
Chleansaid Wind Farm
ESB Asset Development UK Limited
Appendix 8.3: Fisheries



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1 INTRODUCTION

1.1 Background

- 1.1.1 This Technical Appendix has been prepared to accompany **Chapter 8** of the Environmental Impact Assessment Report (EIAR) for the proposed Chleainsaid Wind Farm (hereafter 'Proposed Development').
- 1.1.2 It presents detailed methodologies and results of desk studies and field surveys completed to establish baseline conditions with regards to fisheries.
- 1.1.3 It should be read with reference to the following Figures, presented in Volume 3 of the EIAR:
- **Figure 8.1** Non-Ornithological Statutory Designated Sites for Nature Conservation.
 - **Figure 8.6:** Fisheries Habitat Survey Plan.
- 1.1.4 The following species of conservation significance are considered:
- European eel - Council Regulation (EC) No 1100/ 2007) establishing measures for the recovery of the stock of European eel; listed by IUCN as Critically Endangered, Scottish Biodiversity List (SBL) (Watching Brief Only) and UK Biodiversity Action Plan (BAP) Priority Species.
 - Atlantic salmon – Annex II of Habitats Directive, Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, SBL (Conservation Action Needed & Avoid Negative Impacts) and UK BAP Priority Species.
 - Brown trout/sea trout - SBL (Conservation Action Needed) and UK BAP Priority Species.
 - Freshwater pearl mussel – Schedule 5 of the Wildlife and Countryside Act (1981) and Annex II of Habitats Directive SBL (Conservation Action Needed) and UK BAP Priority Species.
 - River lamprey - Annex II of Habitats Directive, SBL (Avoid Negative Impacts) and UK BAP Priority Species.
 - Brook lamprey - Annex II of Habitats Directive, SBL (Avoid Negative Impacts); and.
 - Sea lamprey - Annex II of Habitats Directive, SBL (Avoid Negative Impacts) and UK BAP Priority Species.
- 1.1.5 **Annex 1** provides the scientific names for the aquatic species regarded in this Technical Appendix.

1.2 Site Overview

- 1.2.1 The 'site', as shown by the red line boundary in **Figures 8.1** and **8.6**, encompasses the 'turbine area' and 'the access area', and lies 13 km north-east of Lairg, and immediately north of the settlement of Dalnessie, in Sutherland. The site largely comprises open bog, heathland and acid grassland habitats, which continues to the north and east, and is fringed by commercial forestry to the west and south-west. Sròn Leathad Chleainsaid is a named hill located along the northern boundary of the turbine area. The Allt nan Con-uisge is a watercourse which flows in the western part of the turbine area. The River Brora marks the south-eastern extent of the turbine area. There are no other waterbodies on-site, although there lochans outside the boundary of the turbine area, with the closest, Loch na Fuaralachd and Loch Beag na Fuaralachd located in forestry to the south-west, and Loch Coire na Bruaiche to the east.

2 METHODOLOGY

2.1 Desk Study

- 2.1.1 A desk study was undertaken to identify any classified waterbodies and existing fisheries records within the site and surrounding area.
- 2.1.2 Information was gathered from the Scottish Environment Protection Agency (SEPA)'s River Basin Management Plan¹, Joint Nature Conservation Committee (JNCC)'s Distribution of the Freshwater Pearl Mussel², and the Brora District Salmon Fisheries Board Website³.
- 2.1.3 Further desk study sources, search areas and information obtained are summarised in **Table 8.3.1**.

Table 8.3.1: Desk study sources.

Key Source	Information Sought	Search Area
SiteLink ⁴	Proximity to statutory designated sites for nature conservation with fish interests.	Within 10 km of the turbine area.
Highland Biological Recording Group (HBRG)	Existing records of protected and notable fish species and non-statutory designated sites.	Within 2 km of the turbine area.

