March 2025

Glen Earrach Pumped Storage Hydro

Environmental Impact Assessment Report

Volume 5: Appendices
Appendix 9.1: Aquatic Ecology Baseline Report

Glen Earrach Energy Ltd

Glen Earrach AECOM

Quality information

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Issue History

Issue	Issue date	Details	Authorized	Name	Position
1	March 2025	Submission	DL	David Lee	Technical Director – Renewable Energy

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1. Introduction

1.1 Background

1.1.1 AECOM was appointed by the Applicant to undertake aquatic ecological baseline surveys, as presented in this appendix, to support the Environmental Impact Assessment (EIA) for the proposed Glen Earrach Pumped Storage Hydro (PSH) scheme (hereafter referred to as the 'Proposed Development'). This appendix should be read with reference to **Chapter 9 Aquatic and Marine Ecology (Volume 2: Main Report).**

1.1.2 The area encompassed by the Proposed Development Site, hereafter referred to as the 'Proposed Development Site', is shown on **Figure 1.1 Site Location Plan (Volume 3: Figures).**

1.1.3 This appendix is supported by the following figures found within **Annex A Site Maps.**

- **Figure 9.1.1: Aquatic Scoping Survey Locations;**
- **Figure 9.1.2: Macroinvertebrate Survey Locations;**
- **Figure 9.1.3: Macrophyte Survey Locations; and,**
- **Figure 9.1.4: Fish Survey Locations.**

1.1.4 As part of the EIA process, a study was undertaken to identify potential impacts on aquatic receptors and protected species such as Atlantic salmon (*Salmo salar*) and freshwater pearl mussel (FWPM) (*Margaritifera margaritifera*), amongst others. Hereafter, these species are referred to in the report as "salmon" and "FWPM", respectively.

1.1.5 This baseline report also identifies several Invasive Non-Native Species (INNS) which could potentially be spread during the Proposed Development's Pre-Construction & Enabling, Construction or Operational phases.

1.2 Purpose of this Chapter Appendix

1.2.1 This appendix describes the methodology for freshwater ecology surveys and the results obtained. The results of the field surveys, in combination with the outcomes of the desk study and on-going consultation, will be used to inform the EIA. Surveys undertaken include:

- Aquatic macrophyte surveys;
- Aquatic macroinvertebrate surveys;
- Fish habitat assessments;
- Fish surveys;
- FWPM habitat assessments; and
- Environmental DNA (eDNA) fish surveys.

Site Description and Survey Site Selection

1.2.2 The Proposed Development Site is located in the Highland region, centred on national grid reference NH 45255 22395 approximately 9.5 km to the south of Drumnadrochit and 6.5 km north of Invermoriston. The Proposed Development Site is generally characterised as rocky moorland plateau with rough grazing. The Headpond location at Loch nam Breac Dearga sits approximately 485 m above ordnance datum (AOD)

1.2.3 The Proposed Development is predominantly located within the catchment of the Allt Saigh watercourse. The Allt Saigh is fed by several smaller streams and lochans in the mountains to the west of Loch Ness, which it flows into at Alltsigh. Flow in the upper reaches of the catchment is diverted at a dam to the Livishie Power Station.

1.2.4 Survey locations were selected based on their potential to be impacted by the Proposed Development. Any watercourses where a channel crossing may be required or with the potential to be impacted by runoff during Construction were surveyed to assess their conservation value and establish a baseline. The majority of survey

locations assessed for this report are small headwater streams that arise in uplands on Meall Fuar-mhonaidh and Sron Dubh and run through a variety of conifer plantations and moorland areas. Additional survey locations included impacted freshwater bodies (lochs) including Loch Ness and Loch nam Breac Dearga.

1.3 Legislative and Policy Context

1.3.1 This assessment has been undertaken within the context of the following relevant legislative instruments, planning policies and guidance documents and legislative instruments (refer to **Chapter 9: Aquatic and Marine Ecology (Volume 2 Main Report)** for further detail on the relevance of this legislation and policy in the context of the EIA):

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive')[1];
- Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the 'Water Framework Directive' [WFD])[2];
- Nature Conservation (Scotland) Act 2004 (as amended);
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- Water Environment and Water Services (Scotland) Act 2003 ('WEWS Act').
- Wildlife and Countryside Act 1981 (as amended) (the 'WCA');
- Wildlife and Natural Environment (Scotland) Act 2011 (as amended) (the 'WANE Act');
- Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the 'Habitats Regulations');
- Regulation 1143/2014 on invasive alien species;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR);
- National Planning Framework 4 (NPF4);
- Highland Nature: Local Biodiversity Action Plan 2021 - 2026 (LBAP);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.3 (CIEEM, 2024); and
- Advice note on the lifespan of ecological reports and surveys (CIEEM, 2019).

[1] Transposed into UK law by the Habitats Regulations below.
[2] Post-Brexit, Statutory objectives are set for Scottish waters through River Basin Management Planning. The CAR Regulations below (and further amendments) enables controls over many activities that can affect the water environment.

2. Methods

2.1 Desk Study

2.1.1 The desk study assessed data obtained from the Scottish Environment Protection Agency (SEPA), NatureScot (formerly Scottish Natural Heritage, SNH), Ness District Salmon Fishery Board (NDSFB) and online sources including NBN Atlas Scotland[3] to assess the distribution of protected aquatic species and INNS within 2.0 km of the Proposed Development Site. Where necessary and specified, a wider Study Area was utilised.

2.1.2 It is an offence in Scotland to spread any non-native species in the wild under the WANE Act, and consequently all species of UK concern, such as those identified on Schedule 9 of the WCA (although this no longer legally applies in Scotland), and those considered species of European Union (EU) concern under the EU Invasive Alien Species Regulation, have been collated and reported.

2.1.3 The information has subsequently been used when considering the potential environmental impacts of the Proposed Development and was also used to inform the survey scope.

2.2 Survey Sites

2.2.1 Survey sites were selected according to the proximity of water bodies to areas of proposed works, such as watercourse crossings, intake/outfall location, and shoreline construction. A total of 32 sites were surveyed **(Table 2-1: Glen Earrach Aquatic Survey Sites,** below and **Figure 9.1.1: Aquatic Scoping Survey Locations (Annex A: Site Maps)**). The survey sites comprised 23 running water sites on varying watercourses, three sites on Loch nam Breac Dearga (LnBD in Table 2-1) and six on Loch Ness (LN sites in Table 2-1). All surveys were completed within their respective seasons (see subsequent sections) in 2024 and 2025.

Table 2-1: Glen Earrach Aquatic Survey Sites

Site Code	Surface water reference	Watercourse	Grid Reference	Macrophyte	Macroinvertebrate (Spring 2024)	Macroinvertebrate (Autumn 2024)	Macroinvertebrate (Spring 2025)	Fish	Fish Habitat	eDNA
Site 1	SW5-C	Trib of Allt Loch an t-Sionnaich 3	NH 44133 21900	✓	✓	✓			✓	
Site 2	SW5-B	Trib of Allt Loch an t-Sionnaich 1	NH 43941 21874	✓	✓	✓		✓	✓	
Site 3	SW11-A	Trib of Allt Coire an Ruighe 8	NH 46621 23577							
Site 4	SW10-C	Trib of Allt Coire an Ruighe 6	NH 48108 25268	✓	✓	✓				
Site 5	SW10-E	Trib of Allt Coire an Ruighe 5	NH 48432 25694	✓	✓	✓				
Site 6	SW11	Allt Coire an Ruighe	NH 47985 24938	✓	✓	✓		✓	✓	
Site 7	-	Trib of River Coiltie 10	NH 47620 26971		✓	✓				
Site 8	-	Trib of River Coiltie 5a	NH 48319 26682	✓	✓	✓				
Site 9	-	Trib of River Coiltie 5b	NH 48285 26727	✓	✓	✓				
Site 10	SW19	River Enrick	NH 45008 29831		✓	✓			✓	
Site 11	SW20	Allt Creag an Fhithich	NH 45183 29549							
Site 12	SW22	Allt na Criche	NH 45739 29416	✓	✓	✓				
Site 13	SW24	Allt Luirg nam Broc	NH 46927 29604		✓	✓				

[3] NBN Atlas Scotland: https://scotland.nbnatlas.org/

Site Code	Surface water reference	Watercourse	Grid Reference	Macrophyte	Macroinvertebrate (Spring 2024)	Macroinvertebrate (Autumn 2024)	Macroinvertebrate (Spring 2025)	Fish	Fish Habitat	eDNA
Site 14	SW5	Trib of Allt Loch an t-Sionnaich 2	NH 44167 21767		✓	✓		✓	✓	
Site 15	SW5-D	Trib of Allt Loch an t-Sionnaich 3	NH 44148 21847		✓	✓		✓	✓	
Site 16	SW5	Trib of Allt Loch an t-Sionnaich 2	NH 44509 21883	✓	✓	✓		✓	✓	
Site 17	SW5-E	Trib of Allt Loch an t-Sionnaich 3	NH 44302 22291	✓	✓	✓		✓	✓	
Site 18	SW5-E	Trib of Allt Loch an t-Sionnaich 3	NH 44521 22641	✓	✓	✓		A	✓	
Site 19	SW11	Trib of Allt Coire an Ruighe 9	NH 46455 23578							
Site 20	SW9	River Coiltie	NH 46489 26715	✓	✓	✓		A	✓	
River 1	SW5	Allt Loch an t-Sionnaich	NH 43495 20836							✓
River 2	SW3	Allt Saigh	NH 43756 19259							✓
River 3	SW3	Allt Saigh	NH 45632 18996							✓
LnBD	SW8	Loch nam Breac Dearga	NH 45266 22412							✓
LnBD A	SW8		NH 45614 22642		✓	✓				
LnBD B	SW8		NH 44856 22075		✓	✓				
LN2	-	Loch Ness	NH 43792 14504				✓			
LN5	-		NH 38225 09398			✓	✓			
LN6			NH 38345 10273				✓			
LN9	-		NH 45720 18960		✓	✓	✓			
LN10			NH 52480 29345				✓			
LN12			NH 56283 33068				✓			

A - Surveys were aborted due to health and safety concerns; either watercourses were in spate, under storm conditions, or they were otherwise unsafe to enter

2.3 Macrophyte Survey

2.3.1 Macrophyte surveys were completed by a suitably qualified aquatic ecologist within the optimal survey season (June to September) between 9th - 13th September 2024. The locations of these surveys are shown **on Figure 9.1.3: Macrophyte Survey Locations (Annex A: Site Maps)**.

2.3.2 Macrophyte surveys were undertaken on running watercourses following the method outlined in the UKTAG River Assessment Method (Macrophytes and Phytobenthos) for use with LEAFPACS2 (WFD-UKTAG, 2014), which conforms to BS EN 14184:2014 Water quality - Guidance for the surveying of aquatic macrophytes in running waters. Macrophyte surveys were not completed in standing water bodies (Loch nam Breac Dearga and Loch Ness) due to the general paucity of macrophyte species; however, incidental observations of macrophyte species were made, where present, and records were obtained by desk study.

2.3.3 The survey was completed by walking within the channel of each watercourse along a 100 m transect, where safely accessible. Any inaccessible areas were bypassed as necessary before re-entering the channel at the next available access point. A list of all macrophytes encountered was made and their relative abundance was recorded using Taxon Cover Values (TCV), detailed below (**Table 2-2 Taxon Cover Values (TCV) and their associated percentage cover).**

Table 2-2: Taxon Cover Values (TCV) and their associated percentage cover

TCV	Percentage cover for the macrophyte species
C1	<0.1%
C2	0.1 to 1%
C3	1 to 2.5%
C4	2.5 to 5%
C5	5 to 10%
C6	10 to 25%
C7	25 to 50%
C8	50 to 75%
C9	>75%

2.3.4 All non-native species adjacent and within the watercourses were also recorded as part of the assessment in order to record the extent of any INNS species, if present, at the survey sites.

2.4 Aquatic Macroinvertebrate Survey

2.4.1 Aquatic macroinvertebrate sampling was undertaken by two suitably experienced aquatic ecologists to assess the biological quality of the surveyed water bodies. The spring surveys were completed between 18th and 22nd March and 3rd and 7th June 2024, with the autumn surveys completed between 3rd and 7th November 2024. Spring surveys completed in June are considered acceptable for such a northern location, where the onset of spring may be delayed, and such conditions persist into June. A suite of surveys of Loch Ness were also undertaken in March 2025, results of which are also presented here. All macroinvertebrate survey locations are shown on **Figure 9.1.2: Macroinvertebrate Survey Locations (Annex A: Site Maps)**.

2.4.2 Macroinvertebrate samples were taken using a standard Freshwater Biological Association (FBA) pattern pond net (mesh size: 1 mm) in line aquatic macroinvertebrate sampling procedures standardised by the Environment Agency (Environment Agency, 2017) and used by regulatory authorities across the UK. These sampling procedures also conform to BS EN ISO 10870:2012 Water Quality – Guidelines for the selection of sampling methods and devices for benthic macroinvertebrates in fresh waters. Instream habitats were ‘kick sampled’ where practicable, or ‘sweep sampled’, for three minutes followed by a one-minute hand search of larger substrates. Lentic loch habitats were sampled by undertaking a one-minute active search of larger substrates and surface-dwelling macroinvertebrates, followed by a three minute ‘kick sample’ where practicable, or ‘sweep sample’, across several depths complying to the referenced best practice methods. The collected samples were subsequently preserved in Industrial Methylated Spirits (IMS) prior to laboratory processing.

Analysis of Aquatic Macroinvertebrate Samples

2.4.3 Each of the samples collected was sorted and analysed in a laboratory setting by suitably trained and experienced aquatic ecologists. Lists of the aquatic macroinvertebrate taxa present were produced in line with the Freshwater macro-invertebrate analysis of riverine samples: Operational instruction 024_08 (Environment Agency, 2014). The aquatic macroinvertebrate samples were analysed to ‘mixed taxon level’ using stereo-microscopes. Most groups were identified to species level (where practicable), except for the following:

- amber snail (Succineidae) were identified to family;
- pea mussels (Sphaeriidae) were identified to genus/genus-group;

- worms (Oligochaeta) were identified to order;
- mites were identified to Hydracarina or Oribatei;
- truefly larvae, which were identified to the maximum resolution possible;
- springtails (Collembola) which were identified to order; and
- immature or damaged specimens, which were identified to the maximum resolution possible on a case-by-case basis.

2.4.4 The survey data was then used to calculate metrics that can be used to inform an assessment of relative nature conservation value, habitat condition and general degradation as detailed below.

Community Conservation Index (CCI)

2.4.5 A Community Conservation Index (CCI) (Chadd & Extence, 2004) was calculated for each sample as detailed in Annex B Community Conservation Index (CCI). The CCI classifies many groups of aquatic macroinvertebrates according to their scarcity and nature conservation value in England (and is also relevant to Scotland) as understood at the time that the classification was developed. Species scores range from 1 to 10, with 1 being Very Common and 10 being Endangered. Since its initial publication, in some cases the references used in the CCI classification to define scarcity and value have been superseded by more recent assessments. Due to this, the author provided AECOM with updated species scores to take account of this new information (Chadd, *pers. comm*., 2018). These updated scores have been used within this assessment.

Whalley, Hawkes, Paisley & Trigg (WHPT)

2.4.6 The aquatic macroinvertebrate data were analysed to generate the Whalley, Hawkes, Paisley & Trigg (WHPT) score Average Score Per Taxon (ASPT), and Number of scoring taxa (NTAXA) values, which provides an indication of the ecological quality in the watercourse (WFD-UKTAG, 2021). This assigns numerical value to taxa according to their sensitivity to organic pollution. The average of the values for each taxon in a sample, known as ASPT is a stable and reliable index of organic pollution. Therefore, these assessments can indicate to what extent an aquatic macroinvertebrate community is exposed to organic pollution (further information is provided in Annex C Whalley, Hawkes, Paisley & Trigg (WHPT) Metric). It is important to note that these indices can vary between geological regions and habitat types. Ditches for example are unable to support many of the high-scoring taxa associated with fast flowing habitats. Therefore, the resultant metrics should be reviewed with an awareness of their potential limitations, and the reach-specific context, as described in this report.

2.4.7 The WHPT method has been primarily designed to respond to organic pollution, however it is suitable for monitoring other types of impact and is used for assessing the WFD classification parameter “General degradation” (WFD-UKTAG, 2021).

