnaeidae	*Lymnaea stagnalis*	1	1	1		4	1	5		1		2					C
Gastropoda	Planorbidae	*Bathyomphalus contortus*										3						C
Gastropoda	Planorbidae	*Gyraulus albus*			1													C
Gastropoda	Planorbidae	*Planorbarius corneus*									1							C
Gastropoda	Planorbidae	*Planorbis planorbis*	1	3			2	4	2				3				4	C
Hemiptera	Corixidae	*Hesperocorixa linnaei*		1	1			1				1		1				C
Hemiptera	Corixidae	*Sigara* sp.		2														C
Hemiptera	Corixidae	sp. indet.						1	1	1								C
Hemiptera	Gerridae	sp. indet.				2		1	1	3		1	1		5		1	C
Hemiptera	Hydrometridae	*Hydrometra stagnorum*		1	1		1		1					2				C
Hemiptera	Nepidae	*Nepa cinerea*	1															C
Hemiptera	Nepidae	*Ranatra linearis*			1													C
Hemiptera	Notonectidae	*Notonecta viridis*			1		1					1						C
Hemiptera	Veliidae	*Velia caprai*												1				C

Group	Family	Species	A13b	A13c	A13d	A14a	A14b	A15a	A18	B1	B2	C1	C2	G1	G3	G4	G5	EPA group
Crustacea	Asellidae	*Asellus aquaticus*	14	9	3	7	29	6	7	4	19	24		5		9	10	**D**
Crustacea	Crangonyctidae	*Crangonyx* sp.							4			4						**D**
Gastropoda	Lymnaeidae	*Ampullacaena balthica*	1								2		2				1	**D**
Gastropoda	Physidae	*Physa fontinalis*							1				1					**D**
Hirudinidae	Erpobdellidae	sp. indet.							1						1			**D**
Hirudinidae	Glossiphoniidae	sp. indet.													1	1	1	**D**
Megaloptera	Sialidae	*Sialis lutaria*		1				1							3			**D**
Mollusca	Sphaeriidae	sp. indet.	5	1							4	1					2	**D**
Diptera	Chironomidae	*Chironomus* spp.	6		4		1	1		8		1		1	3		1	**E**
Gastropoda	Tateidae	*Potamopyrgus antipodarum*								2					8		1	**n/a**
Abundance			**43**	**20**	**41**	**132**	**48**	**46**	**63**	**26**	**44**	**39**	**59**	**25**	**119**	**33**	**58**	
Q-rating			Q2-3*	Q2-3	Q3*	Q3	Q2-3*	Q3*	Q3	Q3*	Q2-3*	Q2-3*	Q3	Q3*	Q3	Q3	Q3	
WFD status			Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	

* tentative Q-rating given the absence of suitable riffle areas for sampling (Toner et al., 2005)

Table 9.3 Macro-invertebrate community recorded at canal site G2, August 2026

Group	Family	Species	G2
Odonata	Coenagrionidae	sp. indet.	11
Mollusca	Unionidae	*Anodonta anatina*[1]	5
Gastropoda	Neritidae	*Theodoxus fluviatilis*	4
Gastropoda	Lymnaeidae	*Lymnaea stagnalis*	4
Ephemeroptera	Baetidae	*Cloeon simile*	3
Arachnida	Hydrachnidiae	sp. indet.	3
Gastropoda	Planorbidae	*Planorbis planorbis*	2
Gastropoda	Bithnyiidae	*Bithynia tentaculata*	2
Crustacea	Asellidae	*Asellus aquaticus*	2
Trichoptera	Leptoceridae	*Triaenodes bicolor*	1
Odonata	Aeshnidae	*Anax imperator*	1
Hemiptera	Notonectidae	*Notonecta viridis*	1
Crustacea	Crangonyctidae	*Crangonyx* sp.	1
Abundance			**40**
Taxon richness			**13**

[1] Listed as 'Vulnerable' n Ireland (Byrne et al., 2009)

10. Appendix D – 2024 aquatic baseline report

Please see the 2024 aquatic baseline report for the Proposed Project (Triturus, 2024)

Aquatic baseline report for the proposed Ballydermot Wind Farm, Co. Offaly and Co. Kildare (2024)

Prepared by Triturus Environmental Ltd. for MKO

November 2024

Please cite as:

Triturus (2024). Aquatic baseline report for the proposed Ballydermot wind farm, Co. Offaly. Report prepared by Triturus Environmental Ltd. for MKO. November 2024.

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by MKO to conduct baseline aquatic surveys to inform EIAR preparation for the proposed Ballydermot wind farm development located at Ballydermot Bog near Clonbulloge, Co. Offaly (**Figure 2.1**).

Undertaken on a catchment-wide scale, this report provides a baseline assessment of the aquatic ecology including fisheries and biological water quality, as well as protected species and habitats in the vicinity of the proposed development, inclusive of the proposed grid connection route (GCR). Aquatic surveys were undertaken in July and August 2024 and would update those previously completed by Triturus in July 2021 (Triturus, 2021).

1.2 Development description

A full description of the proposed development is provided in the Environmental Impact Assessment Report (EIAR) used to support consenting applications.

2. Methodology

2.1 Selection of watercourses for assessment

All freshwater watercourses which could be affected directly or indirectly by the proposed development and associated infrastructure were considered as part of the current assessment. This included sites in vicinity of the site boundary and watercourses crossed by the proposed grid cable route. Thus, a total of *n*=31 sites were selected for detailed aquatic assessment (see **Table 2.1, Figure 2.1** below). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) mapping.

Survey sites were present on the Codd River (EPA code: 14C44) and two unnamed tributaries, Cloncant Stream (14C41), Abbeylough Stream (14A01), Figile River (14F01), Lullybeg Stream (14L13), Lullymore East River (14L11) and an unnamed tributary (14C32), Clonbulloge River (14C53), Ballygarrett River (14B30), Clonkeen Stream (07C36), River Boyne (07B04), Drumsru Stream (14D19), Slate River (14S01) and an unnamed tributary, Killinagh Upper Stream (14K17), Upper Ballynakill River (14U01), Brockagh River (14B73) and the Blackwood Feeder line and main line of the Grand Canal (**Table 2.1**).

None of the survey sites were located within European sites. However, a single site (A4) on the Codd River was contiguous with the boundary of The Long Derries, Edenderry SAC (000925), a site designated for calcareous grassland (NPWS, 2021). There was potential downstream hydrological connectivity (via several watercourses) with the River Barrow and River Nore SAC (002162), Ballynafagh Lake SAC (001387), Ballynafagh Bog SAC (000391), Pollardstown Fen SAC (000396) and Mouds Bog SAC (002231).

Please note this aquatic report should be read in conjunction with the final Environmental Impact Assessment Report (EIAR) prepared for the proposed development. More specific aquatic methodology is outlined below and in the appendices of this report.

2.2 Aquatic site surveys

Aquatic surveys were conducted on the 31st July and between the 1st-3rd August 2024. Survey effort focused on both instream and riparian habitats at each aquatic sampling location and included a fisheries assessment (electro-fishing and or fisheries habitat appraisal), white-clawed crayfish survey, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling) or macro-invertebrate sweep sampling (where applicable) (**Figure 2.1**). This holistic approach informed the overall aquatic ecological evaluation of each site/watercourse in context of the proposed development and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

In addition to the ecological characteristics of the site, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form) including associated evidence of historical drainage
- Substrate type and relative condition, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition and bordering land use practices

Table 2.1 Location of *n*=31 aquatic survey sites in the vicinity of the proposed Ballydermot wind farm, Co. Offaly

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A1	Unnamed stream	n/a	Derries	665752	729939
A2	Unnamed stream	n/a	Derries	666710	729706
A3	Codd River	14C44	Derries	666119	729187
A4	Codd River	14C44	Codd	664647	728006
A5	Cloncant Stream	14C41	Derries	666402	729057
A6	Cloncant Stream	14C41	Cushaling	663787	727511
A7	Abbeylough Stream	14A01	Kilpatrick	670827	728735
A8	Figile River	14F01	Ticknevin	666719	727796
A9	Unnamed stream	n/a	Lullybeg	667604	725885
A10	Lullybeg Stream	14L13	Lullybeg	667108	724788
A11	Lullymore East River	14L11	Lullybeg	666815	725833
A12	Lullybeg Stream	14L33	Cushaling	665668	725039
A13	Clonbrown River	14C32	Cushaling	665055	725590
A14	Figile River	14F01	Cushaling Bridge	665011	725882
A15	Figile River	14F01	Kilcumber Bridge	661004	726833
A16	Clonbulloge River	14C53	Clonmel	661405	723666
A17	Ballygarrett River	14B30	Clonmel	662374	723087
A18	Figile River	14F01	Millgrove Bridge	659896	719047
B1	Clonkeen Stream	07C36	Cloncanon	665410	731179
B2	River Boyne	07B04	Kishawanny Bridge	664528	733464
C1	Drumsru Stream	14D19	Barnaran	670840	724189
C2	Slate River	14S01	Agar Bridge	670272	721700
D1	Killinagh Upper Stream	14K17	Allenwood South	673402	726368
D2	Grand Canal	n/a	Shee Bridge	674633	726464
D3	Upper Ballynakill River	14U01	Derrymullen	676233	726584
D4	Slate River	14S01	Quigley's Bridge	678787	726784
D5	Slate River	14S01	New Bridge	679415	726846
D6	Blackwood Feeder (Grand Canal)	n/a	R403 road crossing	679608	726864
D7	Slate River	14S01	Graigues	679608	726864
D8	Brockagh River	14B73	Dagwelds Cross	680021	726896
D9	Unnamed stream	n/a	Black Stick Cross Roads	682652	727121

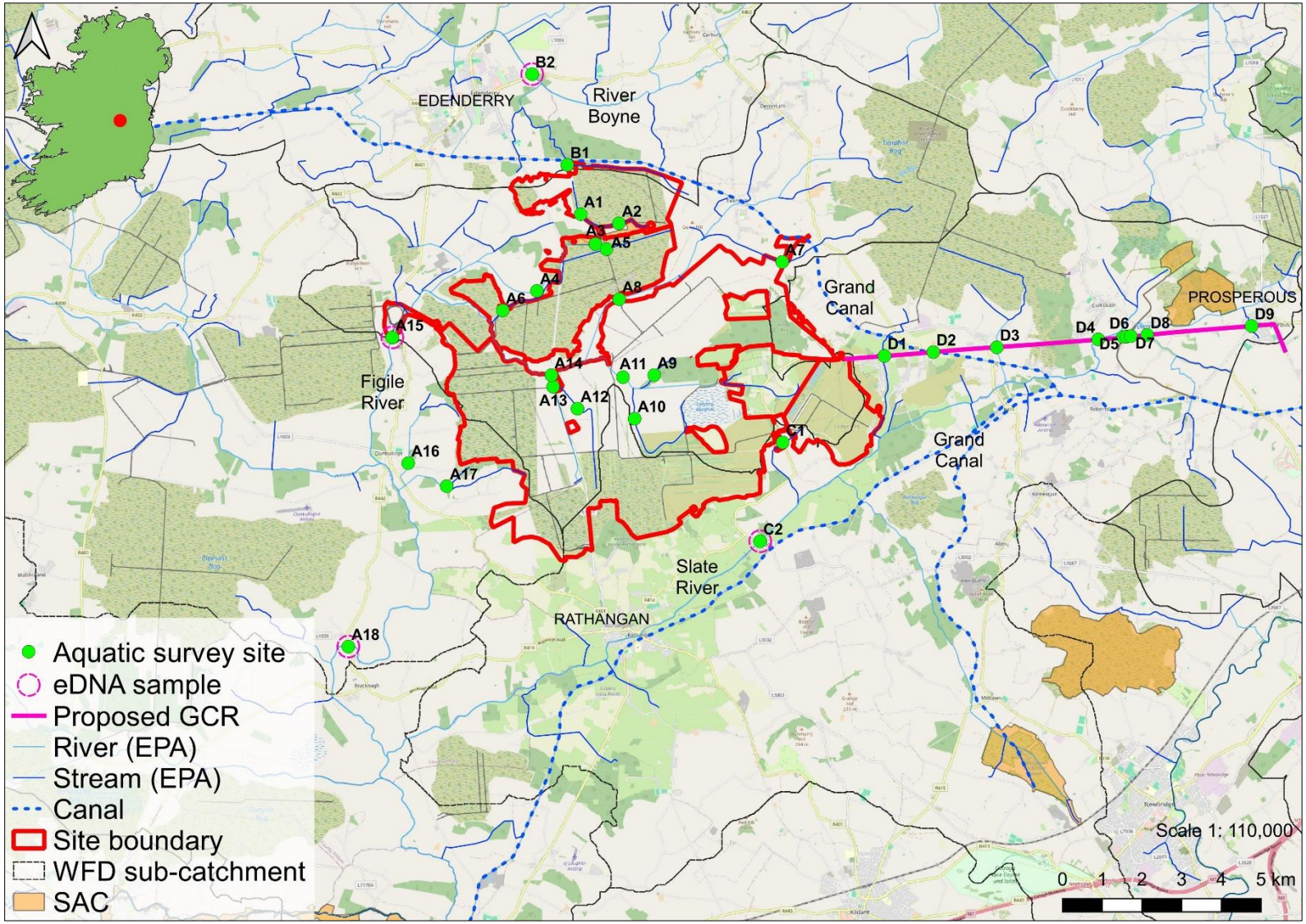


Figure 2.1 Overview of the aquatic survey sites in the vicinity of the proposed Ballydermot wind farm, Co. Offaly

2.3 Fisheries assessment & habitat appraisal

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish sites on riverine watercourses in the vicinity of the proposed development in August 2024 (**Table 2.1, Figure 2.1; Appendix** 1**A**), following notification to Inland Fisheries Ireland, under the conditions of a Department of the Environment, Climate and Communications (DECC) licence. The survey was
undertaken in accordance with best practice (CFB, 2008; CEN, 2003) and Section 14 licencing requirements.

Furthermore, a fisheries habitat appraisal of all aquatic survey sites (**Table 2.1**) was undertaken to establish their importance for salmonid, lamprey, European eel and other fish species. The baseline assessment also considered the quality of spawning, nursery and holding habitat for salmonids and lamprey within the vicinity of the survey sites. For detailed survey methodology, please refer to accompanying fisheries assessment report in **Appendix** 1**A.**

2.4 White-clawed crayfish survey

White-clawed crayfish (*Austropotamobius pallipes*) surveys were undertaken at the aquatic survey sites in July-August 2024 under a National Parks and Wildlife (NPWS) open national licence (no. C20/2024), as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture. As per Inland Fisheries Ireland aquatic biosecurity recommendations, the crayfish sampling started at the uppermost site(s) of the wind farm catchment/sub-catchments in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken according to Reynolds et al. (2010). An appraisal of white-clawed crayfish habitat at each site was conducted based on physical habitat attributes (Gammell et al., 2021; Peay, 2003), water chemistry and incidental records in mustelid spraint. Additionally, a desktop review of crayfish records within the wider survey area was completed.

2.5 eDNA analysis

To further validate site surveys and to detect potentially cryptically low populations of protected and or rare aquatic species within the study area, composite water samples were collected from the Figile River (sites A15 & A18), River Boyne (B2) and Slate River (C2) in August 2024 (**Figure 2.1; Table 2.2**). These were analysed for freshwater pearl mussel (*Margaritifera margaritifera*), white-clawed crayfish (*Austropotamobius pallipes*) and crayfish plague (*Aphanomyces astaci*) environmental DNA (eDNA). The sites were strategically chosen to maximise longitudinal (instream) coverage within the catchment (i.e. facilitating a greater likelihood of species detection).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread at the site (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis with 48 hours of collection. A total of n=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR

replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to **Appendix B** for full eDNA laboratory analysis methodology.

2.6 Biological water quality (Q-sampling)

The 29 no. riverine survey sites were assessed for biological water quality through Q-sampling in August 2024 (**Table 2.1**). All samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a 2-minute kick sample, as per Environmental Protection Authority (EPA) methodology (Feeley et al., 2020). Large cobble was also washed at each site for 1-minute (where present) to collect attached macro-invertebrates (as per Feeley et al., 2020). Samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification to species level. Samples were converted to Q-ratings as per Toner et al. (2005) and assigned to WFD status classes (**Table 2.2**). Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012), stoneflies (Feeley et al., 2020) and other relevant taxa (i.e. Byrne et al., 2009; Nelson et al., 2011).

Table 2.2 Reference categories for EPA Q-ratings (Q1 to Q5) (Toner et al., 2005)

Q value	WFD status	Pollution status	Condition
Q5 or Q4-5	High status	Unpolluted	Satisfactory
Q4	Good status	Unpolluted	Satisfactory
Q3-4	Moderate status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor status	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad status	Seriously polluted	Unsatisfactory

2.7 Canal macro-invertebrate communities

The Grand Canal at site D2 was sampled for macro-invertebrates via sweep netting. A standard pond net (250mm width, mesh size 500µm) was used to sweep macrophytes to capture macro-invertebrates. The net was also moved along the canal bed to collect epibenthic and epiphytic invertebrates from the substratum (as per Cheal et al., 1993). A 3-minute sampling period was employed. To ensure appropriate habitat coverage, the sampling period was also divided amongst the range of meso-habitats present at the survey sites to get a representative sample for sub-habitats.

2.8 Macrophytes and aquatic bryophytes

Surveys of the macrophyte and aquatic bryophyte community were conducted by instream wading at each of the survey sites, with specimens collected (by hand or via grapnel) for on-site identification. An assessment of the aquatic vegetation community helped to identify any rare macrophyte species listed under the Flora (Protection) Order, 2022, Irish Red list for vascular plants (Wyse-Jackson et al., 2016) and or aquatic bryophytes (Lockhart et al., 2012), or habitats corresponding to the Annex I habitats, e.g., 'Water courses of plain to montane levels, with submerged or floating vegetation of the

Ranunculion fluitantis and *Callitricho-Batrachion* (low water level during summer) or aquatic mosses [3260]' (more commonly referred to as 'floating river vegetation').

2.9 Otter signs

The presence of otter (*Lutra lutra*) was determined through the recording of otter signs within 150m radius of each survey site. Notes on the age and location of signs (ITM coordinates) were made, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs etc.).

2.10 Aquatic ecological evaluation

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

2.11 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

3. Desktop review

3.1 Survey area description

The proposed Ballydermot wind farm is located in an area of peatland near Clonbulloge, Co. Offaly (**Figure 2.1**). The proposed wind farm site is situated within the Shannon River Basin District and within the Boyne_SC_010, Figile_SC_010, Figile_SC_020 and Slate_SC_010 river sub-catchments in hydrometric areas 7 (Boyne) and 14 (Barrow).

The watercourses in the vicinity of the proposed Ballydermot wind farm are typically small, historically modified lowland depositing channels (FW2; Fossitt, 2000) and drainage ditches (FW4). Land use practices within the vicinity of the proposed wind farm were predominantly peat bogs (CORINE 412), with the wider survey area featuring land principally occupied by agriculture, with significant areas of natural vegetation (243) and pastures (231). Predominantly, the watercourses flowed over areas of Carboniferous limestone & calcareous shale and dark-grey argillaceous, cherty limestone and shale (Geological Survey of Ireland data).

3.2 Fisheries

The River Boyne rises in Co. Kildare and flows for over 110km in a north easterly direction through counties Offaly, Meath and Louth before entering the Irish Sea at Drogheda. The Boyne is a designated salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988) and is a renowned wild brown trout, Atlantic salmon and (in its lower reaches) sea trout fishery (O'Reilly, 2009). As well as salmonids, the river is known to support *Lampetra* sp., European eel (*Anguilla anguilla*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and three-spined stickleback (*Gasterosteus aculeatus*) (Kelly et al., 2011a, 2011b). A number of other cyprinid species are also known from the river, including roach (*Rutilus rutilus*) and bream (*Abramis brama*), primarily in the middle to lower reaches (pers. obs.).

The Slate River is one of the larger Barrow sub-catchments and covers an area of approximately 214km^2. As part of the upper Barrow system, the Slate is known to support a range of fish species including brown trout, Atlantic salmon, *Lampetra* sp., minnow, three-spined stickleback, roach, perch (*Perca fluviatilis*), stone loach, European eel and invasive dace (*Leuciscus leuciscus*) (Gordon et al., 2021; Delanty et al., 2017; Triturus 2021 data). Whilst the Slate is a noted recreational trout fishery (O'Reilly, 2009), the Slate sub-catchment has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures (Delanty et al., 2017).

The Figile is the largest of the Barrow sub-catchments and drains an area of approximately 320km^2. After its confluence with the Cushina and Slate Rivers, it becomes the Black River before it enters the River Barrow at Monasterevin. The Figile is known to support brown trout, European eel, lamprey (*Lampetra* sp.), minnow, stone loach, roach, roach x bream hybrids (*Rutilus rutilus* x *Abramis brama*), dace, perch, pike, three-spined stickleback and nine-spined stickleback (*Pungitius pungitius*) (Gordon et al., 2021; Delanty et al., 2017). The Figile River has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

The Grand Canal is known to support a range of coarse fish species, including perch, pike (*Esox lucius*), bream, roach, rudd (*Scardinius erythropthalmus*) and their respective hybrids, European eel and tench (*Tinca tinca*) with highly localised common carp (*Cyprinus carpio*) and brown trout (*Salmo trutta*) (IFI data; McLoone, 2011; Tierney et al., 1999; pers. obs.). *Lampetra* sp. lamprey have also been recorded at a low number of locations, e.g. 11th lock, ROD, 2016; 7th lock, Caffrey et al., 2006; 5th lock, MKO, 2019).

Brown trout and European eel are known from the Cloncant Stream, with brown trout also present in the Lullybeg Stream (Triturus 2021 data). No fish were recorded from sites on the Ballygarrett River or Drumsru Stream during previous surveys for the proposed development (Triturus, 2021).

3.3 Protected aquatic species

A comprehensive desktop review of available data from the National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Inland Fisheries Ireland (IFI), Botanical Society of Britain and Ireland (BSBI), National Crayfish Plague Surveillance Programme (NCPSP), Environmental Protection Agency (EPA) and Triturus databases for the 10km grid squares containing and adjoining the development (i.e. N61, N62, N63, N72, N73 & N82) identified a low number of records for rare and or protected aquatic species within the vicinity of the proposed development.

Numerous records for white-clawed crayfish (*Austropotamobius pallipes*) records were available within the survey area (**Figure 3.1**). On the Figile River, >20 records were available, with a lower number of records also available for the Slate River at Ford Bridge and Agar Bridge. Available records ranged from 1986 to 2020. A low number of historical records were also available for the upper reaches of the River Boyne in the vicinity of Edenderry (1975 and 1985, respectively). No white-clawed crayfish were recorded during the previous 2021 surveys for the proposed development (Triturus, 2021).

Otter (*lutra lutra*) records were widespread throughout the relevant grid squares, with a high number of records available for the Figile River and small tributaries, including those within the proposed wind farm site boundary (e.g., Lullybeg Stream, Cloncant Stream). A lower number of records were also available for Slate River, River Boyne and Grand Canal within the vicinity of the proposed development (NPWS, Triturus & NBDC data; **Figure 3.1**). Previous surveys by Triturus for the proposed development in 2021 also recorded otter signs on the River Boyne (current site B2), Codd River, Lullybeg Stream (A14), Figile River (A15), Clonbulloge River, Killinagh Upper Stream (D1) and the Slate River (C2).

Several records were available from the Grand Canal east of the 19th lock for the nationally rare macrophyte species opposite leaved-pondweed (*Groenlandia densa*), listed on the Flora (Protection) Order, 2022. These records were from the 1992-1993 period (data not shown). No NPWS records for other macrophytes or aquatic bryophytes protected under the Flora (Protection) Order, 2022 were available for the respective grid squares.

Common frog (*Rana temporaria*) were widespread throughout the 10km grid squares, including within the proposed wind farm site boundary. Smooth newt (*Lissotriton vulgaris*) records were available for the Lullymore wetlands, within and adjoining the site boundary, and also Ballynafagh Bog north of the proposed GCR (2011-2019 data; **Figure 3.1**).