2.2 Field Survey

- 2.2.1 A fish habitat survey was completed of all watercourses within the turbine area (the 'study area') in July 2020. The survey aimed to identify any areas of critical fish habitat (i.e. spawning, nursery areas, juvenile and adult holding areas, juvenile lamprey and freshwater pearl mussel habitat).
- 2.2.2 All stretches of watercourses with a gradient of $\geq 6\%$ are considered to be unsuitable or non-productive fish habitat for Atlantic salmon and brown/sea trout. Mills (1973⁵) found that gradients of $< 3\%$ were favourable for Atlantic salmon; whilst sea trout were found to spawn in streams with gradients up to 4% . Most populations of lamprey occur where the average stream gradient is $1.9 - 5.7$ m/km, being rarely found where gradients exceed 7.8 m/km (Maitland & Campbell, 1992⁶). Whilst gradients of $\geq 6\%$ are considered to be typically unsuitable for fish fauna, it is recognised that small, isolated, populations of brown trout may occur in locally suitable habitat in stretches with steeper gradients.

¹ SEPA (2021) <https://www.sepa.org.uk/data-visualisation/water-environment-hub> (Accessed 9th November 2021).

² JNCC (2021) <https://sac.jncc.gov.uk/species/> (Accessed 9th November 2021).

³ Brora District Salmon Fisheries Board (2021) <https://brora.dsfb.org.uk/> (Accessed 9th November 2021).

⁴ <https://sitelink.nature.scot/home> (Accessed 9th November 2021).

⁵ Mills, D.H. (1973). Preliminary assessment of the characteristics of spawning tributaries of the River Tweed with a view to management. In: M.W. Smith & W.M. Carter (eds.). International Atlantic Salmon Symposium, St Andrew's, *International Atlantic Salmon Special Publication Series 4* (1), 145-55.

⁶ Maitland, P.S. & Campbell, R.N. (1992). *Freshwater Fishes of the British Isles*. New Naturalist. HarperCollins, London.

- 2.2.3 The watercourses within the study area were systematically walked (including in-stream inspections where required) and the habitats mapped according to the classification presented in **Table 8.3.1**.
- 2.2.4 Specifically, the habitat survey focused on the identification of the following:
- Spawning habitat for salmonid and lamprey species.
 - Nursery habitat for lamprey species.
 - Areas of habitat important for juvenile salmonids (fry and parr).
 - Areas of habitat important for adult holding areas.
 - Areas of suitable substrate and flow conditions for supporting freshwater pearl mussel.
- 2.2.5 The habitat classification used in this study is based on the Scottish Fisheries Co-ordination Centre's Habitat Surveys Training Course Manual (SFCC 2007⁷), the Environment Agency's Restoration of Riverine Salmon Habitats Guidance Manual (Hendry & Cragg-Hine, 1997⁸), and a review of key habitat requirements for other species of conservation significance including lamprey, salmonids and freshwater pearl mussel (e.g. Maitland, 2003⁹; Hendry & Cragg-Hine, 2003¹⁰; Skinner *et al.*, 2003¹¹).
- 2.2.6 Each watercourse was walked in full across its extent within the study area. Detailed analysis was undertaken at sample points within any diverse geomorphological and hydrological conditions within each watercourse; samples were taken at each of the representative sections of each watercourse. The following information was collected at each sample location: channel gradient; substrate composition (% bedrock, boulders >256 mm, cobbles 65-256 mm, pebbles 4-64 mm, gravel 2-4 mm, coarse sand 0.5-2 mm and fine sand/silt/peat <0.5 mm); average wetted channel width (m); average depth (m) and turbidity (1 [clear] – 3 [turbid]). Any potential barriers to fish movement within watercourses were also recorded. A photograph was taken at each sample point.

⁷ SFCC (2007) *Habitat Surveys – Training Course Manual*. Revised August 2007.

⁸ Hendry, K. & Cragg-Hine, D. (1997). *Restoration of riverine salmon habitats: A guidance manual*. R&D Technical Report W44. Environment Agency, Bristol.

⁹ Maitland, P.S. (2003). *Ecology of the River, Brook and Sea Lamprey*. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.

¹⁰ Hendry K & Cragg-Hine D. (2003). *Ecology of the Atlantic Salmon*. Conserving Natura 2000 Rivers Ecology Series No. 7. English Nature, Peterborough.

¹¹ Skinner, A, Young M & Hastie L (2003). *Ecology of the Freshwater Pearl Mussel*. Conserving Natura 2000 Rivers Ecology Series No. 2 English Nature, Peterborough.