Proportion of Sediment-sensitive Invertebrates (PSI)

2.4.8 Calculations were undertaken to determine the proportion of sediment sensitive macroinvertebrates present using the Proportion of Sediment-sensitive Invertebrates (PSI) index (Extence *et al*., 2011). Using this approach, individual taxa of aquatic macroinvertebrate are assigned a Fine Sediment Sensitivity Rating (FSSR) ranging from A to D, as detailed in Annex D Proportion of Sediment-sensitive Invertebrates (PSI). The PSI score for each aquatic macroinvertebrate sample was derived from individual species scores and abundances. The derived PSI score corresponds to the percentage of fine sediment-sensitive taxa present in a sample and ranges from 0 to 100, where low scores correspond to watercourses with high fine sediment cover. The PSI score therefore provides an indication of the extent to which watercourses are influenced by fine sediments, and therefore by inference the potential sensitivity of the associated aquatic macroinvertebrate community to changes in silt load and deposition.

Lotic-invertebrate Index for Flow Evaluation (LIFE)

2.4.9 Lotic-invertebrate Index for Flow Evaluation (LIFE) scores were calculated (Extence *et al*., 1999). This is an index that links benthic macroinvertebrate data to flow regimes prevailing in UK waters. Flow scores have been allocated to various macroinvertebrates based on species/family abundance and ecological association with different flows, as detailed in Annex E Lotic-Invertebrate Index of Flow Evaluation (LIFE). The overall LIFE score for a Reach is calculated as the sum of the individual scores divided by the number of scoring species/families. LIFE scores increase with current velocity, scores <6.00 generally indicating sluggish or still water conditions and score >7.5 indicate fast flows. LIFE allows the mean flow preference of invertebrates colonising a reach to be determined so that effect of habitat changes such as sediment accumulation can be monitored.

River Invertebrate Classification Tool (RICT)

2.4.10 The resultant WHPT-ASPT and NTAXA values and environmental data collected were processed through the River Invertebrate Classification Tool version 3 (RICT) web application, available on the Freshwater Biological Association website[4].

2.4.11 RICT predicts the WHPT-ASPT and NTAXA scores for the surveyed locations based on the survey location, altitude, alkalinity, slope, discharge category, distance from source, channel dimensions and substrate composition. The predicted scores are then compared to actual scores and the output is an Ecological Quality Ratio (EQR). The EQR can be translated into a Water Framework Directive (WFD) classification (High, Good, Moderate, Poor, or Bad). Alkalinity data should be obtained from monthly analysis of samples from each water body over a period of at least one year, whereas here, alkalinity was based on the average of one sample collected during the survey visit, which is only reflective of singular point in time.

2.5 Fish Surveys

2.5.1 Fish surveys were completed by suitably qualified aquatic ecologists within the optimal survey season (June to September 2024). Fish eDNA samples (which are not seasonally constrained) were collected between 18th and 22nd March 2024, with the fish habitat assessments and electric fishing surveys completed between 9th and 13th September 2024. All fish survey locations are shown on **Figure 9.1.4: Fish Survey Locations (Annex A: Site Maps)**.

2.5.2 Fish habitat assessments were completed at 10 sites to establish their suitability for electric fishing surveys. At each site, key aquatic features assessed included channel dimensions, water depth, mesohabitat coverage, habitat features, substrate composition, accessibility for migratory species, and potential spawning areas for salmonids. These were subsequently analysed following SEPA's Guidance for applicants on supporting information requirements for hydropower applications (SEPA, 2005). The degree of suitable fish passage was also considered, as natural or artificial barriers may impact passage of salmonids upstream on surveyed water bodies. Where watercourses were assessed as being suitable for fish, electric fishing surveys were undertaken.

2.5.3 A total of six sites were selected for electric fishing surveys together with an eDNA survey of Loch nam Breac Dearga and the watercourse connecting that Loch to Loch Ness (Table 2-3: Fish Survey Locations and Methods).

Table 2-3: Fish Survey Locations and Methods

Description	Surface water reference	Grid Reference	Date	Method
Site 1	-	NH 44133 21900	11/09/2024	Fish habitat undertaken – Further survey scoped out
Site 2	SW5-C	NH 43941 21874	11/09/2024	Time delineated (10 minute), semi-quantitative
Site 6	SW11	NH 47985 24938	10/09/2024	Time delineated (10 minute), semi-quantitative
Site 10	SW19	NH 45008 29831	12/09/2024	Fish habitat undertaken – Survey aborted due to health and safety
Site 14	SW5	NH 44167 21767	11/09/2024	Time delineated (10 minute), semi-quantitative
Site 15	SW5-D	NH 44148 21847	11/09/2024	Time delineated (10 minute), semi-quantitative
Site 16	SW5	NH 44509 21883	11/09/2024	Time delineated (10 minute), semi-quantitative
Site 17	SW5-E	NH 44302 22291	11/09/2024	Time delineated (6 minute), semi-quantitative
Site 18	SW5-E	NH 44521 22641	11/09/2024	Fish habitat undertaken – Survey aborted due to health and safety
Site 20	SW9	NH 46489 26715	12/09/2024	Time delineated (6 minute), semi-quantitative

[4] https://www.fba.org.uk/rivpacs-and-rict/river-invertebrate-classification-tool

Description	Surface water reference	Grid Reference	Date	Method
River 1	SW5	NH 43495 20836	21/03/2024	eDNA
River 2	SW3	NH 43756 19259	21/03/2024	eDNA
River 3	SW3	NH 45632 18996	21/03/2024	eDNA
LnBD	SW8	NH 45266 22412	19/03/2024 21/03/2024	eDNA

Electric Fishing

2.5.4 Electric fishing surveys were undertaken following a derivation of the standard electric fishing practice for operators and equipment, as detailed in the Environment Agency Code of Practice and Electric Fishing Equipment Annex A and B, Issue II regulations revision (Beaumont et al., 2002). Electric fishing was conducted by fully trained fisheries scientists following the EA Operational Instruction 993_08, Electric fishing operations (Environment Agency, 2019) and in accordance with the Scottish Fisheries Coordination Centre protocols (SFCC, 2021).

2.5.5 Time delineated surveys were undertaken, providing an index of abundance; catch per unit of effort (time). This method was advantageous to use as an alternative to the three-run method, as it facilitated a larger number of sites to be sampled in a short time frame when weather and flow conditions allowed. Operatives electric-fished the watercourse in an upstream direction for 10 minutes where possible. The number of fish caught during this time is regarded as an index of abundance; catch per unit effort (time).

2.5.6 Following capture, the fish were placed within fish holding tanks before being identified and measured then safely released immediately downstream. Holding tank dissolved oxygen was continuously monitored.

Fish eDNA Survey

2.5.7 Water samples for eDNA analysis were collected from Loch nam Breac Dearga, Allt Saigh (SW3: River 2 and 3) and Allt Loch an t-Sionnaich (River 1).

2.5.8 For Loch nam Breac Dearga, 20 samples were collected from the margin at regular intervals, and for the watercourses three samples for each point. For each sample, five subsamples were collected into a 2 L mineral water bottle from areas with no/low sediment and vegetation without the surveyors entering the water to avoid cross-contamination. Once collected, the samples were stored out of direct sunlight in an iced cool box. A blank was also provided for each site, which comprised of an unopened bottle of mineral water ensuring no cross contamination, from the water, in the bottles prior to being used for samples. Due to two sampling days on the loch, two blanks were provided for analysis. The samples and blanks were then filtered within 24 hours of collection at the University of Highlands and Islands, with subsequent extraction and sequencing.

2.6 Limitations

Desk Study

2.6.1 The aim of a desk study is to help characterise the baseline context and provide valuable background information that would not be captured by a single site survey alone. Information obtained by a desk study is dependent upon local recorders and organisations having submitted records for the area of interest. As such, a lack of records for a species does not necessarily mean that the habitats or species do not occur in the Study Area. Likewise, the record of a species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Proposed Development. The relevance of existing data records is assessed in context for the EIA.

Field Surveys

2.6.2 Due to the terrain on the Proposed Development Site, it was not possible to access Sites 3, 7 and 19.

2.6.3 Quantitative fish surveys were not possible as the terrain across the Proposed Development Site limited the ability of the team to carry bulky stop nets to the sampling locations. As such, the team followed the time delineated methodology. Similarly, some surveys were curtailed from the standard 10-minute fishing effort due to accessibility and the ability to electric fish in challenging terrain (i.e., 6-minute surveys).

2.6.4 Due to heavy rainfall overnight, the flows on the River Enrick made electric fishing at Site 10 unsafe; as such this site was not surveyed despite being assessed as providing suitable habitat for fish.

2.6.5 The large boulder substrate and water depth at Site 20 made it impossible to complete a full 10-minute electrofishing survey. Instead, a zig-zag survey pattern was used where it was safe to do so, and accessible pools within this area were surveyed through spot-checks.

2.6.6 The terrain surrounding Loch nam Breac Dearga prevented the collection of equidistant eDNA water samples from around the banks. Samples could not be collected on the shoreline between NH 45501 22516 and NH 45061 21991, where Meall Fuar-mhonaidh drops vertically to the water's edge limiting safe access to the shoreline.

2.6.7 At some sites with high proportions of boulders and large cobbles, it was not possible to get the macroinvertebrate net flat against the bed of the watercourse. In addition to this, where the substrate was dominated by bedrock and boulders, there was limited substrate to disturb during the kick sample. Nevertheless, best efforts were made to collect a representative kick sample.

2.6.8 The macroinvertebrate survey location at the north of Loch nam Breac Dearga (LnBD A) was considered less representative of habitats present in the loch and was therefore moved to the east of the loch during the autumn suite of surveys, the latter being considered more representative of the habitats present due to the substrate present.

2.6.9 While the baseline is not expected to change sufficiently to alter the impact assessment at the time of Construction, the precise situation regarding protected species may nevertheless differ at that time through natural changes. Pre-Construction and Enabling works fish surveys in particular should therefore be undertaken as required, depending upon the timescale of consenting and construction, with aquatic ecological data typically remaining valid for a period of three years from the point of collection.

3. Results

3.1 Desk Study

Water Framework Directive Status

Allt Saigh

3.1.1 The Allt Saigh water body, which includes Loch nam Breac Dearga (Water body ID: 20278), is a heavily modified water body due to the impact of hydroelectricity generation. Allt Saigh is 12.1 km in length and enters Loch Ness at Alltsigh. The Allt Saigh water body is currently classified as having 'Good' overall status (2023). This water body achieved 'Moderate' overall ecological status for hydromorphology whilst having 'High' status for biological elements.

River Coiltie

3.1.2 The River Coiltie water body (Water body ID: 20265) is 17.9 km in length. The River Coiltie has 'Moderate' overall status, having 'High' status for biological elements (solely fish) whilst having 'Moderate' status for hydromorphology and overall hydrology.

River Enrick – Loch Ness to Loch Meiklie

3.1.3 The River Enrick – Loch Ness to Loch Meiklie (Water body ID: 20262) is 9.9 km in length. This water body is currently classified as having 'Good' overall status (2023). The water body had good overall ecological status, achieving 'High' status for physico-chemical elements and 'Good' for biological elements.

Loch Ness

3.1.4 Loch Ness (Water body ID: 100156) has an area of 55.3 km^2 and is currently classified as having 'Good' overall status (2023), being classified as 'Good' status for biological elements, achieving 'High' for both invertebrates and fish but 'Good' for alien species.

Designated Sites

3.1.5 Statutory designated sites within 10 km of the Study Area were identified from data searches. A total of seven statutory designated sites with aquatic ecology features as part of the reason for their designation, were identified within 10 km of the Study Area and are listed in **Table 3-1 International statutory designated sites within 10 km of the Proposed Development Site** below.

Table 3-1: International statutory designated sites within 10 km of the Proposed Development Site (PDS)

Name	Reason for Designation (aquatic features)	Central NGR	Distance from PDS (km)
Dubh Lochs SSSI	Two small moorland lochs supporting natural aquatic plant community dominated by bogbean *Menyanthes trifoliata*, white water lily *Nymphaea alba* and bottle sedge *Carex rostrata* which support Slavonian Grebe. The surrounding land is a diverse mix of wet and dry heath and mire communities.	NH 4627 3592	0 km north
Knockie Lochs SSSI	Extensive beds of emergent vegetation, including long-stalked pondweed *Potamogeton praelongus,* bottle sedge *Carex rostrata and* slender sedge *C. lasiocarpa* supporting nesting and breeding areas for Slavonian grebe *Podiceps auritus.*	NH 4513 3620	4.4 km south
Urquhart Bay Wood SSSI and SAC	One of the remaining floodplain swamp woodlands on confluence of Rivers Enrick and Coiltie. Frequent inundation by floods, changes in channel and accumulations of woody debris are key parts of the interest.	NH 5129 9862	1.8 km north
Balnagrantach SSSI	Diverse aquatic plan community and fringing aquatic and fen vegetation including club sedge *Carex buxbaumii* which is nationally rare.	NH 4932 5177	2.5 km north
Loch Bran SSSI	Supports eleven species of dragonfly including a nationally scarce species, the brilliant emerald *Somatochlora metallica.*	NH 5019 8125	2.7 km east

River Moriston SAC	Designated for its populations of freshwater pearl mussel *Margaritifera margaritifera* and Atlantic Salmon *Salmo salar*.	NH 297 125	3.1 km south east
Loch Ruthven SSSI SAC	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea.*	NH 6201 2760	10.0 km east

Non-statutory Designated Sites

3.1.6 There are no non-statutory designated sites within 2 km of the Proposed Development Site that are either designated for the conservation of aquatic/marine features or are potentially hydrologically connected.

Notable Species

3.1.7 Historic records of fish, aquatic macroinvertebrate and aquatic macrophyte species are available from the SEPA through their routine monitoring programme, as well as from NBN Atlas Scotland (NBN, 2023). Records from within the last ten years are presented below; however, where relevant records older than 10 years were identified, these are included due to the general under-recording of aquatic species.

Fish

3.1.8 As there were no records of notable fish species returned in the NBN dataset within the last 10 years, the search was then extended to 1960. It is assumed that where there are historical records, residual populations may remain present due to the under-recording of such species. A more recent study of Loch Ness, led by the University of Otago, in 2018 identified the eDNA of several fish species. The results of both are shown in **Table 3-1: International statutory designated sites within 10 km of the Proposed Development Site** below.

Table 3-2: Desk Study records for fish

	NBN Atlas data				
Species	Number of records	Closest Record	Most recent year	eDNA Present (2018)	Designations
Arctic charr *Salvelinus alpinus*	6	3.6 km S	1979	✓	BAP-2007 Scottish Biodiversity List
Atlantic salmon *Salmo salar*	15	On site	1995	✓	Bern-A3 OSPAR HabDir-A2*,HabDir-A5, BAP-2007 Scottish Biodiversity List
Brook lamprey *Lampetra planeri*	2	2.5 km E	1983	-	Bern-A3 HabDir-A2* Scottish Biodiversity List
Brown trout *Salmo trutta*	5	3.0 km E	1981	✓	BAP-2007 Scottish Biodiversity List
Brown/Sea trout *Salmo trutta*	18	On site	1995	✓	BAP-2007 Scottish Biodiversity List
Sea trout *Salmo trutta trutta*	2	3.5 km S	1972	✓	BAP-2007 Scottish Biodiversity List
European eel *Anguilla anguilla*	15	On site	1995	✓	BAP-2007 Scottish Biodiversity List
European River Lamprey *Lampetra fluviatilis*	-	-	-	✓	Bern-A3 HabDir-A2*,HabDir-A5 BAP-2007 Scottish Biodiversity List HabReg-Sch4
Grayling *Thymallus thymallus*	-	-	-	✓	Bern-A3 HabDir-A5 HabReg-Sch4

Species	NBN Atlas data: Number of records	Closest Record	Most recent year	eDNA Present (2018)	Designations
Lamprey species *Lampetra* sp.	4	3 km S	2003	-	Bern-A3 HabDir-A2*,HabDir-A5 BAP-2007 Scottish Biodiversity List HabReg-Sch4
Minnow *Phoxinus phoxinus*	3	3.0 km E	1985	✓	Non-native in Scotland – introduced from England and widespread
Nine-spined stickleback *Pungitius pungitius*	-	-	-	✓	-
Pike *Esox lucius*	6	On site	1985	✓	-
Rainbow Trout *Oncorhynchus mykiss*	2	On site	2002	-	Non-native
Sea lamprey *Petromyzon marinus*	4	2.8 km E	2003	✓	Bern-A3 OSPAR HabDir-A2* BAP-2007 Scottish Biodiversity List
Stone Loach *Barbatula barbatula*	-	-	-	✓	
Three-Spined Stickleback *Gasterosteus aculeatus*	9	2.2 km E	1995	✓	-

3.1.9 Catch records from NDSFB show the presence of salmon every year between 2000 and 2020 within Loch Ness. NDSFB also have three monitoring locations on the River Coiltie and four on the River Enrick; all of these monitoring locations are downstream of the Proposed Development Site. The results of NDSFB 2022 quantitative surveys are shown in **Table 3-3: 2022 NDSFB salmonid smolt survey results for the Rivers Coiltie and Enrick** below.