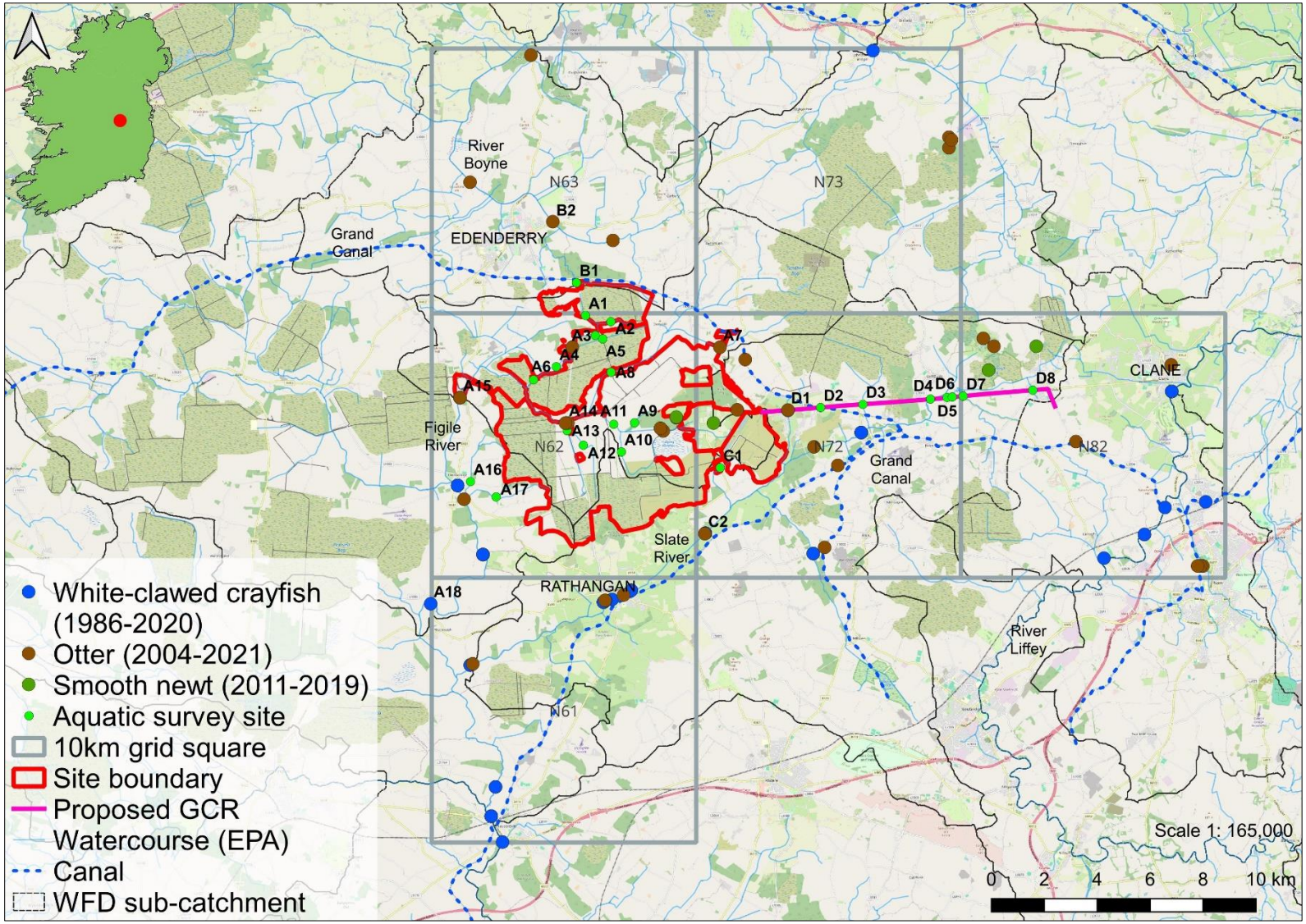


Figure 3.1 Selected protected aquatic species records in the vicinity of the proposed development (source: Triturus, NPWS, NCPSP, EPA & NBDC data)

4. Results of aquatic surveys

The following section summarises each of the *n*=31 survey sites in terms of aquatic habitats, physical characteristics and overall value for fish and macrophyte/aquatic bryophyte communities. Please refer to **Appendix** 1**A** (fisheries assessment report) for more detailed fisheries results. Biological water quality (Q-sample) results are also summarised for each riverine sampling site and in **Appendix** 1**C**. A summary of the fish species recorded at each survey site is provided in **Table 4.2**. A summary of the aquatic species and habitats of high conservation concern recorded during the surveys is provided in **Table 4.3**. An evaluation of the aquatic ecological importance of each survey site based on these aquatic surveys is provided and summarised in **Table 4.4**. Habitat codes are according to Fossitt (2000). Scientific names are provided at first mention only. Sites were surveyed in July and August 2024.

4.1 Aquatic survey site results

4.1.1 Site A1 – unnamed stream, Derries

Site A1 was located on an unnamed tributary of the Codd River (no EPA code) adjoining the proposed site boundary. The lowland stream (FW2: Fossitt, 2000) had been historically straightened and deepened resulting in a homogenous deep U-shaped channel with poor hydromorphology and 3m high banks. The channel was 2m wide and 1-1.5m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The bed was dominated by deep peat and silt accumulations with no hard substrata. The site featured dense macrophyte growth with frequent common water starwort (*Callitriche stagnalis*), fool's watercress (*Helosciadium nodiflorum*) and branched bur-reed (*Sparganium erectum*). Common water plantain (*Alisma plantago-aquatica*) and small pondweed (*Potamogeton berchtoldii*) were occasional. The heavily modified channel was bordered by dense scrubbed-over embankments supporting grey willow (*Salix cinerea*), bramble (*Rubus fruticosus* agg.), bracken (*Pteridium aquilinum*), meadowsweet (*Filipendula ulmaria*), hedge bindweed (*Calystegia sepium*), marsh valerian (*Valeriana dioi*ca), marsh woundwort (*Stachys palustris*) and rosebay willowherb (*Chamaenerion angustifolium*). The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Three-spined stickleback (*Gasterosteus aculeatus*) was the only fish species via electro-fishing at site A1 (**Appendix** 1**A**). The heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, absence of coarse substrata and significant siltation. The site had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources albeit the species was not recorded. The site offered no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A1 was of **local importance (lower value) (Table 4.4).**



Plate 4.1 Representative image of site A1 on an unnamed Codd River tributary, July 2024

4.1.2 Site A2 – unnamed stream, Derries

Site A2 was located on an unnamed tributary of the Codd River (no EPA code) adjoining the proposed site boundary. The lowland stream (FW2) had been historically straightened and deepened resulting in a homogenous deep U-shaped channel with poor hydromorphology and 3-4m high banks. The channel was 2.5-4m wide and 0.5-1.2m deep with low summer flows at the time of survey. The profile comprised slow-flowing glide with localised riffle and pool at culverts. The substrata were dominated by deep compacted peat with some scattered boulders. Macrophyte growth was sparse with occasional stands of bulrush (*Typha latifolia*), reed sweet-grass (*Glyceria maxima*) and small pondweed. Common duckweed (*Lemna minor*) was frequent. No aquatic bryophytes were recorded. The heavily modified channel was bordered by dense, scrubbed-over embankments supporting a mixture of lowland blanket bog and scrub species. These included immature grey willow, downy birch (*Betula pubescens*), deer grass (*Trichophorum germanicum*), cross-leaved heath (*Erica tetralix*), meadowsweet and bramble. The site was bordered by extensive areas of cutover bog (PB4) with coniferous afforestation (WD4) on the south bank.

Three-spined stickleback was the only fish species recorded via electro-fishing at site A2 (**Appendix A**). With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, paucity of coarse substrata and significant siltation. The site had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources albeit the species was not recorded. The site offered no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix C**). However, it should be noted that this was a tentative rating given poor flows and an absence of

suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A2 was of **local importance (lower value) (Table 4.4).**



Plate 4.2 Representative image of site A2 on an unnamed Codd River tributary, July 2024

4.1.3 Site A3 – Codd River, Derries

Site A3 was located on the upper reaches of the Codd River (EPA code: 14C44) within the proposed site boundary. The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogenous V-shaped channel with poor hydromorphology and peat banks of 6-8m in height. The channel was 1-1.5m wide and 0.1-0.3m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The substrata were dominated by deep compacted peat. Macrophyte growth was sparse with occasional water mint (*Mentha aquatica*), branched bur-reed, watercress (*Nasturtium officinale*), fool's watercress instream. Encroachment of terrestrial herbaceous vegetation was often high with abundant great willowherb (*Epilobium hirsutum*). The scrubbed-over peat embankments supported immature grey willow, downy birch, deer grass, cross-leaved heath, heather (*Calluna vulgaris*), meadowsweet, bramble and ferns (*Dryopteris* sp.). The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

No fish were recorded via electro-fishing at site A3 (**Appendix 1A**). The channel at this location was not of fisheries value given extensive modifications, poor flows and siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of

suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A3 was of **local importance (lower value) (Table 4.4).** Whilst the site lies contiguous with The Long Derries, Edenderry SAC (000925), a site of **international importance**, this is designated for terrestrial habitats only (NPWS, 2021a).



Plate 4.3 Representative image of site A3 on the upper reaches of the Codd River, July 2024

4.1.4 Site A4 – Codd River, Codd

Site A4 was located on the upper reaches of the Codd River (14C44) at a farm access crossing, approximately 3.4km downstream of site A3. The lowland river (FW2) had been extensively straightened and deepened historically through pasture, resulting in a homogenous U-shaped channel with poor hydromorphology and banks of 1-1.5m in height. The channel was 1.5-2m wide and 0.2-0.5m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The bed was comprised entirely of deep soft sediment (silt). Macrophyte cover as high with frequent watercress, fool's watercress, water mint and common duckweed. Much of the channel was grassed over by creeping bent (*Agrostis stolonifera*) with pockets of open water being more isolated. The heavily modified channel had narrow riparian zones supporting hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble, gorse (*Ulex europaeus*), alder (*Alnus glutinosa*) and grey willow. The site was bordered by improved pasture (GA1) with cutover bog (PB4) upstream.

No fish were recorded via electro-fishing at site A4 (**Appendix 1A**). The channel at this location was not of fisheries value given extensive modifications, poor flows and siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A4 was of **local importance (lower value) (Table 4.4).**



Plate 4.4 Representative image of site A4 on the upper reaches of the Codd River, July 2024

4.1.5 Site A5 – Cloncant Stream, Derries

Site A5 was located on the uppermost reaches of the Cloncant Stream (14C41) at a bog access track crossing (pipe culvert). The small lowland stream (FW2) had been extensively straightened and deepened historically through peatland, resulting in a deep, homogenous V-shaped channel with poor hydromorphology and peat banks of 6m in height. The channel was 1.5-2m wide and 0.3m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The substrata were dominated by deep compacted peat. Macrophytes were limited to occasional stands of water mint and branched bur-reed with high levels of terrestrial encroachment by herbaceous species such as wild angelica (*Angelica sylvestris*) and marsh valerian (*Valeriana dioica*). The riparian areas featured an open gravelly bank with heavy scrub cover on the opposite bank dominated by bracken. The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Three-spined stickleback was the only fish species recorded via electro-fishing at site A5 (**Appendix A**). With the exception of low densities of this species, the heavily modified channel was not of fisheries value given the lack of flow, absence of coarse substrata and significant siltation. The site offered no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A5 was of **local importance (lower value) (Table 4.4).**



Plate 4.5 Representative image of site A5 on the Cloncant Stream, August 2024

4.1.6 Site A6 – Cloncant Stream, Cushaling

Site A6 was located on the Cloncant Stream (14C41) at a bog access track crossing approximately 3.5km downstream of site A5. The lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep, trapezoidal channel with poor hydromorphology and peat banks of 5-6m in height. The channel was 2-3m wide and 0.1-0.3m deep with a profile of slow-flowing glide and riffle. The substrata were dominated by compacted peat although cobbles and coarse gravels were present locally. Macrophyte cover was moderate with occasional branched bur-reed, unbranched bur-reed (*Sparganium emersum*), water plantain and common water starwort. No aquatic bryophytes were recorded. Cover of filamentous algae was high (c.70%) indicating significant enrichment. The riparian areas featured dense scrub dominated by bracken, gorse, bramble and grey willow with herbaceous species. The site was bordered by cutover bog (PB4) and scrub (WS1) with improved pasture (GA1) upstream.

Three-spined stickleback was the only fish species recorded via electro-fishing at site A6 (**Appendix A**). With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. The site had some low value as a European eel

nursery given abundant refugia and suitable prey resources albeit the species was not recorded. The site was of poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3-4 (moderate status)** (**Appendix 1C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A6 was of **local importance (lower value) (Table 4.4).**



Plate 4.6 Representative image of site A6 on the Cloncant Stream, August 2024

4.1.7 Site A7 – Abbeylough Stream, Kilpatrick

Site A7 was located on the Abbeylough Stream (14A01) at a local road crossing. The lowland stream (FW2) had been historically straightened and locally deepened resulting in channel with poor hydromorphology. The channel was 2m wide and 0.3-0.6m deep with no perceptible flows at the time of survey (i.e. stagnant pool). The substrata comprised deep silt with only scattered cobble and superficial mixed gravels upstream of the crossing where livestock poaching (erosion) had occurred. Open areas supported patches of fool's watercress and common duckweed with high riparian shading typically precluding macrophyte growth. No aquatic bryophytes were recorded. Cover of filamentous algae was high, indicating significant enrichment. Whist open (cleared) upstream of the crossing, the banks were heavily scrubbed with dense blackthorn, hawthorn, bramble and scattered mature ash (*Fraxinus excelsior*). The site was bordered by heavily improved pasture (GA1) with scrub (WS1) and cutover bog (PB4) to the south.

Three-spined stickleback was the only fish species recorded via electro-fishing at site A7 (**Appendix 1A**). With the exception of low densities of this species, the heavily modified channel was of poor

fisheries value given the lack of flow, absence of coarse substrata and significant siltation. Despite some low suitability for European eel given deeper water and instream refugia (undercut banks, macrophytes), none were recorded. The site was of low suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A7 was of **local importance (lower value) (Table 4.4).**



Plate 4.7 Representative image of site A7 on the Abbeylough Stream, August 2024

4.1.8 Site A8 – Figile River, Ticknevin

Site A8 was located on the Figile River (14F01) at a bog access track crossing. The lowland river (FW2) had been historically straightened and deepened to drain adjoining peatland. However, some instream recovery had occurred. The channel was 4-5m wide and 0.1-0.6m deep with 3m high banks. The profile was of shallow slow-flowing glide with riffles confined to bridge aprons and culverts. The substrata were dominated by very soft peat with localised cobble, boulder and gravels under the bridges. The faster flowing riffle and glide under the bridges supported unbedded gravels with lighter siltation. The site supported occasional branched bur-reed and fool's watercress instream. Instream boulder supported abundant *Leptodictyum riparium*, an aquatic bryophyte indicator of enrichment. Filamentous algae cover was high (c.80%), indicating significant enrichment. The peatland channel had a mature riparian zone that supported mature grey willow, reed canary grass (*Phalaris arundinacea*),

meadowsweet and great willowherb. The site was bordered by cutover bog (PB4) with patches of scrub (WS1).

Brown trout (*Salmo trutta*) and three-spined stickleback were the only fish species recorded via electro-fishing at site A8 (**Appendix** 1**A**). The site was of some low value as a salmonid nursery and spawning habitat, supporting a low density of juvenile trout, although the quality was reduced considerably by siltation and enrichment pressures. Spawning areas were limited to broken riffle and glide underneath bridges where mixed gravels free of algae were present. The site offered moderate quality European eel habitat (i.e. refugia under coarse substrata with ample prey resources) albeit no eel were recorded. Soft sediment areas were typically humic in nature and unsuitable for lamprey ammocoetes. Despite some moderate suitability for white-clawed crayfish, none were recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids, the aquatic ecological evaluation of site A8 was of **local importance (higher value) (Table 4.5).**



Plate 4.8 Representative image of site A8 on the Figile River, August 2024

4.1.9 Site A9 – unnamed stream, Lullybeg

Site A9 was located on an unnamed Lullymore East River tributary within the site boundary. The stream had been historically straightened and deepened resulting in a U-shaped channel with poor hydromorphology and 3-4m high banks. The channel was 1.5-2m wide and 0.05-0.1m deep with a profile of very slow-flowing glide and pool (no riffles). The stream suffered from low summer flows at the time of survey. The substrata were dominated by soft, flocculent peat with very localised cobble

and gravels. Given heavy riparian shading, macrophytes were limited to occasional branched bur-reed and water mint in open areas. The mature riparian zones supported mature grey willow, blackthorn and downy birch with a dense scrub understory. The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

No fish were recorded via electro-fishing at site A9 (**Appendix 1A**). The channel at this location was not of fisheries value given extensive modifications, poor flows, siltation pressures and poor connectivity with downstream habitats. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A9 was of **local importance (lower value) (Table 4.4).**



Plate 4.9 Representative image of site A9 on an unnamed Lullymore East River tributary, August 2024

4.1.10 Site A10 – Lullybeg Stream, Lullybeg

Site A10 was located on the Lullybeg Stream (14L13), a tributary of the Lullymore East River, within the proposed site boundary. The lowland stream (FW2) had been historically straightened and locally deepened resulting in channel with poor hydromorphology and steep banks of 4-6m in height. The homogenous channel was 3m wide and 0.5-1m deep with high peat staining and no perceptible flows at the time of survey (i.e. stagnant pool). The bed was composed entirely of deep silt/peat. Macrophyte cover was high with abundant branched bur-reed in addition to common duckweed and ivy-leaved duckweed (*Lemna trisulca*). No aquatic bryophytes were recorded. The mature riparian

zones supported grey willow and sycamore (*Acer psuedoplatanus*) with a dense scrub understory dominated by bramble, bracken meadowsweet and marsh woundwort. site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Three-spined stickleback was the only fish species recorded via electro-fishing at site A10 (**Appendix 1A**). With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. The site had some low value as a European eel nursery given abundant refugia and suitable prey resources albeit the species was not recorded. The site was unsuitable for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A10 was of **local importance (lower value) (Table 4.4).**



Plate 4.10 Representative image of site A10 on the Lullybeg Stream, August 2024

4.1.11 Site A11 – Lullymore East River, Lullybeg

Site A11 was located on the Lullymore East River (14L11) at a bog access track crossing (box culvert) within the proposed site boundary. The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a deep, homogenous U-shaped channel with poor hydromorphology and peat banks of 4-6m in height. The channel was 3-4m wide and 1-2m deep with very low summer flows at the time of survey (i.e. near stagnant). The profile composed deep pool and near stagnant glide with only isolated riffle associated with the culvert. The substrata were dominated

by very soft peat with localised cobble and gravels near the culvert. The site supported frequent arrowhead (*Sagittaria sagittifolia*) with occasional branched bur-reed, water plantain and water starwort (*Callitriche* sp.) (mostly upstream of the culvert). Aquatic bryophytes were not recorded. The riparian zones supported mature grey willow, downy birch, sycamore and ash with a dense scrub understory of bramble, bracken and reed canary grass. The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Brown trout, European eel (*Anguilla anguilla*) and three-spined stickleback were recorded via electro-fishing at site A11 (**Appendix** 1**A**). The site was a poor quality salmonid habitat supporting a very low density of adult trout. Suitable spawning habitat was absent with the quality of nursery habitat impacted by poor flows, siltation and hydromorphological pressures. There was some low value as a salmonid holding habitat given the predominance of deep glide and pool. These areas also offered some value for European eel which were also present in low densities. Abundant soft sediment accumulations were unsuitable for lamprey given their humic nature. The site was of poor suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (good status)** (**Appendix** 1**C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and European eel, the aquatic ecological evaluation of site A11 was of **local importance (higher value) (Table 4.4).**



Plate 4.11 Representative image of site A11 on the Lullymore East River, August 2024

4.1.12 Site A12 – Lullybeg Stream[1], Cushaling

Site A12 was located on the Lullybeg Stream (14L33), a tributary of the Figile River, at a bog access track crossing. The lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a deep U-shaped channel with poor hydromorphology. The peat-stained channel was 3-5m wide and 1.5-2m deep with a profile of very slow-flowing glide and pool (no riffle). The substrata comprised very soft peat with no hard substrata. The peat channel supported limited macrophyte growth apart from localised branched bur-reed and yellow lily (*Nuphar lutea*). The narrow riparian zones supported mature grey willow, bracken, bramble, bindweed (*Calystegia sepium*) and nettle (*Urtica dioica*). The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Electro-fishing was not undertaken at site A12 due to prohibitive sediment and water depths (**Appendix 1A**). The site was of poor fisheries value given extensive modifications, poor flows and siltation pressures. However, there was some low suitability for coarse fish species (e.g. roach, dace,pike) and European eel given connectivity with the Figile River. The site was of low suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A12 was of **local importance (lower value) (Table 4.4).**



Plate 4.12 Representative image of site A12 on the Lullybeg Stream, August 2024

[1] A separate watercourse to the homonymous Lullybeg Stream (EPA code: 14L13) located c.1km east

4.1.13 Site A13 – Clonbrown River, Cushaling

Site A13 was located on the Clonbrown River (14C32), a tributary of the Figile River. The lowland river (FW2) had been heavily modified throughout resulting in impoundment and conversion to peat attenuation ponds in its lower reaches with very poor fluvial connectivity to downstream habitats. The section at the survey site featured a historical pumping station and a channel/pond habitat with steep 5-6m high banks. The site was 1.5-3m deep with a bed comprised entirely of deep soft peat and silt. The site supported abundant spiked water milfoil (*Myriophyllum spicatum*) with occasional bulrush and water mint. Reed sweet-grass (*Glyceria maxima*) was also frequent with branched bur-reed being rare. Aquatic bryophytes were not recorded. Filamentous algal mats were abundant, indicating significant enrichment. The riparian areas supported abundant scrub including grey willow, downy birch, bracken and gorse with scattered heather, deer grass and the native shrub alder buckthorn (*Frangula alnus*). The site was bordered by scrub (WS1) and extensive areas of cutover bog (PB4).

Electro-fishing was not undertaken at site A13 due to prohibitive sediment and water depths (**Appendix 1A**). The ponding area had limited fisheries value apart from as a coarse fish habitat. Species such as roach, pike and perch may occur in the pond in addition to European eel although poor fluvial connectivity via culverts may restrict fish passage. The ponding area had some good suitability for smooth newt given high macrophyte cover but none were recorded during sweep netting. The site was of low suitability for white-clawed crayfish and none were recorded. No otter signs were recorded in vicinity of the site.

Site A13 was unsuitable for Q-sampling given the pond-like conditions. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via sweep sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A13 was of **local importance (lower value)** (**Table 4.4**).



Plate 4.13 Representative image of site A13 on the impounded Clonbrown River, August 2024

4.1.14 Site A14 – Figile River, Cushaling Bridge

Site A14 was located on the Figile River[2] (14F01) at Cushaling Bridge. The lowland river (FW2) had been historically straightened and deepened but retained some semi-natural characteristics, with broken riffle-glide sequences among deeper vegetated areas. The U-shaped channel was 8-10m wide and 0.1-0.4m deep, with 3m high banks. The profile was dominated by riffle and glide with more localised deeper pool habitat downstream of the bridge. Upstream the channel was dominated by slow-flowing deep glide. The substrata comprised frequent boulder and cobble with abundant coarse and medium gravels. These had moderate to high siltation with high infiltration of silt and partial bedding. The site was heavily vegetated with abundant curled pondweed (*Potamogeton crispus*) and frequent unbranched bur-reed. Water plantain was present locally. The aquatic moss species *Leptodictyum riparium*, a species indicative of enrichment pressures, was frequent on cobble and boulder. Filamentous algal cover was high (c.60% cover of the bed), indicating significant enrichment. The riparian areas were heavily scrubbed with bramble, reed canary grass, great willowherb and meadowsweet with scattered grey willow. A large mature sitka spruce (*Picea sitchensis*) plantation (WD4) was present downstream of the bridge on the south bank with improved pasture (GA1) to the north.

