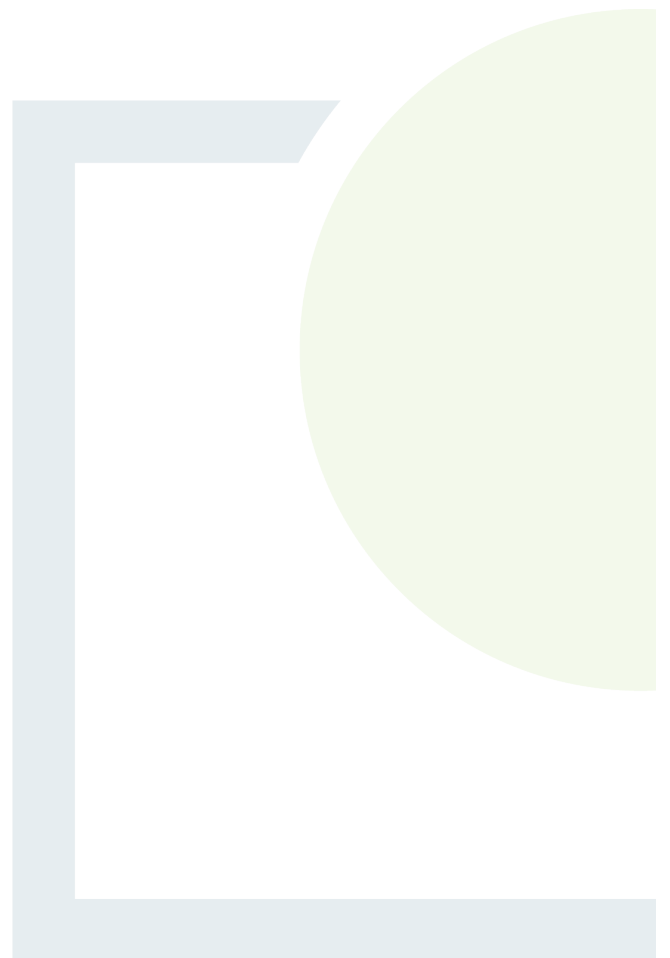




DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

Appendix 9.1

Aquatic Survey Report



Aquatic baseline report for grid connection of the proposed Coom Green Energy Park, Co. Cork



Prepared by Triturus Environmental Ltd. for Fehily Timoney

May 2025

Please cite as:

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1. Introduction

1.1 Background

Triturus Environmental Ltd. were commissioned by Fehily Timoney to conduct baseline aquatic surveys to inform EIA preparation for the grid connection of the proposed Coom Green Energy Park (GEP) development located near Bottlehill, Co. Cork (**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 watercourse crossings and alignment of the proposed grid connection route (GCR) options. Aquatic surveys were undertaken in April 2025.

1.2 Development description

A full description of the proposed development is provided in the Environmental Impact Assessment Report (EIA) 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 GCR options were considered as part of the current assessment. The focus was on proposed watercourse crossings but consideration was also given to watercourses in close proximity (<30m) to the GCR alignment(s). Thus, a total of $n=14$ sites were selected for detailed aquatic assessment (see **Table 2.1**, **Figure 2.1 & 2.2** below). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) mapping.

Riverine survey sites were present on the Shanowen Trib 1 Stream (EPA code: 18S42), Farran North Stream (18F27), Toor River (18T51), River Bride (18B05), Field Chimney Stream (18F43) and an unmapped stream, Bunnaglanna Stream (18B07) and the Red Bog Stream (18R48) (**Table 2.1**). A number of proposed watercourse crossings were located within the Blackwater River (Cork/Waterford) SAC (002170), a site designated for a range of aquatic qualifying interest species and habitats (NPWS, 2012).

Please note this aquatic report should be read in conjunction with the final Environmental Impact Assessment Report (EIAR) prepared for the proposed development.

2.2 Aquatic site surveys

Aquatic surveys were conducted on the 14th, 15th and 30th April 2025. Survey effort focused on both instream and riparian habitats at each aquatic sampling location and included a fisheries habitat appraisal, white-clawed crayfish survey, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling) (**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 $n=14$ aquatic survey sites along proposed grid connection options

Site no.	Watercourse	EPA code	Location	X (ITM)	Y (ITM)
1b	Shanowen Trib 1 Stream	18S42	Ballynahina	582020	594310
1a	Farran North River	18F27	Farran North	578458	595312
3a / 4a	Toor River	18T51	Coom	564137	591664
3b	Toor River	18T51	Coom	564713	591156
3c	River Bride	18B05	Killeagh	567903	590355
3d	Field Chimney Stream	18F43	Glannasack	568214	591694
3e	Unmapped stream	n/a	Glannasack	568893	592309
3f	Bunnaglanna Stream	18B07	Moneygorm	570827	593361
4b	Toor River	18T51	Coom	564769	591020
4c	Red Bog Stream	18R48	Coom	566375	590073
4d	River Bride	18B05	Killeagh	567959	590327
X1	River Bride	18B05	Bride Bridge	568364	590215
4e	Field Chimney Stream	18F43	Glannasack	568157	592192
4f	Bunnaglanna Stream	18B07	Knockdoorty	570064	594407

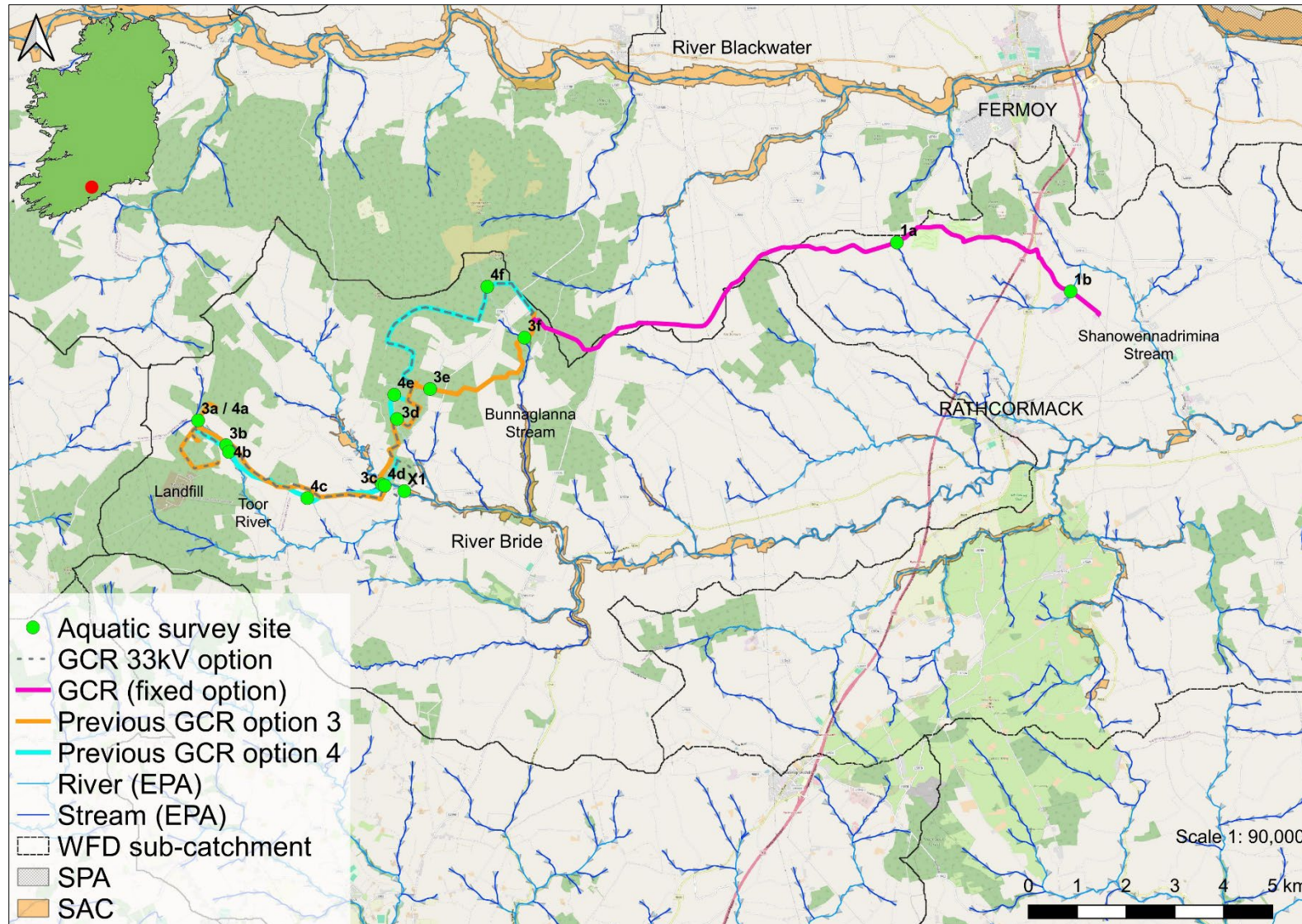


Figure 2.1 Overview of the Coom GEP GCR watercourse crossing aquatic survey sites, April 2025