Table 3-3: 2022 NDSFB salmonid smolt survey results for the Rivers Coiltie and Enrick

River	Site (and NDSFB site codes)	Distance from Site	Number of individuals caught: Salmon Fry	Salmon Parr	Trout Fry	Trout Parr
Enrick	Enrick, EFPS1	1.33	236	33	6	1
	Enrick, Kilmichael Burn, EFPS2	1.53	3	3	0	0
	Enrick, EFPS3	1.59	107	21	6	1
	Enrick, EFPS4	1.74	152	18	2	0
Coiltie	Bottom of old bridge footing	1.77	50	26	7	0
	Left channel, start at point of island	2.47	152	40	22	0
	Downstream large gravel bar	2.60	379	21	31	0

3.1.10 Results of previous salmon smolt tracking studies have also been provided by NDSFB, and these are described in **Chapter 9: Aquatic and Marine Ecology (Volume 2: Main Report)**, where relevant.

Aquatic macroinvertebrates

3.1.11 There were four records of notable macroinvertebrate species identified in the desk study data **(Table 3-4: Notable macroinvertebrate species identified within the Study Area, within the last ten years)**. The most recent was the brilliant emerald dragonfly (*Somatochlora metallica*) recorded within 2021, with the closest records within the Proposed Development Site.

Table 3-4: Notable macroinvertebrate species identified within the Study Area, within the last ten years

Species	Number of records	Closest Record	Most recent year	Designations
Brilliant emerald dragonfly *Somatochlora metallica*	22	Within Proposed Development Site boundary	2021	RedList GB post2001 VU
Northern Emerald dragonfly *Somatochlora arctica*	3	Within Proposed Development Site boundary	2020	RedList GB post2001 NT
A cranefly *Tipula limbata*	2	Within Proposed Development Site boundary	2015	Scottish Biodiversity List
Azure hawker dragonfly *Aeshna caerulea*	1	1.6 km north west	2018	RedList GB post2001 VU Highland BAP 2021-2026

3.1.12 No records of FWPM were available within the Study Area; however, records of FWPM are generally confidential and are not held by the biological records centres. FWPM are known to be present in the River Moriston but the exact distribution of the species in that river is not known – it is therefore assumed that the species may be present in the River Moriston to its confluence with Loch Ness. Through a specific data request to SEPA, it was confirmed that there are no records of FWPM in the River Coiltie.

Aquatic macrophytes

3.1.13 **Table 3-5: Notable macrophyte and bryophyte species identified within 2 km of the Study Area, within the last ten years** below shows records of aquatic macrophytes within the search area. Both yellowish fork-moss (*Dichodontium flavescens*) and curled hookmoss (*Palustriella commutata)* are Scottish Biodiversity List species, whilst green shield-moss (*Buxbaumia viridis)* is listed under the Appendix 1 of the Bern Convention, Annex 2 of the Habitats Directive, and Schedule 8 of the Wildlife and Countryside Act (as amended), it is also classified as Near Threatened under the GB Red List.

Table 3-5: Notable macrophyte and bryophyte species identified within 2 km of the Study Area, within the last ten years

Species	Number of cords	Closest ecord	Most recent ear	Designations
Yellowish fork-moss *Dichodontium flavescens*	1	Within RLB	2014	Scottish Biodiversity List
Curled hookmoss *Palustriella commutata*	3	Within RLB	2015	RedList GB post2001-LC Scottish Biodiversity List
Green shield-moss *Buxbaumia viridis*	1	1.3 km uth east	2016	Bern-A1 HabsDir-A2 RedList GB post2001-NT BAP2007 Scottish Biodiversity List WACA-Sch8 Highlands BAP 2021-2026

Non-native and Invasive Species

3.1.14 There was one record of non-native or invasive species within the records from NBN Atlas **(**Table 3-6: Non-Native and Invasive species identified within the Study Area, within the last ten years**)**; three records of Himalayan balsam were recorded within the Study Area.

Table 3-6: Non-Native and Invasive species identified within the Study Area, within the last ten years

Species	Number of records	Closest Record	Most recent year	Designations
Himalayan Balsam *Impatiens glandulifera*	3	3.1 km south east	2024	IAS Order 2019 WCA 1981 Sch9

3.1.15 NDSFB have identified 12 INNS within the Ness and Beauly catchments. The Ness Catchment Biosecurity Plan (2021 – 2030) identified the following species in Loch Ness and connected watercourses:

- Canadian Waterweed (*Elodea canadensis*) – South Loch Ness;
- New Zealand Pigmyweed (*Crassula helmsii*) – Caledonian Canal;
- Japanese Knotweed (*Reynoutria japonica*) – Urquhart Bay Wood SAC and surrounding area (specified as 'Glen Urquhart');
- Himalayan Balsam (*Impatiens glandulifera*) – Glen Urquhart (as above);and
- Giant Hogweed (*Heracleum mantegazzianum*) – Glen Urquhart (as above).

3.1.16 These INNS plants are listed under the Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2011[5]). This legislation makes it an offence to plant or otherwise cause to grow (including allowing to spread), listed plant species in the wild. If transported off site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm (as per the Environmental Protection Act 1990[6]). The legislation also makes in an offence to release, or allow to escape, listed species (or species not ordinarily resident in and not a regular visitor to Great Britain in a wild state – see subsequent paragraph) into the wild.

3.1.17 There are also records of the non-native flatworm (*Phagocata woodworthi)* and the non-native amphipod 'shrimp' (*Crangonyx pseudogracilis/floridanus)* in Loch Ness, non-native species that are not listed in statutory legislation in the UK. The latter was also found in surveys of Loch Ness.

3.2 Field Survey

3.2.1 No non-native species were recorded at the Proposed Development Site during any aquatic surveys.

Site 1

3.2.2 This survey reach ran across the moorland adjacent to Loch nam Breac Dearga. The small channel (width (W) = 0.4 m, depth (D) = 0.10 m) was lightly shaded with overhanging grasses, for some portions of the reach the watercourse was subterranean. The riverbed was dominated by gravel (48%), with silt, sand, cobble and boulder also present, with variable flow patterns including runs, pools and cascades. No woody debris nor tree roots were present during the invertebrate surveys.

3.2.3 Seven species of macrophytes were recorded along the survey reach, none of which were rare or notable species. The assemblage comprised needle spikerush (*Eleocharis acicularis*), bog pondweed (*Potamogeton polygonifolius*), lesser spearwort (*Ranunculus flammula*) and the bryophytes yellow fringed moss (*Racomitrium aciculare*), water earwort (*Scapania undulata*), lustrous bog-moss (*Sphagnum subnitens var. subnitens*), and yellow starry feather-moss (*Campyllium stellatum var. stellatum*). The community coverage was approximately 4% of the channel.

3.2.4 This survey location, in spring, was recorded as having moderate diversity of macroinvertebrate community (14 taxa). The biological quality of Site1 was assessed as 'very good' and unimpacted (NTAXA: 13; ASPT: 5.86). Site 1 had a moderate conservation value (CCI: 6.00), with most species recorded being of common status (as defined by the CCI). The macroinvertebrates in this watercourse were considered highly sensitive to reduced flows on a species level (LIFE: 7.27). The majority of species found were within class II, requiring moderate to fast flows; these species included the riffle beetle *Elmis aenea*, large dark olive mayfly *(Baetis rhodani)*, and the caddisflies *halesus radiatus*, *Plectrocnemia conspersa* and *Chaetopteryx villosa*. Site 1 had PSI score of 38.10, indicating

[5] Wildlife and Natural Environment (Scotland) Act 2012. Available at: https://www.legislation.gov.uk/asp/2011/6/contents/enacted (accessed November 2023)
[6] Environmental Protection Act 1990, c. 43. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents (accessed November 2023)

that the surveyed area was sedimented. The majority of macroinvertebrates within the sample were moderately insensitive to sediment, this included the mayflies *Centroptilum luteolum* and *Siphlonurus lacustris*, the riffle beetle *Oulimnius tuberculatus* and *Halesus radiatus*, only two species found here were identified as being sediment sensitive - *Baetis rhodani* and the stonefly *Leuctra* sp.

3.2.5 During the autumn surveys, Site 1 was recorded as having a 'good' macroinvertebrate community (NTAXA: 11). The macroinvertebrate community here represented a very good, unimpacted and unpolluted watercourse (ASPT: 6.67) and is considered moderately sedimented (PSI: 52.63) dominated by group B species including *Elmis aenea*, and *Plectrocnemia conspersa*. Site 1 had moderate conservation value (CCI: 7.9), however, only two scoring species were present. The macroinvertebrate community was assessed as highly sensitive to reduced flows (LIFE: 7.60) with species recorded having a preference to moderate/fast flow types such as *Elmis aenea*, *Halesus* sp and *Plectrocnemia conspersa*, and standing water flow types including riffle beetle (*Oulimnius* sp.) and Limnephilidae caddisflies (juvenile / damaged).

3.2.6 A fish habitat appraisal was undertaken at Site 1. This indicated that the watercourse was deep enough to support fish with depths between 8 and 14cm. However, due to the channel width being 0.2 m on average and partly subterranean, it was not possible to electric fish this area.

Site 2

3.2.7 This survey reach ran across the moorland adjacent to Loch nam Breac Dearga. The channel (W = 1 m, D = 0.10 m) had an average flow between 10 to 25 cm/sec and was coloured by natural tannins. The riverbed was dominated by boulders (40%) and cobbles (30%), with pebbles, gravel and sand also present, with moss covering 20% of the surveyed area. The flow type here was dominated by runs.

3.2.8 12 species of macrophytes were recorded along the survey reach, none of which were rare or notable. The assemblage here was comprised of needle spikerush, bulbous rush (*Juncus bulbosus*), and lesser spearwort, and the bryophytes overleaf pellia (*Pellia epiphylla*), bog pondweed, bryophytes yellow fringed moss, lustrous Bog-moss, yellow starry feather-moss, water felt *Vaucheria* sp., filamentous alga *Cladophora* sp., and common haircap moss (*Polytrichum commune var commune*). The community coverage was approximately 5 % of the channel.

3.2.9 The macroinvertebrate community in spring was 'good' (NTAXA: 12.0; ASPT: 5.33) and represented a clean but slightly impacted water quality with moderate sedimentation with a PSI score of 50.00. This was dominated by species including the iron blue nymph mayfly (*Alainites muticus*) which is highly sensitive to sedimentation, and *Plectrocnemia* sp., *Chaetopteryx villosa* and the cranefly *Neolimnomyia* sp. which are moderately sensitive to sedimentation. Additionally, most species were moderately sensitive to reduced flows (LIFE: 7.00) with only Iron blue nymph mayfly and *Chaetopteryx villosa* being representative of moderate to fast flowing environments. Site 2 had moderate conservation value (CCI: 9.6), with only 5 scoring species which were all of common to frequent status.

3.2.10 The macroinvertebrate community in autumn was considered 'very good' (NTAXA: 17; WHPT: 113.40). The macroinvertebrate community here represented an unpolluted, unimpacted watercourse (ASPT: 6.67) dominated by species such as the stoneflies *Leuctra hippopus* and *Isoperla grammatica*. The watercourse was considered slightly sedimented (PSI: 75.00), with sediment-sensitive species including the mayflies *Ecdyonurus venosus* and *Iron blue nymph mayfly* whilst having highly sediment tolerant species also present including Oligochaeta worms and mayfly *Leptophlebia* sp.

3.2.11 For electric fishing surveys, a single 10-minute run was carried out over a 41 m length of watercourse between two cascades and no fish were caught. Three fish were seen and not caught but were considered likely to be trout. The water temperature recorded was 11.32 °C and conductivity measured 32.4 μScm^{-1}.

Site 4

3.2.12 This survey reach was within an area of forestry plantation. The small channel (W = 0.5 m, D = 0.10 m) was moderately shaded by the adjacent woodland. The riverbed was dominated by cobbles (30%) and boulders (25%) with pebble, gravel, sand and silt also present, and a step, pool, run flow pattern. Woody debris and moss were both present in the reach, both accounting for 5% of the surveyed area.

3.2.13 16 species of macrophytes were recorded along the survey reach, none of which were rare or notable. The assemblage here comprised of bulbous rush, jointed rush (*Juncus articulatus*), lesser spearwort, bugle (*Ajuga reptans*), yellow pimpernel (*Lysimachia nemorum*), thyme-leaved speedwell (*Veronica serpyllifolia*) and soft rush (*Juncus effusus*). The bryophytes yellow fringe-moss, yellow starry feather-moss, glittering woodmoss

(*Hylocomium splendens*), heath plait-moss (*Hypnum jutlandicum*), dotted thyme-moss (*Rhizomnium punctatum*) and the riparian moss *Hygrohypnum ochraceum* were also recorded, along with the leafy liverwort *Marsupella aquatica* and water felt alga *Vaucheria* sp. The community coverage was approximately 10 % of the channel.

3.2.14 The biological quality of the spring macroinvertebrate community was 'very good' (NTAXA: 12.0; ASPT: 7.55). The macroinvertebrate community represented a minimally sedimented/unsedimented environment (PSI: 87.50), most species present were highly sensitive to sedimentation and included the mayflies *Baetis rhodani*, *Rhithrogena semicolorata*, and *Electrogena lateralis*, the stoneflies *Leuctra hippopus* and *Dinocras cephalotes.* And the blackfly *Simulium cryophilum*. The species present were highly sensitive to reduced flows (LIFE: 8.45), demonstrated by the dominance of *Rhithrogena semicolorata*, *Electrogena lateralis*, *Leuctra hippopus* and *Dinocras cephalotes* within the community which are adapted to faster flows with dorsally flattened bodies and legs for gripping the substrate. Site 4 had a moderate conservation value (CCI: 7.8). All species identified were of occasional to very common status.

3.2.15 The autumn macroinvertebrate community was very good (NTAXA: 14; ASPT; 7.24). The macroinvertebrate community represented a minimally sedimented environment (PSI: 85.71) dominated by species of high sediment sensitivity including *Rhithrogena* sp., *Leuctra hippopus* and stonefly *Protonemura praecox* and moderately sediment sensitive species including stoneflies *Amphinemura sulcicollis* and *Leuctra nigra*. The LIFE score for autumn here indicated that the community was highly sensitive to reduced flows (LIFE: 8.70), dominated by species representing rapid and fast/moderate flow groups including the stoneflies *Electrogena lateralis* and *Protonemura praecox* which are adapted to fast flows. The community here represents a fairly high conservation value (CCI: 12.5) with all species identified were of occasional to very common status.

3.2.16 Fish were scoped out of this reach, due to the water depth being too shallow for fishes during the walkover survey.

Site 5

3.2.17 This survey reach was within an area of forestry land which had recently been cleared. The small channel (W=0.5 m, D = 0.05 m) had no shading, and the bed was dominated by boulder (30%), cobble (20%) and sand (20%), with smaller proportions of bedrock, pebble and gravel. The surveyed area comprised of a run with woody debris present in 10% of the reach, with filamentous algae equating to 2% of the channel.

3.2.18 Only two plant species were recorded at Site 5, common smoothcap (*Atrichum undulatum*) and overleaf pellia. The community coverage was approximately 5 % of the channel.

3.2.19 During the spring surveys, a 'very good' macroinvertebrate diversity was recorded (NTAXA: 17.0; ASPT: 6.98) indicating unpolluted and unimpacted water quality. This watercourse had slight sedimentation (PSI: 75.00) with the community dominated by sediment sensitive species including blackfly *Simulium cryophilum*, stonefly *Dinocras cephalotes*, and mayfly *Ecdyonurus venosus*. Site 5 also had a high sensitivity to reduced flows (LIFE: 8.57), dominated by mayfly and stonefly species including *Rhithrogena semicolorata, Leuctra hippopus* and *Ecdyonurus venosus*. The survey reach had a moderate conservation value (CCI: 7.9) with no species above occasional conservation status.

3.2.20 During the autumn surveys, a 'very good' macroinvertebrate community was recorded (NTAXA: 23; ASPT: 7.37). The water quality here was considered unpolluted, unimpacted and minimally sedimented/unsedimented (PSI: 82.00), dominated by species which are highly and moderately sensitive to sedimentation, including the mayflies *Rhithrogena semicolorata*, *Electrogena lateralis*, and *Ecdyonurus venosus*, as well as the stoneflies *Siphonoperla torrentium* and *Isoperla grammatica*. The autumn community at Site 5 was highly sensitive to reduced flows (LIFE: 8.64) dominated by rapid flow group species including stone and mayflies, and the caddisflies *Potamophylax* sp. and *Odontocerum albicorne*. The autumn community was classed as being of fairly high conservation value (CCI: 12.1) including locally important species stonefly *Protonemura meyeri* and alderfly *Sialis fuliginosa*.