Brown trout, pike (*Esox lucius*), perch (*Perca fluviatilis*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and roach (*Rutilus rutilus*) were recorded via electro-fishing at site A14 (**Appendix A).** The site was a poor-quality salmonid habitat given significant enrichment pressures in addition to siltation that compromised the quality of spawning and nursery habitat. Some holding habitat for adult salmonids was present in deeper glide upstream of the road bridge but these areas primarily supported coarse fish. Areas of silt and peat were heavily compacted and not suitable for lamprey ammocoete burial (none recorded). The site had some suitability as a nursery for European eel given coarse bed substrata and macrophyte cover but none were recorded. Despite some low suitability for white-clawed crayfish, none were recorded. A regular otter spraint site was recorded underneath the bridge (ITM 665011, 725886).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and Red-listed European eel, in addition to utilisation by otter, the aquatic ecological evaluation of site A14 was of **local importance (higher value) (Table 4.4).**

[2] also known as the Black River at this location



Plate 4.14 Representative image of site A14 on the Figile River at Cushaling Bridge, August 2024

4.1.15 Site A15 – Figile River, Kilcumber Bridge

Site A15 was located on the Figile River (14F01) at Kilcumber Bridge (R401) near Edenderry Power Station, approximately 6km downstream of site A14. The lowland river (FW2) had been historically straightened and locally deepened but retained some semi-natural characteristics, with broken riffle-glide sequences adjoining deeper vegetated areas. The U-shaped channel was 10-12m wide and 0.3-1m deep, with 4-8m high banks. The profile was dominated by deep glide with more localised deeper pool and riffle. The substrata were dominated by boulder and cobble with patches of coarse gravels. These were heavily silted. The site was heavily vegetated with abundant yellow lily and curled pondweed. Arrowhead and branched bur-reed were present locally in addition to common water starwort. The aquatic moss Leptodictyum *riparium* was frequent on cobble and boulder. Filamentous algal cover was very high (c.80% cover of the bed), indicating highly significant enrichment. The riparian areas were heavily scrubbed with bramble, reed canary grass, great willowherb and meadowsweet in addition to scattered grey willow. The site was bordered by improved pasture (GA1) with the power station (BL3) present on the west bank upstream of the bridge.

Pike, roach, stone loach and dace (*Leuciscus leuciscus*) were recorded via electro-fishing at site A15 (**Appendix 1A**). The site was of low value for salmonids given significant siltation, enrichment and hydromorphological pressures, with none recorded during the survey (previously recorded at this site,however; Triturus, 2021). Whilst some good quality holding habitat for adults was present, the enrichment at the site created conditions inimical for salmonids. Suitability was high for coarse fish species, however. Areas of soft sediment suitable as lamprey nurseries were preset locally but these were sub-optimal and did not support ammocoetes. Despite some suitability for European eel and white-clawed crayfish, neither were recorded. Furthermore, environmental DNA sampling at the site did not detect white-clawed crayfish (**Table 4.1**). An otter spraint site was recorded on a boulder under the bridge (ITM 661001, 726836).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the utilisation by otter, the aquatic ecological evaluation of site A15 was of **local importance (higher value) (Table 4.4).**



Plate 4.15 Representative image of site A15 on the Figile River at Kilcumber Bridge, August 2024

4.1.16 Site A16 – Clonbulloge River, Clonmel

Site A16 was located on the Clonbulloge River (15C53) at a local road crossing. The small lowland stream (FW2) had been extensively straightened and deepened historically, resulting in a trapezoidal channel with poor hydromorphology and banks of 2-2.5m in height. The channel was 1.5m wide and 0.05-0.1m deep and suffered from low summer flows at the time of survey. The profile was of very shallow and slow-flowing glide. The substrata comprised heavily bedded and silted cobble and gravels with areas of sand and shallow, flocculent silt. Given high riparian shading, submerged macrophytes and aquatic bryophytes were absent, with some localised water horsetail (*Equisetum fluviatile*) along channel margins. The banks supported dense scrub vegetation of grey willow, ash and hawthorn with abundant bramble. The site was bordered by improved pasture (GA1) with narrow riparian buffers.

No fish were recorded via electro-fishing at site A16 (**Appendix** 1**A**). The channel at this location was not of fisheries value given extensive modifications, shallow depths, poor flows and siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**C**). However, it should be noted that this was a tentative rating given poor flows and an absence of

suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A16 was of **local importance (lower value) (Table 4.4).**



Plate 4.16 Representative image of site A16 on the Clonbulloge River, August 2024

4.1.17 Site A17 – Ballygarrett River, Clonmel

Site A17 was located on the Ballygarrett River (14B30), a tributary of the Figile River, at the confluence with the Clonmel Stream (14C56). The lowland river (FW2) had been extensively straightened and deepened historically, resulting in a deep U-shaped channel with poor hydromorphology. The river suffered from low summer flows and featured high turbidity (likely from livestock poaching) at the time of survey. The river was 3-4m wide and 0.1-0.2m deep with a profile of very slow-flowing glide and pool. Riffle was highly localised. The substrata were dominated by deep silt with occasional boulder, cobble and mixed gravels. The substrata were heavily bedded and the majority of the channel suffered from gross siltation (beds of silt up to 0.2m deep). Given high riparian shading and turbidity, macrophytes and aquatic bryophytes were absent. Filamentous algal cover was high, indicating significant enrichment. The river was lined by narrow, dense riparian treelines of ash, hawthorn, alder, grey willow and hazel (*Corylus avellana*) along filed boundaries. The site was bordered by improved pasture (GA1).

No fish were recorded via electro-fishing at site A17 (**Appendix 1A**). With the exception of potential for three-spined stickleback (not recorded), the channel at this location was not of fisheries value given extensive modifications, shallow depths, poor flows and siltation pressures. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2 (bad status)** (**Appendix** 1**C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site A17 was of **local importance (lower value) (Table 4.4).**



Plate 4.17 Representative image of site A17 on the Ballygarrett River, August 2024

4.1.18 Site A18 – Figile River, Millgrove Bridge

Site A18 was located on the lower reaches of the Figile River (14F01) at Millgrove Bridge (R442). The lowland river (FW2) had a semi-natural, sinuous profile with broken riffle-glide sequences adjoining deeper pool. The channel was 10-14m wide and 0.2-1m deep with 1-2m high banks. The substrata were dominated by boulder and cobble with patches of coarse gravels. These were moderately bedded and heavily silted. Macrophyte growth was dense, with frequent heterophyllous common clubrush (*Schoenoplectus lacustris*). Spiked-water milfoil, branched-bur-reed and curled pondweed were present locally. Instream boulders supported frequent *Rhynchostegium riparioides* with occasional *Fontinalis antipyretica* and *Leptodictyum riparium*. Filamentous algal cover was very high (c.80% surface cover of the bed), indicating highly significant enrichment. The riparian areas supported scattered mature sycamore, grey willow, ash and lime (*Tilia* sp.) with reed canary grass, great willowherb and meadowsweet in the understories. The site was bordered by improved pasture (GA1) with narrow buffers.

Atlantic salmon (*Salmo salar*), brown trout, pike, dace, gudgeon (*Gobio gobio*), stone loach and minnow were recorded via electro-fishing at site A18 (**Appendix** 1**A**). The fish community was one tolerant of eutrophication. However, a low number of Atlantic salmon parr were recorded, with the site providing poor quality nursery and spawning habitat for salmonids. Some good quality holding

habitat for adult salmonids was present, but the enrichment and siltation pressures created conditions inimical for healthy salmonid populations. There was only limited suitability for lamprey given the absence of finer, clean spawning gravels. No lamprey ammocoete burial habitat was recorded downstream of the bridge but ammocetes are present elsewhere on the watercourse (Gordon et al., 2021; Delanty et al., 2017). The site had some suitability as a nursery for European eel (i.e. refugia and good food resources) but none were recorded. Suitability for white-clawed crayfish was low due to very high levels of enrichment and sedimentation with none recorded. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids (including Atlantic salmon), the aquatic ecological evaluation of site A18 was of **local importance (higher value) (Table 4.4).**



Plate 4.18 Representative image of site A18 on the Figile River at Millgrove Bridge, August 2024

4.1.19 Site B1 – Clonkeen Stream, Cloncanon

Site B1 was located on the Clonkeen Stream (07C36) at the northern extent of the proposed site boundary, just upstream of the Grand Canal aqueduct. The stream had been extensively straightened and deepened historically, resulting in a deep U-shaped channel with very poor hydromorphology and 2m high banks. The channel was 3m wide and 0.2m deep with no perceptible flows at the time of survey (i.e. stagnant ponding of water). The substrata were dominated by peat and silt. Macrophyte growth was sparse with occasional patches of common water starwort, small pondweed and spiked water milfoil. Scattered stands of branched-bur reed were also present. No aquatic bryophytes were recorded. The channel was heavily shaded by mature treelines of grey willow, hawthorn and occasional ash. The site was bordered by scrub (WS1) and improved pasture (GA1).

Three-spined stickleback were the only fish species recorded via electro-fishing at site B1 (**Appendix 1A).** However, European eel were recorded at this site previously (Triturus, 2021) and the close proximity of the Grand Canal (to the north) likely acts as a source area for a small eel population. With the exception of low densities of these species, the heavily silted channel was of very poor fisheries value and not capable of supporting salmonids or lamprey species given the lack of flow and heavily silted (peat) conditions. The site offered no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2 (bad status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the known utilisation by Red-listed European eel, the aquatic ecological evaluation of site B1 was of **local importance (higher value) (Table 4.4).**



Plate 4.19 Representative image of site B1 on the Clonkeen Stream, August 2024

4.1.20 Site B2 – River Boyne, Kishawanny Bridge

Site B2 was located on the upper reaches of the River Boyne (07B04) at Kishawanny Bridge. The lowland river (FW2) had been extensively straightened and deepened historically as art of arterial drainage works, resulting in a U-shaped channel with 2-6m high banks and poor hydromorphology. The river was 6-8m and 0.3-1m deep. The profile was dominated by deeper glide-pool sequences with shallower riffle areas confined to the bridge apron. The substrata comprised large, bedded boulder and cobble with more localised coarse and medium gravels (all heavily silted). Large areas of deeper organic-rich silt were also present in pools and in depositing littorals, including under the bridge. The bed had moderate cover of filamentous algae (20% cover). Macrophyte cover was high with frequent common duckweed, heterophyllous arrowhead, common clubrush and branched-bur-reed. Lesser

water parsnip (*Berula erecta*) was rare. Aquatic bryophytes were limited to occasional *Leptodictyum riparium* on small boulders. The riparian areas supported abundant reed canary grass and nettle with scattered mature sycamore and hawthorn. Th site was bordered by improved pasture (GA1) with narrow buffers.

Brown trout, lamprey (*Lampetra* sp.) and European eel were recorded via electro-fishing at site B2 (**Appendix 1A**). The site was a poor-quality salmonid nursery and spawning habitat given limited clean coarse substrata and a paucity of broken oxygenated water. There was moderate suitability for European eel, with a single example recorded. Lamprey ammocoetes were present at moderate to high densities in organic-rich marginal silt beds, which were widespread. There was poor suitability for white-clawed crayfish given the aforementioned siltation issues and none were recorded. Otter prints and a latrine was recorded in marginal mud underneath the bridge (ITM 664513, 733467) but these did not contain crayfish remains. An invasive mink (*Neovison vison*) was observed during the survey.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix 1C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids, lamprey (*Lampetra* sp.) and Red-listed European eel, in addition to utilisation by otter, the aquatic ecological evaluation of site B2 was of **local importance (higher value) (Table 4.4).**



Plate 4.20 Representative image of site C2 on the River Boyne at Kishawanny Bridge, August 2024

4.1.21 Site C1 – Drumsru Stream, Barnaran

Site C1 was located on the Drumsru Stream (25B06), a Slate River tributary, adjoining the proposed site boundary. The small lowland stream (FW2) had been historically straightened and deepened,

resulting in a homogenous U-shaped channel with poor hydromorphology and banks of up to 4m in height. The stream was 1.5-2m wide and 0.1m deep with no perceptible flows at the time of survey (i.e. stagnant). The bed was composed entirely of deep, soft sediment accumulations. Macrophytes were limited to occasional watercress and common duckweed. No aquatic bryophytes were recorded. The mature riparian zones supported dense scrub including bramble, bracken, hedge bindweed and rosebay willowherb with scattered grey willow, alder and downy birch. The site was bordered by scrub (WS1) and improved pasture (GA1) with extensive areas of cutover bog (PB4) upstream.

No fish were recorded via electro-fishing at site C1 (**Appendix 1A**), in keeping with previous surveys of the site (Triturus, 2021). The channel at this location was not of fisheries value given extensive modifications, poor flows, siltation pressures and poor connectivity with downstream habitats. There was no suitability for white-clawed crayfish. No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site C1 was of **local importance (lower value) (Table 4.4).**



Plate 4.21 Representative image of site D1 on the Drumsru Stream, August 2024

4.1.22 Site C2 – Slate River, Agar Bridge

Site C2 was located on the Slate River (14S01) at Agar Bridge (L7004 road). The lowland river (FW2) had been extensively straightened and deepened historically both upstream and downstream of the bridge, resulting in a characteristic trapezoidal channel with poor hydromorphology and 4-5m high banks. The river was 8-10m wide and 0.3-1.6m deep with a profile of deep glide and pool. Shallow

riffle was present at the bridge apron. The substrata were dominated by large boulder and cobble with localised coarse and medium gravels. These were heavily silted. Accumulations of deep silt were also present in pools and along depositing littorals. Given a high average depth, macrophytes were typically restricted to marginal areas with heterophyllous clubrush and occasional spiked-water milfoil and fool's watercress. Aquatic bryophytes were limited to occasional *Fontinalis antipyretica* in isolated riffle areas. Filamentous algal cover was very high (c.70%), indicating significant enrichment. The riparian areas supported abundant reed canary grass with a dense hedgerow of hawthorn and scattered elder along the north bank. The site was bordered by heavily improved pasture (GA1).

Atlantic salmon, brown trout, minnow, stone loach and dace were recorded via electro-fishing at site C2 (**Appendix** 1**A**). The site was a poor-quality salmonid nursery and spawning habitat due to historical modifications and siltation/eutrophication pressures. However, deep glide and pool provided some suitability as holding areas for adult salmonids. These areas also offered diurnal refugia for Europea n eel which were not recorded in the current survey. The site was of higher value as a coarse fish habitat. Despite an abundance of soft sediment accumulation these were mostly humic in nature and, coupled with poor flows, did not provide optimal conditions for lamprey ammocoetes. Suitability for white-clawed crayfish was low and none were recorded. An otter spraint site was recorded in the vicinity of the bridge (ITM 670258, 721697).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids (including Atlantic salmon) and utilisation by otter, the aquatic ecological evaluation of site C2 was of **local importance (higher value) (Table 4.4).**



Plate 4.22 Representative image of site C2 on the Slate River at Agar Bridge, August 2024

4.1.23 Site D1 – Killinagh Upper Stream, Allenwood South

Site D1 was located on the Killinagh Upper Stream (14K17), a tributary of the Slate River, at the R414 road and proposed GCR crossing. The lowland stream (FW2) had been historically straightened and over-deepened, resulting in a deep U-shaped channel with poor hydromorphology and 3m high banks. The stream flowed under the road via a masonry arch culvert and was 1.5-2m wide and 0.2-0.4m deep with a profile of slow-flowing glide (no riffle). The substrata were dominated by silt with bedded, mixed cobbles, small boulder and gravels. The stream was highly turbid at the time of survey (silt in suspension). Macrophyte cover was highly locally with abundant fool's watercress and common duckweed in addition to occasional branched bur-reed. Reed canary grass also encroached from the steep banks. Aquatic bryophytes were not recorded. The channel was shaded by a mature treeline of grey willow, elder, pine (*Pinus* sp.), poplar (*Populus nigra*) and ivy (*Hedera helix*). The site was bordered by improved pasture (GA1), dry meadows (GS2) and residential properties (BL3, GA2).

Three-spined stickleback was the only fish species recorded via electro-fishing at site D1 (**Appendix 1A**). With the exception of low densities of this species, the heavily silted channel was of very poor fisheries value and unsuitable for salmonids or lamprey species given the lack of flow and heavily silted(bed) conditions. The site was also unsuitable for white-clawed crayfish. Some low potential for European eel existed given connectivity to the downstream Slate River. A regular otter spraint site was identified on a concrete plinth under the bridge structure (ITM 673402, 726362) with three-spined stickleback and small mammal remains.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix 1C**). However, it should be noted that this was a tentative rating given poor flows and an absence of suitable riffle areas for sampling (Toner et al., 2005). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given utilisation by otter, the aquatic ecological evaluation of site D1 was of **local importance (higher value) (Table 4.4).**



Plate 4.23 Representative image of site D1 on the Killinagh Upper Stream, August 2024

4.1.24 Site D2 – Grand Canal, Shee Bridge

Site D2 was located on the Grand Canal at Shee Bridge near Allenwood, a proposed GCR crossing. The canal at this location was mature and well-vegetated with a 10m-wide channel and depths between 1 and 2m. The littorals supported frequent heterophyllous common clubrush and yellow lily. Mare's-tail (*Hippuris vulgaris*), blue water speedwell (*Veronica anagallis-aquatica*), water plantain, amphibious bistort (*Persicaria amphibia*) and fine-leaved water dropwort (*Oenanthe aquatica*) were all occasional. The central median of the canal supported heterophyllous arrowhead. Small areas along exposed gravel and cobble margins supported delicate stonewort (*Chara virgata*). The invasive macrophyte New Zealand pigmyweed (*Crassula helmsii*) was present but rare. The largely open banks supported common species of the canal corridor such as meadowsweet, hedge bindweed, reed canary grass, nettle and scattered immature sycamore. The site was bordered by arable crops (BC1) and residential properties (BL3, GA2).

Electro-fishing was not undertaken at site D2 due to prohibitive water depths and lacustrine conditions (**Appendix 1A**).

The site was a high value coarse fish habitat with tench (*Tinca tinca*), roach, pike and perch observed during the survey. The Grand Canal is also a good quality nursery area for European eel given abundant instream refugia and prey resources (small fish and invertebrates). No white-clawed crayfish were recorded during the survey. Despite high foraging suitability, no otter signs were recorded in the vicinity of the site.

Site D2 was unsuitable for Q-sampling given its location on a canal. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via sweep sampling. However, of note the water stick insect *Ranatra linearis*, a recent discovery in Ireland (Nelson, 2018), was recorded in the sample.

Given the location of the site within the Grand Canal pNHA (002104), the aquatic ecological evaluation of site D2 was of **national importance (Table 4.4).**



Plate 4.24 Representative image of site D2 on the Grand Canal at Shee Bridge, August 2024

4.1.25 Site D3 – Upper Ballynakill River, Derrymullen

Site D3 was located on the Upper Ballynakill River (14U09), a Slate River tributary, at the R403 road and proposed GCR crossing. The small lowland stream (FW2) had been historically straightened and deepened, resulting in a trapezoidal channel with poor hydromorphology and steep 3m high banks. The river was 2-3m wide and 0.05-0.1m deep with a profile of slow-flowing glide and riffle. The river suffered from low summer water levels at the time of survey with high turbidity (suspended silt). The substrata were dominated by heavily bedded cobble and coarse gravels with moderate to heavy siltation. The channel had numerous road storm drains that evidently were contributing to silt loading under the box culvert. Given high riparian shading, macrophytes were absent. Aquatic bryophytes were limited to *Leptodictyum riparium*. The river was well-shaded by mature treelines of beech (*Fagus sylvatica*) and ash with ivy. The site was bordered by residential areas (BL3, GA2) with narrow buffers.

Three-spined stickleback was the only fish species recorded via electro-fishing at site D3 (**Appendix 1A**). With the exception of low densities of this species, the heavily silted and shallow channel was of poor value for salmonids or lamprey species given the lack of flow, shallow depths and heavily silted(bed) conditions. Some low potential for European eel existed given connectivity to the downstream Slate River although none were recorded. Suitability for white-clawed crayfish was low with none recorded (paucity of refugia). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q2-3 (poor status)** (**Appendix 1C**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site D3 was of **local importance (lower value) (Table 4.4).**



Plate 4.25 Representative image of site D3 on the Upper Ballynakill Stream, August 2024

4.1.26 Site D4 – Slate River, Quigley's Bridge

Site D4 was located on the upper reaches of the Slate River (14S01) at Quigley's Bridge (R403), a proposed GCR crossing. The lowland river (FW2) had been historically deepened (banks to 3m) but not straightened and retained some good seminatural characteristics. The river was 3m wide and 0.2-0.3m deep with a profile of mixed riffle, glide and pool and low summer flows at the time of survey. The substrata were dominated by heavily bedded cobble and coarse gravels with moderate to heavy siltation. Macrophyte growth was limited to localised fool's watercress. No aquatic bryophytes were recorded. Cover of filamentous algae was high (c. 40%) indicating enrichment pressures. The river was lined with dense hedgerows of grey willow, hawthorn and white willow (*Salix alba*) with bramble-dominated scrub although many areas had been historically cleared. The site was bordered by improved pasture (GA1).

Brown trout was the only fish species recorded via electro-fishing at site D4 (**Appendix 1A**). The site was a moderate quality salmonid nursery and spawning area given the stoney bed and broken flow patterns, although this was compromised by enrichment and siltation pressures. Good quality holding habitat for adult salmonids was present in pools and bank scours with overhanging vegetation. These areas also offered some habitat for European eel although none were recorded. Soft sediment accumulations were typically flocculent and unsuitable for lamprey ammocoetes. The site some low suitability for white-clawed crayfish given alkaline nature with semi-natural character and stoney refugia. However, the species was not recorded and no remains were observed in a regular otter spraint site identified under the bridge (ITM 678796, 726794).

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status)** (**Appendix** 1**B**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the presence of salmonids and utilisation by otter, the aquatic ecological evaluation of site D4 was of **local importance (higher value) (Table 4.4).**



Plate 4.26 Representative image of site D4 on the upper reaches of the Slate River at Quigley's Bridge, August 2024

4.1.27 Site D5 – Slate River, New Bridge

Site D5 was located on the uppermost reaches of the Slate River (14S01) at New Bridge (R403), a proposed GCR crossing approximately 0.7km upstream of site D4. The channel was mapped (by the EPA) as the Slate River although the main flows of the Slate evidently present only in the downstream-connecting channel emanating from Ballynafagh Lake (perhaps erroneously named the West Coolearagh River). The channel at the road crossing was 1m wide with 2m high banks and was dry at the time of the survey with a dry mud base. The channel likely only held water following heavy rainfall. The ephemeral U-shaped channel was very heavily vegetated with abundant reed sweet-grass, iris (*Iris psuedacorus*), meadowsweet (*Filipendula ulmaria*) and great willowherb (*Epilobium hirsutum*) in the channel and on the sloping banks. The riparian areas supported scattered wych elm (*Ulmus glabra*), bramble and grey willow. The site was bordered by scrub (WS1), mixed woodland (WD1) and improved pasture (GA1).

Given the dry, ephemeral nature of the channel, no aquatic or fisheries habitats were present, and it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site D5 was of **local importance (lower value) (Table 4.4).**



Plate 4.27 Representative image of site D5 on the upper reaches of the Slate River at New Bridge, August 2024 (dry ephemeral channel)

4.1.28 Site D6 – Blackwood Feeder, R403 crossing

Site D6 was located on the Blackwood Feeder at the R403 road and proposed GCR crossing. The artificial Grand Canal supply was partially filled-in during the 1940s although still maintains an ecological link between Ballynafagh Lake and the Grand Canal, which is joins near Bonynge Bridge (NPWS, 2021b). The channel at the road crossing was 4-6m and dry at the time of survey with no aquatic habitats present, The channel was heavily scrubbed and encroached by terrestrial vegetation. The riparian areas supported mature elder, grey willow, hawthorn, sycamore, osier (*Salix viminalis*) and ash.

Given the dry, ephemeral nature of the channel, no aquatic or fisheries habitats were present, and it was not possible to collect a macro-invertebrate sample.

Given the location of the site within the Ballynafagh Lake SAC (001387), the aquatic ecological evaluation of site D6 was of **international importance (Table 4.4).**



Plate 4.28 Representative image of site D6 on the Blackwood Feeder of the Grand Canal, August 2024 (dry ephemeral channel)

4.1.29 Site D7 – Slate River, Graigues

Site D7 was located on the uppermost reaches of the Slate River (14S01) at a R403 road and proposed GCR crossing approximately 0.3km upstream of site D5. As noted above, the channel was mapped (by the EPA) as the Slate River although the main flows of the Slate evidently emanated from the downstream-connecting channel (perhaps erroneously named the West Coolearagh River). The channel at the road crossing was 1m wide with 2m high banks and was dry at the time of the survey. The channel likely only held water following heavy rainfall. The ephemeral U-shaped channel featured a bare earth base with bramble, nettle and grassy margins and high encroachment by ruderal and herbaceous species. The riparian zone supported mature elder, ash and hawthorn. The site was bordered by residential properties (GA2, BL3) and improved pasture (GA1).