2.3 Fisheries habitat appraisal

A fisheries habitat appraisal of 14 no. sites was undertaken to establish their importance for salmonid, lamprey, European eel and other fish species. 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 profile, substrata etc.).

2.4 White-clawed crayfish survey

White-clawed crayfish (*Austropotamobius pallipes*) surveys were undertaken at the aquatic survey sites in April 2025 under a National Parks and Wildlife (NPWS) open national licence 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 Green Energy Park 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 Biological water quality (Q-sampling)

The 14 no. riverine survey sites were assessed for biological water quality through Q-sampling in April 2025 (**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

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

2.7 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.).

2.8 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).

2.9 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. Where feasible, equipment was also thoroughly dried (through UV exposure) between survey areas. 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 GCR options are located in a mostly upland area near Bottlehill south-west of Fermoy, Co. Cork. The proposed routes are within hydrometric area 18 (Blackwater (Munster), with proposed crossings located in the Bride[Waterford]_SC_010 and Bride[Waterford]_SC_020 river sub-catchments. The watercourses crossed by the Coom Green Energy Park GCR options are typically small upland channels (FW1; Fossitt, 2000) which flow over areas of old red sandstone, sandstone, conglomerate & mudstone (Geological Survey of Ireland data). Land use practices in the wider survey area are dominated by coniferous forestry (CORINE 312) with extensive adjoining areas of pasture (231).

3.2 Fisheries

The River (Waterford) Bride, the major watercourse within the survey area, is known to support Atlantic salmon (*Salmo salar*), brown/sea trout (*Salmo trutta*), lamprey (*Lampetra* sp.), European eel (*Anguilla anguilla*) and stone loach (*Barbatula barbatula*) (Triturus data; Matson et al., 2019; Kelly et al., 2013). The Bride river system has been ranked 26th in the country in terms of the quantity of accessible fluvial habitat (for salmon and sea trout) available, representing 0.78% of the national total (McGinnity et al., 2003).

The Toor River, a tributary of the Bride, and the Field Chimney Stream both support Atlantic salmon, brown trout and European eel (Triturus data; Matson et al., 2019).

The Farran North River, a tributary of the Shanowennadrimina Stream, is known to support Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel and three-spined stickleback (*Gasterosteus aculeatus*) (Triturus 2020 data).

Previous surveys of the Shanowen Trib 1 Stream at the proposed GCR crossing failed to capture any fish (Triturus 2020 data).

3.3 Protected and rare 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. W68, W69, W79 & W89) identified a low number of records for rare and or protected aquatic species within the vicinity of the proposed GCR options.

Annex II otter (*Lutra lutra*) records were widespread throughout the respective grid squares (**Figure 3.1**). Records were available for the River Bride, including at Bride Bridge (site X1) (NPWS & Triturus data). A record was also available for the Inchinanagh River, a tributary of the River Bride, within the wider survey area (Triturus data).

Numerous records for Annex II freshwater pearl mussel (*Margaritifera margaritifera*) were available

for the W69, W79 and W89 grid squares but all were confined to the River Blackwater. No records overlapped with the survey area. Similarly, Annex II white-clawed crayfish (*Austropotamobius pallipes*) records were available for the River Blackwater and the Ballyclogh Stream (upper tributary upstream of Mallow, W59) but no records overlapped with the survey area.

Numerous sea lamprey (*Petromyzon marinus*) records were available for the Munster Blackwater catchment (e.g. River Blackwater, Clyda River) but no records overlapped with the survey area. River lamprey (*Lampetra fluviatilis*) records were available for the River Blackwater and the lower River Bride at Rathcormack Bridge (not within survey area).

No contemporary NPWS records for macrophytes or aquatic bryophytes protected under the Flora (Protection) Order, 2022 were available for the respective grid squares.

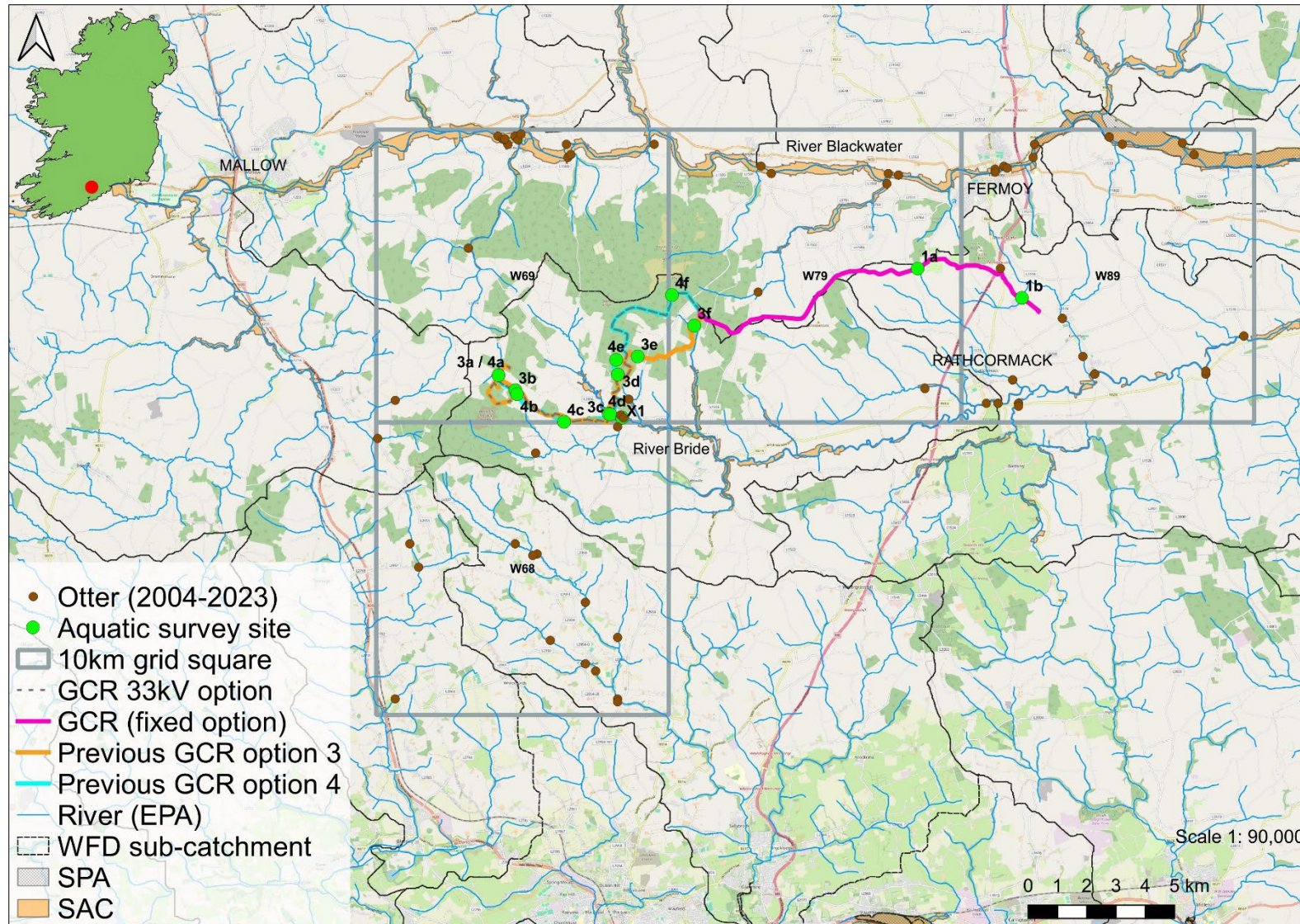


Figure 3.1 Selected protected aquatic species records in the vicinity of the proposed GCR options (source: Triturus, NPWS & NBDC data)