Table 8.3.2: Fish River habitat classifications.

Cat.	Habitat Type	Description	Species Suitability
1 1a 1b 1c	Unsuitable Steep > 10% gradient 6-10% gradient Other – ephemeral, shallow drains, dry beds	Usually 1 st – 2 nd order watercourses with steep gradient, ≥6% slopes (often substantially greater), abundant bedrock, lack of fixed substrates, high velocity (e.g. headwaters/rivulets). Also includes less steep ephemeral stretches (e.g. headwater sources), shallow drains and modified watercourses with dry beds.	No productive fish habitat, although some species may migrate through these areas (also refer to 7. Rapids) depending on whether they represent a migration barrier.
2 2a 2b	Spawning Habitat Salmonids Lamprey	Stable “gravels” of minimum 15-30 cm depth, optimal 20-30 mm, not compacted or with excessive silt/sands (<20% by weight) for salmonids. Lamprey spawning habitat where “gravels” include sands. Often at tail end of pools or upstream ends of riffle-runs ensuring oxygenated substrate. Can also be found at end of weir pools.	Spawning habitat - Atlantic salmon (c. 9 m ² per pair) and sea/brown trout; lamprey.
3	Riffle	Shallow (< 20 cm) and fast flowing, with upstream-facing wavelets which are unbroken (although often some broken water), with substrate dominated by gravel and cobbles.	Fry (0+) habitat – Atlantic salmon/ brown trout/sea trout.
4 4a 4b	Run Shallow (< 0.5 m deep) Deep (>0.5 m deep)	Generally deeper (20-40 cm) and less steep bed compared to riffle, with substrate of boulders, cobbles and gravels. Usually disturbed, rippled surface. Often located immediately downstream of riffle.	Mixed salmonid juvenile habitat. Fry (0+) & Par (1+) habitat - Atlantic salmon/ brown trout/sea trout.
5 5a 5b	Glide Shallow (<0.5 m deep) Deep (> 0.5 m deep)	Shallow gradient stretches with smooth laminar flow with little surface turbulence and generally > 30 cm deep; water flow is silent. Often located below pool.	European eel; non-productive salmonid habitat, although may provide some shelter for adults.
6 6a 6b 6c	Pool Plunge/Scour pool Meander pool Weir/bridge pool	No perceptible flow, eddying and usually > 100 cm deep. Substrate with high proportion of sand and silts. Often located on the outside of meanders, but includes natural scour or plunge pools and artificial weir pools.	Adult refugia Atlantic salmon, sea/brown trout, European eel.
7 7a 7b 7c	Rapids Steep - >10% gradient Moderate - 6-10% gradient Low - <6% gradient	Sections of relatively steep gradient with fast currents and turbulence, with mixed flow types, including free-fall, chutes and broken, with obstructions such as large boulders, rock outcrops and falls.	Negative feature for migratory species and may pose a migratory barrier; elvers and eels limited to velocity of <0.5 m/sec and 2.0 m/sec respectively; lamprey to 2 m/sec.
8 8a 8b	Banks of fine sediment of silts and sands Optimal Sub-optimal	Limited flow (sometimes back-flow) allowing deposition of silts/sands, not anoxic, with/without riparian trees. Optimal habitat is stable fine sediment and sand ≥15 cm deep with some organic detritus. Sub-optimal habitat includes small areas of deposited silts/sands behind boulders.	Lamprey ammocoete nursery and adult refuge.
9 9a 9b 9c 9d 9e	Vegetation features Riparian trees (tunnel) Flow constriction Aquatic macrophytes Emergent macrophytes Large woody debris	Closed woodland canopy forming tunnel vegetation. In-stream emergent, boulders. Stands of aquatic and floating vegetation. Stands of emergent (usually marginal) vegetation. Large woody debris (LWD) forming dams, etc.	Tunnel riparian trees may be negative feature for salmonids, although tree roots and fallen trees may provide refugia for Atlantic salmon/ brown trout/sea trout and European eel. Aquatics/emergents provide cover for fish, particularly juveniles.
10	Obstructions to migration	Impassable waterfalls, rapids, flow constrictions, weirs, bridge sills, culverts, shallow braided river sections, pollution preventing upstream migration.	All migratory species; impassability varies between species. Leaping ability: <3.7 m Atlantic salmon; <1.81 trout; European eel and lamprey none.
11 11a 11b 11c	Other features Side channel Backwater Artificial channel	Includes other channel features, with side channel (connected to main channel) and backwaters. Artificial channels may comprise either man-made banks and/or beds.	Side channel/backwater often important refugia for juveniles. Artificial channels have limited diversity and are often non-productive fish habitat.