Given the dry, ephemeral nature of the channel, no aquatic or fisheries habitats were present, and it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site D7 was of **local importance (lower value) (Table 4.4).**



Plate 4.29 Representative image of site D7 on the upper reaches of the Slate River, August 2024 (dry ephemeral channel)

4.1.30 Site D8 – Brockagh River, Dagwelds Cross

Site D8 was located on the Brockagh River (14B73) at the R403 road and proposed GCR crossing. The channel represented a roadside drainage channel that was 0.5m wide and dry at the time of survey. The shallow ephemeral U-shaped channel featured a dry earthen base and was covered by a dense hawthorn, ivy and bramble hedgerow, or ruderal species in open areas. The channel likely only held water following heavy rainfall. The site was bordered by residential properties (GA2, BL3) and improved pasture (GA1).

Given the dry, ephemeral nature of the channel, no aquatic or fisheries habitats were present, and it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site D8 was of **local importance (lower value) (Table 4.4).**



Plate 4.30 Representative image of site D8 on the Brockagh River at Dagwelds Cross, August 2024 (dry, ephemeral channel)

4.1.31 Site D9 – unnamed stream, Black Stick Crossroads

Site D9 was located on an unnamed stream at the R403 road and proposed GCR crossing. The channel was 1m wide and dry at the time of survey with a dry mud base. The ephemeral U-shaped channel had been realigned historically and crossed under the road via a 600m culvert. The channel was heavily shaded by Leyland cypress (*Cupressus* × *leylandii*), ash and dense bramble scrub. The channel likely only held water following heavy rainfall. The site was bordered by residential properties and amenity grassland (GA2, BL3).

Given the dry, ephemeral nature of the channel, no aquatic or fisheries habitats were present, and it was not possible to collect a biological water quality sample.

Given the absence of aquatic species or habitats of higher conservation value, the aquatic ecological evaluation of site D9 was of **local importance (lower value) (Table 4.4).**



Plate 4.31 Representative image of site D9 on an unnamed stream at Black Stick Crossroads, August 2024 (dry, ephemeral channel)

4.2 White-clawed crayfish survey

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia and no crayfish remains were identified in otter spraint sites recorded during the survey. Furthermore, white-clawed crayfish eDNA was not detected in samples collected from the Figile River (sites A15 & A18), River Boyne (B2) or Slate River (C2) (section 4.3 below).

4.3 eDNA analysis

No white-clawed crayfish, crayfish plague or freshwater pearl mussel eDNA was detected in composite water samples collected from the Figile River (sites A15 & A18), River Boyne (B2) or Slate River (C2) (0 positive qPCR replicates out of 12, respectively) (**Table 4.1; Appendix 1C**). These results were considered as evidence of the species' absence at and or upstream of the sampling locations.

Table 4.1 eDNA results in the vicinity of the proposed Ballydermot wind farm, Co. Offaly (positive qPCR replicates out of 12 in parentheses)

Site	Watercourse	Freshwater pearl mussel	White-clawed crayfish	Crayfish plague
A15	Figile River	Negative (0/12)	Negative (0/12)	Negative (0/12)
A18	Figile River	Negative (0/12)	Negative (0/12)	Negative (0/12)
B2	River Boyne	Negative (0/12)	Negative (0/12)	Negative (0/12)
C2	Slate River	Negative (0/12)	Negative (0/12)	Negative (0/12)

4.4 Biological water quality (macro-invertebrates)

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a total of 24 no. wetted riverine sites in July-August 2024 (**Appendix C**). Whilst not protected, the nationally uncommon water stick insect *Ranatra linearis*, a recent discovery in Ireland (Nelson, 2018), was recorded at site D2 on the Grand Canal (the species has been recorded at multiple locations on the Grand Canal in recent years; Triturus data).

None of the survey sites achieved greater than **Q3-4 (moderate status)** and thus all failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**).

Site A6 on the Cloncant Stream achieved **Q3-4 (moderate status)** water quality (**Figure 4.1**). Despite the presence of the EPA group A mayfly species *Ecdyonurus* sp., this was only recorded in low numbers (<5% of total sample) and thus did not meet the qualifying criteria for good status as set out by Toner et al. (2005).

A total of 21 no. sites (i.e. A1, A2, A3, A4, A5, A7, A8, A9, A10, A11, A12, A14, A15, A16, A18, B2, C1, C2, D1, D3 & D4) achieved **Q2-3 or Q3 (poor status)** based on an absence of group A species, low numbers of group B species and a dominance of group C and D species, particularly freshwater shrimp (*Gammarus duebeni*) and hoglouse (*Asellus aquaticus*) (**Appendix 1C**).

Sites A17 on the Ballygarrett River and B1 on the Clonkeen Stream achieved Q2 (bad status) given the dominance of highly pollution tolerant group D and E species such as *Asellus aquaticus* and Chironomus spp. (**Appendix 1C**). However, the ratings for both sites were tentative given poor summer flows and an absence of riffle areas for sampling (as per Toner et al., 2005). The Q-rating for a further 12 no. sites were also tentative for these reasons (**Appendix 1C**)

Sites D5, D6, D7, D8 and D9 were dry at the time of survey and thus it was not possible to collect a biological water quality sample at these locations.

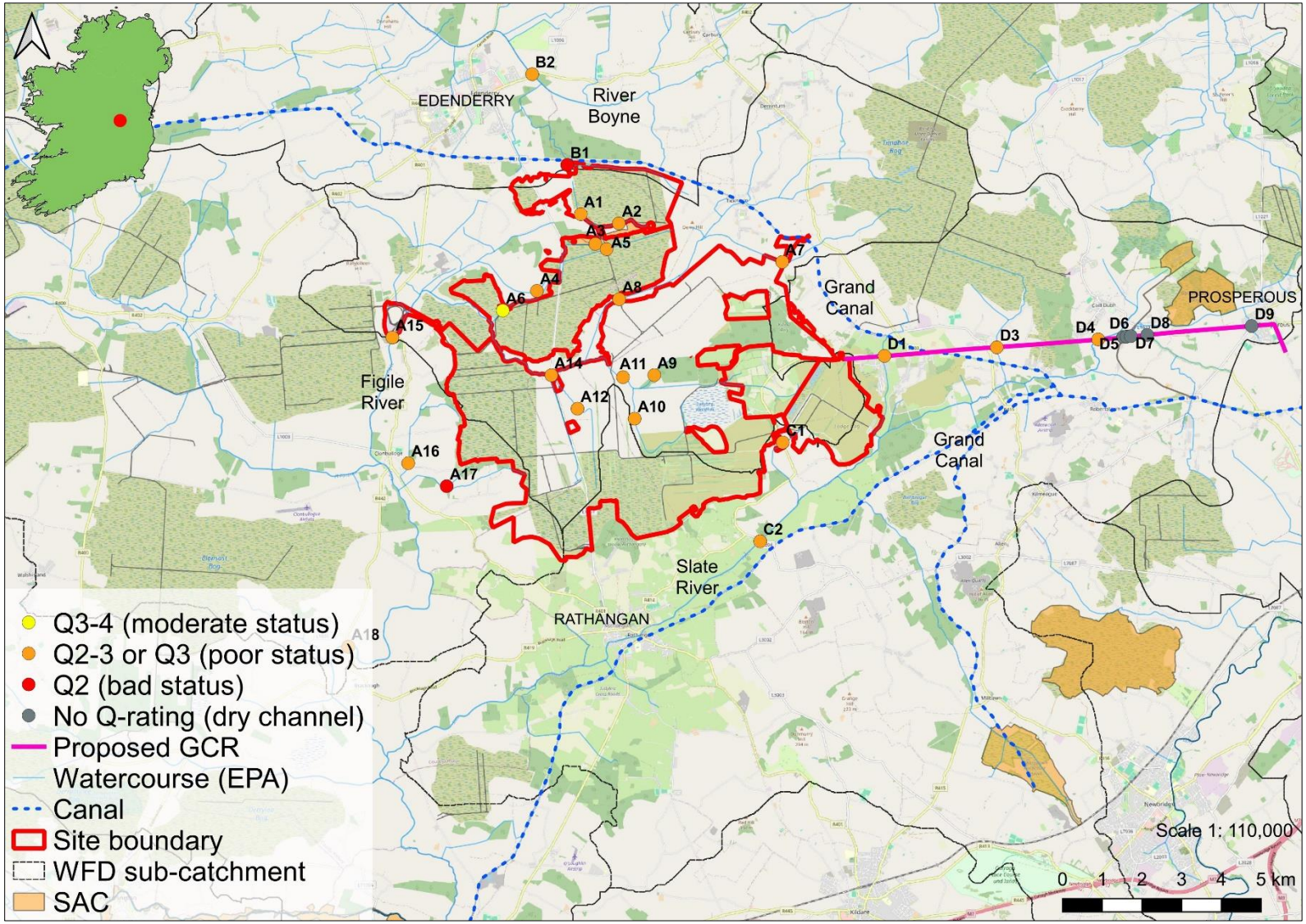


Figure 4.1 Overview of the biological water quality status in the vicinity of the proposed development, July-August 2024

Table 4.2 Relative abundance of fish species of higher conservation value recorded via **electro-fishing** in the vicinity of the proposed development, July-August 2024

Site	Watercourse	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Other species
A1	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A2	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A3	Codd River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A4	Codd River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A5	Cloncant Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A6	Cloncant Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A7	Abbeylough Stream	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
A8	Figile River	Not recorded	Low	Not recorded	Not recorded	Three-spined stickleback
A9	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A10	Lullybeg Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A11	Lullymore East River	Not recorded	Low	Not recorded	Low	Three-spined stickleback
A12	Lullybeg Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A13	Clonbrown River	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
A14	Figile River	Not recorded	Low	Not recorded	Not recorded	Minnow, perch, pike, roach, stone loach
A15	Figile River	Not recorded	Not recorded	Not recorded	Not recorded	Dace, pike, roach, stone loach
A16	Clonbulloge River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A17	Ballygarrett River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A18	Figile River	Low	Low	Not recorded	Not recorded	Minnow, dace, gudgeon, pike, stone loach
B1	Clonkeen Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
B2	River Boyne	Not recorded	Low	High	Low	No fish recorded
C1	Drumsru Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
C2	Slate River	Low	Low	Not recorded	Not recorded	Stone loach, dace, minnow
D1	Killinagh Upper Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
D2	Grand Canal	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
D3	Upper Ballynakill River	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
D4	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	Brown trout
D5	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D6	Blackwood Feeder	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)

Site	Watercourse	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Other species
D7	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D8	Brockagh River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D9	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)

Table 4.3 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of the proposed development, July-August 2024

Site	Watercourse	White-clawed crayfish	Otter signs[3]	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
A1	Unnamed stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A2	Unnamed stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A3	Codd River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A4	Codd River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A5	Cloncant Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A6	Cloncant Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A7	Abbeylough Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A8	Figile River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A9	Unnamed stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A10	Lullybeg Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A11	Lullymore East River	None recorded	No signs recorded	Not present	None recorded	None recorded	**European eel**
A12	Lullybeg Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A13	Clonbrown River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A14	Figile River	None recorded	**Regular spraint site**	Not present	None recorded	None recorded	**European eel**
A15	Figile River	None recorded	**Spraint site**	Not present	None recorded	None recorded	None recorded
A16	Clonbulloge River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A17	Ballygarrett River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
A18	Figile River	None recorded	No signs recorded	Not present	None recorded	None recorded	**Atlantic salmon**
B1	Clonkeen Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	**European eel (known from site; Triturus, 2021)**

Site	Watercourse	White-clawed crayfish	Otter signs[3]	Annex I aquatic habitats	Rare or protected macrophytes/ aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
B2	River Boyne	None recorded	**Latrine & prints**	Not present	None recorded	None recorded	***Lampetra* sp., European eel**
C1	Drumsru Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
C2	Slate River	None recorded	**Spraint site**	Not present	None recorded	None recorded	**Atlantic salmon**
D1	Killinagh Upper Stream	None recorded	**Regular spraint site**	Not present	None recorded	None recorded	None recorded
D2	Grand Canal	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D3	Upper Ballynakill River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D4	Slate River	None recorded	**Regular spraint site**	Not present	None recorded	None recorded	None recorded
D5	Slate River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D6	Blackwood Feeder	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D7	Slate River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D8	Brockagh River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
D9	Unnamed stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded

Conservation value: Eurasian otter (*Lutra lutra*), Atlantic salmon (*Salmo salar*) & lamprey (*Lampetra* spp.) are listed under Annex II and Annex V of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive'). European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011).

[3] Otter signs within 150m of the survey site

Table 4.4 Aquatic ecological evaluation summary of the survey sites according to NRA (2009) criteria

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
A1	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A2	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A3	Codd River	14C44	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A4	Codd River	14C44	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A5	Cloncant Stream	14C41	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A6	Cloncant Stream	14C41	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3-4 (moderate status) water quality
A7	Abbeylough Stream	14A01	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A8	Figile River	14F01	**Local importance (higher value)**	Salmonids recorded
A9	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A10	Lullybeg Stream	14L13	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A11	Lullymore East River	14L11	**Local importance (higher value)**	Salmonids and Red-listed European eel recorded
A12	Lullybeg Stream	14L33	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A13	Clonbrown River	14C32	Local importance (lower value)	No aquatic species or habitats of high conservation value
A14	Figile River	14F01	**Local importance (higher value)**	Salmonids, Red-listed European eel & otter recorded
A15	Figile River	14F01	**Local importance (higher value)**	Otter recorded
A16	Clonbulloge River	14C53	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality (tentative rating)
A17	Ballygarrett River	14B30	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2 (bad status) water quality (tentative rating)
A18	Figile River	14F01	**Local importance (higher value)**	Salmonids (including Atlantic salmon) recorded

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
B1	Clonkeen Stream	07C36	**Local importance (higher value)**	Red-listed European eel known from site (Triturus, 2021)
B2	River Boyne	07B04	**Local importance (higher value)**	Salmonids, lamprey (*Lampetra* sp.), Red-listed European eel & otter recorded
C1	Drumsru Stream	14D19	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2-3 (poor status) water quality (tentative rating)
C2	Slate River	14S01	**Local importance (higher value)**	Salmonids (including Atlantic salmon) & otter recorded
D1	Killinagh Upper Stream	14K17	**Local importance (higher value)**	Otter recorded
D2	Grand Canal	n/a	**National importance**	Located within the Grand Canal pNHA (002104)
D3	Upper Ballynakill River	14U01	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q2-3 (poor status) water quality
D4	Slate River	14S01	**Local importance (higher value)**	Salmonids & otter recorded
D5	Slate River	14S01	Local importance (lower value)	No aquatic species or habitats of high conservation value; no biological water quality sample possible (dry, ephemeral channel)
D6	Blackwood Feeder	n/a	**International importance**	Located within the Ballynafagh Lake SAC (001387)
D7	Slate River	14S01	Local importance (lower value)	No aquatic species or habitats of high conservation value; no biological water quality sample possible (dry, ephemeral channel)
D8	Brockagh River	14B73	Local importance (lower value)	No aquatic species or habitats of high conservation value; no biological water quality sample possible (dry, ephemeral channel)
D9	Unnamed stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; no biological water quality sample possible (dry, ephemeral channel)

Conservation value: Eurasian otter (*Lutra lutra*), Atlantic salmon (*Salmo salar*) & lamprey (*Lampetra* spp.) are listed under Annex II of the Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) ('EU Habitats Directive') and are protected under the Irish Wildlife Acts 1976-2023. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011). Atlantic salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations. Apart from the Inland Fisheries Acts 1959 to 2017, non-anadromous brown trout and coarse fish species have no legal protection in Ireland.

5. Discussion

The surveyed watercourses in the vicinity of the proposed Ballydermot wind farm development were typically small lowland channels draining areas of peatland that experienced low summer flows. Historical drainage pressures (straightening, deepening) and ongoing peat escapement (siltation) had significantly reduced the quality of aquatic habitats and biological water quality on the majority of surveyed watercourses. Sites were often evaluated as **local importance (lower value) (Table 4.4)**. However, in keeping with previous 2021 surveys, several species of high conservation value were recorded in the survey area, including Annex II Atlantic salmon, lamprey (*Lampetra* sp.) and otter as well as Red-listed European eel. This resulted in the aquatic evaluation of 10 no. sites on the Figile River (A8, A14, A15, A18), Lullymore East River (A11), Clonkeen Stream (B1), River Boyne (B2), Slate River (C2, D4) and the Killinagh Upper Stream (D1) as **local importance (higher value) (Table 4.4).** Site D2 on the Grand Canal was of **national importance** given its location with the Grand Canal pNHA (002104), and site D6 on the Blackwood Feeder (despite not featuring permanent aquatic habitats) was of **international importance** given its location within the Ballynafagh Lake SAC (001387) where it served as an ecological corridor.

Freshwater pearl mussel and white-clawed crayfish were not recorded during the surveys, in keeping with findings of the previous 2021 surveys. No rare or protected macro-invertebrates, macrophytes or aquatic bryophytes, nor examples of Annex I aquatic habitats were recorded. Broadly speaking, the highest value watercourses in the survey area in terms of aquatic ecology were the larger River Boyne, Figile River, Slate River, in addition to the Grand Canal (crossed by the proposed GCR).

5.1 Fisheries

A typical diversity of fish species for the upper Barrow and Boyne catchments was recorded during the electro-fishing survey, with Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel, stone loach, minnow, gudgeon, pike, perch and three-spined stickleback captured, alongside invasive roach and dace[3] (**Table 4.2**). A similar fish assemblage was recorded at comparable sites in the previous 2021 surveys (**Appendix A**).

Salmonid populations were restricted in their distribution, with low densities of brown trout being recorded from a total of 6 no. sites on the Figile River (A8, A14, A18), Lullymore East River (A11), River Boyne (B2) and the Slate River (C2) (**Table 4.2**). Annex II Atlantic salmon were only recorded from sites A18 on the Figile River (Millgrove Bridge) and C2 on the Slate River (Agar Bridge). As per previous surveys, lamprey ammocoetes (*Lampetra* sp.) were only recorded from a single site on the River Boyne at Kishawanny Bridge (B2), where low densities were present. The quality of lamprey habitat was generally poor across the survey area given widespread hydromorphological and siltation pressures (**Appendix A**). Red-listed European eel were also restricted in their distribution, being recorded from sites A11 on the Clonkeen Stream (a Figile tributary) and B2 on the River Boyne. Siltation and eutrophication pressures were significant throughout much of the survey area and were evidently

[3] Although established in Ireland, both roach and dace are invasive cyprinid species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011) and subject to Regulations 49 and 50 throughout the State

contributing to a reduction in the quality of fisheries habitat, particularly for salmonids and lamprey (**Appendix A**).

5.2 Otter

Otter signs (comprising spraints, latrines and or prints) were recorded from a total of 6 no. sites on the Figile River (site A14, A15), River Boyne (B2), Slate River (C2, D4) and the Killinagh Upper Stream (D1), a Slate tributary. Otters are known to be widespread in the vicinity of the proposed wind farm (**Figure 3.1**), including during the previous surveys (Triturus, 2021), with a preference for larger lowland channels such as the River Boyne, Figile River and Slate River which support superior prey resources (Hong et al., 2020; Sittenthaler et al., 2019; Scorpio et al., 2016; Reid et al., 2013; Remonti et al., 2009). No breeding (holt) or couch (resting) areas were identified in the vicinity of the survey sites in July-August 2024.

5.3 White-clawed crayfish

Despite local habitat suitability and numerous available records within the study area, including on the Figile and Slate rivers (1986-2020; **Figure 3.1**), no white-clawed crayfish were recorded during the current survey. Environmental DNA sampling of the Figile, Boyne and Slate rivers also failed to detect the species in the survey area (**Table 4.1; Appendix 1B**). No crayfish were recorded during the previous 2021 surveys (Triturus, 2021). The limited distribution would appear to be reflective of not only peat harvesting and historical drainage pressures but also of the spread of crayfish plague. The Boyne catchment suffered crayfish plague outbreaks in the late 1980s (Demers et al., 2005) and in more
recent years, crayfish plague has been confirmed on the Slate River in the vicinity of Rathangan (NPWS, 2019). However, white-clawed crayfish were detected via eDNA sampling on the Figile River as recently as 2020 (near Bracknagh) as part of the National Crayfish Plague Surveillance Programme (NCPSP), although most crayfish records within the wider survey area are from 2015 or before (NPWS, EPA & Triturus data).

5.4 Biological water quality & pressures

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from a total of 24 no. wetted riverine sites in July-August 2024 (**Appendix C**), i.e. none of greater than Least Concern.

None of the survey sites achieved greater than **Q3-4 (moderate status)** and thus all failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**). Whilst not all of the current survey sites were directly comparable to previous surveys (Triturus, 2021), biological water quality results were broadly similar in the wider survey area (i.e. less than good status). Low summer flows and hydromorphological modifications often resulted in tentative Q-ratings for the survey sites, as per the guidelines of Toner et al. (2005). In general, the biological water quality of the survey area was of **poor status (Q2-3 or Q3)** with significant siltation, eutrophication and hydromorphological impacts evidently contributing to a reduction in aquatic habitat quality. Arterial drainage (hydromorphological) and peat harvesting have been identified as the major pressures impacting water quality in the upper Barrow and Boyne catchments (EPA data) and this was observed during the current and previous surveys.

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7. Appendix 1A – Fisheries assessment report

Please see accompanying fisheries assessment report

Fisheries assessment for the proposed Ballydermot wind farm, Co. Offaly and Co. Kildare (2024)

Prepared by Triturus Environmental Ltd. for MKO

November 2024

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by MKO to undertake a baseline fisheries assessment of numerous watercourses in the vicinity of the proposed Ballydermot wind farm, located near Clonbulloge, Co. Offaly.

The survey was undertaken to establish baseline fisheries data used in the preparation of the EIAR for the proposed development and would update previous surveys completed by Triturus in July 2021 (Triturus, 2021). In order to gain an accurate overview of the existing and potential fisheries value of the watercourses within the vicinity of the proposed development, a catchment-wide electro-fishing survey across *n*=29 riverine sites was undertaken (**Table 2.1; Figure 2.1**). A fisheries appraisal of 2 no. sites on the Grand Canal and Blackwood Feeder was also completed. Electro-fishing helped to identify the importance of the watercourses as nurseries and habitats for salmonids, lamprey (*Lampetra* sp.) and European eel (*Anguilla anguilla*). Other species of lower conservation value were also recorded. The presence and or absence of fish populations and or associated supporting habitat would help inform impact assessment and any subsequent mitigation for the development.

Triturus Environmental Ltd. made an application under Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962, to undertake a catchment-wide electro-fishing survey in the vicinity of the proposed Ballydermot wind farm. The surveys were undertaken in July and August 2024.

1.2 Fisheries (desktop review)

The River Boyne rises in Co. Kildare and flows for over 110km in a north easterly direction through counties Offaly, Meath and Louth before entering the Irish Sea at Drogheda. The Boyne is a designated salmonid watercourse under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988) and is a renowned wild brown trout, Atlantic salmon and (in its lower reaches) sea trout fishery (O'Reilly, 2009). As well as salmonids, the river is known to support *Lampetra* sp., European eel (*Anguilla anguilla*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and three-spined stickleback (*Gasterosteus aculeatus*) (Kelly et al., 2011a, 2011b). A number of other cyprinid species are also known from the river, including roach (*Rutilus rutilus*) and bream (*Abramis brama*), primarily in the middle to lower reaches (pers. obs.).

The Slate River is one of the larger Barrow sub-catchments and covers an area of approximately 214km^2. As part of the upper Barrow system, the Slate is known to support a range of fish species including brown trout, Atlantic salmon, *Lampetra* sp., minnow, three-spined stickleback, roach, perch (*Perca fluviatilis*), stone loach, European eel and invasive dace (*Leuciscus leuciscus*) (Gordon et al., 2021; Delanty et al., 2017; Triturus 2021 data). Whilst the Slate is a noted recreational trout fishery (O'Reilly, 2009), the Slate sub-catchment has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures (Delanty et al., 2017).