4. Results of aquatic surveys

The following section summarises each of the 14 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 sampling site and in **Appendix A**. A summary of the aquatic species and habitats of high conservation concern recorded during the surveys is provided in **Table 4.1**. An evaluation of the aquatic ecological importance of each survey site based on these aquatic surveys is provided and summarised in **Table 4.2**. Habitat codes are according to Fossitt (2000). Scientific names are provided at first mention only. Sites were surveyed in April 2025.

4.1 Aquatic survey site results

4.1.1 Site 1a – Shanowen Trib 1 Stream, Ballynahina

Site A1 was located on the Shanowen Trib 1 Stream (EPA code: 18S42), a tributary of the Shanowen River, at a proposed GCR crossing. The small lowland depositing stream (FW2) had been historically straightened and locally straightened resulting in a homogenous channel 1m wide with 1m high banks. The stream suffered from low flows at the time of survey and was 0.05m deep with a profile of very shallow slow-flowing riffle. The bed comprised heavily bedded and silted small boulder, cobbles and gravels with some low rates of siltation. The site supported occasional water mint (*Mentha aquatica*) with the liverwort *Riccardia chamedryfolia* present on instream cobble. The riparian areas featured mature hawthorn (*Crataegus monogyna*), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.) adjoining improved pasture (GA1).

Located in the uppermost reaches of the watercourse, the site was too small and shallow to support resident fish. Low flow volumes further reduced its fisheries and white-clawed crayfish potential. Previous surveys of the site failed to record fish species via electro-fishing (Triturus 2020 data). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q3 (poor status) (Appendix A)**. 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 1a was of **local importance (lower value) (Table 4.2)**.



Plate 4.1 Representative image of site 1a on the Shanowen Trib 1 Stream, April 2025

4.1.2 Site 1b – Farran North River, Farran North

Site A2 was located on the Farran North River (18F27), a tributary of the Shanowennadrimina Stream, at a proposed GCR crossing. The lowland channel (FW2) had been heavily modified historically and was 1.5-2m wide with 1.5-2m high banks. The site was 0.2-0.8m deep with a profile dominated by deeper glide with localised pool. The bed comprised mixed boulder, cobble and gravels with deep beds of silt in depositing pool habitat. Primarily due to siltation but also riparian shading, macrophytes and aquatic bryophytes were absent. The riparian areas supported scattered mature beech (*Fagus sylvatica*), grey willow (*Salix cinerea* sp. *oleifolia*), ash (*Fraxinus excelsior*) and hawthorn with pockets of invasive Himalayan balsam (*Impatiens glandulifera*) along the verges. The site was bordered by intensive pasture (GA1) with a sawmill upstream.

Site 1b was of good value for salmonids, despite siltation pressures, with mixed cohort salmonids observed in pools during the site visit. Whilst spawning and nursery habitat was compromised and of moderate value only, deeper glide and pool (with overhanging vegetation) provided good holding opportunities for adult salmonids and also European eel refugia. Abundant silt deposits provided good quality lamprey ammocoete (nursery) habitat. Atlantic salmon, brown trout, lamprey (*Lampetra* sp.), European eel and three-spined stickleback have been recorded from the site previously (Triturus 2020 data). Despite some suitability (i.e. rocky refugia and deeper water) no white-clawed crayfish 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 A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given suitability for and the known presence of salmonids (including Atlantic salmon), lamprey (*Lampetra* sp.) and European eel (Triturus 2020 data), the aquatic ecological evaluation of site 1b was of local importance (higher value) (Table 4.2).



Plate 4.2 Representative image of site 1b on the Farran North River, April 2025



Plate 4.3 Example of lamprey ammocoete habitat at site 1b on the Farran North River, April 2025

4.1.3 Site 3a / 4a – Toor River, Coom

Site 3a / 4a (same location) was located on the upper reaches of the Toor River (18T51) at a proposed GCR crossing. The small upland channel (FW1) had been historically straightened through a coniferous plantation (WD4) and improved pasture (GA1). The river was 1.5-2m wide and 0.1-0.4m deep with 1m bank heights. The profile was of deep glide and riffle with very localised pool. The bed comprised boulders, cobble, mixed gravels and sand. These were moderately silted with substrata being moderately bedded. Bank erosion, inclusive of livestock poaching, was widespread. The small river supported no macrophytes due to its high energy. However, instream sandstone boulders supported the moss species *Rhynchostegium riparioides*. The riparian areas were predominantly open pasture with pockets of species-poor wet grassland (GS4) and or bordered by semi-mature sitka spruce (WD4).

Site 3a / 4a was a good quality nursery for salmonids and a small population of mixed cohort brown trout was observed. These were also captured during kick sampling (**Plate 4.5**). The presence of mixed boulder, cobble and gravels with broken flow patterns (i.e. oxygenated riffle-glide) provided good salmonid nursery conditions. The small river also had moderate eel suitability given the presence of abundant rocky refugia and ample depth, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey and no suitable habitat was observed. The sandstone geology of the Toor River was unsuitable 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 **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 3a / 4a was of **local importance (higher value) (Table 4.2)**.



Plate 4.4 Representative image of site 3a / 4a (same location) on the Toor River, April 2025



Plate 4.5 Juvenile brown trout recorded via kick sampling at site 3a / 4a on the Toor River, April 2025

4.1.4 Site 3b – Toor River, Coom

Site 3b was located on the upper reaches of the Toor River (18T51) at a proposed GCR crossing approximately 0.8km downstream of site 3a/4a. The small upland river channel (FW1) had been historically deepened but retained good sinuosity with a profile of deep glide and riffle and localised shallow pool on meanders. The river was 1.5-2m wide and 0.1-0.5m deep with 1m high banks. The bed comprised boulder, cobble and mixed gravels but these were heavily silted with the substrata being moderately bedded. This was mainly due to unfenced cattle access to the small river upstream (poaching) where significant volumes of eroded silt was entering the river. Water-crowfoot (*Ranunculus* sp.) was occasional instream. Larger instream boulders supported locally frequent *Fontinalis antipyretica*. The channel margins supported occasional marsh marigold (*Caltha palustris*) and hemlock water-dropwort (*Oenanthe crocata*). The riparian areas featured frequent scattered grey willow, gorse and bramble. Wet hollows in the adjoining willows supported tussock sedge (*Carex paniculata*), soft rush (*Juncus effusus*), hemlock water dropwort, marsh marigold and hairy bittercress (*Cardamine hirsuta*). The site was bordered by improved pasture (GA1) and coniferous afforestation (WD4).

Site 3b was a good quality habitat for salmonids and a small population of mixed cohort brown trout was observed. A young-of-the-year (0+) trout was also captured during kick sampling. The site provided only moderate salmonid nursery conditions given evident siltation pressures but localised pools offered valuable holding areas for adults. The small river also had moderate eel suitability given the presence of abundant rocky refugia and ample depth, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey and no suitable habitat was observed. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 3b was of **local importance (higher value) (Table 4.2)**.