2.3 Field Survey Personnel

- 2.3.1 The survey was undertaken by C. Nisbet MCIEEM, who is experienced and fully trained in fish habitat survey as part of his Level 3 Management of Electrofishing Operations qualification as accredited by the Scottish Fisheries Coordination Centre (SFCC)

2.4 Field Survey Limitations

- 2.4.1 No limitations were encountered during the surveys.

3 RESULTS

3.1 Desk Study

- 3.1.1 This section provides details of existing fish information and existing records of protected and notable fish species identified within and in proximity to the site from desk study sources listed in **Table 8.3.1**, as well as relevant information gathered from the resources listed in **Section 2.1.2** of **Technical Appendix 8.3**.

Designated Sites for Nature Conservation

- 3.1.2 In review of Sitelink, the site does not form a part of any statutory designated site for nature conservation.
- 3.1.3 **Table 8.3.3** provides a summary of statutory designated sites with qualifying fish (and aquatic invertebrate) interest located within 10 km of the study area and should be read with reference to **Figure 8.1**.

Table 8.3.3: Statutory designated sites for nature conservation.

SAC: Special Area of Conservation.

Designated Site	Distance and Direction from the Study Area	Qualifying Interests
River Naver SAC	6.5 km, north	<ul style="list-style-type: none">• Freshwater pearl mussel.• Atlantic salmon.

Non-statutory Designated Sites for Nature Conservation

- 3.1.4 The data request submitted to the HBRG identifies that the study area does not form part of any non-statutory designated sites for nature conservation with fish interests.
- 3.1.5 In further review of non-statutory designated sites, the study area is also not located within 2 km of any such site with fish interests.

Watercourse Status

- 3.1.6 The European Water Framework Directive (WFD) requires that surface waterbodies in member states are classified according to ecological status. SEPA's River Basin Management Plan confirms the status of the following watercourses within the study area as illustrated on **Figure 8.6**:

- W1 – River Brora: Good Ecological Status/High Access for Fish Migration.

- W2 – Allt nan Con-uisge: Unclassified.
- W3 – Unnamed tributary of Allt nan Con-uisge: Unclassified.
- W4 – Unnamed tributary of Allt nan Con-uisge: Unclassified.
- W5 – Unnamed tributary of Allt nan Con-uisge: Unclassified.
- W6 – Unnamed tributary of Allt nan Con-uisge: Unclassified.
- W7 – Unnamed tributary of River Tirry: Unclassified.

3.2 Field Survey

3.2.1 Surveyed watercourses are shown in **Figure 8.6**. Environmental data for all sampling points are provided in **Annex 2** and photographs of the sampling points are provided in **Annex 3**.

W1 – River Brora

3.2.2 W1 flows in a southerly direction along the eastern boundary of the study area.

3.2.3 Over its length the River Brora is classified as having good overall ecological status and having high access for migratory fish. However, fish migration is restricted at the Dalnessie abstraction impoundment, which supplies the Shin Hydro Scheme, as the impoundment does not include a fish pass. SEPA consider that there is very little suitable habitat for migratory fish upstream of the impoundment. The River Brora within the study area varies between 3.5 – 8 m in width, with run/riffle sections approximately 0.4 m deep and deeper glides and pool sections in excess of 1 m deep. There is also a small waterfall, approximately 2 m in height, to the south of where the river forms the eastern boundary of the study area.

3.2.4 Environmental data from W1 including channel dimensions, gradient and substrate composition, are included from five sample points.

3.2.5 In summary, W1 is considered to comprise a combination of category 3 riffle, category 4 run, category 5 glide and category 6 pool habitats. The presence of category 10 obstructions to migration mean the section of W1 within the study area is only really suitable for non-migratory fish. Brown trout were observed during the survey, with an adult trout taken from the river by an osprey *Pandion haliaetus*.