The Figile is the largest of the Barrow sub-catchments and drains an area of approximately 320km^2. After its confluence with the Cushina and Slate Rivers, it becomes the Black River before it enters the River Barrow at Monasterevin. The Figile is known to support brown trout, European eel, lamprey (*Lampetra* sp.), minnow, stone loach, roach, roach x bream hybrids (*Rutilus rutilus* x *Abramis brama*), dace, perch, pike, three-spined stickleback and nine-spined stickleback (*Pungitius pungitius*) (Gordon et al., 2021; Delanty et al., 2017). Invasive dace have been known in the River Barrow catchment since the early 1990s (Caffrey et al., 2007). The Figile River has been identified as one of the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

The Grand Canal is known to support a range of coarse fish species, including perch, pike (*Esox lucius*), bream, roach, rudd (*Scardinius erythropthalmus*) and their respective hybrids, European eel and tench (*Tinca tinca*) with highly localised common carp (*Cyprinus carpio*) and brown trout (*Salmo trutta*) (IFI data; McLoone, 2011; Tierney et al., 1999; pers. obs.). *Lampetra* sp. lamprey have also been recorded at a low number of locations, e.g. 11th lock, ROD, 2016; 7th lock, Caffrey et al., 2006; 5th lock, MKO, 2019).

Brown trout and European eel are known from the Cloncant Stream, with brown trout also present in the Lullybeg Stream (Triturus 2021 data). No fish were recorded from sites on the Ballygarrett River or Drumsru Stream during previous surveys for the proposed development (Triturus, 2021).

2. Methodology

2.1 Fish stock assessment (electro-fishing)

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish sites on watercourses in the vicinity of the proposed Ballydermot wind farm on the 31st July and 1st, 2nd and 3rd August 2024 following notification to Inland Fisheries Ireland and under the conditions of a Department of the Environment, Climate and Communications (DECC) licence. The electro-fishing survey was undertaken across 29 no. riverine sites (see **Table 2.1, Figure 2.1**).

Both river and holding tank water temperature was monitored continually throughout the survey to ensure temperatures of 20°C were not exceeded, thus minimising stress to the captured fish due to low dissolved oxygen levels. A portable battery-powered aerator was also used to further reduce stress to any captured fish contained in the holding tank. Salmonids, European eel and other captured fish species were transferred to a holding container with oxygenated fresh river water following capture. To reduce fish stress levels, anaesthesia was not applied to captured fish. All fish were measured to the nearest millimetre and released in-situ following a suitable recovery period.

As three primary species groups were targeted during the survey, i.e., salmonids, lamprey, and eel, the electro-fishing settings were tailored for each species. By undertaking electro-fishing using the rapid electro-fishing technique (see methodology below), the broad characterisation of the fish community at each sampling reach could be determined as a longer representative length of channel was surveyed. Electro-fishing methodology followed accepted European standards (CEN, 2003) and adhered to best practice (e.g., CFB, 2008).

2.1.1 Salmonids and European eel

For salmonid species and European eel, as well as all other incidental species, electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson et al., 2018). A total of approximately 30-75m channel length was surveyed at each site, where feasible, in order to gain a better representation of fish stock assemblages.

Relative conductivity of the water at each site was checked in-situ with a conductivity meter and the electro-fishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids and European eel to the anode without harm. For the moderate conductivity waters of the sites a voltage of 220-275v, frequency of 35-40Hz and pulse duration of 3.5-4ms was utilised to draw fish to the anode without causing physical damage.

2.1.2 Lamprey

Electro-fishing for lamprey ammocoetes was conducted using targeted quadrat-based electro-fishing (as per Harvey & Cowx, 2003) in objectively suitable areas of sand/silt, where encountered. As lamprey take longer to emerge from silts and require a more persistent approach, they were targeted at a lower frequency (30Hz) burst DC pulse setting which also allowed detection of European eel in sediment, if present. Settings for lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven & McAuley (2013). Using this approach, the anode was placed under

the water's surface, approximately 10-15cm above the sediment, to prevent immobilising lamprey ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine-mesh hand net as they emerged.

Lamprey species were identified to species level, where possible, with the assistance of a hand lens, through external pigmentation patterns and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003).

2.2 Fisheries habitat

A fisheries habitat appraisal of all 31 no. sites was undertaken to establish the importance of the supporting habitats as nursery, spawning and or holding habitats. The appraisal surveys focused on evaluating the spawning, nursery and or holding habitat for salmonids and lamprey species but also considered European eel and other fish species. The appraisals of salmonids and lamprey were cognisant of species-specific habitat requirements and preferences as outlined in O'Grady (2006), Hendry et al. (2003), Armstrong et al. (2003), Harvey & Cowx (2003), Maitland (2003) and Hendry & Cragg-Hine (1997). River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (EA, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the riverine sites (i.e., channel profiles, substrata etc.).

2.3 Biosecurity

A strict biosecurity protocol following IFI (2010) and the Check-Clean-Dry approach was adhered to during surveys for all equipment and PPE used. Disinfection of all equipment and PPE before and after use with Virkon™ was conducted to prevent the transfer of pathogens or invasive propagules between survey sites. Surveys were undertaken at sites in a downstream order to minimise the risk of upstream propagule mobilisation. Particular cognisance was given towards preventing the spread or introduction of highly virulent crayfish plague (*Aphanomyces astaci*). Any aquatic invasive species or pathogens recorded within or adjoining the survey areas were geo-referenced. All Triturus staff are certified in 'Good fieldwork practice: slowing the spread of invasive non-native species' by the University of Leeds.

Table 2.1 Location of *n*=31 electro-fishing & fisheries appraisal survey sites in the vicinity of Ballydermot wind farm, Co. Offaly

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
A1	Unnamed stream	n/a	Derries	665752	729939
A2	Unnamed stream	n/a	Derries	666710	729706
A3	Codd River	14C44	Derries	666119	729187
A4	Codd River	14C44	Codd	664647	728006
A5	Cloncant Stream	14C41	Derries	666402	729057
A6	Cloncant Stream	14C41	Cushaling	663787	727511
A7	Abbeylough Stream	14A01	Kilpatrick	670827	728735
A8	Figile River	14F01	Ticknevin	666719	727796
A9	Unnamed stream	n/a	Lullybeg	667604	725885
A10	Lullybeg Stream	14L13	Lullybeg	667108	724788
A11	Lullymore East River	14L11	Lullybeg	666815	725833
A12	Lullybeg Stream	14L33	Cushaling	665668	725039
A13	Clonbrown River	14C32	Cushaling	665055	725590
A14	Figile River	14F01	Cushaling Bridge	665011	725882
A15	Figile River	14F01	Kilcumber Bridge	661004	726833
A16	Clonbulloge River	14C53	Clonmel	661405	723666
A17	Ballygarrett River	14B30	Clonmel	662374	723087
A18	Figile River	14F01	Millgrove Bridge	659896	719047
B1	Clonkeen Stream	07C36	Cloncanon	665410	731179
B2	River Boyne	07B04	Kishawanny Bridge	664528	733464
C1	Drumsru Stream	14D19	Barnaran	670840	724189
C2	Slate River	14S01	Agar Bridge	670272	721700
D1	Killinagh Upper Stream	14K17	Allenwood South	673402	726368
D2	Grand Canal	n/a	Shee Bridge	674633	726464
D3	Upper Ballynakill River	14U01	Derrymullen	676233	726584
D4	Slate River	14S01	Quigley's Bridge	678787	726784
D5	Slate River	14S01	New Bridge	679415	726846
D6	Blackwood Feeder (Grand Canal)	n/a	R403 road crossing	679608	726864
D7	Slate River	14S01	Graigues	679608	726864
D8	Brockagh River	14B73	Dagwelds Cross	680021	726896
D9	Unnamed stream	n/a	Black Stick Cross Roads	682652	727121

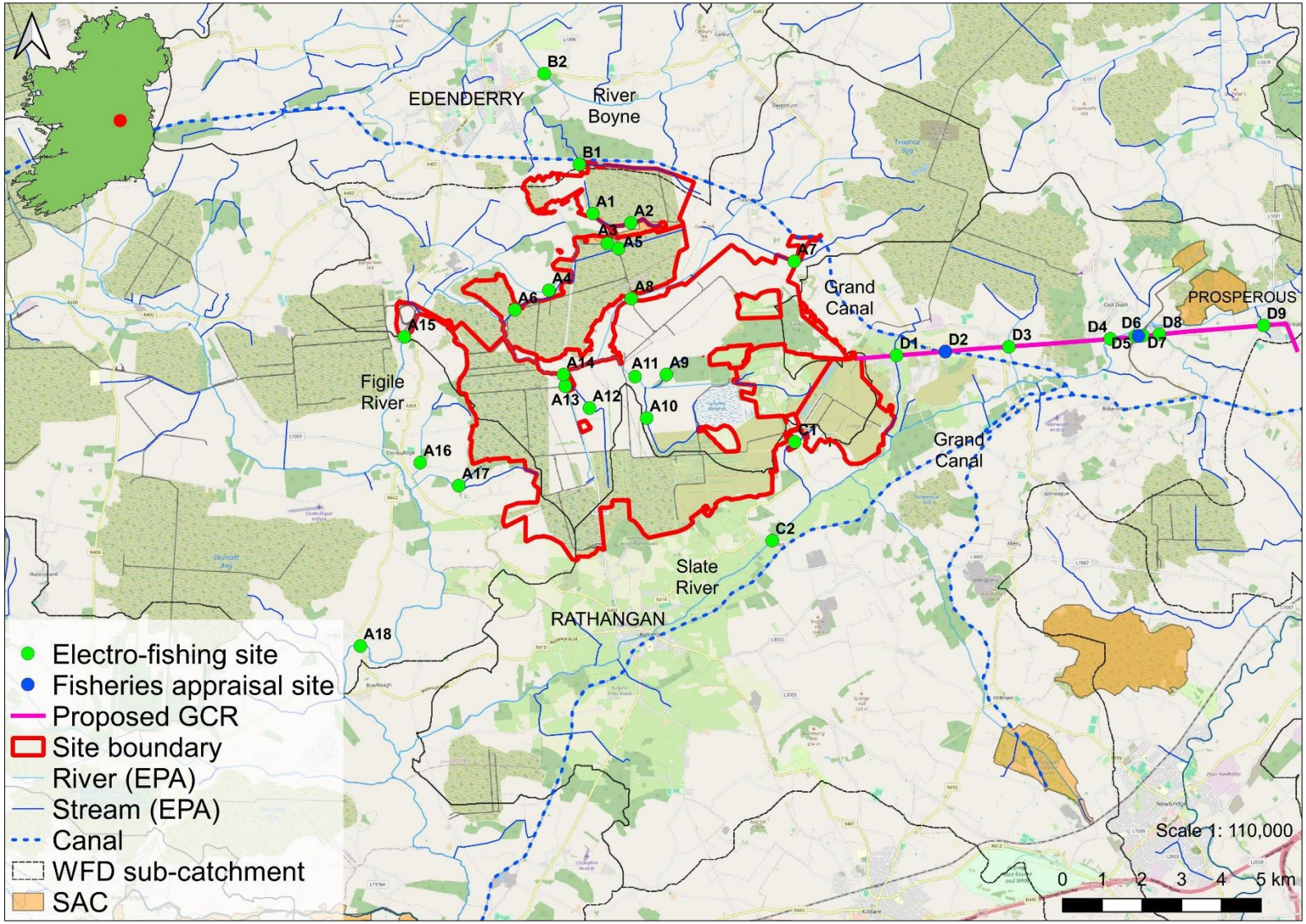


Figure 2.1 Overview of the *n*=31 electro-fishing & fisheries appraisal survey site locations for the proposed Ballydermot wind farm, Co. Offaly (2024)

3. Results

A catchment-wide fisheries survey of 29 no. riverine and 2 no. canal sites in the vicinity of the proposed Ballydermot wind farm was conducted on the 31st July and 1st, 2nd and 3rd August 2024 following notification to Inland Fisheries Ireland. The results of the survey are discussed below in terms of fish population structure, population size and the suitability and value of the surveyed areas as nursery and spawning habitat for salmonids, European eel and lamprey species. Scientific names are provided at first mention only.

3.1 Fisheries assessment & appraisal

3.1.1 Site A1 – unnamed stream, Derries

Three-spined stickleback (*Gasterosteus aculeatus*) (*n*=4) was the only fish species via electro-fishing at site A1 on an unnamed tributary of the Codd River (**Figure 3.1**).

The heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, absence of coarse substrata and significant siltation. The site had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources albeit the species was not recorded.

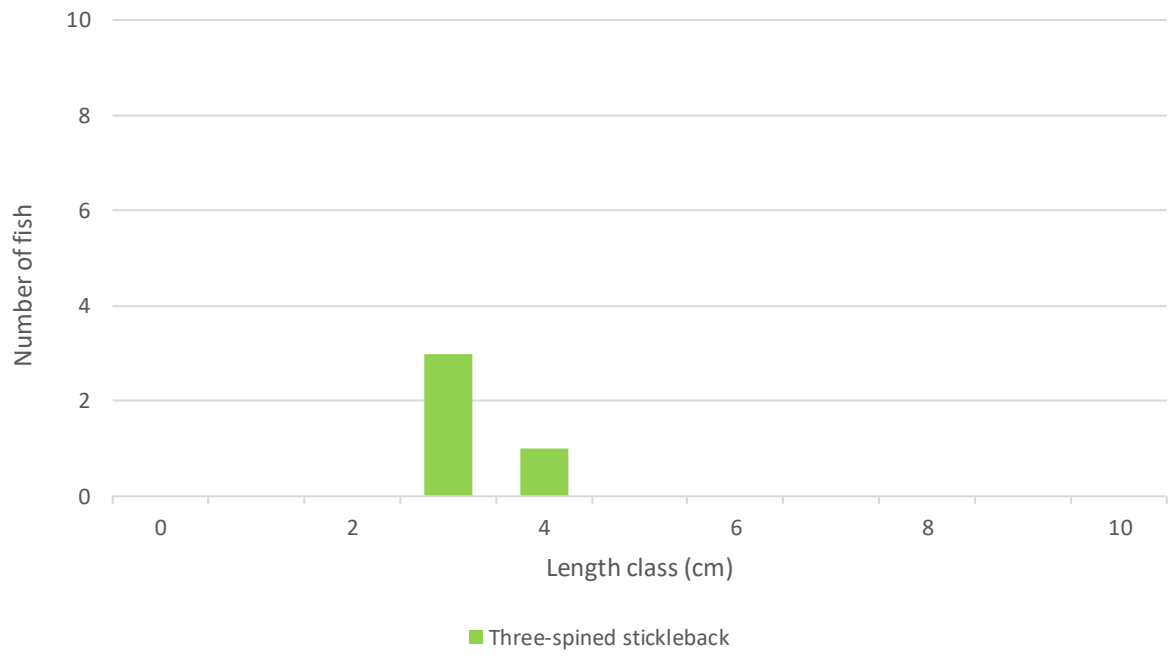


Figure 3.1 Length frequency distribution recorded via electro-fishing at site A1, July 2024



Plate 3.1 Male three-spined stickleback recorded at site A1 on an unnamed Codd River tributary, July 2024

3.1.2 Site A2 – unnamed stream, Derries

Three-spined stickleback (*n*=6) was the only fish species recorded via electro-fishing at site A2 on an unnamed tributary of the Codd River (**Figure 3.2**).

With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given the lack of flow, paucity of coarse substrata and significant siltation. The site had some value as a European eel nursery given deep water, abundant macrophyte refugia and prey resources albeit the species was not recorded.

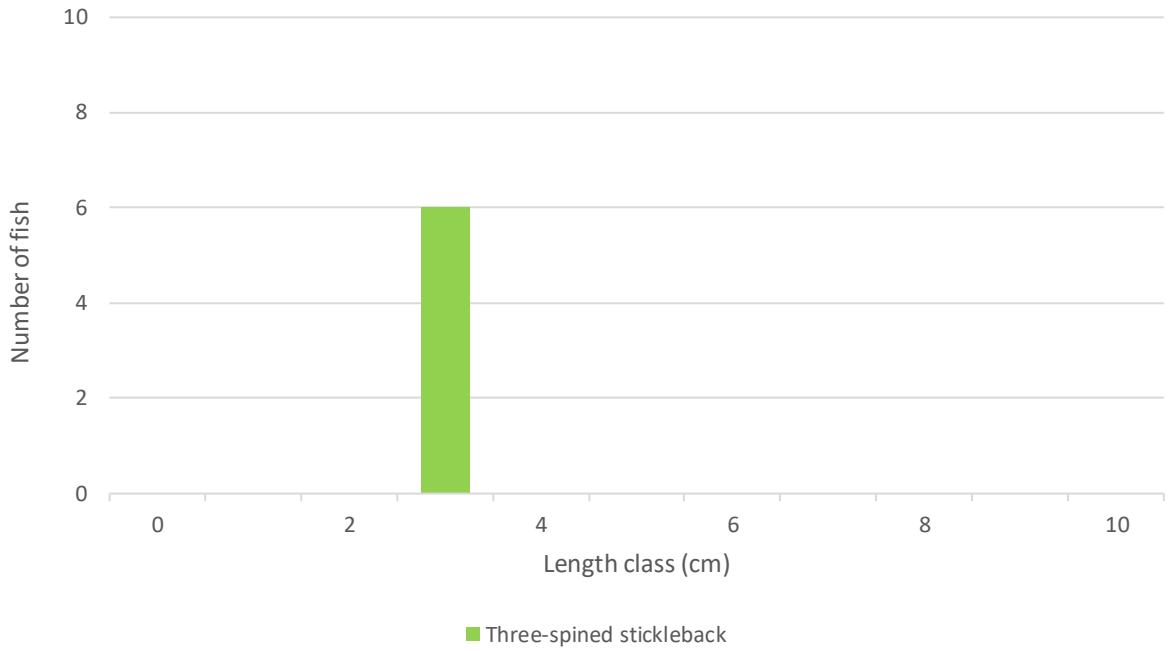


Figure 3.2 Length frequency distribution recorded via electro-fishing at site A2, July 2024



Plate 3.2 Representative image of site A2 on an unnamed Codd River tributary, July 2024

3.1.3 Site A3 – Codd River, Derries

No fish were recorded via electro-fishing at site A3 on the upper reaches of the Codd River (EPA code: 14C44). The channel at this location was not of fisheries value given extensive modifications, poor flows and siltation pressures.



Plate 3.3 Representative image of site A3 on the upper reaches of the Codd River, July 2024

3.1.4 Site A4 – Codd River, Codd

No fish were recorded via electro-fishing at site A4 on the upper reaches of the Codd River (14C44). The channel at this location was not of fisheries value given extensive modifications, poor flows and siltation pressures.



Plate 3.4 Representative image of site A4 on the upper reaches of the Codd River, July 2024

3.1.5 Site A5 – Cloncant Stream, Derries

Three-spined stickleback (*n*=10) was the only fish species recorded via electro-fishing at site A5 on the uppermost reaches of the Cloncant Stream (14C41) (**Figure 3.3**).

With the exception of low densities of this species, the heavily modified channel was not of fisheries value given the lack of flow, absence of coarse substrata and significant siltation.

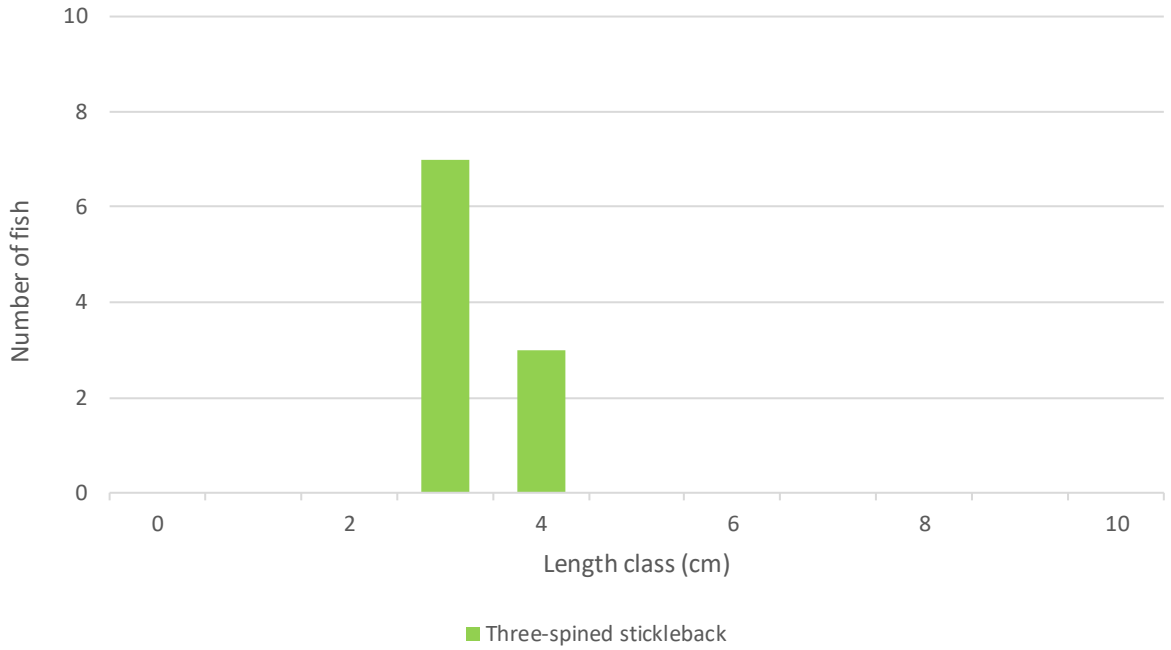


Figure 3.3 Length frequency distribution recorded via electro-fishing at site A5, July 2024



Plate 3.5 Representative image of site A5 on the Cloncant Stream, August 2024

3.1.6 Site A6 – Cloncant Stream, Cushaling

Three-spined stickleback (*n*=12) was the only fish species recorded via electro-fishing at site A6 on the Cloncant Stream (14C41) (**Figure 3.4**).

With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. The site had some low value as a European eel nursery given abundant refugia and suitable prey resources albeit the species was not recorded.

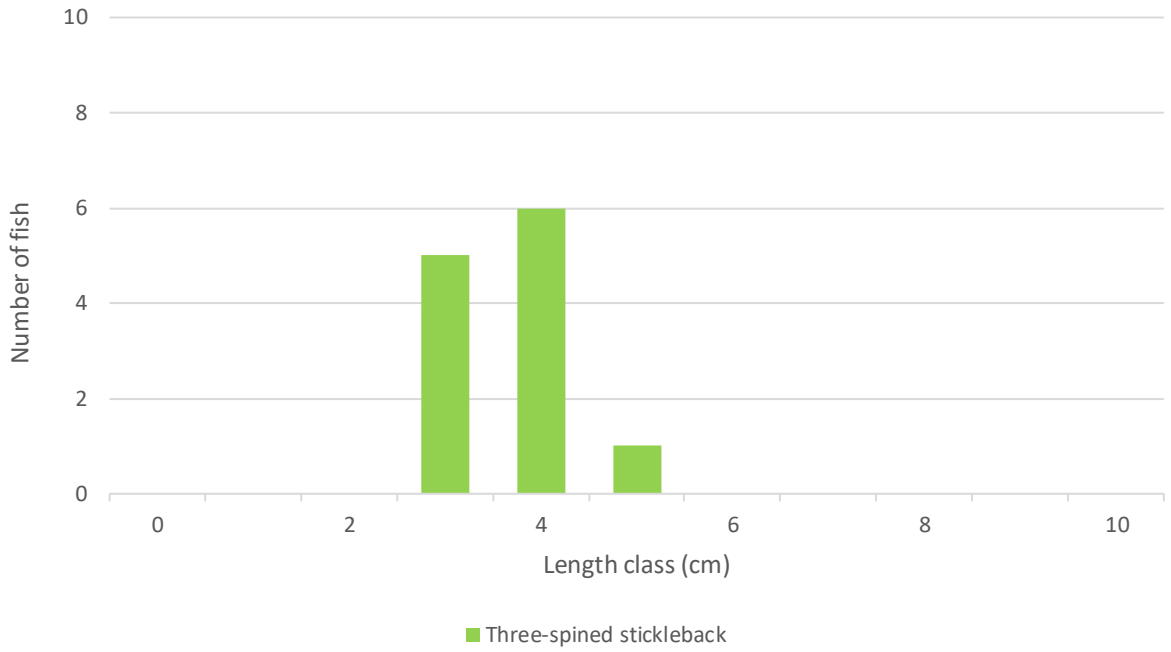


Figure 3.4 Length frequency distribution recorded via electro-fishing at site A6, July 2024



Plate 3.6 Representative image of site A6 on the Cloncant Stream, August 2024

3.1.7 Site A7 – Abbeylough Stream, Kilpatrick

Three-spined stickleback (*n*=8) was the only fish species recorded via electro-fishing at site A7 on the Abbeylough Stream (14A01) at a local road crossing (**Figure 3.5**).