Plate 4.6 Representative image of site 3b on the Toor River, April 2025

4.1.5 Site 3c – River Bride, Killeagh

Site 3c was located on the upper reaches of the River Bride (18B05) at a previously proposed GCR crossing (route option 3). The upland eroding river (FW1) featured a semi-natural meandering profile with a profile dominated by shallow riffle and glide with localised pools. The river was 3-4m wide and 0.1-0.4m deep with bank heights of up to 1.2m. The bed comprised small boulder, cobble and mixed gravels. However, the substrata were heavily silted and moderately bedded. The site supported occasional hemlock water-dropwort and water crowfoot (*Ranunculus* sp.). Instream boulders supported occasional *Fontinalis antipyretica*. The riparian areas featured scattered grey willow, gorse, bramble and scattered elder (*Sambucus nigra*). The site was bordered by often dense scrub (WS1), improved pasture (GA1) and coniferous afforestation (WD4).

Site 3c was a moderate quality salmonid nursery habitat with medium densities of mixed cohort salmonids observed. A recently emerged 0+ Atlantic salmon was recorded during kick sampling (**Plate 4.8**). The presence of mixed boulder, cobble and gravels with local broken flow patterns (i.e. oxygenated riffle-glide) provided moderate quality spawning and nursery conditions. However, the value was compromised by high siltation pressures. Holding habitat for adult salmonids was moderate given a paucity of deeper pools (this improved downstream). The site was also considered a moderate quality eel nursery habitat given the presence of abundant rocky refugia and ample depth. The site

was of too high energy for lamprey despite some compacted beds of superficial silt being present. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the location of the site within the Blackwater River (Cork/Waterford) SAC (002170), the aquatic ecological evaluation of site 3c was of **international importance (Table 4.2)**.



Plate 4.7 Representative image of site 3c on the River Bride, April 2025



Plate 4.8 Recently emerged Atlantic salmon fry (0+) recorded via kick sampling at site 3c on the River Bride, April 2025

4.1.6 Site 3d – Field Chimney Stream, Glannasack

Site 3d was located on the upper reaches of the Field Chimney Stream (18F43), a tributary of the Inchinanagh River, at a proposed GCR crossing. The sinuous upland channel (FW1) was of very high energy, flowing over a moderate gradient with exposed sandstone boulder cascades. The stream was 2-3m wide and 0.1-0.3m deep with steep banks that graded into the adjoining V-shaped valley. The stream had a profile of shallow cascading riffle and glide with localised plunge pools. The bed comprised of rounded boulder, cobble, mixed gravels and sand. The substrata had light to moderate siltation with the substrata being moderately bedded. The site did not support macrophytes given high energies and shading. However, instream boulders supported the liverwort *Chiloscyphus polyanthos* in shaded pockets with more frequent *Rhynchostegium riparioides* on exposed boulder tops. The riparian areas supported frequent grey willow that bordered mature Sitka spruce (*Picea sitchensis*) from the adjoining plantations (WD4).

Site 3d was a moderate quality nursery for salmonids and a small population of mixed cohort brown trout was observed. Atlantic salmon are also known from the site (Triturus 2020 data). The presence of mixed boulder, cobble and gravels with broken flow patterns (i.e. oxygenated riffle-glide) provided good nursery conditions (improving from site 4e upstream) despite the high gradient of the channel. Good quality spawning habitat was present locally in pockets of lower gradient glide between cascading areas. The broadleaved buffer (grey willow) evidently benefited the salmonid value of the stream. The site also had moderate eel suitability given the presence of abundant rocky refugia, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey and no suitable habitat was observed. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 3d was of **local importance (higher value) (Table 4.2)**.



Plate 4.9 Representative image of site 3d on the Field Chimney Stream, April 2025

4.1.7 Site 3e – unmapped stream, Glannasack

Site 3e was located on an unmapped tributary of the Inchinanagh River at a previously proposed GCR crossing (route option 3). The small upland eroding stream (FW1) had been historically deepened and straightened through coniferous afforestation (WD4) resulting in a 0.5-1m wide channel with 1m bank heights. The shallow stream was 0.05m deep at the time of survey with a profile of very shallow riffle and glide. The channel evidently suffered from low dry weather flows. The bed comprised localised heavily bedded boulder and cobble with finer mixed gravels and sand. These were moderately silted and had high cover of the liverwort *Chiloscyphus polyanthos*. The site did not support any macrophytes due to high riparian shading. The channel was heavily shaded by grey willow and beech (*Fagus sylvatica*) that formed a buffer between adjoining Sitka spruce plantations.

The small stream was not of fisheries value at this location due to poor flows and very poor bed condition (heavily siltation & compaction of bed). There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. 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 3e was of **local importance (lower value)** (Table 4.2).



Plate 4.10 Representative image of site 3e on an unmapped tributary of the Inchinanagh River, April 2025

4.1.8 Site 3f – Bunnaglanna Stream, Moneygorm

Site 3f was located on the upper reaches of the Bunnaglanna Stream (18B07), a tributary of the River Bride, at a previously proposed GCR crossing (route option 3). The upland eroding channel (FW1) flowed over a high gradient with a semi-natural, meandering form through mature sitka spruce plantations. The stream was 3-4m wide and 0.1-0.3m deep. The flow profile was of mixed cascading riffle, glide and pool sequences. The bed supported large rounded boulder and cobble with mixed gravels in interstitial spaces. The large stream was of too high energy to support macrophytes at this location. However, the liverwort species *Chiloscyphus polyanthos* was present locally on stable boulders. The riparian areas supported mature grey willow, bramble and gorse that formed a dense layer for c. 10m either side of the channel. The site was bordered by coniferous afforestation (WD4).

Site 3f was of some value for salmonids, with low numbers of mixed cohort brown trout observed in deeper pool (holding) areas during the site visit. Salmonid spawning habitat was present but limited due to high bed mobility. Good quality nursery habitat was present throughout the site. The site had moderate eel suitability given the presence of abundant rocky refugia and ample depth, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status)** (Appendix A). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 3f was of **local importance (higher value) (Table 4.2)**.



Plate 4.11 Representative image of site 3f on the Bunnaglanna Stream, April 2025

4.1.9 Site 4b – Toor River, Coom

Site 4b was located on the upper reaches of the Toor River (18T51) at a previously proposed GCR crossing (route option 4) approximately 0.15km downstream of site 3b. The small upland river channel (FW1) had been historically deepened but retained good sinuosity with a profile of deep glide and localised riffle. The river was 1.5-2m wide and 0.1-0.5m deep with 1-1.2m high banks. The bed comprised boulder, cobble and mixed gravels but these were heavily silted with the substrata being moderately bedded. The site supported locally frequent hemlock water-dropwort. Larger instream boulders supported occasional *Fontinalis antipyretica* with the exposed and eroded muddy banks support the liverwort *Pellia epiphylla*. The mature scrubby riparian areas featured frequent scattered grey willow, gorse and bramble with sedges and rushes in wetter areas. The site was bordered by a local road (to the south), scrub (WS1), improved pasture (GA1) and coniferous afforestation (WD4).

Site 4b was a moderate quality nursery for salmonids and a small population of mixed cohort brown trout was observed. The site provided only moderate salmonid nursery conditions given evident siltation pressures. The paucity of holding pool areas reduced the value for adult salmonids. The site had moderate eel suitability given the presence of abundant rocky refugia, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey and no suitable habitat was observed. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national

red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 4b was of **local importance (higher value) (Table 4.2)**.



Plate 4.12 Representative image of site 4b on the Toor River, April 2025

4.1.10 Site 4c – Red Bog Stream, Coom

Site 4c was located on the Red Bog Stream (18R48) in close proximity (<10m) to the previously proposed GCR option 4. The small Coom River tributary had been historically deepened and straightened through coniferous afforestation (WD4) and improved pasture (GA1). The small upland stream (FW1) was 0.5-1m wide and <0.2m deep with 1.5m bank heights. The profile comprised very shallow riffle and glide. The channel evidently suffered from low dry weather flows. The substrata were dominated by boulder and cobble with heavily mixed gravels. These were heavily silted and bedded with high cover of flocculant iron-oxidising bacterial films. The site did not support macrophytes due to heavy shading. The riparian zones supported frequent grey willow, gorse and bramble scrub (WS1). The site was bordered by improved pasture (GA1) and mature scrub buffers with coniferous afforestation upstream (WD4).