3.2.21 Fish were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 6

3.2.22 This survey reach was within an area of forestry land which had become naturalised. The channel (W= 4m, D=0.20m) had no shading, and the bed was dominated by cobble (60%) with boulder, pebble, gravel and silt also present. The surveyed area was dominated by run flow type, with a small area of riffle, pool, additionally, woody debris was present in 10% of the reach, with moss present in 20% coverage.

3.2.23 Seven macrophyte species were recorded here. The reach here comprised of yellow pimpernel, bulbosus rush, jointed rush, and soft rush, and the bryophytes yellow fringe-moss and yellow starry feather-moss, and *Marsupella aquatica*. The community coverage was approximately 3% of the channel.

3.2.24 During the spring surveys, a 'very good' diversity was recorded (NTAXA: 17.0; ASPT: 8.21), indicating unpolluted and unimpacted water quality. This site was minimally sedimented (PSI: 88.37), represented by Iron blue nymph mayfly, mayflies (*Rhithrogena semicolorata*, *Electrogena lateralis*, *Ecdyonurus venosus* and *Serratella ignita)*, caseless caddisflies (*Philopotamus montanus*, *Wormaldia* sp. and *Hydropsyche siltalai)*, and blackfly larvae (*Simulium cryophilum* and *Simulium argyreatum/variegatum*). The macroinvertebrate community at Site 6 was highly sensitive to reduced flows (LIFE: 8.78), dominated by rapid flow species including *Leuctra hippopus*, *Dinocras cephalotes*, *Rhithrogena semicolorata* and *Electrogena lateralis, Philopotamus montanus*, and *Wormaldia* sp. Here the community had a fairly high conservation value (CCI: 11.1), with no species above occasional conservation status.

3.2.25 During the autumn surveys, a 'good' diversity represented a slightly impacted site (NTAXA: 12; ASPT: 8.27). This site was classed as being minimally sedimented/unsedimented (PSI: 92.31) with scoring species only being grouped into the highly and moderately sediment sensitive score groups including *Leuctra hippopus*, *Amphinemura sulcicollis*, *Rhithrogena* species and the water beetle *Hydraena gracilis* respectively. The community at Site 6 was considered to be highly sensitive to reduced flows (LIFE:8.46) dominated by rapid flow species including the stoneflies (*Electrogena lateralis* and *Ecdyonurus venosus*) and caddisfly *Philopotamus montanus*. The community here was considered to be of fairly high conservation value (CCI: 12.1).

3.2.26 For electric fishing surveys, a single 10-minute run was carried out over a 23 m length of watercourse; one brown trout was caught with a fork length of 105 mm (Image 3-1: Brown Trout at Site 6). The water temperature recorded was 10.6°C and conductivity measured 40 μScm^{-1}.

Image 3-1: Brown Trout at Site 6

Site 8

3.2.27 This survey reach was within an area of moorland. The channel (W = 0.5 m, D = 0.05 m) was lightly shaded by the valley side the bed was dominated by sand (30%), silt (20%) and gravel (20%), with boulder, cobble and pebble also present. The surveyed area was predominantly a run system; however, a small pool was also present. Of the surveyed area, woody debris was present in 20% of the reach.

3.2.28 At Site 8, 29 plant species were recorded. This comprised jointed rush, bulbous rush, lesser spearwort, heath speedwell, common dog violet, soft rush, common wood sorrel (*oxalis acetosella*), common butterwort (*pinguicula vulgaris*), ribwort plantain (*Plantago lanceolata*), hairy bittercress (*Cardamine hirsuita*), and long-stalked hairy sedge (*Carex lepidocarpa*). The bryophytes, *sphagnum* spp., yellow starry feather-moss, glittering woodmoss, dotted thyme-moss, common haircap, *Dicranella heteromalla*, greater fork moss (*Dicranum majus*), broom fork moss (*Dicranum scoparium*), neat feathermoss (*Pseudoscleropodium purum*), yellow fringe-moss, jagged germanderwort (*Riccardia chamedryfolia*), blunt-leaved bogmoss (*Sphagnum palustre*), *Blindia acuta*, Transparent Fork-moss (*Dichodontium pellucidum*), and common Tamarisk-moss (*Thuidium tamariscinum*) were also present, along with the liverworts overleaf pellia and water earwort,. The community coverage was approximately 10% of the channel.

3.2.29 In spring, 13 scoring macroinvertebrate taxa were identified. The biological quality was classed as 'good', clean but slightly impacted (WHPT: 6.38) demonstrated by species including stoneflies *Siphonoperla torrentium*, *Leuctra* sp. and *Nemoura cinerea*. The watercourse had moderate conservation value (CCI: 7.7), with all species found being of common status. The PSI score, here was 81.25 and as such was considered minimally sedimented; most taxa in the sample were considered highly sensitive to sedimentation. The community at Site 8 was moderately sensitive to reduced flows (LIFE: 7.11). This was demonstrated by species such as *Siphonoperla torrentium* which habitat rapid flows, and *Baetidae* (juvenile / damaged), iron blue nymph mayfly*,* mayfly *Baetis niger*, and caddisfly *Plectrocnemia conspersa,* which inhabit areas of fast flows.

3.2.30 The autumn survey indicated that site was of 'very good' quality with unimpacted and unpolluted watercourses (NTAXA: 18; ASPT: 6.71), however, the watercourse was considered to be slightly sedimented (PSI: 64.00) dominated by species highly and moderately sensitive to sediment, including the stonefly *Isoperla grammatica* and cased caddisfly *Beraea maurus*. The autumn community at Site 8 was considered to be highly sensitive to reduced flows (LIFE: 8.10) with species including stone- and mayflies, such as *Siphonoperla torrentium* and *Leuctra hippopus*, both of which are highly adapted to rapid water flows. The community at Site 8 was considered to be of high conservation value (CCI: 15.0) – most species were of common to occasional status. The only notable species recorded within this community is the blackfly *Simulium angustitarse*, which is regionally notable (Conservation score: 6).

3.2.31 Fish were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 9

3.2.32 This survey reach was within a small, wooded valley within an area of moorland. The channel (W=0.25 m, D=0.02m) was lightly shaded by the valley side. The riverbed was dominated by cobble (40%) and bedrock (30%), with boulder, pebble, gravel, sand and silt also present, and the flow was dominated by cascade habitat type. Of the surveyed area, wood debris and moss equated to 10% respectively.

3.2.33 During the macrophyte surveys, 14 plant species were identified. These the bryophytes, Fissidens sp. (aggregated), *sphagnum* sp(p), yellow starry feather-moss, glittering woodmoss, yellow fringe-moss, common Tamarisk-moss, *Fontinalis squamosa*, horn calcareous moss (*Mnium hornum*), yellow saxifrage (*Saxifraga aizoides*) and little shaggy moss (*Rhytidiadelphus loreus*), along with *Marsupella aquatica* and water earwort. The community coverage was approximately 7 % of the channel.

3.2.34 During the spring macroinvertebrates 12 scoring macroinvertebrate taxa were identified. The biological quality of the watercourse was classed as 'good', clean but slightly impacted (WHPT: 86.50) demonstrated by species including *Electrogena lateralis* and Leuctra sp. Site 9 had high conservation value (CCI: 15.0), however, there was a lack of scoring species as such it is likely that this is artificially inflated as all species found are of common status. Site 9 had a PSI score of 100.00 and as such was considered to be minimally sedimented/unsedimented, all taxa in the sample were considered highly or moderately sensitive to sedimentation, with only Dytiscidae diving beetles scoring below this (highly insensitive). Most species present were highly sensitive to reduced flows (LIFE: 8.83), demonstrated by species such as iron blue nymph mayfly and *Electrogena lateralis*, both of which are adapted to faster flows with dorsally flattened bodies and legs for gripping the substrate.

3.2.35 During the autumn macroinvertebrate surveys 12 scoring species were identified. The score was indicative of 'very good', unimpacted and unpolluted quality (ASPT: 8.09), with minimal sedimentation/unsedimented (PSI: 95.24) dominated by species which were highly sediment sensitive including *Dinocras cephalotes* and *Philopotamus montanus*. Species here were considered to be highly sensitive to reduced flows (LIFE: 8.82), dominated by rapid flow species including *Electrogena lateralis*, and *Dinocras cephalotes*. The community at Site 9 was considered to be of fairly high conservation value (CCI: 14.5) and included the regionally notable fly larvae *Thaumalea verralli* (Conservation score: 6).

3.2.36 Fish surveys were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 10

3.2.37 This survey reach was on the River Enrick, within a coniferous woodland block adjacent to the A831. The river (W = 10m, D = 0.2m) was moderately shaded by the overhanging trees. The riverbed was dominated by boulder (50%), with cobble, pebble and gravel also present, the flow type was dominated by riffle with small areas of pools. Within the surveyed area, moss covered 50%, filamentous algae covered 10% and woody debris 5%.

3.2.38 The macrophyte survey identified eight species. These included common water starwort (*Callitriche stagnalis*), marsh marigold (*Caltha palustris*), bulbous rush, and water mint *Mentha* sp. The bryophytes *Fissidens* sp. (aggregated), yellow fringe-moss, yellow starry fen-moss and *Fontinalis squamosa*, and snakeskin liverwort (*Conocephalum conicum*) were also recorded. The community coverage was approximately 8% of the channel.

3.2.39 During the spring surveys, 24 scoring macroinvertebrate taxa were identified. The biological quality of here was classed as 'very good' (ASPT: 7.00) with several pollution sensitive species recorded including caddisflies, indicating that the watercourse is not impacted by organic pollutants. Site 10 was considered to be slightly sedimented, with a PSI score of 77.97, with sediment sensitive species dominating the community. The macroinvertebrate community was also considered to be highly sensitive to reduced flows (LIFE: 8.76), with rapid flow species including mayflies (*Heptagenia sulphurea* and *Ecdyonorus* sp.), stoneflies (*Siphonoperla torrentium* and *Isoperla grammatica*), and caseless caddisflies (*Rhyacophila dorsalis* and *Chimarra marginata*), and fast/moderate flow species including the flatworm *Polycelis felina,* freshwater limpet *Ancylus fluviatilis*, mayflies (including *Baetis fuscatus/scambus, Baetis rhodani,* iron blue nymph mayfly, *Serratella ignita*) and the stonefly *Leuctra fusca*. The community here was considered to be of fairly high conservation value (CCI: 14.9), the majority of species identified were between very common and local status (conservation scores 1 to 4). The exceptions to this are the sedgefly *Ceraclea albimacula* which is of local status (conservation score 5) and caseless caddisfly *Chimarra marginata*, which is notable – but not RDB status (conservation score: 7).

3.2.40 During the autumn macroinvertebrate surveys, 22 scoring species were identified with Site 10 being very good, unpolluted/unimpacted (ASPT: 6.53). The watercourse was considered to be slightly sedimented (PSI: 69.77) dominated by highly sediment sensitive species including *Ancylus fluviatilis*, *Baetis rhodani* and *Hydropsyche siltalai*. The macroinvertebrate community considered to be highly sensitive to reduced flow (LIFE: 8.36), dominated by rapid flow group species including *Ecdyonurus* sp., *Leuctra hippopus* and *Protonemura meyeri*. With the watercourse's community considered of high conservation value (CCI: 15.2), like in spring the majority of species identified were between very common and local status (conservation scores 1 to 5), with the exception of the caseless caddisfly *Chimarra marginata*, which is notable – but not RDB status (conservation score: 7).

3.2.41 No electric fishing surveys were undertaken at Site 10 due to fast currents making the reach unsafe to enter, however due to the size of the watercourse, it is assumed that fish are supported within the watercourse.

Site 11

3.2.42 This survey reach was within a coniferous woodland block. The river (W = 1 m, D = 0.12 m) here was moderately shaded by overhanging trees. The riverbed was dominated by boulder (30%) and cobble (30%), with pebble and gravel also present, the flow type was dominated by a run. Woody debris and moss both covered 10% of the surveyed area respectively, with filamentous algae covering 5%. Downstream of this reach the watercourse was culverted beneath the forestry track.

3.2.43 This site had limited suitability for macrophytes due to shading, and as such was scoped out of detailed survey.

3.2.44 The spring invertebrate community was representative of 'very good' biological quality (NTAXA: 13; ASPT: 7.84), with pollution sensitive taxa recorded, indicating the watercourse is unpolluted and unimpacted. The PSI score for this watercourse was 100.00, indicating that Site 11 is minimally sedimented/unsedimented. The macroinvertebrate community had high sensitivity to reduced flows (LIFE: 8.54), dominated by species adapted for rapid flows including mayflies (*Electrogena lateralis* and *Heptagenia sulphurea*), stoneflies (*Isoperla grammatica* and *Diura bicaudata*), and caddisflies (*Philopotamus montanus* and *Plectrocnemia geniculata*). At Site 11 the macroinvertebrate community had moderate conservation value (CCI: 6.0), with all species found being between very common and frequent.

3.2.45 The autumn macroinvertebrate community represented a 'very good', unpolluted, unimpacted watercourse (NTAXA: 19; ASPT: 7.64). The PSI here, 95.00, represented the watercourse as being minimally sedimented/unsedimented including the mayflies *Rhithrogena semicolorata* and *Electrogena lateralis*. The autumn community was considered to be highly sensitive to reduced flows (LIFE: 8.67) dominated by rapid flow species including mayflies and stoneflies which have dorsally flattened bodies highly adapted to rapid flows and the caseless caddisflies *Rhyacophila dorsalis* and *Wormaldia occipitalis/mediana*. The community was of fairly high conservation value (CCI: 12.6) – whilst most species identified were between local and very common status (conservation scores 1 to 5), the stonefly *Protonemura montana* was recorded which is regionally notable (Conservation score: 6).

3.2.46 Fish surveys were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 12

3.2.47 This survey reach was within a coniferous woodland block. The river (W = 1.5 m, D = 0.07 m) was heavily shaded by overhanging trees. The riverbed was dominated by boulder (50%), with cobble, pebble and gravel also present, the flow type was dominated a run. Woody debris 5% of the surveyed area, with moss covering 20%. Downstream of this reach the watercourse was culverted beneath the forestry track.

3.2.48 The macrophyte survey here identified overleaf pellia, yellow fringe-moss, sphagnum species, yellow starry feather-moss, glittering wood moss and riparian yellow pimpernel. The community coverage was approximately 15 % of the channel.

3.2.49 The spring surveys indicated that Site 12 was of 'very good' biological quality (ASPT: 7.30; NTAXA: 17), with several pollution sensitive species recorded including stoneflies *Brachyptera risi* and *Siphonoperla torrentium*, indicating that the watercourse is not impacted by organic pollution. Site 12 was also minimally sedimented/unsedimented (PSI: 93.55) with high proportions of sediment sensitive species including mayflies *Baetis rhodani* and *Electrogena lateralis*, and caddisfly *Glossosoma conformis*. The macroinvertebrate community at Site 12 was highly sensitive to reduced flows (LIFE: 8.53), dominated by species preferring rapid flows. These included: *Heptageniidae (juvenile / damaged)*, *Electrogena lateralis*, *Ecdyonurus venosus, Leuctra hippopus, Dinocras cephalotes,* and *Odontocerum albicorne.* the community also had high conservation value (CCI: 18.5). All species identified were between very common and local community status, with the exception of the diving beetle *Agabus biguttatus* which is considered to be notable – but not of RDB status (Conservation score: 7).

3.2.50 The autumn survey identified 17 species of macroinvertebrates, which indicated 'very good', unpolluted, impacted biological quality (ASPT: 7.50). Site 12 was also minimally sedimented (PSI: 87.18), supporting species, such as blackfly *Simulium cryophilum*, *Isoperla grammatica* and *Protonemura montana*, which are highly sensitive to sedimentation. The community here was also highly sensitive to reduced flows (LIFE: 8.41) dominated by species preferring rapid flows including *Protonemura praecox*, *Protonemura montana*, *Perlodes mortoni* and *Siphonoperla torrentium*. The macroinvertebrate community was also considered to be of fairly high conservation value (CCI: 13.6) with all species being between very common and local community status, with the exception of the stonefly *Protonemura montana* which is considered regionally notable (Conservation score: 6).

3.2.51 Fish were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 13

3.2.52 This survey reach was within a coniferous woodland block. The river here (W = 2.5 m, D = 0.10 m) was moderately shaded by the overhanging trees. The riverbed was dominated by boulder (50%), with cobble, pebble and gravel also present, the flow type was dominated by a run with a small cascade area. Both woody debris and moss covered 5% of the surveyed area respectively. Downstream of this reach the watercourse was culverted under the forestry track.