With the exception of low densities of this species, the heavily modified channel was of poor fisheries value given the lack of flow, absence of coarse substrata and significant siltation. Despite some low suitability for European eel given deeper water and instream refugia (undercut banks, macrophytes), none were recorded.

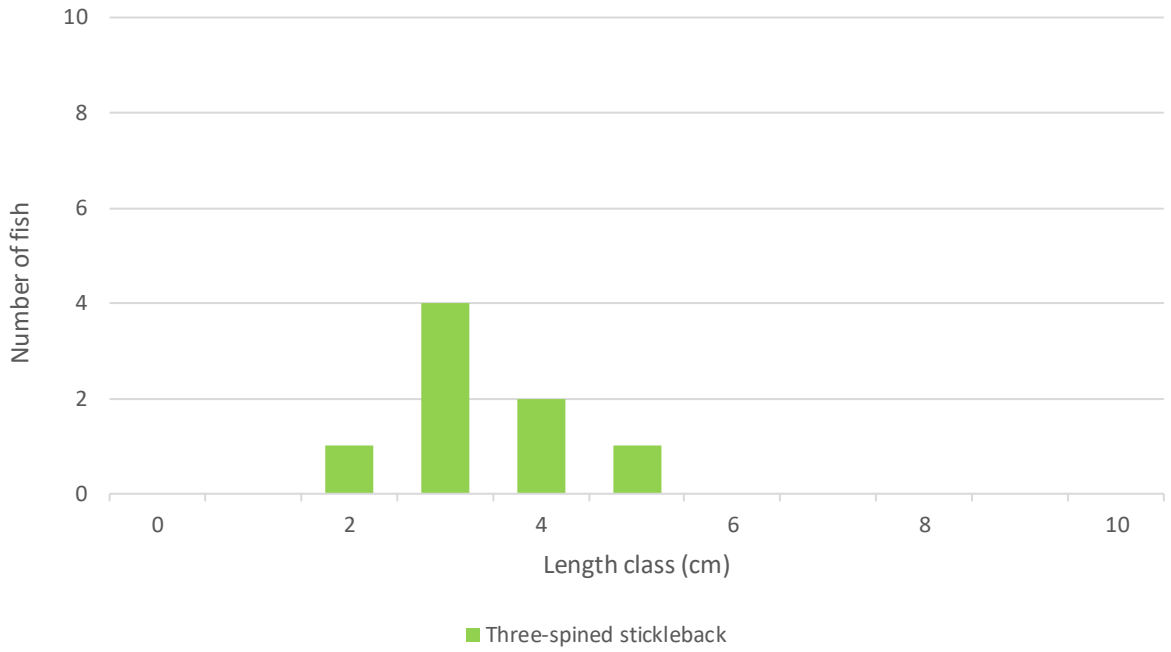


Figure 3.5 Length frequency distribution recorded via electro-fishing at site A7, July 2024



Plate 3.7 Representative image of site A7 on the Abbeylough Stream, August 2024

3.1.8 Site A8 – Figile River, Ticknevin

Brown trout (*Salmo trutta*) (*n*=3) and three-spined stickleback (*n*=3) were the only fish species recorded via electro-fishing at site A8 on the Figile River (14F01) at a bog access track crossing (**Figure 3.6**).

The site was of some low value as a salmonid nursery and spawning habitat, supporting a low density of juvenile trout, although the quality was reduced considerably by siltation and enrichment pressures. Spawning areas were limited to broken riffle and glide underneath bridges where mixed gravels free of algae were present. The site offered moderate quality European eel habitat (i.e. refugia under coarse substrata with ample prey resources) albeit no eel were recorded. Soft sediment areas were typically humic in nature and unsuitable for lamprey ammocoetes.

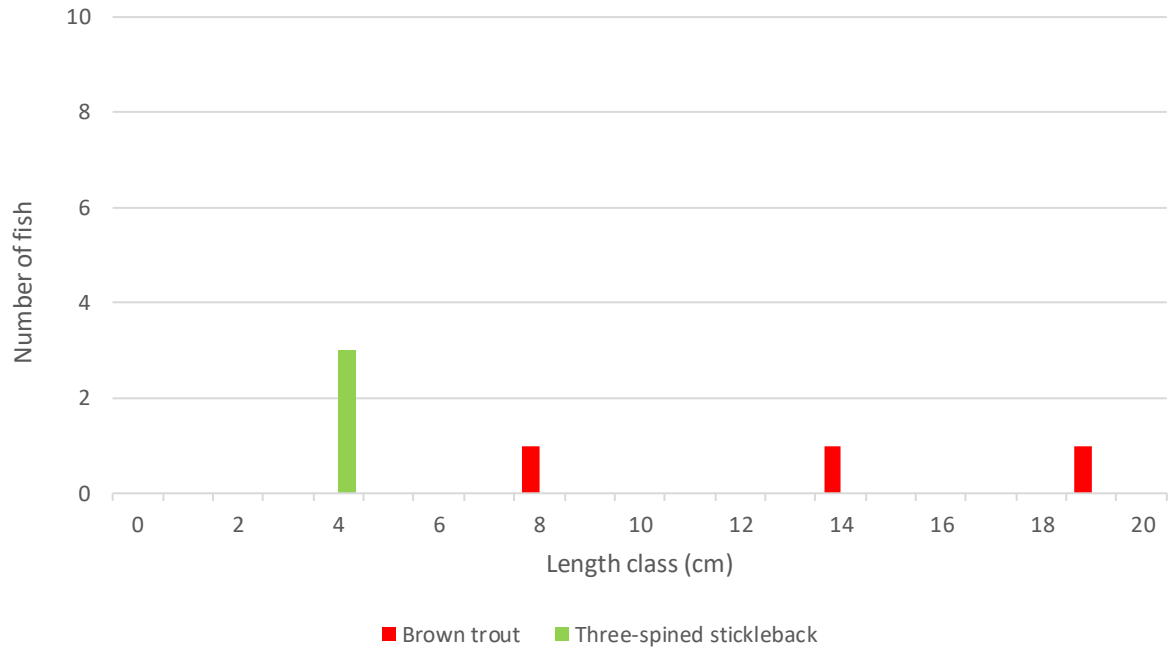


Figure 3.6 Length frequency distribution recorded via electro-fishing at site A8, July 2024



Plate 3.8 Juvenile brown trout recorded at site A8 on the Figile River, August 2024

3.1.9 Site A9 – unnamed stream, Lullybeg

No fish were recorded via electro-fishing at site A9 on an unnamed Lullymore East River tributary. The channel at this location was not of fisheries value given extensive modifications, poor flows, siltation pressures and poor connectivity with downstream habitats.



Plate 3.9 Representative image of site A9 on an unnamed Lullymore East River tributary, August 2024

3.1.10 Site A10 – Lullybeg Stream, Lullybeg

Three-spined stickleback (*n*=9) was the only fish species recorded via electro-fishing at site A10 (**Figure 3.7**).

With the exception of low densities of this species, the heavily silted channel was of low fisheries value and was unsuitable for salmonids or lamprey species given poor flows, poor hydromorphology, paucity of coarse substrata and significant siltation. The site had some low value as a European eel nursery given abundant refugia and suitable prey resources albeit the species was not recorded.

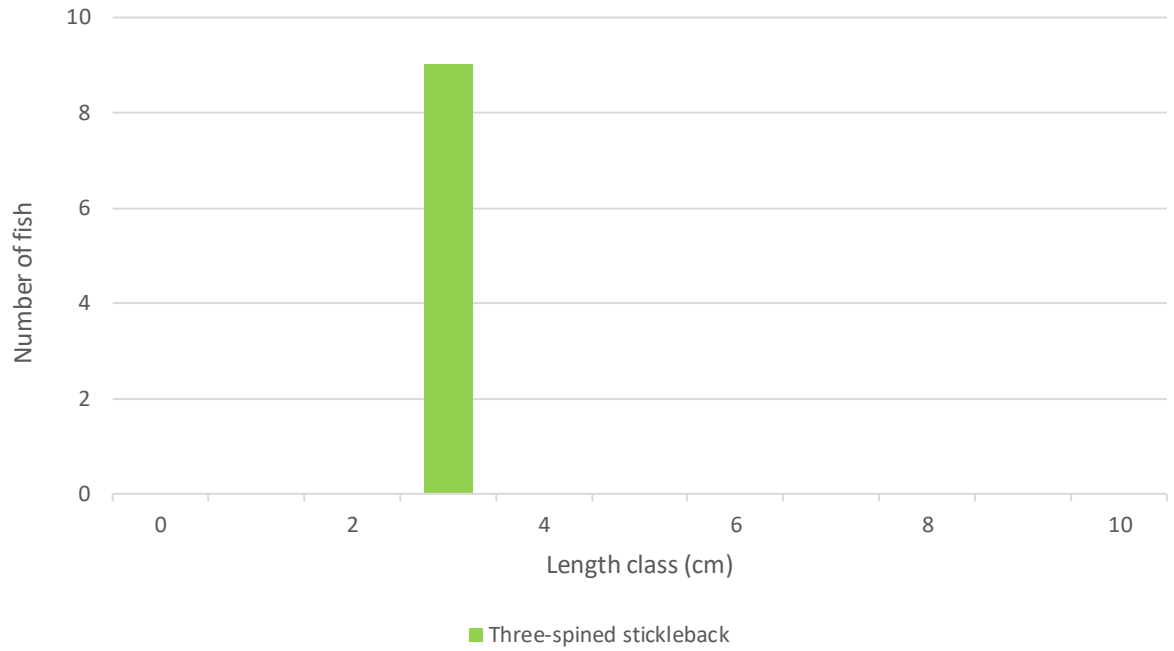


Figure 3.7 Length frequency distribution recorded via electro-fishing at site A10, July 2024



Plate 3.10 Representative image of site A10 on the Lullybeg Stream, August 2024

3.1.11 Site A11 – Lullymore East River, Lullybeg

Brown trout (*n*=1), European eel (*Anguilla anguilla*) (*n*=1) and three-spined stickleback (*n*=4) were recorded via electro-fishing at site A11 on the Lullymore East River (14L11) at a bog access track crossing (**Figure 3.8**).

The site was a poor quality salmonid habitat supporting a very low density of adult trout. Suitable spawning habitat was absent with the quality of nursery habitat impacted by poor flows, siltation and hydromorphological pressures. There was some low value as a salmonid holding habitat given the predominance of deep glide and pool. These areas also offered some value for European eel which were also present in low densities. Abundant soft sediment accumulations were unsuitable for lamprey.

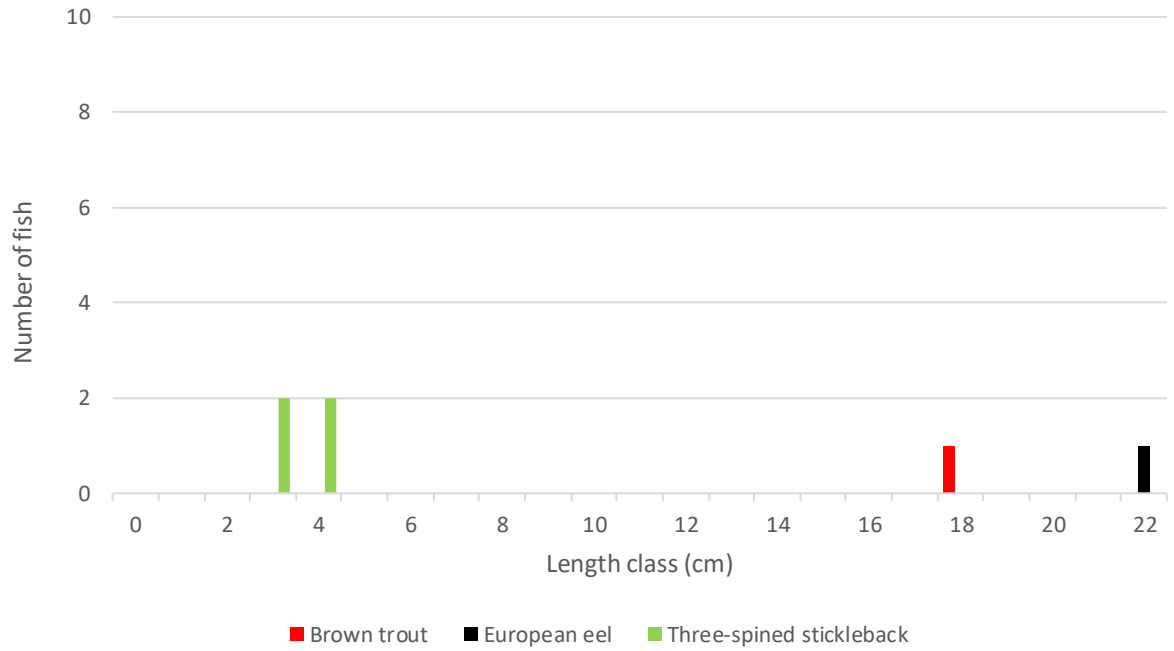


Figure 3.8 Length frequency distribution recorded via electro-fishing at site A11, July 2024



Plate 3.11 Juvenile European eel recorded at site A11 on the Lullymore East River, August 2024

3.1.12 Site A12 – Lullybeg Stream[1], Cushaling

Electro-fishing was not undertaken at site A12 due to prohibitive sediment and water depths on the Lullybeg Stream (14L33), a tributary of the Figile River. The site was of poor fisheries value given extensive modifications, poor flows and siltation pressures. However, there was some low suitability for coarse fish species (e.g. roach, dace, pike) and European eel given connectivity with the Figile River.

[1] A separate watercourse to the homonymous Lullybeg Stream (EPA code: 14L13) located c.1km east



Plate 3.12 Representative image of site A12 on the Lullybeg Stream, August 2024

3.1.13 Site A13 – Clonbrown River, Cushaling

Electro-fishing was not undertaken at site A13 due to prohibitive sediment and water depths on the Clonbrown River (14C32), a heavily modified tributary of the Figile River flowing through peat attenuation ponds. The ponding area had limited fisheries value apart from as a coarse fish habitat. Species such as roach, pike and perch may occur in the pond in addition to European eel although poor fluvial connectivity via culverts may restrict fish passage.



Plate 3.13 Representative image of site A13 on the impounded Clonbrown River, August 2024

3.1.14 Site A14 – Figile River, Cushaling Bridge

Brown trout (*n*=6), pike (*Esox lucius*) (*n*=5), perch (*Perca fluviatilis*) (*n*=1), stone loach (*Barbatula barbatula*) (*n*=9), minnow (*Phoxinus phoxinus*) (*n*=4) and roach (*Rutilus rutilus*) (*n*=1) were recorded via electro-fishing at site A14 on the Figile River[2] (14F01) at Cushaling Bridge (**Figure 3.9**).

The site was a poor quality salmonid habitat given significant enrichment pressures in addition to siltation that compromised the quality of spawning and nursery habitat. Some holding habitat for adult salmonids was present in deeper glide upstream of the road bridge but these areas primarily supported coarse fish. Areas of silt and peat were heavily compacted and not suitable for lamprey ammocoete burial (none recorded). The site had some suitability as a nursery for European eel given coarse bed substrata and macrophyte cover but none were recorded.

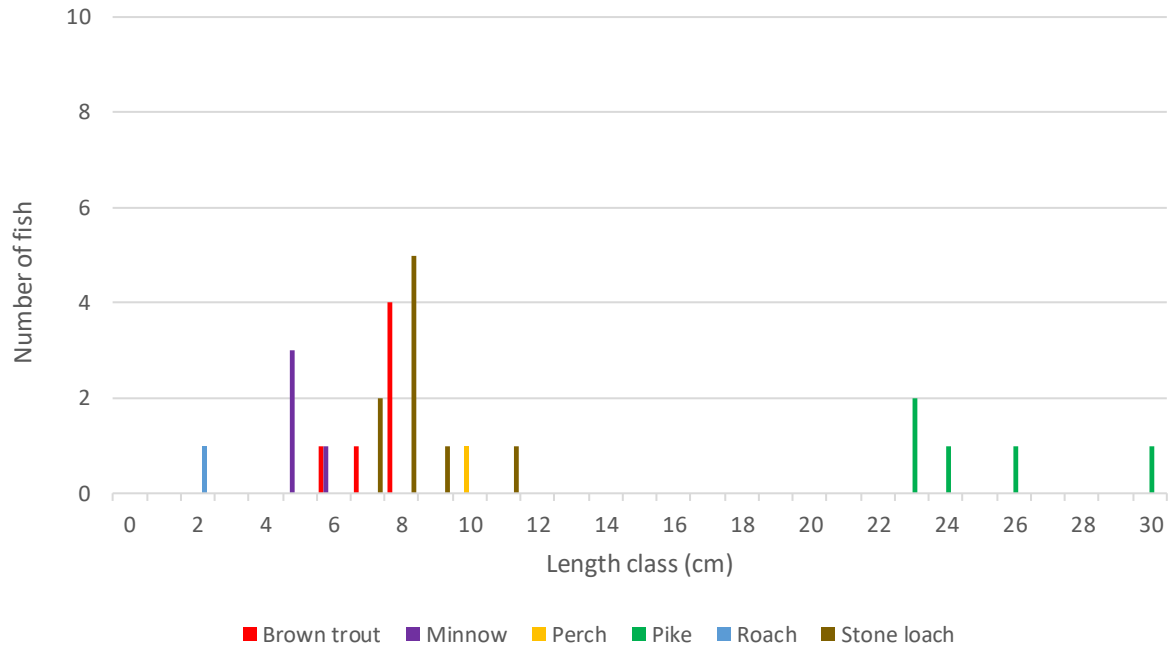


Figure 3.9 Length frequency distribution recorded via electro-fishing at site A14, July 2024

[2] also known as the Black River at this location



Plate 3.14 Juvenile pike recorded at site A14 on the Figile River at Cushaling Bridge, August 2024

3.1.15 Site A15 – Figile River, Kilcumber Bridge

Pike (*n*=3), roach (*n*=5), stone loach (*n*=7) and dace (*Leuciscus leuciscus*) (*n*=6) were recorded via electro-fishing at site A15 on the Figile River (14F01) at Kilcumber Bridge (R401) (**Figure 3.10**).

The site was of low value for salmonids given significant siltation, enrichment and hydromorphological pressures, with none recorded during the survey (previously recorded at this site, however; Triturus, 2021). Whilst some good quality holding habitat for adults was present, the enrichment at the site created conditions inimical for salmonids. Suitability was high for coarse fish species, however. Areas of soft sediment suitable as lamprey nurseries were preset locally but these were sub-optimal and did not support ammocoetes. Despite some suitability for European eel, none were recorded.

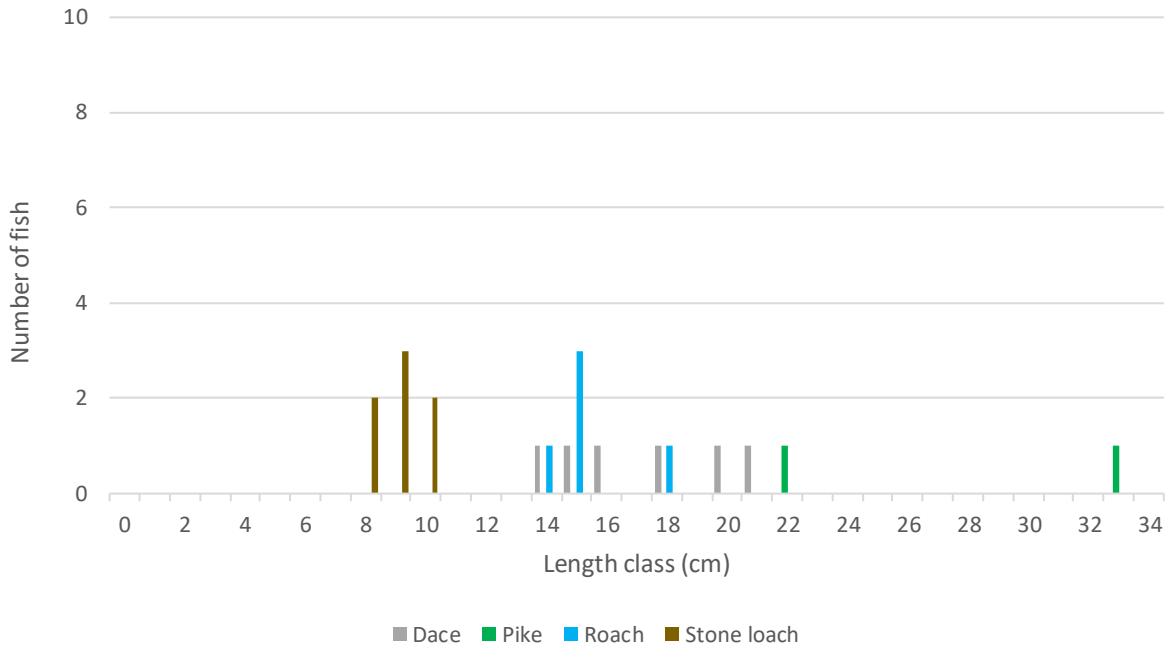


Figure 3.10 Length frequency distribution recorded via electro-fishing at site A15, July 2024



Plate 3.15 Dace and pike recorded at site A15 on the Figile River at Kilcumber Bridge, August 2024

3.1.16 Site A16 – Clonbulloge River, Clonmel

No fish were recorded via electro-fishing at site A16 on the Clonbulloge River (15C53) at a local road crossing. The channel at this location was not of fisheries value given extensive modifications, shallow depths, poor flows and siltation pressures.



Plate 3.16 Representative image of site A16 on the Clonbulloge River, August 2024

3.1.17 Site A17 – Ballygarrett River, Clonmel

No fish were recorded via electro-fishing at site A17 on the Ballygarrett River (14B30), a tributary of the Figile River, at the confluence with the Clonmel Stream (14C56). With the exception of potential for three-spined stickleback (not recorded), the channel at this location was not of fisheries value given extensive modifications, shallow depths, poor flows and siltation pressures.



Plate 3.17 Representative image of site A17 on the Ballygarrett River, August 2024

3.1.18 Site A18 – Figile River, Millgrove Bridge

Atlantic salmon (*Salmo salar*) (*n*=7), brown trout (*n*=1), pike (*n*=7), dace (*n*=7), gudgeon (*Gobio gobio*) (*n*=7), stone loach (*n*=7) and minnow (*n*=7) were recorded via electro-fishing at site A18 on the lower reaches of the Figile River (14F01) at Millgrove Bridge (R442) (**Figure 3.11**).

The fish community was one tolerant of eutrophication. However, a low number of adult trout and Atlantic salmon parr were recorded, with the site providing poor quality nursery and spawning habitat for salmonids. Some good quality holding habitat for adult salmonids was present, but the enrichment and siltation pressures created conditions inimical for healthy salmonid populations. There was only limited suitability for lamprey given the absence of finer, clean spawning gravels. No lamprey ammocoete burial habitat was recorded downstream of the bridge but ammocetes are present elsewhere on the watercourse (Gordon et al., 2021; Delanty et al., 2017). The site had some suitability as a nursery for European eel (i.e. refugia and good food resources) but none were recorded.