The small stream was not of fisheries value at this location due to poor flows and very poor bed condition (heavily siltation & compaction of bed with high cover of iron-oxidising bacteria). There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status) (Appendix A)**. 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 4c was of **local importance (lower value)** (Table 4.2).



Plate 4.13 Representative image of site 4c on the Red Bog Stream, April 2025

4.1.11 Site 4d – River Bride, Killeagh

Site 4d was located on the upper reaches of the River Bride (18B05) at a proposed GCR crossing approximately c.100m downstream of site 3c. The medium-sized upland river (FW1) featured a semi-natural meandering profile dominated by shallow riffle and glide with localised deeper pool. The river was 4m wide and 0.1-0.7m deep with 0.5-1.2m bank heights. The bed comprised small boulder, cobble, mixed gravels and silt. The instream bed substrata were moderately silted and bedded. The increase in gradient locally did not facilitate the settling of fines. The site supported occasional hemlock water-dropwort and water crowfoot (*Ranunculus* sp.). Instream boulders supported occasional *Fontinalis antipyretica*. The moss *Leptodictyum riparium* was recorded as rare (a species indicative of enrichment pressures). The riparian supported frequent grey willow, gorse, and bramble with occasional alder (*Alnus glutinosa*). The site was bordered by often dense scrub (WS1), improved pasture (GA1) and coniferous afforestation (WD4).

Site 4d was a good quality nursery habitat for Atlantic salmon and brown trout (both observed). The presence of mixed boulder, cobble and gravels with local broken flow patterns (i.e. oxygenated riffle-glide) provided improved nursery conditions (despite siltation pressures). Deeper pools provided valuable holding areas for adult salmonids. Spawning habitat quality was good locally in pools where well sorted gravels were present despite siltation pressures. The River Bride at this location was considered a moderate quality eel nursery habitat given the presence of abundant rocky refugia and ample depth. The site was of too high energy for lamprey despite some compacted beds of superficial silt being present. There was no suitability for white-clawed crayfish (unsuitable catchment geology). A regular otter latrine was identified on a willow tree root system immediately downstream of the

bridge (ITM 567955, 590311; **Plate 4.15**).

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status)** (**Appendix A**). No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the location of the site within the Blackwater River (Cork/Waterford) SAC (002170), the aquatic ecological evaluation of site 4d was of **international importance** (**Table 4.2**).



Plate 4.14 Representative image of site 4d on the River Bride, April 2025

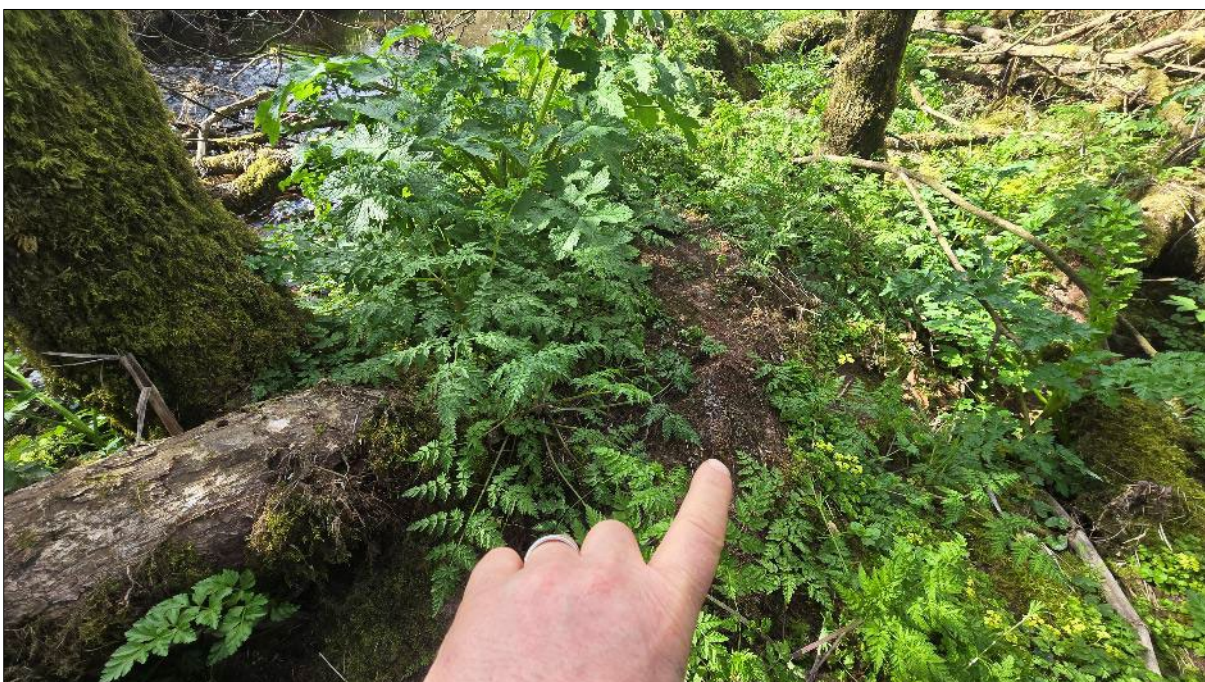


Plate 4.15 Location of regular otter latrine on willow tree root at site 4d on the River Bride, April 2025

4.1.12 Site X1 – River Bride, Bride Bridge

Site X1 was located on the River Bride (18B01) at Bride Bridge, a proposed GCR crossing (33kV option), upstream of its confluence with the Coom River. The natural upland watercourse (FW1) flowed over exposed bedrock resulting in deep pools between bedrock cascades. The river was 6-10m wide and 0.1-0.6m deep with gently sloping, well-vegetated banks. The substrata were dominated by bedrock with frequent cobble and mixed gravels. Boulders were scattered. Filamentous algae cover was high (c.70% of the bed), indicative of enrichment pressures. However, siltation was low given the high energy nature of the channel. Given high flow rates, macrophytes were scarce with only localised water crowfoot (*Ranunculus* sp.) and hemlock water dropwort. Instream boulders also supported occasional bryophytes including *Rhynchostegium riparioides* and *Fontinalis squamosa*. The wet riparian areas were dominated by willow (*Salix* spp.) and hawthorn (*Crataegus monogyna*) with occasional iris (*Iris pseudacorus*). The site was bordered by improved pasture (GA1) and coniferous afforestation (WD4) with mature scrubby buffers.

Site X1 was of high value for salmonids, with the large pool immediately below the bridge providing excellent holding opportunities for adult fish. Riparian shading significantly improved the holding habitat providing cover and thermal shading. Salmonid spawning and nursery habitat quality was good locally but the frequency and extent of such habitat improved significantly downstream of the Coom River confluence (where riffle and glide sequences were present in addition to mixed cobble gravel substrata). Both Atlantic salmon and brown trout are known from the site (Triturus 2020 data). European eel habitat was of moderate quality given presence of deeper pools, however, instream refugia were sparse. The site was of too high energy for lamprey despite some mixed spawning gravels being present. There was no suitability for white-clawed crayfish (unsuitable catchment geology). An otter spraint site was recorded on a small marginal boulder under the bridge (ITM 568360, 590217).

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the location of the site within the Blackwater River (Cork/Waterford) SAC (002170), the aquatic ecological evaluation of site X1 was of **international importance (Table 4.2)**.