W2 - Allt nan Con-uisge

3.2.6 Allt nan Con-uisge (W2) tributes through the study area in a south-easterly direction before joining the River Brora.

3.2.7 W2 is a main tributary of the River Brora. Its source lies in headwaters in the west of the study area. The watercourse has a varied structure and flow conditions and is considered to be suitable for supporting a non-migratory population of brown trout.

3.2.8 Environmental data for W2, including channel dimensions, gradient and substrate composition, are included from six sample points.

3.2.9 In summary, W2 has naturally meandering channel for its length. Flow conditions comprises several category 6 pools in its lower reaches, interspersed with category 3 riffle and category 4 run sections. Nearer its head waters it becomes a shallow, peaty stream. The burn has a wetted width of between 0.6 m and 7 m, but is always < 2 m where pools are absent. The average depth varied between 0.35 – 0.8 m, excluding the pools which were > 1 m in depth.

3.2.10 Substrate type throughout the burn is typified by a dominance of peat in the headwater section, with a greater mix of substrate types (mainly boulder, cobble and pebble) over the remainder of the watercourse. Due to the presence of the impound on the River Brora W2 is of negligible suitability for migratory fish. Non-migratory brown trout were observed in the channel during the survey.

W3 – W6 – Unnamed Tributaries of Allt nan Con-uisge

3.2.11 W3 – W6 are all unnamed tributaries of Allt nan Con-uisge. All are unclassified watercourses.

3.2.12 W3 – W6 are almost identical in structure, comprising narrow channels for the most part, over shallow gradients (typically between 1 % and 2 %) with category 1c shallow headwater habitat over peat at their origins and category 4 run flow conditions over a gravel/pebble base nearer where they enter Allt nan Con-uisge. W4 also contains category 6 pool habitat near its lower extent where gradient is extremely shallow (similar to the structure of W2). W3 – W6 are all suitable for supporting small populations of migratory brown trout fry/parr, but are considered too minor for supporting adult fish. Due to the presence of the impound on the River Brora W3 - W6 are of negligible suitability for migratory fish.

3.2.13 W3 – W6 environmental data, including channel dimensions, gradient and substrate composition, are included from representative sample points for each tributary.

W7 - Headwater of the River Tirry

3.2.14 W7 is an un-named watercourse, comprised of a minor channel running through blanket bog and clearfell. The banks are dominated by soft rush and tufted hair-grass developed on peaty soils on a shallow gradient (~1 %). A brash pile lies within and across the watercourse at sample point 20, limiting fish access. This watercourse is located in the western section of the study area and is one of the headwaters of the River Tirry catchment.

3.2.15 W7 is unclassified and environmental data, including channel dimensions, gradient and substrate composition, are included from representative sample points.

3.2.16 In summary, W7 is considered to comprise category 1c Other – ephemeral, shallow drains, dry beds at its origin and Category 3-4 riffle/run in the more southern reach within the survey area. It provides suitable habitat for low numbers of non-migratory fish.

Summary

3.2.17 Watercourses within the study area are typically not suitable for migratory fish species, given the Shin hydro impoundment on the River Brora which will prevent fish from passing. The watercourses are likely to support non-migratory fish, including brown trout which were recorded in the River Brora (W1) and Allt nan Con-uisge (W2).

4 REFERENCES

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ANNEX 1 - SCIENTIFIC AQUATIC SPECIES NAMES

Table A1.1 provides common and scientific names of aquatic species regarded in this Technical Appendix.

Common name	Scientific name
European eel	<i>Anguilla anguilla</i>
Atlantic salmon	<i>Salmo salar</i>
Brown trout/sea trout	<i>Salmo trutta</i>
Freshwater pearl mussel	<i>Margaritifera margaritifera</i>
River lamprey	<i>Lampetra fluviatilis</i>
Brook lamprey	<i>Lampetra planeri</i>
Sea lamprey	<i>Petromyzon marinus</i>

ANNEX 2 - ENVIRONMENTAL DATA

Table A2.1: Environmental data from sample locations from W1.