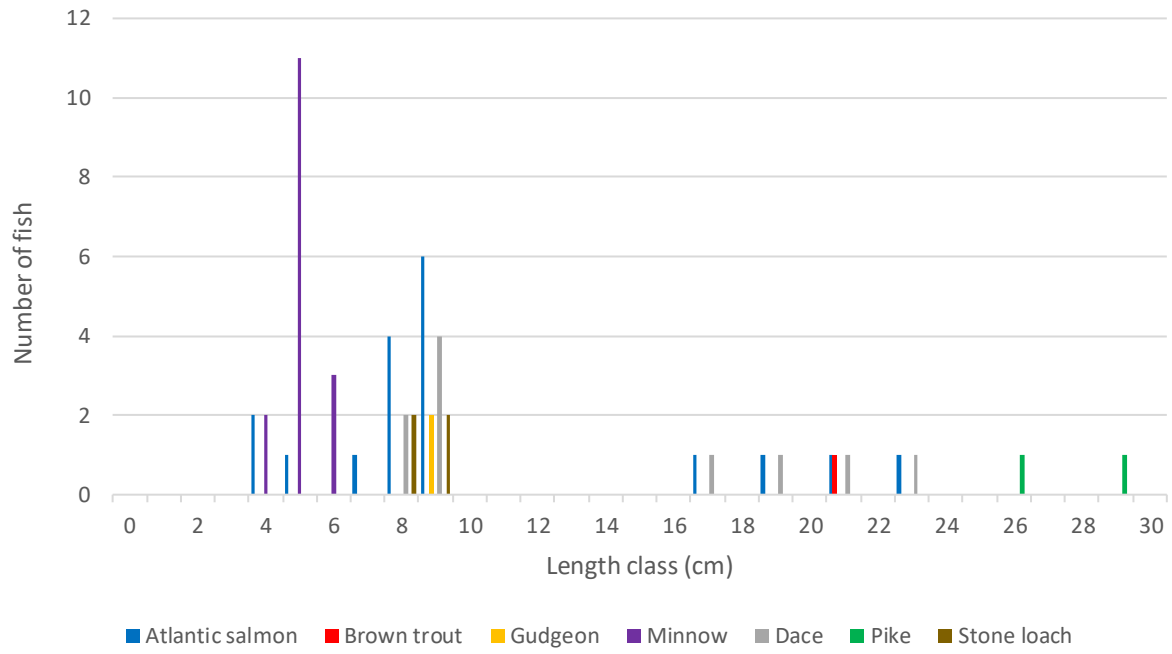


Figure 3.11 Length frequency distribution recorded via electro-fishing at site A18, July 2024



Plate 3.18 Well-conditioned brown trout, gudgeon & dace recorded at site A18 on the Figile River at Millgrove Bridge, August 2024

3.1.19 Site B1 – Clonkeen Stream, Cloncanon

Three-spined stickleback (*n*=11) were the only fish species recorded via electro-fishing at site B1 on the Clonkeen Stream (07C36) (**Figure 3.12**).

However, European eel were recorded at this site previously (Triturus, 2021) and the close proximity of the Grand Canal (to the north) likely acts as a source area for a small eel population. With the exception of low densities of these species, the heavily silted channel was of very poor fisheries value and not capable of supporting salmonids or lamprey species given the lack of flow and heavily silted (peat) conditions.

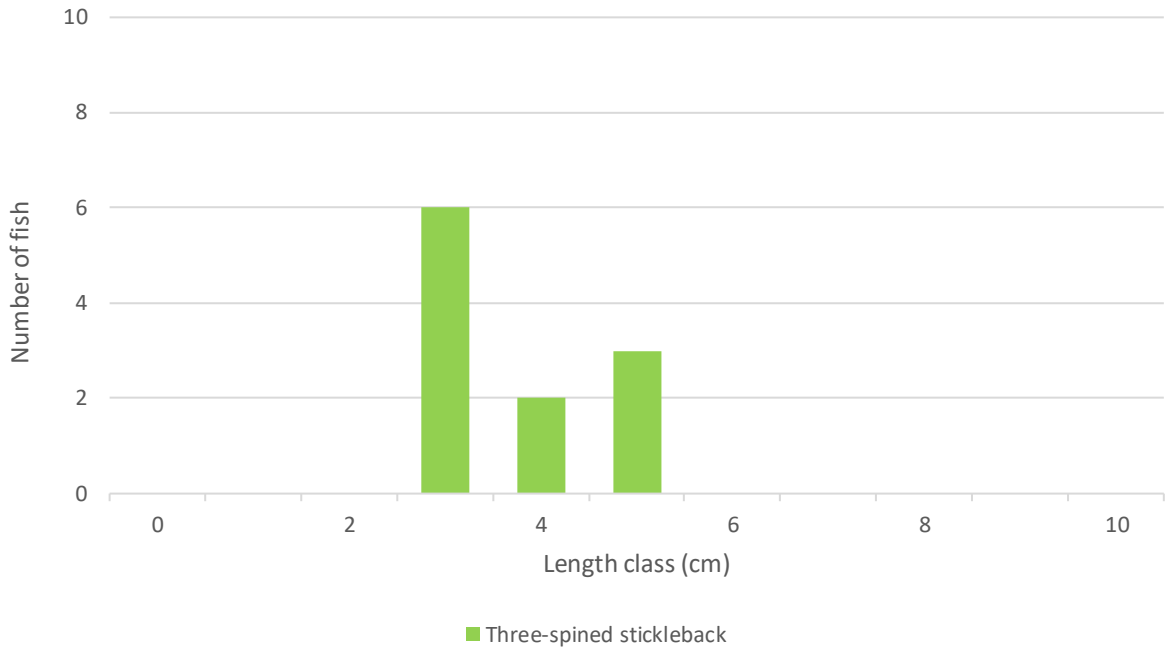


Figure 3.12 Length frequency distribution recorded via electro-fishing at site B1, July 2024



Plate 3.19 Representative image of site B1 on the Clonkeen Stream, August 2024

3.1.20 Site B2 – River Boyne, Kishawanny Bridge

Brown trout (*n*=2), lamprey (*Lampetra* sp.) (*n*=21) and European eel (*n*=1) were recorded via electro-fishing at site B2 on the upper reaches of the River Boyne (07B04) at Kishawanny Bridge (**Figure 3.13**).

The site was a poor quality salmonid nursery and spawning habitat given limited clean coarse substrata and a paucity of broken oxygenated water. There was moderate suitability for European eel, with a single example recorded. Lamprey ammocoetes were present at moderate to high densities (7 per m^2)

in organic-rich marginal silt beds, which were widespread.

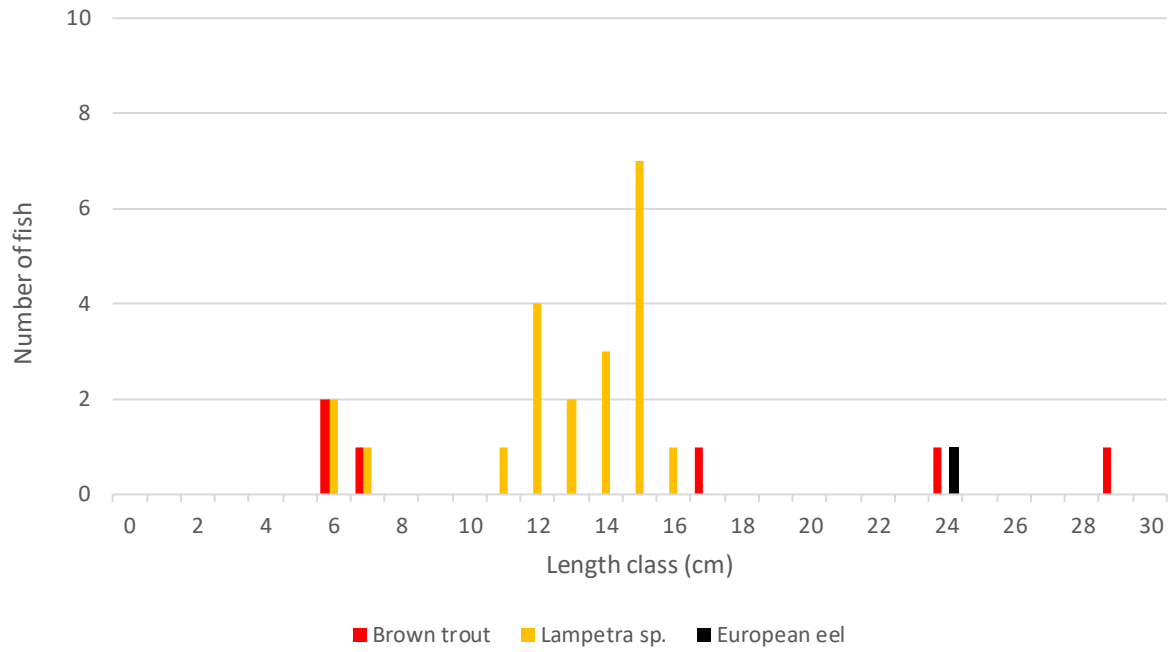


Figure 3.13 Length frequency distribution recorded via electro-fishing at site B2, July 2024



Plate 3.20 *Lampetra* sp. ammocoetes recorded at site B2 on the River Boyne at Kishawanny Bridge, August 2024

3.1.21 Site C1 – Drumsru Stream, Barnaran

No fish were recorded via electro-fishing at site C1 on the Drumsru Stream (25B06), a Slate River tributary, in keeping with previous surveys of the site (Triturus, 2021). The channel at this location was

not of fisheries value given extensive modifications, poor flows, siltation pressures and poor connectivity with downstream habitats.



Plate 3.21 Representative image of site D1 on the Drumsru Stream, August 2024

3.1.22 Site C2 – Slate River, Agar Bridge

Atlantic salmon (*n*=1), brown trout (*n*=5), minnow (*n*=3), stone loach (*n*=5) and dace (*n*=3) were recorded via electro-fishing at site C2 on the Slate River (14S01) at Agar Bridge (L7004 road) (**Figure 3.14**).

The site was a poor quality salmonid nursery and spawning habitat due to historical modifications and siltation/eutrophication pressures. However, deep glide and pool provided some suitability as holding areas for adult salmonids. These areas also offered diurnal refugia for European eel which were not recorded in the current survey. The site was of higher value as a coarse fish habitat. Despite an abundance of soft sediment accumulation these were mostly humic in nature and, coupled with poor flows, did not provide optimal conditions for lamprey ammocoetes.

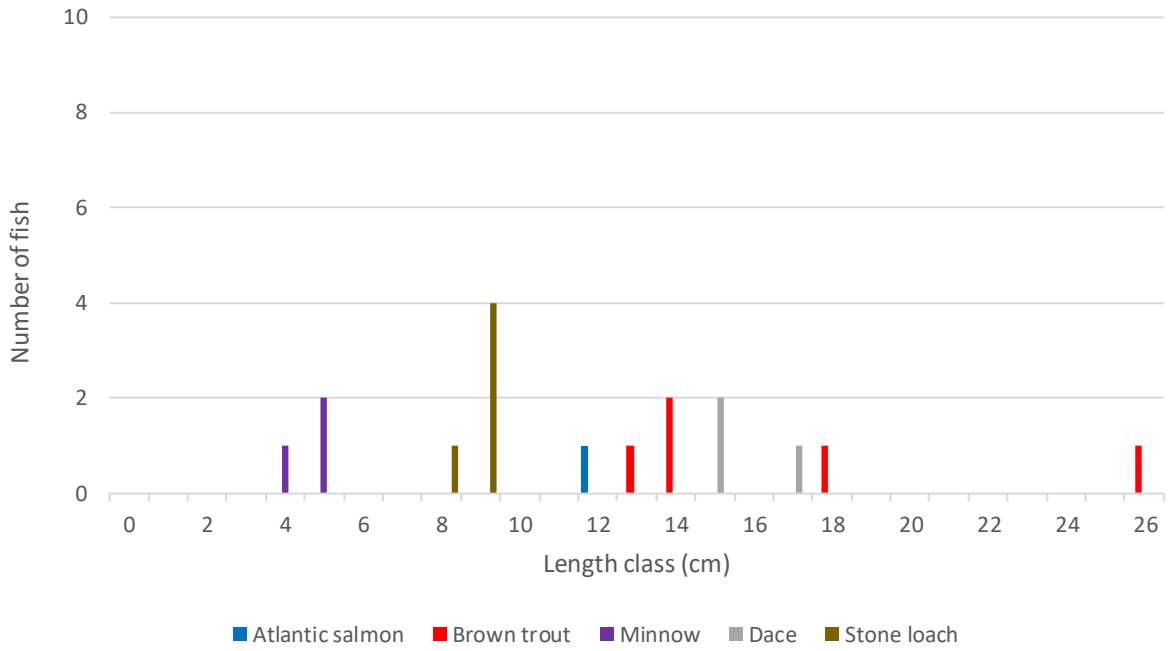


Figure 3.14 Length frequency distribution recorded via electro-fishing at site C2, July 2024



Plate 3.22 Brown trout (top) and Atlantic salmon (bottom) recorded at site C2 on the Slate River at Agar Bridge, August 2024

3.1.23 Site D1 – Killinagh Upper Stream, Allenwood South

Three-spined stickleback (*n*=14) was the only fish species recorded via electro-fishing at site D1 on the Killinagh Upper Stream (14K17), a tributary of the Slate River, at the R414 road and proposed GCR crossing (**Figure 3.15**).

With the exception of low densities of this species, the heavily silted channel was of very poor fisheries value and unsuitable for salmonids or lamprey species given the lack of flow and heavily silted (bed) conditions. The site was also unsuitable for white-clawed crayfish. Some low potential for European eel existed given connectivity to the downstream Slate River.

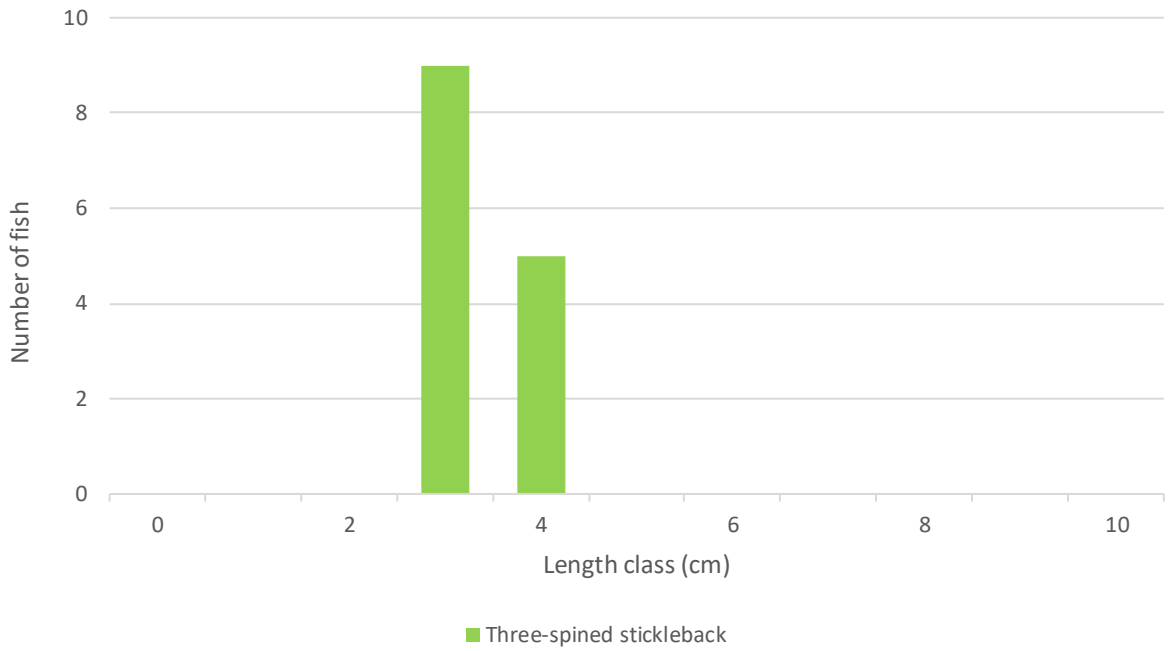


Figure 3.15 Length frequency distribution recorded via electro-fishing at site D1, July 2024



Plate 3.23 Representative image of site D1 on the Killinagh Upper Stream, August 2024

3.1.24 Site D2 – Grand Canal, Shee Bridge

Site D2 was located on the Grand Canal at Shee Bridge near Allenwood, a proposed GCR crossing. Electro-fishing was not undertaken at site D2 due to prohibitive water depths and lacustrine conditions. The site was a high value coarse fish habitat with tench (*Tinca tinca*), roach, pike and perch observed during the survey. The Grand Canal is also a good quality nursery area for European eel given abundant instream refugia and prey resources (small fish and invertebrates).



Plate 3.24 Representative image of site D2 on the Grand Canal at Shee Bridge, August 2024

3.1.25 Site D3 – Upper Ballynakill River, Derrymullen

Three-spined stickleback (*n*=4) was the only fish species recorded via electro-fishing at site D3 on the Upper Ballynakill River (14U09), a Slate River tributary, at the R403 road and proposed GCR crossing (**Figure 3.16**).

With the exception of low densities of this species, the heavily silted and shallow channel was of poor value for salmonids or lamprey species given the lack of flow, shallow depths and heavily silted (bed) conditions. Some low potential for European eel existed given connectivity to the downstream Slate River although none were recorded.

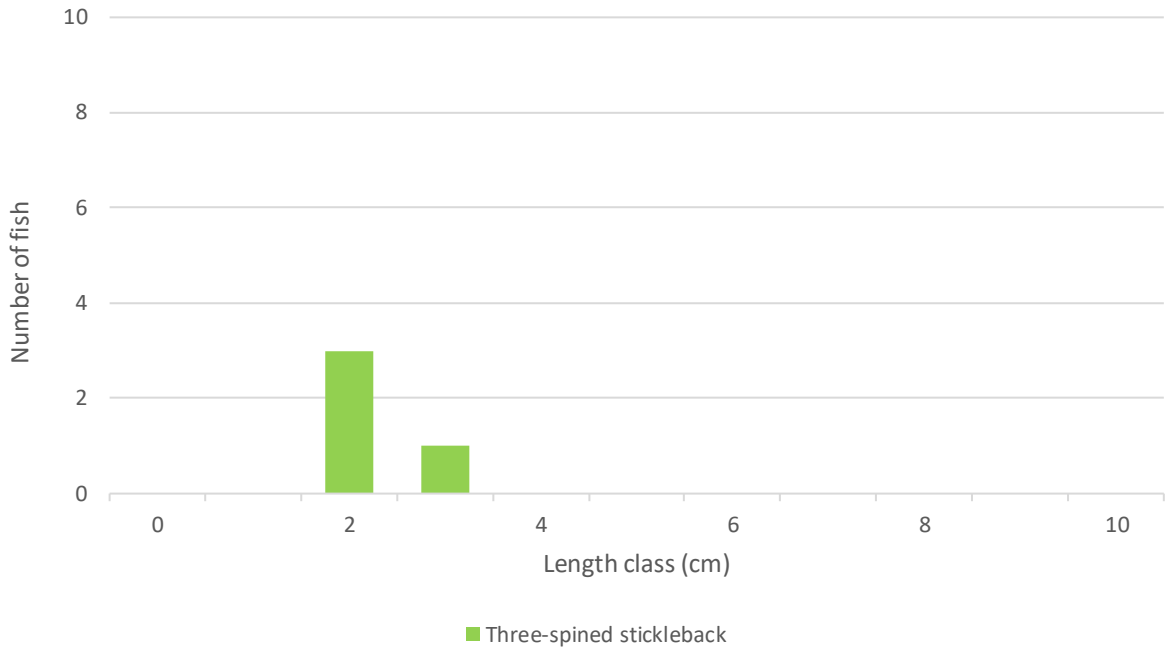


Figure 3.16 Length frequency distribution recorded via electro-fishing at site D3, July 2024



Plate 3.25 Representative image of site D3 on the Upper Ballynakill Stream, August 2024

3.1.26 Site D4 – Slate River, Quigley's Bridge

Brown trout (*n*=18) was the only fish species recorded via electro-fishing at site D4 on the upper reaches of the Slate River (14S01) at Quigley's Bridge (R403), a proposed GCR crossing (**Figure 3.17**).

A mixed cohort brown trout population was present. The site was a moderate quality salmonid nursery and spawning area given the stoney bed and broken flow patterns, although this was compromised by enrichment and siltation pressures. Good quality holding habitat for adult salmonids was present

in pools and bank scours with overhanging vegetation. These areas also offered some habitat for European eel although none were recorded. Soft sediment accumulations were typically flocculent and unsuitable for lamprey ammocoetes.

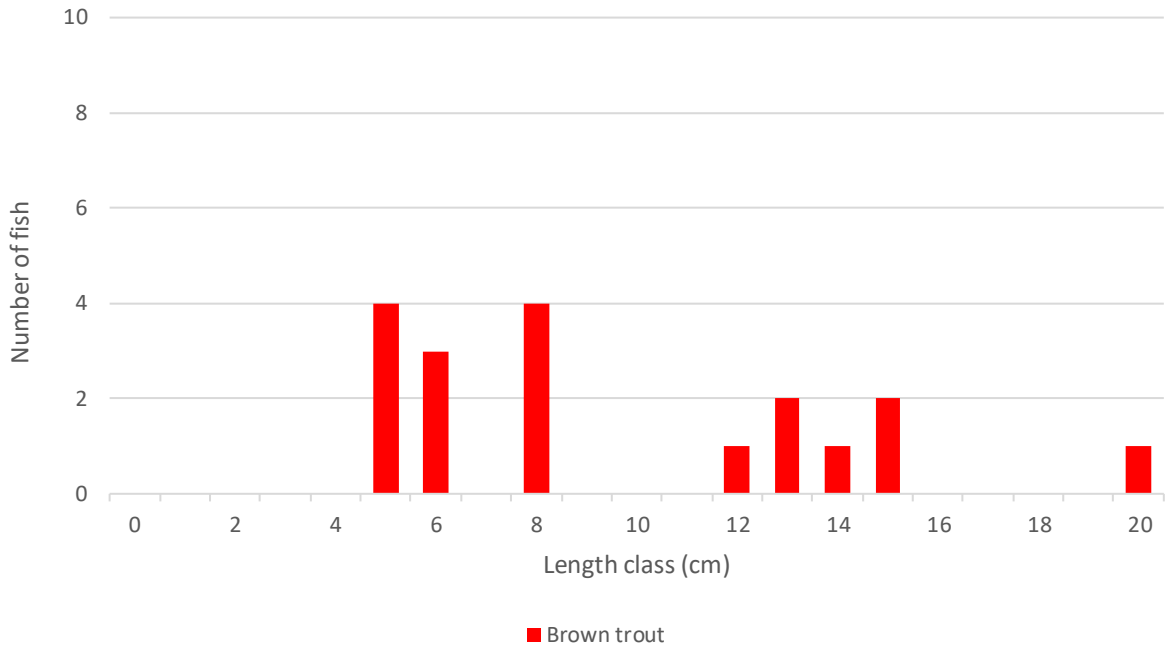


Figure 3.17 Length frequency distribution recorded via electro-fishing at site D4, July 2024



Plate 3.26 Brown trout recorded at site D4 on the upper reaches of the Slate River at Quigley's Bridge, August 2024

3.1.27 Site D5 – Slate River, New Bridge

Site D5 was located on the uppermost reaches of the Slate River (14S01) at New Bridge (R403), a proposed GCR crossing. The channel was dry at the time of survey and thus no electro-fishing was undertaken. There was no fisheries habitat present.



Plate 3.27 Representative image of site D5 on the upper reaches of the Slate River at New Bridge, August 2024 (dry ephemeral channel)

3.1.28 Site D6 – Blackwood Feeder, R403 crossing

Site D6 was located on the Blackwood Feeder at the R403 road and proposed GCR crossing. The channel was dry at the time of survey and thus no electro-fishing was undertaken. There was no fisheries habitat present.



Plate 3.28 Representative image of site D6 on the Blackwood Feeder of the Grand Canal, August 2024 (dry ephemeral channel)

3.1.29 Site D7 – Slate River, Graigues

Site D7 was located on the uppermost reaches of the Slate River (14S01) at a R403 road and proposed GCR crossing. The channel was dry at the time of survey and thus no electro-fishing was undertaken. There was no fisheries habitat present.



Plate 3.29 Representative image of site D7 on the upper reaches of the Slate River, August 2024 (dry ephemeral channel)

3.1.30 Site D8 – Brockagh River, Dagwelds Cross

Site D8 was located on the Brockagh River (14B73) at the R403 road and proposed GCR crossing. The channel was dry at the time of survey and therefore of no value to fish.