Plate 4.16 Representative image of site X1 on the River Bride, April 2025 (downstream of bridge)

4.1.13 Site 4e – Field Chimney Stream, Glannasack

Site 4e was located on the upper reaches of the Field Chimney Stream (30L49) at a previously proposed GCR crossing (route option 4), c.0.5km upstream of site 3d. The very high energy upland eroding channel (FW1) cascaded over beds of exposed sandstone boulder and cobble, following a sinuous profile through the adjoining conifer plantations. The stream was 2-3m wide and 0.1-0.3m with steep banks that graded into the adjoining V-shaped valley. The flow profile was of shallow cascading riffle, glide and pool. The bed comprised rounded boulder, cobble, mixed gravels and sand. The substrata featured light to moderate siltation with the substrata being moderately bedded. The channel did not support macrophytes due to high energy and shading. Instream boulders supported the liverwort *Chiloscyphus polyanthos* in shaded pool pockets with more frequent *Rhynchostegium riparioides* on exposed boulder tops. The riparian areas featured scattered grey willow that formed buffers along mature lodgepole pine (*Pinus contorta*) plantations (WD4).

Site 4e was a moderate quality nursery for salmonids and low numbers of mixed cohort brown trout were observed in pool areas. The site provided moderate nursery conditions despite the high gradient of the channel. Spawning habitat was very localised in pool habitat (given the high energy). The site also had moderate eel suitability given the presence of abundant rocky refugia, despite being located in poorer access (higher gradient) reaches of the sub-catchment. The site was of too high energy to support lamprey. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4-5 (high status) (Appendix A)**. No macro-invertebrate species of conservation value greater than 'least concern', according to national red lists, were recorded via Q-sampling.

Given the suitability for and confirmed presence of salmonids, the aquatic ecological evaluation of site 4e was of **local importance (higher value) (Table 4.2)**.



Plate 4.17 Representative image of site 4e on the Field Chimney Stream, April 2025

4.1.14 Site 4f – Bunnaglanna Stream, Knockdoorty

Site 4f was located on the uppermost reaches of the Bunnaglanna Stream (18B07), a tributary of the River Bride, at a previously proposed GCR crossing c.1.5km upstream of site 3f. The upland stream (FW1) flowed over a steep gradient in a deeply incised natural valley. The meandering channel was 1-2m wide and 0.1-0.2m deep with a profile of mixed cascading riffle, pool and glide sequences. The stream suffered from low flows at the time of survey. The substrata were dominated by angular boulder and cobble with frequent areas of mixed gravel and sands. Areas of bedrock were present locally. The high energy site did not support macrophytes but the liverworts *Chiloscyphus polyanthos* and *Scapania undulata* grew on instream small boulders. The often steep banks supported mature grey willow for c. 5m either side of the channel which provided valuable buffers against the adjoining coniferous afforestation (WF4) and clear-fell (WS5) areas.

The stream at site 4f was considered too shallow and high gradient to support salmonid populations. The low flows (likely an annual occurrence¹) would further reduce to the fisheries potential of the site (located in the uppermost reaches of the watercourse). However, fisheries value improved downstream with salmonids observed at survey site 3f. The site was of too high energy to support lamprey. There was no suitability for white-clawed crayfish (unsuitable catchment geology). No otter signs were recorded in vicinity of the site.

Biological water quality, based on Q-sampling, was calculated as **Q4 (good status) (Appendix A)**. No

¹ supported by very high densities of Glossosomatidae caddis that proliferate in streams that suffer from low seasonal flows

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 4f was of **local importance (lower value) (Table 4.2)**.



Plate 4.18 Representative image of site 4f on the Bunnaglanna Stream, April 2025

4.2 White-clawed crayfish survey

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia at any of the aquatic survey sites in April 2025. Furthermore, inspection of mustelid spraint at 2 no. sites on the River Bride did not reveal the presence of crayfish remains.

The results are in keeping with the absence of records for the species in the survey area (nearest record is the River Blackwater at Fermoy) and this is largely reflective of unsuitable water chemistry and habitats in the survey area (Demers et al., 2005; Lucy & McGarrigle, 1987).

4.3 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 14 no. riverine sites in April 2025 (**Appendix A**).

A total of 9 no. sites on the Toor River (3a/4a, 3b, 4b), River Bride (3c, 4d, X1), unnamed stream (3e), Bunnaglanna Stream (3f) and the Field Chimney Stream (4e) achieved **Q4-5 (high status)** water quality and thus met the target good status ($\geq Q4$) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (**Figure 4.1**). This intermediate rating between Q4 and Q5 was given the presence of at least one group A Heptageniidae (mayfly) species plus ≥ 3 Plecoptera (stonefly) species in fair numbers (5% of total abundance). These included the mayflies *Ecdyonurus dispar* and *Rhithrogena semicolorata*

in addition to stoneflies such as *Siphonoperla torrentium*, *Amphinemura sulcicollis*, *Protonemura meyeri*, *Dinocras cephalotes*, *Isoperla grammatica* and or *Brachyptera risi*. The high status ratings were in spite of some observed siltation pressures at the sampling sites.

Sites 3d on the Field Chimney Stream, 4c on the Red Bog Stream and 4f on the Bunnaglanna Stream achieved **Q4 (good status)** water quality given the presence of at least one group A taxa in fair numbers (**Appendix A**).

The remaining two sites on the Shanowen Trib 1 Stream (1a) and Farran North River (1b) achieved **Q3 (poor status)** based on an absence of group A species, low numbers of group B species and a dominance of group C species, particularly the mayfly *Baetis rhodani* and the freshwater shrimp (*Gammarus duebeni*) (**Appendix A**).



Plate 4.19 Example of the EPA group A stonefly *Dinocras cephalotes* recorded at site 4d on the River Bride, April 2025