3.2.53 Site 13 had limited suitability for macrophytes due to shading, and as such was scoped out of detailed survey as the results would not be representative in terms of WFD assessment.

3.2.54 The spring survey showed that the biological quality of Site 13 was 'very good' (NTAXA: 9; ASPT: 7.54), indicating organic pollution impacts, with the community dominated by pollution sensitive invertebrates. The watercourse was minimally sedimented/unsedimented (PSI: 88.24), the community was comprised of highly and moderately sensitive species, with the only exception being Oligochaeta worms, classed as highly insensitive to sedimentation. The community at Site 13 was highly sensitive to reduced flows (LIFE: 8.53), with all scoring species being within the rapid and moderate/fast flow groups, dominated by mayflies including *Rhithrogena semicolorata* and *Electrogena lateralis*. Marsh beetle *Scirtidae* (larvae / damaged) was the only scoring species out of this flow group, being within flow group IV – standing water. Here there was a moderate conservation value (CCI: 5.5) with only 6 scoring species present all between very common and frequent conservation scores (1 – 3).

3.2.55 The autumn survey showed that the biological quality of Site 13 was 'very good' (NTAXA: 18; ASPT:7.32) indicating that the watercourse was not impacted by organic pollutants, with the community dominated by pollution sensitive species including *Perlodes mortoni*. The community was dominated by highly sediment sensitive species including *Leuctra hippopus* and *Siphonoperla torrentium*, indicating minimally sedimented/unsedimented conditions (PSI: 84.78). The community here was also sensitive to reduced flows (LIFE: 8.67), dominated by rapid and fast/moderate flow species including the stoneflies *Leuctra hippopus* and *Leuctra nigra*. The conservation value here was fairly high (CCI: 13.6) with all species between very common and local community status, with

the exception of the stonefly *Protonemura montana* which is considered regionally notable (Conservation score: 6).

3.2.56 Fish were scoped out of this reach due to the water depth being too shallow for fishes during the walkover surveys.

Site 14

3.2.57 This survey reach was on Allt Loch an t-Sionnaich which ran across the moorland from Loch nam Breac Dearga, here the river (W = 0.50 m, D=0.10 m) was not shaded. The riverbed was dominated by boulders (60%), with cobble, pebble and gravel also present, the flow type was dominated by a series of runs (70%) with steps between each (30%). Both filamentous algae and moss covered 5% of the surveyed area respectively.

3.2.58 No macrophytes were identified during the survey, as such macrophytes here are not considered further.

3.2.59 During the spring macroinvertebrate surveys, a biological quality was 'very good' (NTAXA: 18; ASPT: 7.65), being unpolluted and unimpacted with no impact by organic pollution. The community was dominated by pollution sensitive species including *Dinocras cephalotes*, *Siphonoperla torrentium* and *Odontocerum albicorne*. Site 14 was minimally sedimented/unsedimented (PSI: 86.67), dominated by highly and moderately sediment sensitive species including *Electrogena lateralis* and *Siphonoperla torrentium*. The macroinvertebrate community at Site 14 was highly sensitive to reduced flows (LIFE: 8.38). Dominated by the rapid flow group species including the mayflies Heptageniidae (juvenile / damaged)*, Rhithrogena semicolorata*, and *Electrogena lateralis*, stonefly *Siphonoperla torrentium*, and cased caddisfly *Odontocerum albicorne,* and moderate/fast flow group species, *Baetidae (juvenile / damaged), Nigrobaetis niger/digitatus, Leuctra fusca* and, *Plectrocnemia conspersa*. Site 14 had moderate conservation value (CCI: 9.6), with all scoring species having a conservation value between very common and occasional (conservation scores between 1 and 4).

3.2.60 During the autumn macroinvertebrate surveys, a 'very good' biological quality was recorded with the water being of unpolluted/unimpacted water quality (ASPT: 7.53). The community represented a minimally sedimented/unsedimented watercourse (PSI: 90.20), dominated by species which are highly sensitive to sediment including the riffle beetles *Elmis aenea*, *Limnius volckmari* and *Oulimnius* species. Site 14 had a fairly high conservation value (CCI: 11.8), with all species between very common and local community status, with the exception of the stonefly *Protonemura montana* which is considered to be regionally notable (Conservation score: 6).

3.2.61 For electric fishing surveys, a single 10-minute run was carried out over a 57 m length of watercourse, one trout was caught with a fork length of 88 mm (**Image 3-2: Brown Trout at Site 14**). The water temperature recorded was 12.3 C and conductivity measured 33.0 µScm^{-1}.

Image 3-2: Brown Trout at Site 14

Site 15

3.2.62 This survey reach ran across the moorland adjacent to the Loch nam Breac Dearga; here the water body (W=0.75 m, D=0.10 m) was not shaded. The bed was dominated by cobbles (50%), with boulder, pebble and gravel also

present, the flow type was dominated by a run/pool system. Within the area surveyed moss covered 20% whilst filamentous algae covered 5% of the channel.

3.2.63 No macrophytes were identified during the survey, as such macrophytes here are not considered further.

3.2.64 The biological quality in spring was very good (NTAXA: 19; ASPT: 7.02), indicating that Site 15 was unpolluted/unimpacted, and not impacted by organic pollution. However, the watercourse was slightly sedimented (PSI: 76.47). The community at Site 15 was highly sensitive to reduced flows (LIFE: 8.20), with the species composition ranging from standing water to rapid flow group species. Rapid flow type species present included the mayflies *Electrogena lateralis* and *Ecdyonurus venosus*, the stonefly *Isoperla grammatica*, and caddisflies *Rhyacophila dorsalis*, *Philopotamidae* (juvenile / damaged) and *Philopotamus montanus*, whilst standing water communities were represented by Dytiscidae (larvae / damaged), water scavenger beetle *Anacaena globulus*, Scirtidae species and riffle beetle *Oulimnius tuberculatus*. Site 15 had fairly high conservation value (CCI: 10.9). Of the 16 scoring species, all were of very common to occasional conservation status (conservation score: 1-4).

3.2.65 The autumn community survey at Site 15 represented a ‘very good’, unpolluted and unimpacted watercourse (NTAXA: 9; ASPT: 6.08), shown by the presence of pollution sensitive species including the stonefly *Nemoura avicularis* and mayfly *Paraleptophlebia cincta.* Site 15 had a lack of scoring species for both the PSI and LIFE scores. The watercourse was slightly sedimented (PSI (family): 66.67), dominated by species with are highly sediment tolerant including the mayfly *Leptophlebia marginata*. The family LIFE score for this showed that the community here was moderately sensitive to reduced flows (LIFE (family): 6.71) dominated by standing water species including *Nemoura avicularis* and *Oulimnius* species. The community here was of moderate conservation value (CCI: 8.0), with all species identified were of very common to occasional conservation status (Conservation score: 1-4).

3.2.66 For electric fishing surveys, a single 10-minute run was carried out over a 25 m length of watercourse (depth up to 0.5 m), however no fish were caught. The water temperature recorded was 11.9°C and conductivity measured 28.6 μScm^{-1}.

Site 16

3.2.67 This survey reach was on Allt Loch an t-Sionnaich which ran across the moorland from Loch nam Breac Dearga, here the river (W = 1.25 m, D=0.15 m) was not shaded. The riverbed was dominated by cobbles (30%) and gravels (30%), with boulder, pebble and sand also present, the flow type was dominated by a riffle/run system. Within the area surveyed, 30% was covered by filamentous algae, 10% moss and 2% macrophyte.

3.2.68 Only two plant species were recorded in the macrophyte survey – overleaf pellia and *Sphagnum* sp(p). The community coverage was approximately 2% of the channel.

3.2.69 The spring macroinvertebrate survey represented a ‘very good’ biological quality (NTAXA: 23.0; ASPT:7.07), with several pollution sensitive taxa recorded such as *Dinocras cephalotes*, indicating that the watercourse was not impacted by organic pollution. However, the PSI score of 69.44 was indicative of slight sedimentation. The community at Site 16 was highly sensitivity to reduced flows (LIFE:8.95), with moderate/fast flow group species, including iron blue nymph mayfly*, Nigrobaetis niger, Paraleptophlebia submarginata,* and the caddisflies *Plectrocnemia conspersa, Polycentropus flavomaculatus* and *Hydropsyche siltalai* dominating. Rapid and standing flow group species were also present in lower proportions. The community had moderate conservation value (CCI: 8.5) with all species being between very common and occasional status.

3.2.70 The autumn macroinvertebrate survey represented ‘very good’ biological quality (NTAXA: 22; ASPT: 7.36) with several pollution sensitive taxa recorded including the stonefly *Dinocras cephalotes* and mayfly *Ecdyonurus venosus* indicating no impact by organic pollution. Site 16, however, was slightly sedimented (PSI: 74.51) dominated by species which are highly sediment sensitive including the mayflies *Baetis rhodani* and *Iron blue nymph mayfly.* The community was highly sensitive to reduced flows (LIFE: 8.25) dominated by rapid flow species including the stonefly *Leuctra hippopus* and cased caddis *Hydropsyche siltalai.* The macroinvertebrate surveys in autumn showed that the community was of fairly high conservation value (CCI: 11.9) with all species identified being of very common to local conservation status (Conservation score: 1 – 5), with the exception of the stonefly *Protonemura montana* which is regionally notable (Conservation score: 6).

3.2.71 For electric fishing surveys, a single 10-minute run was carried out over a 40 m length of watercourse, with no fish were caught. However, Site 16 is located between Site 14 and Loch nam Breac Dearga and as brown trout have been identified at both survey reaches it is highly likely that brown trout are present at Site 16. The water temperature recorded was 12.1°C and conductivity measured 26.6 μScm^{-1}.

Site 17

3.2.72 This survey reach ran across the moorland Loch Ruighe an t-Seilich, here the river (W = 0.25 m, D=0.10 m) was not shaded. The riverbed was dominated by bedrock (40%) with boulder, cobble, pebble, gravel and sand also present, the flow type was dominated by a pool with a small area of run also surveyed.

3.2.73 The macrophyte survey at Site 17 recorded 11 species. This comprised of needle spikerush, bulbous rush, bog pondweed, lesser spearwort, common butterwort, overleaf pellia, yellow fringe-moss, *Sphagnum* spp., *Cladophora* sp., common great pocket moss (*Fissenden taxifolius var. taxifolius*) and yellow starry feather-moss. The community coverage was approximately 4 % of the channel.

3.2.74 During the spring surveys, 11 scoring surveys were recorded, 'very good' biological quality was indicated (NTAXA: 11; ASPT: 6.47). This was indicative of the watercourse not being impacted by organic pollution; however, it was considered to be slightly sedimented (PSI: 72.73), with moderately sensitive species dominating the community including mayflies (*Paraleptophlebia sp.*), stoneflies (*Amphinemura sulcicollis*), riffle beetles (*Elmis aenea* and *Limnius volckmari*), and caddisflies (*Polycentropus flavomaculatus, Chaetopteryx villosa*, and *Sericostoma personatum*). Here the community is moderately sensitive to reduced flows (LIFE (family): 7.22), dominated by species within the moderate/fast flow groups - mayflies (iron blue nymph mayfly, *Paraleptophlebia sp.,* and *Serratella ignita.*), stoneflies (*Amphinemura sulcicollis, Leuctra fusca*), and the larvae of the golden-ringed dragonfly (*Cordulegaster boltonii*). The community at Site 17 was of moderate conservation value (CCI: 6.0), with only 6 scoring species identified, however, all scoring taxa were very common to occasional (conservation score: 1 – 4).

3.2.75 During the autumn surveys, 17 scoring species were identified, Site 17 had 'very good' biological quality (ASPT: 7.35). This was indicative of the watercourse being unimpacted by organic pollution with minimal sedimentation or being unsedimented (PSI: 88.57) dominated by species with high and moderate sediment sensitivity. The autumn community at Site 17 was highly sensitive to reduced flows (LIFE: 8.59) with species requiring rapid and fast/moderate flows dominating, including stoneflies (*Protonemura montana* and *Protonemura meyeri*) and mayflies (*Electrogena lateralis* and *Ecdyonurus venosus*) which are highly adapted to fast flows with streamlined bodies, and caseless caddis *Rhyacophila dorsalis* which buildings nets to catch prey in the flow. The community was of fairly high conservation value (CCI: 12.1), with all species identified being of very common to local conservation status (Conservation score: 1 – 5), with the exception of the stonefly *Protonemura montana* which is regionally notable (Conservation score: 6).

3.2.76 A fish habitat assessment was undertaken. Upstream and downstream of this reach has several waterfalls between 0.5 and 1 m in height with limited pools between steps in several waterfalls. Upstream of the surveyed area, the watercourse was 0.3 m wide and 0.2 m deep. For electric fishing surveys, a single 5-minute run was carried out over a 15 m length of watercourse, however no fish were caught. The water temperature recorded was 12.1 C and conductivity measured 29.7 μScm^{-1}.

Site 18

3.2.77 This survey reach ran across the moorland Loch Ruighe an t-Seilich, here the river (W = 0.75 m, D=0.20 m) was not shaded. The riverbed was dominated by boulder (55%), with cobble, pebble, gravel, sand and silt also present, the flow type was dominated by glide. During the walkover survey, a small stand of macrophytes was recorded covering 3% of the reach.

3.2.78 Eight species of macrophytes were recorded along the survey reach, however, none of which were rare or notable species. These included stonewort *Chara* sp., yellow fringe-moss, little shaggy moss, bulbous rush, bog pondweed, long-stalked hairy sedge, common butterwort, and lesser spearwort. The community coverage was approximately 8 % of the channel.

3.2.79 The spring invertebrate community indicated that the watercourse had 'very good' biological quality (NTAXA: 15; ASPT: 5.41), with several pollution sensitive taxa recorded including the mayfly *Siphlonurus lacustris*, indicating that there was no impact by organic pollution. Site 18 was heavily sedimented (PSI: 18.75), with the macroinvertebrate community dominated by highly sediment insensitive taxa. This included pea clam *Euglesa* sp., Oligochaeta, *Leptophlebia vespertine*, *Sigara* species and moth-fly larvae Psychodidae. The macrophyte community at Site 18 was moderately sensitive to reduced flows (LIFE: 6.63). Within the sample, there were only eight scoring taxa which were dominated by standing water species: *Siphlonurus lacustris*, *Leptophlebia vespertine*, whirligig beetle *Gyrinus substriatus* and *Oulimnius* sp. *Electrogena lateralis* and the amphipod 'shrimp' *Gammarus lacustris* were also present in the community which were representative of rapid flow group and

drought resistance respectively. Site 18 was of high conservation value (CCI: 15.6), the majority of taxa present scored between very common and occasional conservation scores (1 to 5).

3.2.80 The autumn community indicated that the watercourse had 'very good' biological quality (NTAXA: 20; ASPT: 6.66), with several pollution sensitive species taxa recorded including the mayfly *Paraleptophlebia submarginata* and the stonefly *Perlodes mortoni*, indicating no impact by organic pollution. However, the watercourse was considered to be slightly sedimented (PSI: 72.50) dominated by highly sediment sensitive species including the mayflies *Baetis rhodani*, iron blue nymph mayfly and *Electrogena lateralis*; however, there were also moderately and highly sediment insensitive species present including the bivalves *Euglesa casertana*, *Euglesa subtruncata* and *Euglesa nitida*. The community here was highly sensitive to reduced flows (LIFE: 8.11) dominated by species within the rapid and fast/moderate flow groups including the caseless caddisflies *Hydropsyche siltalai*, *Plectrocnemia conspersa* and *Rhyacophila dorsalis*. This site was considered to be of moderate conservation value (CCI: 9.4) with all scoring taxa present scored between very common and occasional conservation scores (1 to 5).

3.2.81 A fish habitat assessment was undertaken. Downstream of Site 18, between Sites 17 and 18, the watercourse spread across the moorland and became a flowing wetland at several intervals preventing fish from moving up- and downstream within this watercourse. At the surveyed area, the watercourse formed a waterfall, run, riffle sequence with a 2 m waterfall at the upstream extent.

Site 20

3.2.82 This reach was on the River Coiltie within an area of moorland; here the river (W = 9.0 m, D = 0.3 m) was not shaded. The riverbed was dominated by boulders (40%) and cobbles (40%), with pebbles and gravels also present, the flow type was dominated by a run/riffle sequence (70%/29%), with small areas of pools.