Location		Substrate Composition (%)						Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 –2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type
NC 63366 17238	1	0	25	50	15	10	0	0	4	0.6	1	1-2%	3, 4
NC 63423 17184	2	0	15	60	15	10	0	0	3.5	0.4	1	1-2%	3, 4
NC 63202 16847	3	0	10	30	35	20	5	0	6	0.85	1	1-2%	5, 6
NC 63097 16769	4	0	25	55	15	5	0	0	5	>1	1	1-2%	4, 5
NC 62794 16050	5	75	20	5	0	0	0	0	8	>1	1	1-2%	10

Table A2.2: Environmental data from sample locations from W2.

Location		Substrate Composition (%)						Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 –2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type
NC 62488 15840	6	0	10	15	10	5	10	50	7	>1	1	<1%	6
NC 62352 15974	7	0	30	40	25	5	0	0	2	0.35	1	1%	3, 4
NC 61958 16353	8	0	10	10	10	10	5	55	7	>1	1	<1%	6
NC 61656 16646	9	0	25	45	25	5	0	0	1.5	0.4	1	1-2%	4
NC 61371 16992	10	0	25	40	20	10	5	0	1	0.4	1	1%	3, 4
NC 60929 17299	11	0	0	0	0	5	5	90	0.6	0.8	1	<1%	1c

Table A2.3: Environmental data from sample locations from W3.

Location		Substrate Composition (%)							Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 – 2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type	
NC 62297 16121	12	0	5	10	30	10	5	40	0.50	0.15	1	1%	3, 4	

Table A2.4: Environmental data from sample locations from W4.

Location		Substrate Composition (%)							Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 – 2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type	
NC 60626 17564	13	0	0	0	0	0	0	100	4	>1	1	<1%	6	
NC 60736 17723	14	0	0	0	0	0	0	100	10	>1	1	<1%	6	
NC 60924 18024	15	0	0	0	0	5	5	90	0.1	0.05	1	1-2%	1c	

Table A2.5: Environmental data from sample locations from W5.

Location		Substrate Composition (%)							Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 – 2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type	
NC 60361 17694	16	0	0	0	0	0	5	95	0.3	>1	1	<1	1c	

Table A2.6: Environmental data from sample locations from W6.

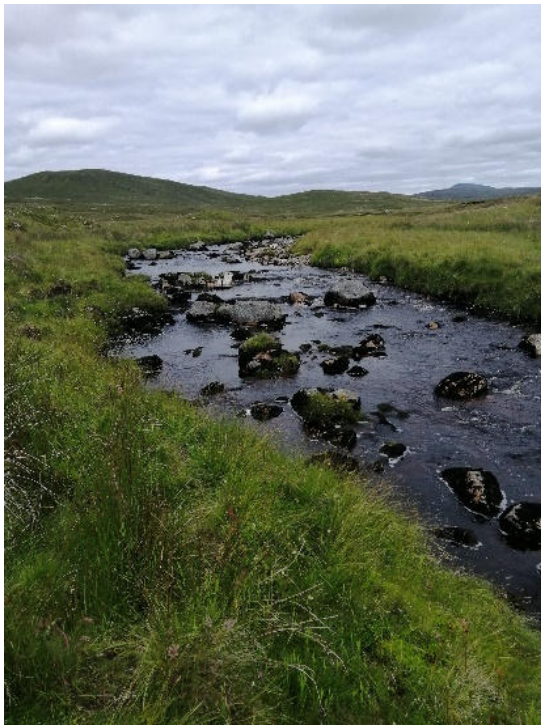
Location		Substrate Composition (%)							Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 – 2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)	Habitat Type	
NC 60556 17982	17	0	0	0	0	0	5	95	0.2	0.1	2	<1	1c	

Table A2.7: Environmental data from sample locations from W7 – Un-named.