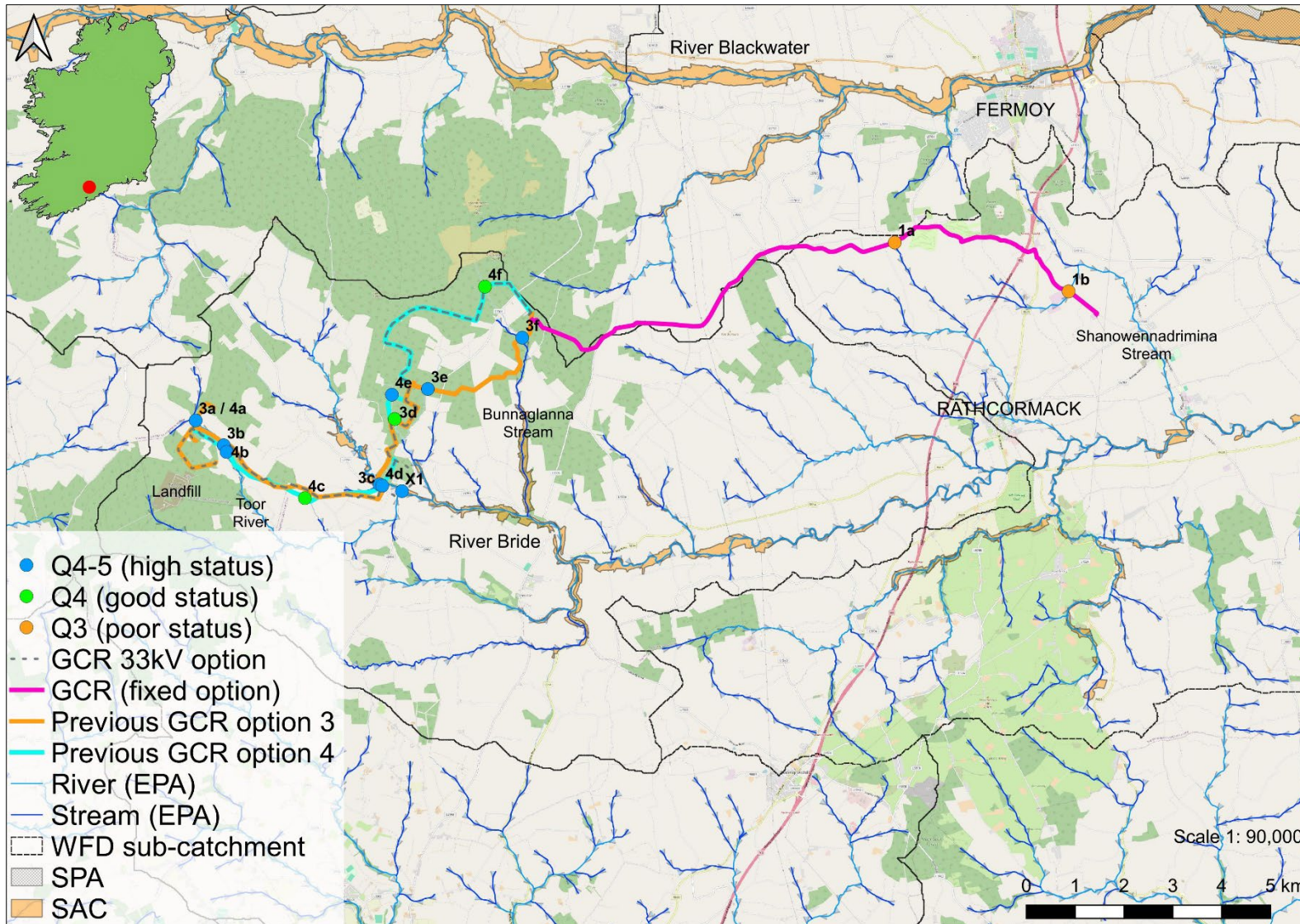


Figure 4.1 Overview of the biological water quality status in the vicinity of the proposed GCR options, April 2025

Table 4.1 Summary of aquatic species and habitats of higher conservation value recorded in the vicinity of the proposed development, April 2025

Site	Watercourse	White-clawed crayfish	Otter signs ²	Annex I aquatic habitats	Rare or protected macrophytes/aquatic bryophytes	Rare or protected macro-invertebrates	Other species/habitats of high conservation value
1a	Shanowen Trib 1 Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
1b	Farran North River	None recorded	No signs recorded	Not present	None recorded	None recorded	Atlantic salmon, <i>Lampetra</i> sp. & European eel known from site (Triturus 2020 data)
3a / 4a	Toor River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
3b	Toor River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
3c	River Bride	None recorded	No signs recorded	Not present	None recorded	None recorded	0+ Atlantic salmon recorded via kick sampling
3d	Field Chimney Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	Atlantic salmon known from site (Triturus 2020 data)
3e	Unmapped stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
3f	Bunnaglanna Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
4b	Toor River	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
4c	Red Bog Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
4d	River Bride	None recorded	Regular latrine site	Not present	None recorded	None recorded	Atlantic salmon parr observed
X1	River Bride	None recorded	Regular spraint site	Not present	None recorded	None recorded	Atlantic salmon parr observed
4e	Field Chimney Stream	None recorded	No signs recorded	Not present	None recorded	None recorded	None recorded
4f	Bunnaglanna 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'). Atlantic salmon and otter are both protected under the Irish Wildlife Acts 1976-2023. Atlantic salmon are also protected under the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations. 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).

² Otter signs within 150m of the survey site

Table 4.2 Aquatic ecological evaluation summary of the survey sites according to NRA (2009) criteria

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
1a	Shanowen Trib 1 Stream	18S42	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q3 (poor status) water quality
1b	Farran North River	18F27	Local importance (higher value)	Atlantic salmon, lamprey (<i>Lampetra</i> sp.) & European eel known from site (Triturus 2020 data)
3a / 4a	Toor River	18T51	Local importance (higher value)	Salmonids observed
3b	Toor River	18T51	Local importance (higher value)	Salmonids observed
3c	River Bride	18B05	International importance	Located within Blackwater River (Cork/Waterford) SAC (002170)
3d	Field Chimney Stream	18F43	Local importance (higher value)	Salmonids observed; Atlantic salmon known from site (Triturus 2020 data)
3e	Unmapped stream	n/a	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q4-5 (high) status water quality
3f	Bunnaglanna Stream	18B07	Local importance (higher value)	Salmonids observed
4b	Toor River	18T51	Local importance (higher value)	Salmonids observed
4c	Red Bog Stream	18R48	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q4 (good) status water quality
4d	River Bride	18B05	International importance	Located within Blackwater River (Cork/Waterford) SAC (002170)
X1	River Bride	18B05	International importance	Located within Blackwater River (Cork/Waterford) SAC (002170)
4e	Field Chimney Stream	18F43	Local importance (higher value)	Salmonids observed
4f	Bunnaglanna Stream	18B07	Local importance (lower value)	No aquatic species or habitats of high conservation value; Q4 (good) status water quality

Conservation value: 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'). Atlantic salmon are also protected under the Irish Wildlife Acts 1976-2023 and the Wild Salmon and Sea Trout Tagging Scheme (Amendment) Regulations. Apart from the Inland Fisheries Acts 1959 to 2017, non-anadromous brown trout 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).

5. Discussion

The watercourses crossed by proposed grid connection route (GCR) options as part of the Coom Green Energy Park development were typically small upland and higher gradient channels. Whilst some local modifications had occurred historically (e.g. near conifer plantations) the survey channels retained natural or semi-natural profiles. Despite evidence of water quality pressures (siltation), biological water quality was typically of $\geq Q4$ (good status) throughout much of the survey area, with the majority of sites achieving Q4-5 (high status) water quality in April 2025.

A number of high conservation value aquatic species were recorded or are at least known from the survey area based on previous survey data, including Atlantic salmon, lamprey (*Lampetra* sp.), otter and Red-listed European eel. This resulted in most sites being evaluated as **local importance (higher value)** in terms of their aquatic ecology (**Table 4.2**). Sites 3c, 4d and X1 on the River Bride were of **international importance** given their location within the Blackwater River (Cork/Waterford) SAC (002170), a site designated for a range of aquatic interests including Atlantic salmon, lamprey, white-clawed crayfish, otter and floating river vegetation habitat (NPWS, 2012). No examples of white-clawed crayfish or Annex I floating river vegetation were recorded at the survey sites.

Broadly speaking, the highest value watercourses in terms of aquatic ecology were the River Bride (mostly located Blackwater River (Cork/Waterford) SAC), Field Chimney Stream and the Toor River.

5.1 Fisheries

Salmonid populations were observed across the survey area. Whilst smaller channels such as the Toor River likely only support brown trout populations, Atlantic salmon are known from the River Bride, Field Chimney Stream and the Farran North River in vicinity of proposed GCR crossings. Particularly good quality salmonid spawning and nursery habitat was present on the upper River Bride, a regionally important salmonid watercourse (McGinnity et al., 2003). A recently emerged 0+ Atlantic salmon was captured during kick sampling at site 3c on this watercourse (**Plate 4.8**), supporting previous survey data as to its nursery value.

Suitability for lamprey (*Lampetra* sp.) was poor or absent at most survey sites by virtue of higher natural gradients and higher flow velocities. Such characteristics reduce the extent of fine gravels required for spawning (Dawson et al., 2015; Rooney et al., 2013; Lasne et al., 2010) and discourages the deposition of fine, organic-rich sediment ≥ 5 cm in depth generally required by larval *Lampetra* spp. settlement (Aronsoo & Virkkala, 2014; Goodwin et al., 2008; Gardiner, 2003). However, silt deposits at site 1b on the Farran North Stream are known to support *Lampetra* sp. ammocoetes (Triturus 2020 data).

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). Most survey sites provided at least moderate quality eel habitat, with ample instream refugia such as boulders and deeper pool areas required by the species. Nevertheless, eel densities are likely low (at best) in the vicinity of the proposed GCR crossings, reflecting the high energy/spate nature of many watercourses in addition to other natural characteristics including high gradients and small channel width/depth. Eel penetration into the upper reaches of catchments is often low, especially where higher natural gradients result in higher flow velocities, reduced accessibility and sub-optimal eel habitats (Matondo et al., 2021; Laffaille et al., 2003). Abundance

naturally decreases with gradient and distance from marine habitats (Degerman et al., 2019), with a greater frequency of eel typically found in the lower gradient reaches of watercourses (Moriarty, 2003).