3.2.83 No macrophytes were identified during the survey, and as such macrophytes here are not considered further.

3.2.84 During the spring surveys, Site 20 had 12 scoring taxa recorded and 'very good' biological quality (NTAXA: 12; ASPT: 7.52). Several pollution sensitive taxa were recorded, indicating that the watercourse is not impacted by organic pollution. Site 20 was slightly sedimented (PSI: 77.42), although the community was dominated by sediment sensitive species including mayflies (*Baetis scambus* and Iron blue nymph mayfly) and stoneflies (*Leuctra hippopus* and *Leuctra fusca*), moderately sensitive taxa including caddisflies (*Polycentropus flavomaculatus* and *Cyrnus trimaculatus*) and moderately insensitive taxa including the mayflies *Centroptilum luteolum* and *Siphlonurus lacustris* were also present. The community at Site 20 was highly sensitive to reduced flow (LIFE: 8.33) dominated by rapid flow group communities included the mayflies *Rhithrogena semicolorata*, *Electrogena lateralis* and *Ecdyonurus venosus*, and stoneflies *Leuctra hippopus* and *Siphonoperla torrentium*, and moderate/fast flow group including the mayflies *Baetis scambus*, iron blue nymph mayfly, and *Caenis rivulorum*, and stonefly *Leuctra fusca* and diving beetle *Oreodytes septentrionalis*. The community had moderate conservation value (CCI: 7.0), with all species having very common to occasional conservation value.

3.2.85 During the autumn surveys, the watercourse was of 'very good' biological quality (NTAXA: 17; ASPT: 7.77), with several pollution sensitive species including the caseless caddisflies *Perlodes mortoni* and *Isoperla grammatica*, recorded. Site 20 was considered minimally sedimented (PSI: 85.37) with highly sediment intolerant species dominating including stoneflies (*Protonemura meyeri* and *Leuctra hippopus*). The community here was considered to be highly sensitive to reduced flows (LIFE: 8.41), with the community dominated by rapid flow species including caseless caddisflies. The community was of fairly high conservation value (CCI: 14.0) with all species having very common to occasional conservation value (Conservation score: 1-4), with the exception of the stoneflies *Capnia atra* and *Protonemura montana* which had conservation scores of 5 – locally notable and 6 – regionally notable respectively.

3.2.86 For electric fishing surveys, a single 6-minute run was carried out over a 20 m length of watercourse, however no fish were caught. The water temperature recorded was 8.1°C and conductivity measured 24.7 μScm^{-1}.

River 1

3.2.87 The sample point River 1 (W =1 m, D = 0.25 m) was on the Allt Loch an t-Sionnaich, within the moorland adjacent to the access track from Alltsigh. Here the surveyed area was dominated by boulders (70%) with cobble, pebble and gravel also present.

3.2.88 eDNA analysis of the three samples from River 1 showed that only brown trout were present.

River 2

3.2.89 The sample point River 2 (W =8m, D = 0.40 m) was on the Allt Saigh, within an area of plantation woodland. Here the surveyed area was dominated by bedrock (60%) and boulders (30%) with cobbles, pebbles, gravels and sand also present.

3.2.90 eDNA analysis of water from River 2 showed that brown trout and minnow were present in similar proportions across the three samples **(Table 3-7: Fish eDNA results from River 2)**, totally 49.71% and 50.03% respectively. Three-spined stickleback were also found in one sample in small proportions.

Table 3-7: Fish eDNA results from River 2

Species	River 2 sub-samples			Overall read Counts (the number of DNA sequences assigned to a species)	Overall Percentage of Read Counts
	LNR2a	LNR2b	LNR2c		
3 Spined Stickleback (*Gasterosteus aculeatus*)	248	0	0	248	0.26
Minnow (*Phoxinus phoxinus*)	20965	12926	13005	46896	50.03
Brown Trout (*Salmo trutta*)	18068	11096	17429	46593	49.71

River 3

3.2.91 The sample point River 3 (W =5 m, D = 0.25 m) was on the Allt Saigh, within a broadleaved woodland block adjacent to the A82, upstream of the mouth with Loch Ness. Here the surveyed area was dominated by cobbles (60%) with boulders, pebbles, gravels and sand also present.

3.2.92 eDNA analysis of water from River 3 showed this was the most diverse section of the watercourse **(Table 3-8: Fish eDNA results from River 3)**.

3.2.93 At River 3, brown trout remained the dominant species composing 77.62% of the sequenced eDNA. Minnow, European eel, three-spined stickleback and salmon were also sequenced from the water samples in smaller proportions. All species were found in all samples.

Table 3-8: Fish eDNA results from River 3

Species	River 3 sub-samples			Overall read Counts (the number of DNA sequences assigned to a species)	Overall Percentage of Read Counts
	LNR3a	LNR3b	LNR3c		
European Eel (*Anguilla anguilla*)	462	569	424	1455	3.68
Three Spined Stickleback (*Gasterosteus aculeatus*)	520	969	909	2398	6.06
Minnow (*Phoxinus phoxinus*)	1178	1623	1001	3802	9.60
Atlantic Salmon (*Salmo salar*)	484	401	321	1206	3.05
Brown Trout (*Salmo trutta*)	8022	14009	8697	30728	77.62

Loch nam Breac Dearga (LnBD)

3.2.94 LnBD eDNA sampling consisted of 20 surveys points around the loch, which is a freshwater loch situated at approximately 485 mAOD covering an area of 0.24 km^2.

3.2.95 eDNA analysis of water samples found that only brown trout were present within Loch nam Breac Dearga, despite the name translating as ‘lake of the red trout’ (arctic char *Salvelinus alpinus*).

LnBD A Macroinvertebrate Survey

3.2.96 LnBD A was on the north western extent of Loch nam Breac Dearga in autumn and was relocated to the north eastern corner in spring where substrate was more representative of the loch. The latter sample was collected from a beach area, where the average water depth was 0.1m, the substrate was dominated by pebbles (70%), with cobbles and gravels also present.

3.2.97 During the spring surveys, LnBD A was considered to have ‘very good’ biological quality (NTAXA: 6.0; ASPT: 6.68). Several pollution sensitive taxa, including stonefly *Siphonoperla torrentium*, were recorded indicating no impact by organic pollution. However, it was considered to be moderately sedimented (PSI (family): 40.00), with sediment insensitive species dominating including *Glossiphonia complanata* and diving beetle *Agabus* sp. The community at LnBD A had a low conservation value (CCI: 1.3) with four of six taxa recorded scoring as either very common or common.

3.2.98 During the autumn surveys LnBD A had ‘very good’ biological quality (NTAXA: 19; ASPT: 7.16), with several pollution intolerant species present including the upland summer mayfly *Ameletus inopinatus* and stonefly *Siphonoperla torrentium*. The survey area was moderately sedimented (PSI: 50.00), being dominated by moderately sediment sensitive species including the caseless caddisflies *Plectrocnemia conspersa*, *Polycentropus flavomaculatus* and *Tinodes waeneri*. The community here had a fairly high conservation value (CCI: 13.9) with all species having very common to local conservation value (Conservation score: 1-5), with the exception of *Protonemura montana* and *Ameletus inopinatus* which have a conservation score of 6 – regionally notable.

LnBD B Macroinvertebrate Survey

3.2.99 LnBD B was on the south western extent of the Loch nam Breac Dearga. The sample was collected from a beach area, where the average water depth was 0.3 m, the substrate was dominated by cobbles (85%), with bedrock and pebbles also present.

3.2.100 During the spring surveys LnBD B was considered to have ‘very good’ biological quality (NTAXA: 6; ASPT: 6.32). Several pollution sensitive taxa were recorded, including the common medium stonefly *Diura bicaudata* indicating that there was no impact by organic pollution, however, the surveyed area was considered to be moderately sedimented (PSI (family): 55.56). This site had a moderate conservation value (CCI: 5.0) with the taxa recorded scoring as either very common or common.

3.2.101 During the autumn survey, the LnBD B was considered to be of ‘very good’ biological quality (NTAXA: 18; ASPT: 7.29) with several pollution sensitive species present including the mayfly *Leptophlebia marginata* and stonefly *Siphonoperla torrentium*. The surveyed location was moderately sedimented (PSI: 50.00) with highly sediment tolerant species including the stonefly *Diura bicaudata* and caddisfly *Apatania wallengreni* and highly sediment insensitive species including the mayfly *Leptophlebia marginata* and pea clam *Sphaerium* spp. present. The community here was of very high conservation value (CCI: 32.1). Whilst the majority of scoring species being of very common to local conservation value, the mayflies *Procloeon bifidum* and *Ameletus inopinatus* were recorded which are regionally notable (Conservation score: 6) and the diving beetle *Nebrioporus depressus* was recorded which is Red Data Book Nationally Scarce (Conservation score: 8).

Loch Ness

3.2.102 Accessible sites were surveyed in Loch Ness, most recently in early spring (March) 2025. The results of those surveys are described in the sections that follow.

LN2 Macroinvertebrate Survey

3.2.103 LN2 was on the south western extent of Loch Ness. The sample was collected from a beach area with an average water depth of 0.3 m, with the substrate dominated by cobbles (40%) and boulders (35%), with pebble, gravel and sand also present. Here the surrounding land use was dominated by broadleaved woodland and moorland. The water here was clear and unshaded.

3.2.104 During the spring 2025 survey, LN2 was of ‘very good’ biological quality (NTAXA: 9.00; ASPT: 8.06), dominated by pollution sensitive species including the stoneflies *Siphonoperla torrentium* and *Diura bicaudata*. This location was considered to be minimally sedimented/unsedimented (PSI: 81.82) dominated by species which were highly sensitive to sediments including stonefly *Leuctra hippopus* and caddisfly *Agapetus fuscipes*. The community at this site was considered to be of moderate conservation value (CCI: 5.3) with all species having very common to frequent conservation value (Conservation score: 1-3).

LN5 Macroinvertebrate Survey

3.2.105 LN5 was on the southern extent of Loch Ness, on the peninsula between the confluence of the River Oich and the Caledonian Canal. The sample was collected from a beach area with an average water depth of 15 cm, with the substrate dominated by pebbles (58%), with cobble, gravel and sand also present. Here the land use was predominantly urban with residential buildings and small areas of broadleaved woodland. The water here was clear and unshaded.

3.2.106 During the autumn survey, LN5 was of ‘very good’ biological quality (NTAXA: 12.0; ASPT: 5.73), dominated by pollution sensitive species including caddisfly *Sericostoma personatum* and stonefly *Amphinemura sulcicollis.* This location was considered to be moderately sedimented (PSI: 40.00) dominated by species which were moderately sensitive to sediments including cranefly *Tipula* sp. and *Amphinemura sulcicollis*. The community at this site was considered to be of low conservation value (CCI: 4.3) with all species having very common to frequent conservation value (Conservation score: 1-3).

3.2.107 During the spring 2025 survey, LN5 was of ‘very good’ biological quality (NTAXA: 18.00; ASPT: 5.97), dominated by pollution sensitive species including the stoneflies *Siphonoperla torrentium* and *Isoperla grammatica*. This location was considered to be moderately sedimented (PSI: 51.61) dominated by species which were highly sensitive to sediments including stoneflies *Leuctra hippopus* and *Isoperla grammatica*. The community at this site was considered to be of moderate conservation value (CCI: 8.8) with all species having very common to frequent conservation value (Conservation score: 1-3).

LN6 Macroinvertebrate Survey

3.2.108 LN6 was on the southern extent of Loch Ness, adjacent to the Cherry Island Viewpoint. The sample was collected from a beach area with an average water depth of 30 cm, with the substrate dominated by pebbles (45%) and cobble (25%), with gravel, sand, boulders and silt also present. Here the land use was predominantly urban and roads with broadleaved woodland setback from the road, the waterline line here was a marina comprising of buoy moorings. The water here was clear and unshaded.

3.2.109 During the spring 2025 survey, LN6 was of ‘good’ biological quality (NTAXA: 18.00; ASPT: 4.85), with pollution sensitive species present including stonefly *Nemoura avicularis*. This location was considered to be heavily sedimented (PSI: 10.53) dominated by species which were moderately and highly insensitive to sediments including the water hoglouse (*Asellus aquaticus*) and Oligochaeta worms. The community at this site was considered to be of very high conservation value (CCI: 26.2) with the majority of species having very common to frequent conservation value (Conservation score: 1-3), but with several species of note: diving beetle *Nebrioporus depressus* which has a conservation score of 8: Red Data Book - Rare, the leech *Dina lineata* which has a conservation score of 6: Regionally Notable, and lesser water boatman *Sigara scotti* and caseless caddisfly *Tinodes unicolor* which both have a conservation score of 5: Local.

LN9 Macroinvertebrate Survey

3.2.110 LN9 was on the western side of Loch Ness, on a beach adjacent to the Allt Saigh confluence. The sample was collected from a beach area with an average water depth of 15 cm, with the substrate solely comprised of cobble. Here the land use was predominantly broadleaved; the water here was clear and lightly shaded.

3.2.111 During the spring survey, the sample was considered to be of ‘very good’ biological quality (NTAXA:12; ASPT: 6.6), dominated by pollution sensitive species including stonefly *Diura bicaudata*. This location was considered to be slightly sedimented (PSI: 65.0) dominated by species of moderate sensitivity to sediment including the stonefly *Zwicknia bifrons* and Dytiscidae diving beetle *Oreodytes sanmarki*. The community here was of fairly high conservation value (CCI: 11.1) with all species having very common to frequent conservation value (Conservation score: 1-3), with the exception of *Zwicknia bifrons* which has a conservation score of 6 – regionally notable.

3.2.112 During the autumn survey, LN9 was considered to be of ‘very good’ biological quality (NTAXA: 12.0; ASPT: 6.1), with several pollution sensitive species present including the stonefly *Siphonoperla torrentium*. this location was considered to be moderately sedimented (PSI: 58.3) dominated by highly and moderately sensitive species

including the cranefly *Antocha vitripennis* and riffle beetle *Esolus parallelepipedus*. The community in autumn was of moderate conservation value (CCI: 6.33) with all species having very common to occasional conservation status (Conservation score: 1-4).

LN10 Macroinvertebrate Survey

3.2.113 LN10 was on the north western side of Loch Ness, within Urquhart Bay Wood at Drumnadrochit at the mouth of the River Coiltie. The sample was collected from a beach area with an average water depth of 40 cm, with the substrate dominated by sand (45%) with pebble (20%), gravel (20%), cobbles and boulders also present. The surrounding land use here was broadleaved woodland. The water here was clear and unshaded.

3.2.114 During the spring 2025 survey, LN10 was of 'very good' biological quality (NTAXA: 17.00; ASPT: 6.74), dominated by pollution sensitive species including stoneflies *Siphonoperla torrentium* and *Isoperla grammatica.* This location was considered to be minimally sedimented/unsedimented (PSI: 81.82) dominated by species which were highly sensitive to sediments including mayflies *Rhithrogena semicolorata* and *Electrogena lateralis*. The community at this site was considered to be of moderate conservation value (CCI: 9.2) with all species having very common to occasional conservation value (Conservation score: 1-4).

LN12 Macroinvertebrate Survey

3.2.115 LN12 was on the north western side of Loch Ness adjacent to the Clansman Harbour. The sample was collected from a beach area with an average water depth of 20 cm, with the substrate dominated by cobbles (45%) and pebbles (25%) with boulders, gravel and sand also present. Here the land use was predominantly urban comprising of a harbour, hotel and the A82. The water here was clear and unshaded.

3.2.116 During the spring 2025 survey, LN12 was of 'very good' biological quality (NTAXA: 10.00; ASPT: 7.43), dominated by pollution sensitive species including mayfly *Ecdyonurus sp.* and stonefly *Amphinemura sulcicollis.* This location was considered to be slightly sedimented (PSI: 66.67) dominated by species which were highly sensitive to sediments including stoneflies *Siphonoperla torrentium* and *Diura bicaudata*. The community at this site was considered to be of moderate conservation value (CCI: 6.0) with all species having very common to frequent conservation value (Conservation score: 1-3).

3.3 Biological Metrics

Macrophytes

3.3.1 The full list of macrophyte taxa and marginal species recorded during the surveys can be found in **Annex F: Macrophyte Taxa**. River Macrophyte Nutrient Index (RMNI), number of macrophyte taxa (NTAXA – scoring taxa only), Number of Functional Groups (NFG) and cover of filamentous green algae (ALG) and observed and predicted scores for each survey reach are detailed in **Table 3-9: LEAFPACS2 metrics for macrophyte surveys conducted**. The table also includes the overall Ecological Quality Ratio (EQR) and WFD class for each survey reach.