Plate 3.30 Representative image of site D8 on the Brockagh River at Dagwelds Cross, August 2024 (dry, ephemeral channel)

3.1.31 Site D9 – unnamed stream, Black Stick Cross Roads

Site D9 was located on an unnamed stream at the R403 road and proposed GCR crossing. The channel was dry at the time of survey and therefore of no value to fish.



Plate 3.31 Representative image of site D9 on an unnamed stream at Black Stick Cross Roads, August 2024 (dry, ephemeral channel)

Table 3.1 Fish species densities per m^2 recorded at sites in the vicinity of the proposed Ballydermot wind farm via electro-fishing in July-August 2024 (values in **bold** represent the highest densities recorded for each species, respectively)

Site	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Three-spined stickleback	Minnow	Dace	Perch	Pike	Roach	Stone loach	Gudgeon
A1	Unnamed stream	5	100	0.000	0.000	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A2	Unnamed stream	5	85	0.000	0.000	0.000	0.000	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A3	Codd River	5	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A4	Codd River	5	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A5	Cloncant Stream	5	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A6	Cloncant Stream	5	120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A7	Abbeylough Stream	10	150	0.000	0.000	0.000	0.000	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A8	Figile River	10	180	0.000	0.017	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A9	Unnamed stream	10	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A10	Lullybeg Stream	10	150	0.000	0.000	0.000	0.000	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A11	Lullymore East River	10	160	0.000	0.006	0.000	**0.006**	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A12	Lullybeg Stream	5	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A13	Clonbrown River	n/a	Too deep for electro-fishing	n/a	n/a	n/a	n/a	n/a	0.000	0.000	n/a	n/a	n/a	n/a	n/a
A14	Figile River	10	350	0.000	0.017	0.000	0.000	0.000	0.011	0.000	**0.003**	**0.014**	0.003	**0.026**	0.000
A15	Figile River	10	300	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.010	**0.017**	0.023	0.000
A16	Clonbulloge River	5	150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Site	Watercourse	CPUE (elapsed time)	Approx. area fished (m^2)	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Three-spined stickleback	Minnow	Dace	Perch	Pike	Roach	Stone loach	Gudgeon
A17	Ballygarrett River	10	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A18	Figile River	10	350	**0.009**	0.003	0.000	0.000	0.000	**0.046**	**0.029**	0.000	0.006	0.000	0.011	**0.006**
B1	Clonkeen Stream	5	125	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B2	River Boyne	10	250	0.000	0.008	**7 per m^2**	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
C1	Drumsru Stream	5	40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
C2	Slate River	10	300	0.003	0.017	0.000	0.000	0.000	0.010	0.013	0.000	0.000	0.000	0.017	0.000
D1	Killinagh Upper Stream	10	150	0.000	0.000	0.000	0.000	**0.093**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
D2	Grand Canal	n/a	Too deep for electro-fishing	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D3	Upper Ballynakill River	5	80	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000
D4	Slate River	10	240	0.000	**0.075**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
D5	Slate River	n/a	Dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D6	Blackwood Feeder	n/a	Dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D7	Slate River	n/a	Dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D8	Brockagh River	n/a	Dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
D9	Unnamed stream	n/a	Dry channel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 3.2 Relative abundance of fish species of higher conservation value recorded via **electro-fishing** in the vicinity of the proposed development, August 2024

Site	Watercourse	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Other species
A1	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A2	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A3	Codd River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A4	Codd River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A5	Cloncant Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A6	Cloncant Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A7	Abbeylough Stream	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
A8	Figile River	Not recorded	Low	Not recorded	Not recorded	Three-spined stickleback
A9	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A10	Lullybeg Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
A11	Lullymore East River	Not recorded	Low	Not recorded	Low	Three-spined stickleback
A12	Lullybeg Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A13	Clonbrown River	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
A14	Figile River	Not recorded	Low	Not recorded	Not recorded	Minnow, perch, pike, roach, stone loach
A15	Figile River	Not recorded	Not recorded	Not recorded	Not recorded	Dace, pike, roach, stone loach
A16	Clonbulloge River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A17	Ballygarrett River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
A18	Figile River	Low	Low	Not recorded	Not recorded	Minnow, dace, gudgeon, pike, stone loach
B1	Clonkeen Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
B2	River Boyne	Not recorded	Low	High	Low	
C1	Drumsru Stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded
C2	Slate River	Low	Low	Not recorded	Not recorded	Stone loach, dace, minnow
D1	Killinagh Upper Stream	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
D2	Grand Canal	Not recorded	Not recorded	Not recorded	Not recorded	Too deep for electro-fishing
D3	Upper Ballynakill River	Not recorded	Not recorded	Not recorded	Not recorded	Three-spined stickleback
D4	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	Brown trout
D5	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)

Site	Watercourse	Atlantic salmon	Brown trout	*Lampetra* sp.	European eel	Other species
D6	Blackwood Feeder	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D7	Slate River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D8	Brockagh River	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)
D9	Unnamed stream	Not recorded	Not recorded	Not recorded	Not recorded	No fish recorded (dry channel)

Conservation value: Atlantic salmon (*Salmo salar*), brook lamprey (L*ampetra planeri*) and river lamprey (*Lampetra fluviatilis*) are listed under Annex II of the Habitats Directive [92/42/EEC]. Atlantic salmon and river lamprey are also listed under Annex V of the Habitats Directive [92/42/EEC]. European eel are 'critically endangered' according to most recent ICUN red list (Pike et al., 2020) and listed as 'critically engendered' in Ireland (King et al., 2011). With the exception of the Inland Fisheries Acts 1959 to 2017, brown trout and coarse fish species have no legal protection in Ireland.

Table 3.3 Comparison of fish recorded via electro-fishing in 2021 and 2024

			Fish species recorded	
Site no.	Watercourse	EPA code	July 2021	July-August 2024
A1	Unnamed stream	n/a	Not surveyed	Three-spined stickleback
A2	Unnamed stream	n/a	Not surveyed	Three-spined stickleback
A3	Codd River	14C44	Not surveyed	No fish recorded
A4	Codd River	14C44	Not surveyed	No fish recorded
A5	Cloncant Stream	14C41	Not surveyed	No fish recorded
A6	Cloncant Stream	14C41	Brown trout, minnow	No fish recorded
A7	Abbeylough Stream	14A01	Three-spined stickleback	n/a – too deep for electro-fishing
A8	Figile River	14F01	Not surveyed	Brown trout, three-spined stickleback
A9	Unnamed stream	n/a	Not surveyed	No fish recorded
A10	Lullybeg Stream	14L13	Not surveyed	Three-spined stickleback
A11	Lullymore East River	14L11	Not surveyed	Brown trout, European eel, three-spined stickleback
A12	Lullybeg Stream	14L33	Not surveyed	No fish recorded
A13	Clonbrown River	14C32	Not surveyed	n/a – too deep for electro-fishing
A14	Figile River	14F01	Not surveyed	Brown trout, minnow, perch, pike, roach, stone loach
A15	Figile River	14F01	Dace, perch	Dace, pike, roach, stone loach
A16	Clonbulloge River	14C53	Not surveyed	No fish recorded
A17	Ballygarrett River	14B30	No fish recorded	No fish recorded
A18	Figile River	14F01	Not surveyed	Atlantic salmon, brown trout, minnow, dace, gudgeon, pike, stone loach
B1	Clonkeen Stream	07C36	European eel, three-spined stickleback	Three-spined stickleback
B2	River Boyne	07B04	Brown trout, lamprey (*Lampetra* sp.), stone loach, roach	Brown trout, lamprey (*Lampetra* sp.), European eel
C1	Drumsru Stream	14D19	No fish recorded	No fish recorded
C2	Slate River	14S01	Atlantic salmon, brown trout, stone loach, dace, minnow	Atlantic salmon, brown trout, stone loach, dace, minnow

Site no.	Watercourse	EPA code	Fish species recorded	
			July 2021	July-August 2024
D1	Killinagh Upper Stream	14K17	Three-spined stickleback	Three-spined stickleback
D2	Grand Canal	n/a	Not surveyed	n/a – too deep for electro-fishing
D3	Upper Ballynakill River	14U01	Not surveyed	Three-spined stickleback
D4	Slate River	14S01	Not surveyed	Brown trout
D5	Slate River	14S01	Not surveyed	No fish recorded (dry channel)
D6	Blackwood Feeder	n/a	Not surveyed	No fish recorded (dry channel)
D7	Slate River	14S01	Not surveyed	No fish recorded (dry channel)
D7	Brockagh River	14B73	Not surveyed	No fish recorded (dry channel)
D8	Unnamed stream	n/a	Not surveyed	No fish recorded (dry channel)

4. Discussion

The surveyed watercourses in the vicinity of the proposed Ballydermot wind farm development were typically small, heavily modified lowland channels draining areas of peatland that experienced low summer flows. Historical drainage pressures (straightening, deepening) and ongoing peat escapement (siltation) had significantly reduced the quality of fisheries habitats on the majority of surveyed watercourses. Historical straightening and deepening of watercourses damages habitat and hydromorphological heterogeneity, encourages sediment deposition and invariably results in an irreparable reduction in fisheries potential, particularly for salmonids and lamprey (O'Grady et al., 2017, O'Grady, 2006). Nevertheless, several fish species of high conservation value were recorded in the survey area. A typical diversity of fish species for the upper Barrow and Boyne catchments was recorded via electro-fishing, with Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel, stone loach, minnow, gudgeon, pike, perch and three-spined stickleback captured, alongside invasive roach and dace[3] (**Table 3.1, 3.2**). A similar fish assemblage was recorded at comparable sites in the previous 2021 surveys (**Table 3.3**).

In alignment with previous surveys, salmonid populations were restricted in their distribution, with low densities of brown trout being recorded from a total of 6 no. sites on the Figile River (A8, A14, A18), Lullymore East River (A11), River Boyne (B2) and the Slate River (C2) (**Table 3.1, 3.2**). Annex II Atlantic salmon were only recorded from sites A18 on the Figile River (Millgrove Bridge) and C2 on the Slate River (Agar Bridge). Again, these were present in low numbers. Siltation and eutrophication pressures were significant throughout much of the survey area and were evidently contributing to a reduction in the quality of fisheries habitat. Although supporting the most significant salmonid populations in the survey area, both the Figile and Slate rivers have been identified among the least productive for salmonids in the wider Barrow catchment, primarily due to historical drainage and water quality pressures which have impacted the availability of spawning and nursery areas (Delanty et al., 2017).

Lamprey ammocoetes (*Lampetra* sp.) were recorded from a single site, namely site B2 on the River Boyne at Kishawanny Bridge, where a moderate density of 7 per m^2 were recorded in organic-rich, marginal silt beds. This was also the only site found to support ammocoetes in the previous 2021 survey (Triturus, 2021). The quality of lamprey habitat was generally poor across the survey area. Owing to their relatively small morphologies, *Lampetra* species such as brook lamprey require clean, fine gravels in which to dig their redds (Dawson et al., 2015; Rooney et al., 2013; Lasne et al., 2010) although areas may also include fractions of sand, larger gravels, and cobble (Nika & Virbickas, 2010). Spawning habitat in the vicinity of the proposed Ballydermot wind farm was sparse and of poor quality due to significant (peat) siltation pressures (as outlined above). Furthermore, lamprey ammocoetes require the deposition of fine, organic-rich sediment ≥5cm in depth in which to burrow and mature (Aronsuu & Virkkala, 2014; Goodwin et al., 2008; Gardiner, 2003). Peat-dominated substrata (i.e., humic deposits), such as those typically found in the vicinity of the proposed Ballydermot wind farm, do not provide suitable burial/burrowing habitat complexity or structure for ammocoetes given their invariably fine and flocculent nature (pers. obs.).

[3] Although established in Ireland, both roach and dace are invasive cyprinid species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011) and subject to Regulations 49 and 50 throughout the State

European eel are Red-listed in Ireland (King et al., 2011) and are classed as 'critically endangered' on a global scale (Pike et al., 2020). Despite some suitability across much of the survey area, European eel were only recorded in very low densities from sites A11 on the Clonkeen Stream (a Figile tributary) and B2 on the River Boyne (**Table 3.1, 3.2**). A very restricted eel distribution was also observed during the previous 2021 surveys. Better quality eel habitat was confined to the larger watercourses with higher flow rates and superior habitat heterogeneity/recovery, as well as the Grand Canal. As per salmonids, European eel habitat is also degraded by arterial drainage by virtue of a reduction or removal of instream refugia required by the species (Laffaille et al., 2003) and more optimal areas of channel (e.g. boulder zones) were highly localised in vicinity of the proposed wind farm. As eel occurrence decreases significantly with increasing distance from the sea (Degerman et al., 2019), the paucity of eel observed can be further explained by the large distances between the survey area and marine habitats (Matondo et al., 2021; Chadwick et al., 2007).

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8. Appendix 1B – eDNA lab report

Triturus

Folio No:	3265-2024
Purchase Order:	eDNA Ballydermot 24
Contact:	Triturus Environmental Ltd
Issue Date:	13.08.2024
Received Date:	06.08.2024

eDNA Report

Technical Report

SureScreen Scientifics

Folio No:	3265-2024
Purchase Order:	eDNA Ballydermot 24
Contact:	Triturus Environmental Ltd
Issue Date:	13.08.2024
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SureScreen Scientifics

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK1869	A15		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed crayfish	Pass	Negative	0
FK2417	C2		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed crayfish	Pass	Negative	0
FK1868	B2		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed	Pass	Negative	0

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		crayfish			
FKI870	A18	Crayfish plague	Pass	Negative	0
		Freshwater pearl mussel	Pass	Negative	0
		White-clawed crayfish	Pass	Negative	0

Matters affecting result: none

Reported by:Lauryn Jewkes

Approved by: Vanessa Hind

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Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check:

Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

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9. Appendix 1C – Macro-invertebrates (biological water quality)

Table 9.1 Macro-invertebrate Q-sampling results for sites A1-A18, August 2024

Group	Family	Species	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A14	A15	A16	A17	A18	EPA group
Ephemeroptera	Heptageniidae	*Ecdyonurus* sp.						1												**A**
Ephemeroptera	Baetidae	*Alainites muticus*																	1	**B**
Trichoptera	Cased caddis pupa	sp. indet.			2										1					**B**
Trichoptera	Glossosomatidae	*Agapetus fuscipes*						1												**B**
Trichoptera	Leptoceridae	*Athripsodes aterrimus*								1										**B**
Trichoptera	Limnephilidae	*Halesus radiatus*						3												**B**
Trichoptera	Limnephilidae	*Limnephilus auricularia*					3													**B**
Trichoptera	Limnephilidae	*Limnephilus lunatus*					1		3											**B**
Trichoptera	Limnephilidae	*Micropterna* sp.									2									**B**
Trichoptera	Sericostomatidae	*Sericostoma personatum*									2									**B**
Hemiptera	Aphelocheiridae	*Aphelocheirus aestivalis*													6	2			11	**B**
Odonata	Aeshnidae	*Anax imperator*												1						**B**
Odonata	Calopterygidae	*Calopteryx splendens*									1									**B**
Odonata	Coenagrionidae	sp. indet.	1	4					2				2							**B**
Ephemeroptera	Baetidae	*Baetis rhodani*											2		5	1	18		5	**C**
Ephemeroptera	Caenidae	sp. indet.							2							1				**C**
Ephemeroptera	Ephemerellidae	*Serratella ignita*					1	2		10					9	1			40	**C**
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*				1		3		44					22	9	1		79	**C**
Trichoptera	Hydropsychidae	*Hydropsyche siltalai*											1							**C**
Trichoptera	Polycentropodidae	*Polycentropus kingi*						4					3			5				**C**
Coleoptera	Dytiscidae	*Acilius sulcatus*		1																**C**
Coleoptera	Dytiscidae	Dytiscidae larva							1				2							**C**
Coleoptera	Dytiscidae	*Dytiscus semisulcatus*			1															**C**
Coleoptera	Dytiscidae	*Graptodytes pictus*		1																**C**
Coleoptera	Dytiscidae	*Hydroporus tessellatus*				2														**C**

Group	Family	Species	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A14	A15	A16	A17	A18	EPA group
Coleoptera	Dytiscidae	*Hyphydrus ovatus*		1					1											C
Coleoptera	Dytiscidae	*Ilybius ater*				1														C
Coleoptera	Dytiscidae	*Ilybius fuliginosus*					1					1	1				1	1		C
Coleoptera	Dytiscidae	*Nebrioporus sp.*											1						1	C
Coleoptera	Elmidae	*Elmis aenea*						8		5					5	1			4	C
Coleoptera	Elmidae	*Limnius volckmari*						3		6						1				C
Coleoptera	Elmidae	*Oulimnius* sp.														1				C
Coleoptera	Gyrinidae	*Gyrinus substriatus*							3			1	3							C
Coleoptera	Haliplidae	*Brychius elevatus*											3							C
Coleoptera	Hydrophilidae	*Anacaena globulus*				4	1													C
Coleoptera	Hydrophilidae	*Helophorus brevipalpis*			1	2														C
Crustacea	Gammaridae	*Gammarus duebeni*	1		3		4	1	14	10	9	1	5		12	14	22	5	18	C
Diptera	Chironomidae	Non-*Chironomus* spp.				9		1	2		1				2	2		5	4	C
Diptera	Culicidae	sp. indet.				1						1								C
Diptera	Limoniidae	*Antocha* sp.													1	1				C
Diptera	Pediciidae	*Dicranota* sp.							1	4	1									C
Diptera	Simuliidae	sp. indet.						1		29					2	2			2	C
Diptera	Tipuliidae	sp. indet.							3	1			1							C
Gastropoda	Acroloxidae	*Acroloxus lacustris*					2													C
Gastropoda	Bithnyiidae	*Bithynia tentaculata*	5																	C
Gastropoda	Lymnaeidae	*Lymnaea stagnalis*					1						4						3	C
Gastropoda	Planorbidae	*Bathyomphalus contortus*				1														C
Gastropoda	Planorbidae	*Gyraulus albus*					3		1											C
Gastropoda	Planorbidae	*Planorbarius corneus*					1													C
Gastropoda	Planorbidae	*Planorbis planorbis*	1	7	1		1					5	3		1				4	C
Gastropoda	Tateidae	*Potamopyrgus antipodarum*							5				1						3	C

Group	Family	Species	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A14	A15	A16	A17	A18	EPA group
Hemiptera	Corixidae	Corixidae nymph	2						1				1			1				C
Hemiptera	Corixidae	*Hesperocorixa linnaei*	1						3										1	C
Hemiptera	Gerridae	Gerridae nymph		1	2		1	1				1	1		1					C
Hemiptera	Gerridae	*Gerris* sp.		3					2			1	2							C
Hemiptera	Hydrometridae	*Hydrometra stagnorum*										1								C
Hemiptera	Notonectidae	Notonectidae nymph		2								1								C
Hemiptera	Veliidae	*Velia caprai*				2	2		3		2	3					4	2		C
Arachnida	Hydrachnidiae	sp. indet.							6								1			C
Hirudinidae	Piscicolidae	*Piscicola* sp.									1									C
Crustacea	Asellidae	*Asellus aquaticus*	1	8		5	1	2	4	2	6	14	17	8	10	2	28	31	12	D
Crustacea	Crangonyctidae	*Crangonyx* sp.												2						D
Gastropoda	Lymnaeidae	*Ampullacaena balthica*					1													D
Hirudinidae	Glossiphoniidae	sp. indet.		1		1							1							D
Megaloptera	Sialidae	*Sialis lutaria*											1	1				1		D
Mollusca	Sphaeriidae	sp. indet.	1	2					8							4		3	2	D
Diptera	Chironomidae	*Chironomus* spp.	3			2			3				5	9	1	2	5	3		E
Annelidae	Oligochaeta	sp. indet.							5	1								4		n/a
Abundance			**16**	**31**	**10**	**31**	**24**	**31**	**73**	**113**	**25**	**30**	**60**	**21**	**78**	**50**	**80**	**55**	**190**	
Q-rating			Q3*	Q3*	Q3*	Q3*	Q3*	Q3-4	Q3*	Q3	Q3*	Q2-3*	Q3	Q2-3*	Q3	Q3	Q3*	Q2*	Q3	
WFD status			Poor	Poor	Poor	Poor	Poor	Mod	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Bad	Poor	

* tentative Q-rating given lack of suitable riffle areas for sampling and or poor flows (Toner et al., 2005)

Table 9.2 Macro-invertebrate Q-sampling results for sites B1-B2, C1-C2 & D1-D4, August 2024

Group	Family	Species	B1	B2	C1	C2	D1	D3	D4	EPA group
Ephemeroptera	Baetidae	*Alainites muticus*				2				**B**
Trichoptera	Leptoceridae	*Athripsodes aterrimus*				1				**B**
Trichoptera	Phryganeidae	*Agrypnia obsoleta*							1	**B**
Trichoptera	Sericostomatidae	*Sericostoma personatum*					1		9	**B**
Ephemeroptera	Baetidae	*Baetis rhodani*						1		**C**
Ephemeroptera	Ephemerellidae	*Serratella ignita*				28				**C**
Trichoptera	Hydropsychidae	*Hydropsyche instabilis*				3				**C**
Trichoptera	Hydropsychidae	*Hydropsyche siltalai*				1				**C**
Trichoptera	Polycentropodidae	*Plectrocnemia conspersa*					2			**C**
Trichoptera	Polycentropodidae	*Polycentropus kingi*				1				**C**
Coleoptera	Dytiscidae	*Nebrioporus* sp.		1						**C**
Coleoptera	Elmidae	*Elmis aenea*		2		3			2	**C**
Coleoptera	Halipliidae	*Brychius elevatus*		7						**C**
Coleoptera	Halipliidae	*Haliplus ruficollis* group			2					**C**
Coleoptera	Hydrophilidae	*Helophorus brevipalpis*	1							**C**
Coleoptera	Hydrophilidae	*Helophorus minutus*	1							**C**
Coleoptera	Hydrophilidae	*Hydrobius fuscipes*	1							**C**
Crustacea	Gammaridae	*Gammarus duebeni*	3	9	7	13	14	4	14	**C**
Diptera	Chironomidae	Non-*Chironomus* spp.					3	5		**C**
Diptera	Limoniidae	*Antocha* sp.			1					**C**
Diptera	Pediciidae	*Dicranota* sp.			1				2	**C**
Gastropoda	Bithnyiidae	*Bithynia tentaculata*		2						**C**
Gastropoda	Planorbidae	*Ancylus fluviatilis*						1		**C**
Gastropoda	Planorbidae	*Bathyomphalus contortus*				1				**C**

Group	Family	Species	B1	B2	C1	C2	D1	D3	D4	EPA group
Gastropoda	Planorbidae	*Planorbis planorbis*	1							**C**
Gastropoda	Tateidae	*Potamopyrgus antipodarum*			2	5				**C**
Hemiptera	Corixidae	*Hesperocorixa linnaei*			4					**C**
Hemiptera	Gerridae	Gerridae nymph	1		1					**C**
Hemiptera	Gerridae	*Gerris* sp.	1	1	1					**C**
Hemiptera	Hydrometridae	*Hydrometra stagnorum*					2			**C**
Arachnida	Hydrachnidiae	sp. indet.		3	1			1		**C**
Crustacea	Asellidae	*Asellus aquaticus*	19	12	24	13	6	25	2	**D**
Crustacea	Crangonyctidae	*Crangonyx* sp.		2				2		**D**
Gastropoda	Lymnaeidae	*Ampullacaena balthica*			5					**D**
Hirudinidae	Glossiphoniidae	sp. indet.		2						**D**
Mollusca	Sphaeriidae	sp. indet.		3	7				2	**D**
Diptera	Chironomidae	*Chironomus* spp.		1	1	1	2	4		**E**
Annelidae	Oligochaeta	sp. indet.			4		1			**n/a**
Abundance			**28**	**45**	**61**	**72**	**31**	**43**	**32**	
Q-rating			Q2*	Q2-3	Q2-3*	Q3	Q3*	Q2-3	Q3	
WFD status			Bad	Poor	Poor	Poor	Poor	Poor	Poor	

* tentative Q-rating given lack of suitable riffle areas for sampling and or poor flows (Toner et al., 2005)



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