Location		Substrate Composition (%)										Channel Information					Habitat Type
Co-ordinates	Photo/Sample No.	Bed-rock	Boulders >256 mm	Cobbles 65–256 mm	Pebbles 4 – 64 mm	Gravel 2 – 4 mm	Coarse sand 0.5 – 2 mm	Peat/fine sand/silt <0.5 mm	Av. Wetted Width (m)	Av. Depth (m)	Turbidity (1 [clear]-3 [turbid])	Channel Gradient (%)					
NC 60758 18488	18	0	0	0	0	0	5	95	0.3	0.4	1	<1			1c		
NC 60358 18375	19	0	20	50	20	5	5	0	0.5	0.1	1	1			4		
NC 60246 18414	20	0	0	45	30	20	5	0	0.5	0.15	1	<1			4		

ANNEX 3 - PHOTOGRAPHS

W1 – River Brora: Sample Point 1



W1 – River Brora: Sample Point 2



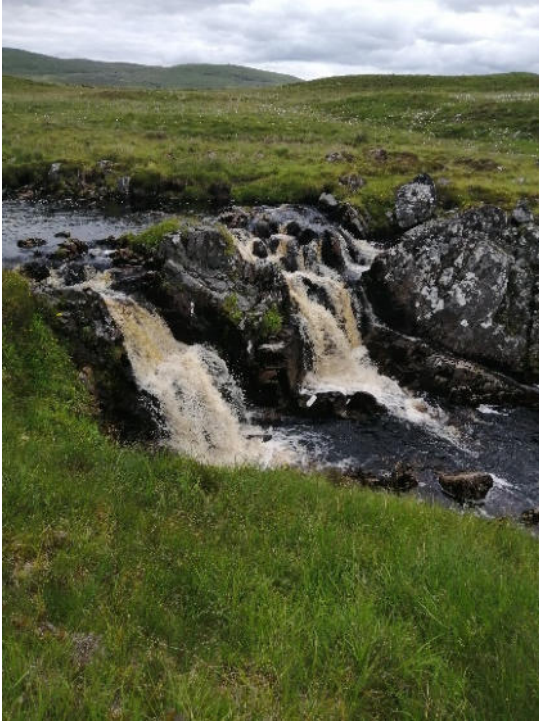
W1 – River Brora: Sample Point 3



W1 – River Brora: Sample Point 4



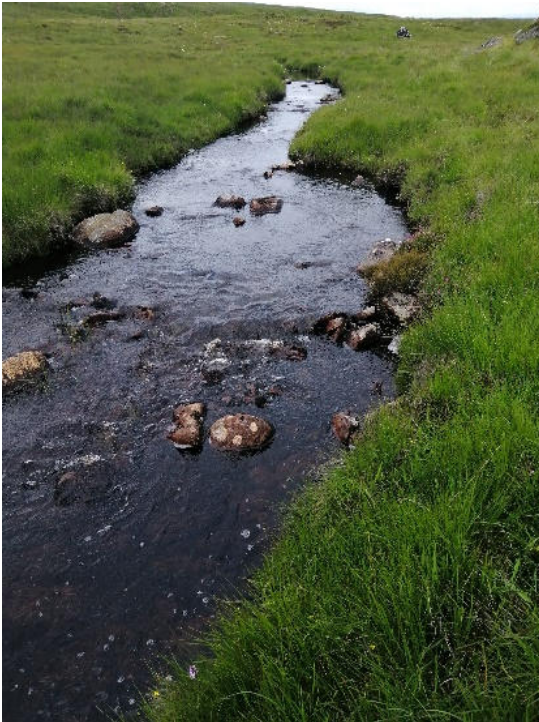
W1 – River Brora: Sample Point 5



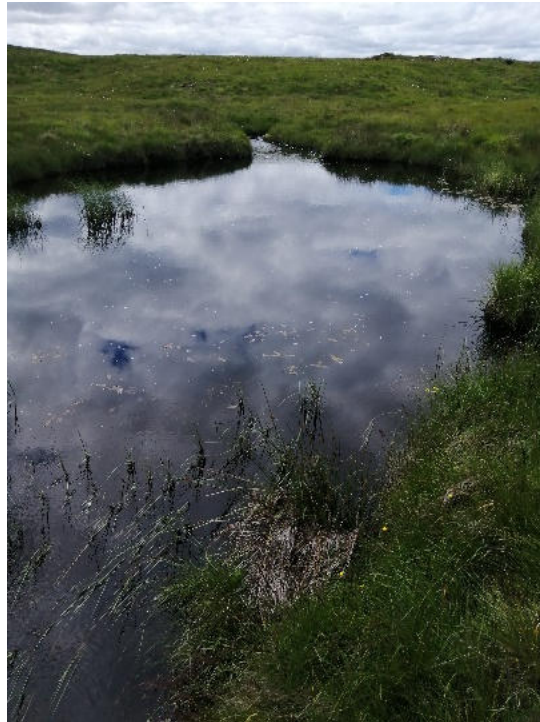
W2 – Allt nan Con-uisge: Sample Point 6