Table 3-9: LEAFPACS2 metrics for macrophyte surveys conducted

Site	RMNI		NTAXA		NFG		ALG	EQR	Classification
	Expected	Observed	Expected	Observed	Expected	Observed	Observed		
1	4.55	2.71	10.03	4	6.30	4	0	1.064	High
2	2.83	3.55	3.48	6	2.47	4	0.1	0.866	High
4	3.18	3.23	4.67	5	3.21	5	0.05	0.990	High
5	3.47	3.34	4.20	0	2.92	0	0	-	Unclassifiable
6	3.91	2.51	5.67	3	3.81	3	0	1.021	High
8	3.40	2.09	4.10	4	2.86	3	0	1.166	High
9	3.95	3.10	5.49	4	3.70	2	0	0.945	High
10	5.00	4.42	10.03	4	6.30	2	0	0.835	High

12	2.69	1.86	3.53	4	2.50	3	0	1.151	**High**
16	2.58	1.83	4.55	0	3.13	1	0	-	**Unclassifiable**
17	2.75	3.30	3.90	5	2.73	0	0	0.600	**Moderate**
18	2.71	2.50	4.50	4	3.10	4	0.5	0.983	**High**

3.3.2 Only three survey locations did not achieve High WFD classification; Site 17 attained Moderate WFD classification whilst Sites 5 and 16 were unclassifiable due to no scoring species being identified. The locations which achieved High WFD classification demonstrating the macrophyte communities present were not impacted by either nutrient enrichment, alterations in river flow and/or modifications to morphological conditions. Whilst Site 17 is impacted by nutrient enrichment, changes to flow and/or channel modification.

3.3.3 Macrophyte surveys were not completed in Loch Ness due to the general lack of macrophytes present. However, observations were made of plant species present at Urquhart Bay from both the terrestrial ecology and aquatic ecology surveys, and these have supported the impact assessment.

Macroinvertebrates

3.3.4 A summary of the macroinvertebrate biological metrics calculated for each site is presented in **Table 3-10 Macroinvertebrate biotic index results** below. The full lists of aquatic macroinvertebrate taxa can be found in **Annex G Macroinvertebrate Taxa**.

Table 3-10: Macroinvertebrate biotic index results

Family		WHPT score	ASPT (WHPT)	PSI Score (species) and interpretation	LIFE Score (species) and interpretation	CCI Score and interpretation
Site 1	Spring	76.20	5.86	38.10 - Sedimented	7.27 - High sensitivity to reduced flows	6.0 - Moderate conservation value
	Autumn	73.40	6.67	52.63 – Moderately Sedimented	7.60 - High sensitivity to reduced flows	7.9 - Moderate conservation value
Site 2	Spring	63.90	5.33	50.00 - Moderately Sedimented	7.00- Moderate sensitivity to reduced flows	9.6 -Moderate conservation value
	Autumn	113.40	6.67	75.00 - Slightly Sedimented	8.00 - High sensitivity to reduced flows	13.3 - Fairly High conservation value
Site 4	Spring	90.60	7.55	87.50 - Minimally sedimented / Unsedimented	8.45 - High sensitivity to reduced flows	7.75 - Moderate conservation value
	Autumn	101.30	7.24	85.71 - Minimally sedimented / Unsedimented	8.70 - High sensitivity to reduced flows	12.5 - Fairly High conservation value
Site 5	Spring	118.70	6.98	75.00 - Slightly Sedimented	8.57 - High sensitivity to reduced flows	7.9 -Moderate conservation value
	Autumn	169.40	7.37	82.00 - Minimally sedimented / Unsedimented	8.64 - High sensitivity to reduced flows	12.1 - Fairly High conservation value
Site 6	Spring	139.50	8.21	88.37 - Minimally sedimented / Unsedimented	8.78 - High sensitivity to reduced flows	11.1 - Fairly High conservation value
	Autumn	99.20	8.27	92.31 - Minimally sedimented / Unsedimented	8.46 - High sensitivity to reduced flows	12.1 - Fairly High conservation value
Site 8	Spring	82.90	6.38	81.25 - Minimally sedimented / Unsedimented	7.11 - Moderate sensitivity to reduced flows*	7.0 - Moderate conservation value
	Autumn	120.80	6.71	64.00 - Slightly Sedimented	8.10 - High sensitivity to reduced flows	15.0 - High conservation value
Site 9	Spring	86.50	7.21	100.00 - Minimally sedimented / Unsedimented	8.83 - High sensitivity to reduced flows	15.0 - High conservation value
	Autumn	97.10	8.09	95.24 - Minimally sedimented / Unsedimented	8.82 - High sensitivity to reduced flows	14.5 - Fairly High conservation value
Site 10	Spring	167.90	7.00	77.97 - Slightly Sedimented	8.76 - High sensitivity to reduced flows	14.9 - Fairly High conservation value

Family		WHPT score	ASPT (WHPT)	PSI Score (species) and interpretation	LIFE Score (species) and interpretation	CCI Score and interpretation
	Autumn	156.80	6.53	69.77 - Slightly Sedimented	8.36 - High sensitivity to reduced flows	15.2 - High conservation value
Site 11	Spring	101.90	7.84	100.00 - Minimally sedimented / Unsedimented	8.54 - High sensitivity to reduced flows	6.0 - Moderate conservation value
	Autumn	145.20	7.64	95.00 - Minimally sedimented / Unsedimented	8.67 - High sensitivity to reduced flows	12.6 - Fairly High conservation value
Site 12	Spring	124.10	7.30	93.55 - Minimally sedimented / Unsedimented	8.53 - High sensitivity to reduced flows	18.5 - High conservation value
	Autumn	127.50	7.50	87.18 - Minimally sedimented / Unsedimented	8.41 - High sensitivity to reduced flows	13.6 - Fairly High conservation value
Site 13	Spring	67.90	7.54	88.24 - Minimally sedimented / Unsedimented	8.71 - High sensitivity to reduced flows	5.5 - Moderate conservation value
	Autumn	131.70	7.32	84.78 - Minimally sedimented / Unsedimented	8.67 - High sensitivity to reduced flows	13.8 - Fairly High conservation value
Site 14	Spring	145.30	7.65	86.67 - Minimally sedimented / Unsedimented	8.38 - High sensitivity to reduced flows	9.6 - Moderate conservation value
	Autumn	143.10	7.53	90.20 - Minimally sedimented / Unsedimented	8.64 - High sensitivity to reduced flows	11.8 - Fairly High conservation value
Site 15	Spring	133.40	7.02	76.47 - Slightly Sedimented	8.20 - High sensitivity to reduced flows	10.9 - Fairly High conservation value
	Autumn	54.70	6.08	66.67 - Slightly Sedimented*	6.71 - Moderate sensitivity to reduced flows*	8.0 - Moderate conservation value
Site 16	Spring	162.60	7.07	69.44 - Slightly Sedimented	8.95 - High sensitivity to reduced flows	8.5 - Moderate conservation value
	Autumn	162.00	7.36	74.51 - Slightly Sedimented	8.25 - High sensitivity to reduced flows	11.9 - Fairly High conservation value
Site 17	Spring	71.20	6.47	72.73 - Slightly Sedimented	7.22 - Moderate sensitivity to reduced flows*	6.0 - Moderate conservation value
	Autumn	124.90	7.35	88.57 - Minimally sedimented / Unsedimented	8.59 - High sensitivity to reduced flows	12.1 - Fairly High conservation value
Site 18	Spring	81.20	5.41	18.75 - Heavily Sedimented	6.63 - Moderate sensitivity to reduced flows	15.6 - High conservation value
	Autumn	133.20	6.66	72.50 - Slightly Sedimented	8.11 - High sensitivity to reduced flows	9.4 - Moderate conservation value
Site 20	Spring	90.20	7.52	77.42 - Slightly Sedimented	8.33 - High sensitivity to reduced flows	7.0 - Moderate conservation value
	Autumn	139.90	7.77	85.37 - Minimally sedimented / Unsedimented	8.41 - High sensitivity to reduced flows	14.0 - Fairly High conservation value
LnBD A	Spring	40.10	6.68	33.33 - Sedimented	n/a – standing water body	1.3 - Low conservation value
	Autumn	136.00	7.16	50.00 - Moderately Sedimented	n/a – standing water body	13.9 - Fairly High conservation value
LnBD B	Spring	37.90	6.32	55.56 - Moderately Sedimented	n/a – standing water body	5.0 - Moderate conservation value
	Autumn	131.30	7.29	50.00 - Moderately Sedimented	n/a – standing water body	32.1 - Very High conservation value
LN2	Spring 2025	9.00	8.06	81.82 - Minimally sedimented / Unsedimented	n/a – standing water body	5.3 - Moderate conservation value
LN5	Autumn	12.00	5.73	40.00 – Moderately Sedimented	n/a – standing water body	4.3 – Low conservation value
	Spring 2025	18.00	5.97	51.61 – Moderately Sedimented	n/a – standing water body	8.8 – Moderate conservation value
LN6	Spring 2025	19.00	4.85	10.53 – Heavily Sedimented	n/a – standing water body	26.2 – Very high conservation value

Family		WHPT score	ASPT (WHPT)	PSI Score (species) and interpretation	LIFE Score (species) and interpretation	CCI Score and interpretation
LN9	Spring	13.00	6.61	65.00 – Slightly Sedimented	n/a – standing water body	11.1 – Fairly High conservation value
	Autumn	17.00	6.08	58.33 – Moderately Sedimented	n/a – standing water body	6.3 – Moderate conservation value
LN10	Spring 2025	17.00	6.74	81.82 - Minimally sedimented / Unsedimented	n/a – standing water body	9.2 - Moderate conservation value
LN12	Spring 2025	10.00	7.43	66.67 – Slightly Sedimented	n/a – standing water body	6.0 - Moderate conservation value

**Lack of scoring species so family scores have been used*

3.3.5 **Table 3-11 RICT indices for running watercourse macroinvertebrate surveys**, displays the Ecological Quality Ratio (EQR) and WFD macroinvertebrate status for the WHPT ASPT and NTAXA indices for each survey location, as well as the most probable WFD status based on the combination of the modelled distributions for each of ASPT and NTAXA across all classes, termed MINTA (Minimum of NTAXA and ASPT EQRs). Loch nam Breac Deara and Loch Ness survey locations were removed from analysis as RICT was developed for communities within running watercourses.

Table 3-11: RICT indices for running watercourse macroinvertebrate surveys

Site ID	NTAXA EQR		ASPT EQR		Overall WFD class (MINTA)
	Spring	Autumn	Spring	Autumn	
Site 1	0.84 (H)	0.74 (H)	0.80 (M)	0.91 (G)	Moderate
Site 2	0.79 (H)	1.09 (H)	0.73 (M)	0.91 (G)	Moderate
Site 4	0.8 (H)	0.93 (H)	1.00 (H)	0.97 (H)	High
Site 5	1.07 (H)	1.44 (H)	0.94 (G)	1.00 (H)	Good
Site 6	1.00 (H)	0.75 (H)	1.09 (H)	1.10 (H)	High
Site 8	0.73 (G)	1.15 (H)	0.98 (H)	1.10 (H)	High
Site 9	0.72 (G)	0.79 (H)	1.04 (H)	1.21 (H)	High
Site 10	1.61 (H)	1.77 (H)	0.90 (G)	0.84 (M)	Good
Site 11	0.85 (H)	1.23 (H)	1.04 (H)	1.02 (H)	High
Site 12	1.12 (H)	1.18 (H)	0.96 (G)	0.99 (H)	High
Site 13	0.62 (M)	1.17 (H)	1.00 (H)	0.99 (H)	High
Site 14	1.21 (H)	1.23 (H)	1.02 (H)	1.01 (H)	High
Site 15	1.18 (H)	0.62 (M)	0.95 (G)	0.83 (M)	Good
Site 16	1.44 (H)	1.42 (H)	0.95 (G)	0.99 (H)	Good
Site 17	0.73 (G)	1.09 (H)	0.87 (G)	0.99 (H)	Good
Site 18	0.96 (H)	1.26 (H)	0.74 (M)	0.91 (G)	Moderate
Site 20	0.83 (H)	1.29 (H)	0.96 (G)	1.00 (H)	High

EQRs are valued as High (H), Good (G), Moderate (M), Poor (P), and Bad (B)

3.3.6 Nine survey locations attained a High overall classification whilst the remaining sites were classified as having a Good or Moderate overall WFD class. Official WFD classifications are based on combined spring and autumn macroinvertebrate survey data with alkalinity data obtained from monthly analysis of samples from each over a period of at least one year. Here, only two alkalinity samples were taken during the survey period in parallel with the macroinvertebrate surveys, therefore the samples are indicative of point-in-time classification only.

Fish eDNA

3.3.7 The species found in the eDNA samples are shown in **Table 3-12 Results of eDNA surveys for fish species.**

3.3.8 Within the river samples, River 3 was adjacent to Loch Ness and River 1 was in the headwaters within close proximity to Loch nam Breac Dearga, and River 2 was between the two locations.

3.3.9 Five fish species were detected in the eDNA sample for River 3. Brown trout had the highest percentage of sequence reads on average across the three subsamples (77.6%), other species sequenced included minnow (9.6%), three spined stickleback (6.1%), European eel (3.7%) and salmon (3.0%).

3.3.10 Three species of fishes were sequenced in the eDNA sample for River 2. Across the three subsamples, minnow dominated the sequence reads (50.0%) on average, brown trout were also present at a high frequency of sequence reads (49.7%).

3.3.11 Three-spined stickleback was also present at River 2 in low proportions of sequence reads (0.3%). Only brown trout were sequenced in the eDNA sequence for River 1. Whilst River 3 was the most diverse sample, River 2 had a greater number of sequenced reads.

3.3.12 eDNA samples were also taken from Loch nam Breac Dearga; from these only brown trout eDNA was sequenced, with no areas with higher sequenced reads.

Table 3-12: Results of eDNA surveys for fish species

Common name	Scientific Name	LnBD	River 1	River 2	River 3
European eel	*Anguilla anguilla*				✓
Three Spined Stickleback	*Gasterosteus aculeatus*			✓	✓
Minnow	*Phoxinus phoxinus*			✓	✓
Salmon	*Salmo salar*				✓
Brown Trout	*Salmo trutta*	✓	✓	✓	✓

4. Discussion and Recommendations

4.1 Macrophytes

4.1.1 Three notable macrophytes were identified within the desk study, two within the Proposed Development Site, however, none of these species were identified during the surveys.

4.1.2 No additional rare or notable species were recorded within any of the survey locations. The watercourses surveyed are on small oligotrophic headwater streams and supported typical macrophyte communities characterised by bryophytes with higher plants limited and generally confined to the margins.

4.1.3 These macrophyte communities are considered typical of upland watercourses in this part of Scotland. The steep gradients, resulting high velocity flow conditions, and unstable substrates does not allow the development of extensive or diverse stands of macrophytes, whilst bryophytes, which are able to cope with these conditions, dominate.

4.1.4 Of the 12 survey reaches, only three (Sites 2, 4 and 17) had greater numbers of scoring macrophytes species observed than expected, these locations also had a greater observed RMNI than expected both suggesting that these were enriched with nutrients indicative of peat moorlands. Sites 2, 4, 8, 12 and 18 had a greater observed number of functional groups than expected. Algae was minimal across all of the survey reaches, with filamentous algae *Cladophora* spp. only present at Sites 2, 5, 10, 11, 14, 15, 16, and 17 in low proportions.

4.2 Aquatic Macroinvertebrates

4.2.1 Four notable macroinvertebrate species were identified during the desk study, three of which were found within the Proposed Development Site Boundary; the brilliant emerald and northern emerald dragonflies are designated as vulnerable and near threatened respectively under the Red List, and the cranefly *Tipula limbata* is listed under the Scottish Biodiversity List. A record of azure hawker was also recorded within 2 km of the Red Line Boundary; this is classed as vulnerable under the GB Red List and is also listed under the Highland BAP 2021-2026. No aquatic larvae of these species were found during the surveys.

4.2.2 Within the flowing water sites the communities are considered typical of fast-flowing upland watercourses comprising a range of mayfly, stonefly, caddisfly, truefly and beetle taxa. Although the watercourses are classified as moderate to fairly high conservation value in terms of the CCI, none are considered to be notably diverse or unique (in a local context). It is likely that similar macroinvertebrate communities are common across the wider landscape.

4.2.3 The most notable species recorded during the Spring surveys were the caseless caddisfly *Chimarra marginata* and the diving beetle *Agabus biguttatus* (conservation score: 7, Notable but not Red Data Book status) at Sites 10 and 12 respectively. Neither species is listed under the SBL, but their distribution is limited by specific habitat requirements. However, in the local context, these habitats are fairly common and as such it can be expected to occur wherever there are comparable habitats.

4.2.4 The most notable species recorded within the autumn surveys was found on the shores of Loch nam Breac Dearga at LnBD B; this was the diving beetle *Nebrioporus depressus*, which has a conservation score of 8 – Nationally Scarce.