5.2 Otter

Despite suitability at many survey sites in terms of prey resources (e.g. salmonids), otter signs (spraint sites or latrines) were only recorded at 2 no. sites during the current survey. Both were on the River Bride (sites 4d & X1), where previous otter records existed (including at Bride Bridge, site X1). Otters are also known to utilise the Inchinanagh River, to which the unmapped stream at site 3e connects (**Figure 3.1**) and are listed as a qualifying interest of the Blackwater River (Cork/Waterford) SAC (002170) with which a number of survey watercourses share hydrological connectivity. No breeding (holts) or resting (couch) areas were identified in the vicinity of the GCR crossing survey sites in April 2025.

Otter occurrence is negatively associated with elevation (Triturus data; Hong et al., 2020) with smaller, upland, higher-gradient watercourses often providing more restricted, stochastic prey resources and reduced foraging opportunities for otter compared with lower-gradient, larger watercourses (Sittenthaler et al., 2019; Scorpio et al., 2016; Remonti et al., 2009). This likely explains the paucity of signs recorded during the current survey and is supported by previous surveys in the upper River Bride catchment.

5.3 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 14 no. riverine sites in April 2025 (**Appendix A**), i.e. none of greater than Least Concern.

However, **Q4-5 (high status)** water quality was widespread in the survey area, being present at 9 of the 14 no. sites in total on the Toor River (3a/4a, 3b, 4b), River Bride (3c, 4d, X1), unnamed stream (3e), Bunnaglanna Stream (3f) and the Field Chimney Stream (4e). High status waterbodies continue to decline significantly in Ireland (Trodd et al., 2022) and thus these watercourses require strict protection in light of proposed GCR (and wind farm) works that can result in water quality impacts through siltation, enrichment and or hydrocarbons. Although the Bride[Waterford]_SC_010 and SC_020 sub-catchments containing the proposed GCR options achieved good status in the 2016-2021 period (EPA data), site observations would suggest that nutrient enrichment (eutrophication) and siltation originating from land use pressures (e.g. agriculture, afforestation) pose a risk to water quality in the wider area.

6. References

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7. Appendix A – Macro-invertebrates (biological water quality)

Table 7.1 Macro-invertebrate Q-sampling results for proposed GCR crossings, April 2025

Group	Family	Species	1a	1b	3a/4a	3b	3c	3d	3e	3f	4b	4c	4d	X1	4e	4f	EPA group
Ephemeroptera	Heptageniidae	<i>Ecdyonurus dispar</i>							1				2	1			A
Ephemeroptera	Heptageniidae	<i>Rhithrogena semicolorata</i>			2	28	33	3	4	2	26		72	46	23		A
Plecoptera	Chloroperlidae	<i>Siphonoperla torrentium</i>			4		5	2	1	10	7	1	2	4		2	A
Plecoptera	Nemouridae	<i>Amphinemura sulcicollis</i>			8	4							5		6	1	A
Plecoptera	Nemouridae	<i>Protonemura meyeri</i>					1		1				1	3			A
Plecoptera	Perlidae	<i>Dinocras cephalotes</i>											2	1			A
Plecoptera	Perlodidae	<i>Isoperla grammatica</i>				4	10	1		1	23		5	6	2	4	A
Plecoptera	Taeniopterygidae	<i>Brachyptera risi</i>			4	5			3	16	2		6		11		A
Ephemeroptera	Baetidae	<i>Alainites muticus</i>		2	2		3	1	2					2	2		B
Plecoptera	Leuctridae	<i>Leuctra fusca</i>			18	2	6	14	4	41		3	6	4	2	2	B
Trichoptera	Glossosomatidae	<i>Agapetus fuscipes</i>					1							2		2	B
Trichoptera	Goeridae	<i>Silo pallipes</i>						2					1			1	B
Trichoptera	Limnephilidae	<i>Drusus annulatus</i>									1	1				1	B
Trichoptera	Limnephilidae	<i>Halesus radiatus</i>		2		2				3	1	3					B
Trichoptera	Limnephilidae	<i>Potamophylax cingulatus</i>				2		7	2	1	1						B
Trichoptera	Limnephilidae	sp. indet.														1	B
Trichoptera	Sericostomatidae	<i>Sericostoma personatum</i>	2	1				1	3				2				B
Hemiptera	Veliidae	Veliidae nymph										1					B
Ephemeroptera	Baetidae	<i>Baetis rhodani</i>	11	5	42	41	5	12		15	28	3	12	10	7	6	C
Ephemeroptera	Caenidae	<i>Caenis rivulorum</i>		1													C
Ephemeroptera	Ephemerellidae	<i>Serratella ignita</i>		4			1	3						2			C
Trichoptera	Hydropsychidae	<i>Diplectrona felix</i>								1					4		C
Trichoptera	Hydropsychidae	<i>Hydropsyche instabilis</i>					2						1	3			C
Trichoptera	Hydropsychidae	<i>Hydropsyche siltalai</i>					3	2	2		2	1	5	3			C
Trichoptera	Philopotamidae	<i>Wormaldia occipitalis</i>			2			1	10	4							C

Group	Family	Species	1a	1b	3a/4a	3b	3c	3d	3e	3f	4b	4c	4d	X1	4e	4f	EPA group
Trichoptera	Polycentropodidae	<i>Plectrocnemia conspersa</i>							1			1				1	C
Trichoptera	Rhyacophilidae	<i>Rhyacophila dorsalis</i>				2	1				2		1	4			C
Trichoptera	Rhyacophilidae	<i>Rhyacophila munda</i>				1		1									C
Arachnida	Hydrachnidiae	sp. indet.					1					1		1			C
Coleoptera	Dytiscidae	<i>Hydroporus tessellatus</i>									1					1	C
Coleoptera	Dytiscidae	<i>Oreodytes sanmarkii</i>					1										C
Coleoptera	Elmidae	<i>Elmis aenea</i>		1	7	5	7	3	1					6		2	C
Coleoptera	Elmidae	<i>Limnius volckmari</i>	2		4	6	13	7		1	4		3	6			C
Coleoptera	Gyrinidae	Gyrinidae larva	1			1	2				1		1				C
Coleoptera	Hydraenidae	<i>Hydraena gracilis</i>			1	1									1		C
Coleoptera	Hydrophilidae	<i>Helophorus grandis</i>									1						C
Crustacea	Gammaridae	<i>Gammarus duebeni</i>		14	3	3	2	17	17	7	5	3	1	5	1	3	C
Diptera	Chironomidae	Non- <i>Chironomus</i> spp.		1	4		26	1	1				5	1	1	1	C
Diptera	Culicidae	sp. indet.					2										C
Diptera	Pediciidae	<i>Dicranota</i> sp.	1		7		2		1	1		1					C
Diptera	Simuliidae	sp. indet.			10					2	3		1	2			C
Diptera	Thaumaleidea	sp. indet.														1	C
Diptera	Tipuliidae	<i>Tipula</i> sp.							1					1			C
Gastropoda	Tateidae	<i>Potamopyrgus antipodarum</i>	6	1								2					C
Gastropoda	Planorbidae	<i>Ancylus fluviatilis</i>			1											1	C
Gastropoda	Lymnaeidae	<i>Ampullacaena balthica</i>		3							3						D
Diptera	Chironomidae	<i>Chironomus</i> spp.	1				1										E
Abundance			24	35	119	107	128	78	55	105	111	23	132	113	60	30	
Q-rating			Q3	Q3	Q4-5	Q4-5	Q4-5	Q4	Q4-5	Q4-5	Q4-5	Q4	Q4-5	Q4-5	Q4-5	Q4	
WFD status			Poor	Poor	High	High	High	Good	High	High	High	Good	High	High	High	Good	



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