W2 – Allt nan Con-uisge: Sample Point 7



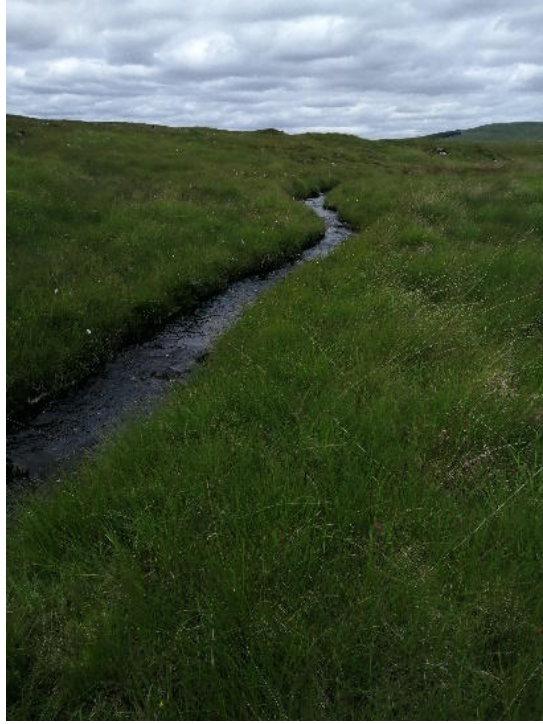
W2 – Allt nan Con-uisge: Sample Point 8



W2 – Allt nan Con-uisge: Sample Point 9



W2 – Allt nan Con-uisge: Sample Point 10



W2 – Allt nan Con-uisge: Sample Point 11



W3 – Unnamed Tributary of Allt nan Con-uisge: Sample Point 12



W4– Unnamed Tributary of Allt nan Con-uisge:
Sample Point 13



W4– Unnamed Tributary of Allt nan Con-uisge:
Sample Point 14



W4 – Unnamed Tributary of Allt nan Con-uisge:
Sample Point 15

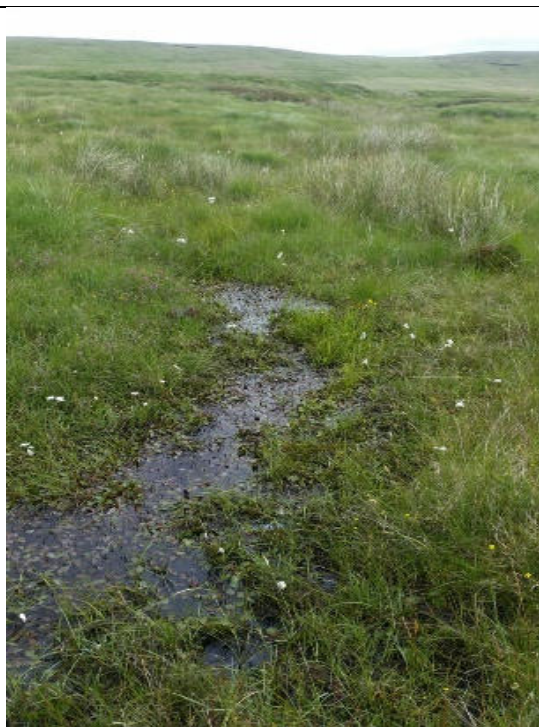


W5 – Unnamed Tributary of Allt nan Con-uisge:
Sample Point 16



W6 – Unnamed Tributary of Allt nan Con-uisge:
Sample Point 17

W7 – Unnamed Tributary of River Tirry: Sample
Point 18



W7 – Unnamed tributary of River Tirry: Sample Point 19



W7 – Unnamed tributary of River Tirry: Sample Point 20