4.2.5 Five locally notable species were present across the autumn surveys, as classified by their CCI score (5: local). The stonefly *Protonemura montana* was widespread, being found at seven sites (Sites 11, 12,13, 14,16, 17 and 20) and the blackfly *Simulium angustitarse* present at Site 8. The non-biting midge *Thaumalea verralli* which was present at Site 9 during both seasons. The caddisfly *Ceraclea albimacula* was recorded at Site 10 during the spring surveys, and the stonefly *Capnia atra* was recorded at Site 20 in autumn; although both species have a conservation score of 5: local, they are both also nationally scarce.

4.2.6 Within the Loch nam Breac Dearga samples, the most notable species was *Nebrioporus depressus*, recorded in autumn at LnBD B (Conservation Score: 8 – Red Data Book Rare and IUCN Near Threatened). Both loch samples have varying conservation values between the spring and autumn samples with the CCI score of Loch nam Breac Dearga having a very high conservation value during the autumn sample. *Procloeon bifidum* and *Ameletus inopinatus* were recorded at LnBD B during the autumn surveys with the latter also recorded at LnBD A, both

species are classified as regionally notable with *Ameletus inopinatus* also recorded as Nationally Scarce. At both sites in the autumn surveys *Apatania wallengreni* was identified which is recorded as nationally scarce. All other aquatic macroinvertebrates were common and typical of the habitats present. None were threatened or legally protected.

4.2.7 Within the Loch Ness samples in 2025, the only notable species was *Nebrioporus depressus* which has a conservation score of 8: Red Data Book – Rare within the LN6 sample. However, this is common across the surveyed area and typical of lochs and lochans in Scotland. Within the Loch Ness autumn samples, the sole notable species was the stonefly *Zwicknia bifrons*, which is regionally notable, identified within the autumn sample of LN9. All other species identified across the other surveys were of very common to occasional conservation status with conservation scores between 1 and 4, and were not legally protected.

4.2.8 Communities generally represented slightly sedimented to minimal sedimentation/unsedimented conditions. Loch nam Breac Dearga at both sites was considered moderately sedimented across both seasons, however, this is likely due to the low numbers of species and families identified with the sample due to the high proportion of bedrock within the area surveyed. The communities at Site 1 in both seasons and Site 2 in spring represented sedimented and moderately sedimented communities, this is likely due to these being small channels than the other water crossings flowing across moorland with smaller proportions of boulders and cobbles. Site 18 was heavily sedimented during the spring survey, this is likely due to the watercourse upstream of this point being representative of wetland habitat before returning to the channel.

4.2.9 Communities were generally of high and moderate sensitivity to reduced flow, most likely due to the nature of faster flows in highland headwater rivers and streams. The samples were dominated by stoneflies, mayflies and caseless caddisflies, which are adapted to rapid flow habitats – stoneflies and mayflies typically have streamlined bodies with short legs keeping them close to the substrate.

4.2.10 The non-native species New Zealand mud snail *Potamopyrgus antipodarum* (Site 10) and amphipod 'shrimp' *Crangonyx pseudogracilis/floridanus* (Loch Ness Sites LN5, LN6 and LN10) were identified within macroinvertebrate community samples. Both species are not considered invasive and are widespread and naturalised in such habitats.

4.3 Fish

4.3.1 Only brown trout was identified within Loch nam Breac Dearga, and during surveys of the watercourse crossing points. Brown trout, European eel, three spined stickleback, minnow and salmon were identified in river samples 1, 2, and 3. The legislative status for these species is shown in **Table 4-1 Fish legislation and protected status** below.

Table 4-1: Fish legislation and protected status

Common name	UKBAP / SBL	IUCN Red List	OSPAR	Habitat Directive (Annex)	Bern Convention (Annex)	Freshwater Fish Conservation (Prohibition on Fishing for Eels) (Scotland) Regulations 2008	The Salmon and Freshwater Fisheries Act
European eel (*Anguilla anguilla*)	✓	Critically Endangered				✓	
Three Spined Stickleback (*Gasterosteus aculeatus*)							
Minnow (*Phoxinus phoxinus*)							
Atlantic Salmon (*Salmo salar*)	✓	Endangered (UK)	✓	A2, A5	A3		✓
Brown trout (*Salmo trutta*)	✓						

Fish Habitat

4.3.2 Fish habitat surveys identified habitat with the potential to support breeding populations of species identified within the desk study. Subsequently, these surveys helped to evaluate likely impacts to the watercourses and Loch nam Breac Dearga.

4.3.3 Potential salmonoid spawning habitat was observed in isolated pockets at Sites 1, 10, 13, 16, 20, 4 and 6, these reaches having substrates between 10 and 75 mm covering an area of at least 0.1 m^2.

4.3.4 During electric fishing surveys brown trout parr were observed at Sites 2, 6, and 14, confirming their suitability to support spawning for this species.

4.3.5 Due to suitable spawning habitat for brown trout being identified at the water crossings adjacent to Loch nam Breac Dearga and the presence of fish in Sites 2 and 14 and Loch nam Breac Dearga it is likely that fish are using all of the watercourses to move around this area. However, connection between this upland area and Allt Loch an t-Sionnaich is limited by the hydroelectric dam at NH 43893 21620 which restricts fish movements up- and downstream.

4.3.6 Electric fishing survey found brown trout at Site 6, upstream of a large cascade system; as such it is assumed that brown trout are using the Allt Coire an Ruighe despite perceived natural obstacles.

4.3.7 Despite good habitat and potential spawning habitat being identified at Site 20, no fish were caught. A study of the SEPA *Obstacles to Fish Migration* map layer showed the presence of two natural barriers to migration which could explain the absence of migratory fish at this reach.

4.3.8 A habitat assessment was undertaken at Site 1. Here the water was between 8 and 14 cm deep width and average width of 20 cm, along the area surveyed the watercourse was naturally culverted at intervals. Although it was not possible to undertake an electric fishing survey at this site it is assumed that salmonid species (salmon and/or trout) could be supported here due to the sufficient water depths and suitable substrate.

4.3.9 A habitat assessment was also undertaken at Site 10. Here the average width was 13 m and average depth 50 cm in the margins. The substrate here was dominated by bedrock and boulders, creating a small cascade/riffle sequence with pools. A study of the SEPA *Obstacles to Fish Migration* map layer showed that there were no barriers to dispersal along the River Enrick, which connects Loch Meiklie and Loch Ness. It was not possible to undertake electric fishing surveys here due to overnight rainfall; the River Enrick was deemed too fast to enter and survey. However, it is assumed that this watercourse supports migratory fish species based on the presence of suitable habitat and records of migratory fish in the desk study.

4.3.10 Site 18 was also assessed for fish habitat. Here the watercourse was approximately 0.75 m wide and 0.2 m deep, the substrate was dominated by cobble and boulders forming a waterfall, run, riffle sequence. Upstream of the survey point the watercourse narrowed before entering a subterranean section; upstream of this was a waterfall approximately 2 m in length at a 45° incline; no resting pools were observed. Downstream of Site 18 the watercourse flowed out of channel over the grass with a water depth of 2 cm, representative of a flush. It is assumed that there are no fish at this survey point due to unsuitable water depths downstream and natural barriers upstream. These barriers also prevent the movement of brown trout between Loch nam Breac Dearga and Loch Ruighe an t-Seilich.

Electric fishing

4.3.11 Electric fishing was undertaken at Site 2, 6, 14, 15, 16, 17, and 20. Brown trout were recorded at three of the seven reaches that were electric-fished (Site 2, 6, and 14; **Table 4-2: Fish caught in surveys**).

4.3.12 All fish caught were considered to be parr 1+ year classes. This confirms that active spawning is occurring in and around the locations where fish were caught. Site 14 is upstream of a large cascade system; however, it is likely that this is passible due to the presence of brown trout within the reach. It is therefore possible that salmon and brown trout, as well as European eel and lamprey, could utilise the reach.

4.3.13 No fish were caught at Site 15, 16 or 17.

4.3.14 Although no fish were identified at Site 16, brown trout have been recorded at Site 14 in the electric fishing survey which is downstream of Site 16, and also in Loch nam Breac Dearga upstream of Site 16. It is therefore assumed, although none were found during the survey, that brown trout may be present at this reach.

4.3.15 No natural barriers to dispersal were identified downstream of Site 15, with hydrological connections between both Sites 12 and 14. However, Site 15 had limited smaller substrate, reducing spawning habitat and was dominated by fast velocity habitat types such as cascades and runs with limited pools for resting opportunities.

4.3.16 Site 17 formed part of a waterfall/run system with limited pools. The substrate here was dominated by cobble and bedrock, limiting salmonoid spawning habitat. Additionally, the waterfalls (height = 0.5 - 1 m) at this survey reach could form barriers to fish movement upstream for the parr.

Table 4-2: Fish caught in surveys

Site	Surface water reference	Common Name	Scientific Name	Fork Lenth (mm)	Catch per unit equivalent (Fish caught/Minute)
2	SW5-C	Brown Trout	*Salmo trutta*	Seen not caught	0.3
		Brown Trout	*Salmo trutta*	Seen not caught	
		Brown Trout	*Salmo trutta*	Seen not caught	
6	SW11	Brown Trout	*Salmo trutta*	100	0.1
14	SW14	Brown Trout	*Salmo trutta*	88	0.1

eDNA

4.3.17 eDNA from Loch nam Breac Dearga identified only brown trout (UKBAP and SBL Priority Species) present. Arctic charr *Salvelinus* alpinus (UKBAP species) were thought to be present within the loch, however, no eDNA for this species was returned despite the robust sampling protocol.

4.3.18 eDNA results for river samples 1, 2, and 3 returned the presence of European eel (IUCN Critically Endangered, UKBAP and SBL Species), brown/sea trout (UKBAP and SBL Species) and Atlantic salmon (IUCN Endangered in the UK; Annex II Habitats Directive, UKBAP, and SBL Species).

4.4 Invasive Non-Native Species

4.4.1 The desk study data from NBN Atlas only returned records of Himalayan balsam, and no invasive non-native species (INNS) present during the surveys within the Proposed Development Site boundary – with the exception of New Zealand mud snail *Potamopyrgus antipodarum* Site 10. However, the Loch Ness Fisheries Board have identified several non-native invasive species within the study catchment and two non-native macroinvertebrate species were identified in field surveys.

5. References

Beaumont, W.R.C, Taylor, A.A.L, Lee, M.J, and Welton, J.S., (2002) Guidelines for Electric Fishing Best Practice, R&D Technical Report W2-054/TR.

Chadd, R. & Extence, C. (2004) The conservation of freshwater macro-invertebrate populations: a community-based classification scheme. *Aquatic Conservation: Marine & Freshwater Ecosystems* 14: 597-624.

CIEEM (2019). *Advice note on the lifespan of ecological reports and surveys*. Available at: https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf

Environment Agency (last issue: 2014) Freshwater macro-invertebrate analysis of riverine samples. Operational instruction 024_08.

Environment Agency (2017). Freshwater macro-invertebrate sampling in rivers Operational Instruction 018_08. Environment Agency, Bristol, UK.

Environment Agency (2019) Electric fishing operations: equipment and working practices. Operational Instruction 993_08.

Extence, C.A., Balbi, D.M. and Chadd, R.P. (1999). River flow indexing using British benthic macroinvertebrates: a framework for setting hydroecological objectives. Regulated Rivers: Research & Management: An International Journal Devoted to River Research and Management, 15(6), 545-574.

Extence, C.A., Chadd, R.P., England, J., Dunbar, M.J., Wood, P.J., & Taylor, E.D. (2011). The assessment of fine sediment accumulation in rivers using macro-invertebrate community response. River Research and Applications DOI: 10.1002/rra.1569.

JNCC, (2007). List of UK Local Biodiversity Action Plan (LBAP) Priority Fish Species. http://data.jncc.gov.uk/data/98fb6dab-13ae-470d-884b-7816afce42d4/UKBAP-priority-fish.pdf

SFCC (2021) Scottish Fisheries coordination Centre Training Manual *Team Leader Electrofishing.* Freshwater Fisheries laboratory, Pitlochry. June 2022.

SEPA (2005) *Guidance for applicants on supporting information requirements for hydropower applications*. The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR).

Water Framework Directive – United Kingdom Advisory Group (WFD-UKTAG) (2021) *UKTAG River Assessment Method (Benthic Invertebrate Fauna Invertebrates (General Degradation): Whalley, Hawkes, Paisley & Trigg (WHPT) metric in River Invertebrate Classification Tool (RICT)* May 2021.

Water Framework Directive – United Kingdom Advisory Group (WFD-UKTAG) (2014) UKTAG River Assessment Method Macrophytes and Phytobenthos.

Annex A Site Maps

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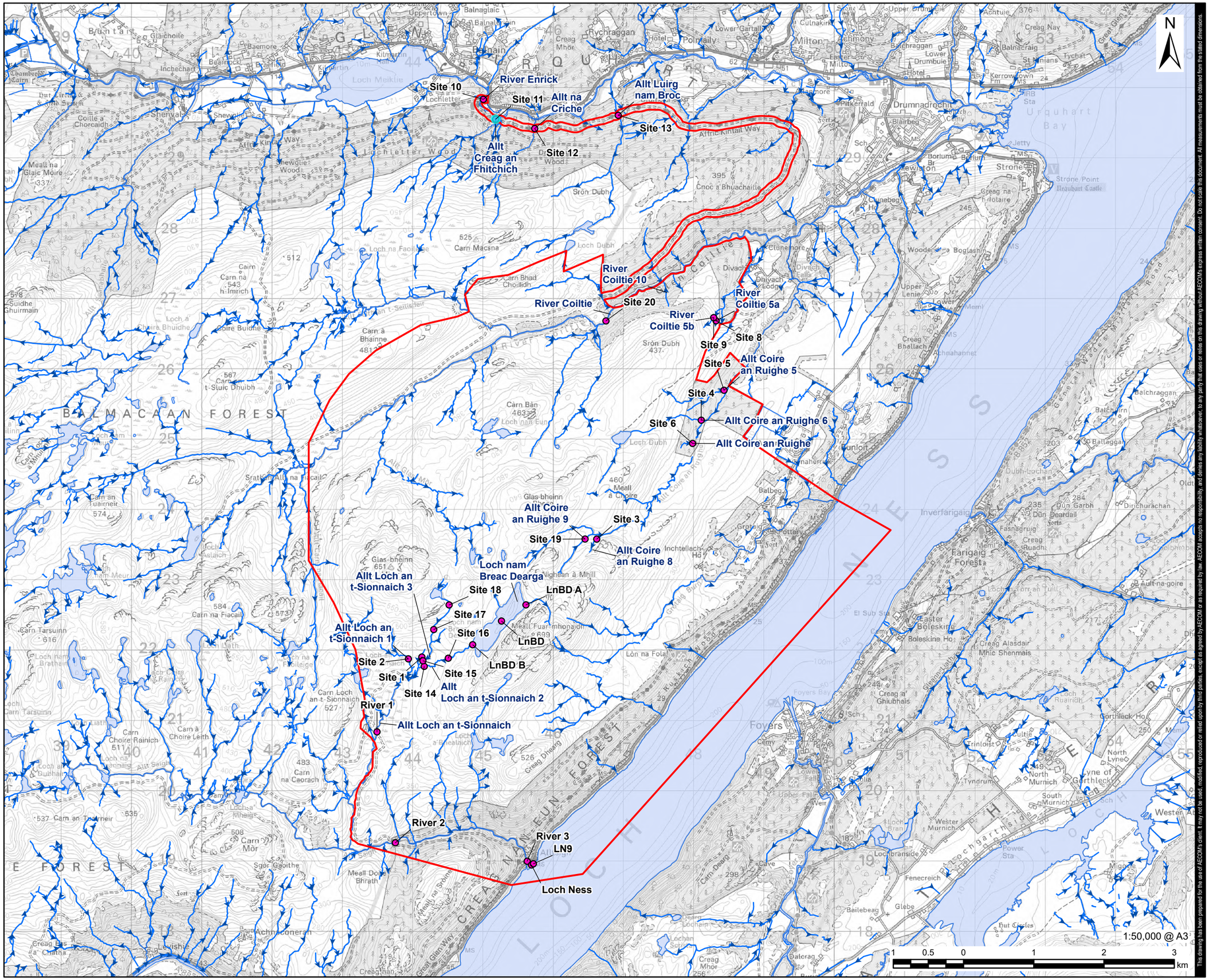

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LEGEND

- Red Line Boundary
- Aquatic Scoping Survey Location
- Watercourse
- Surface Water

NOTES

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FIGURE TITLE

Aquatic Scoping Survey Locations

FIGURE NUMBER

Figure 9.1.1

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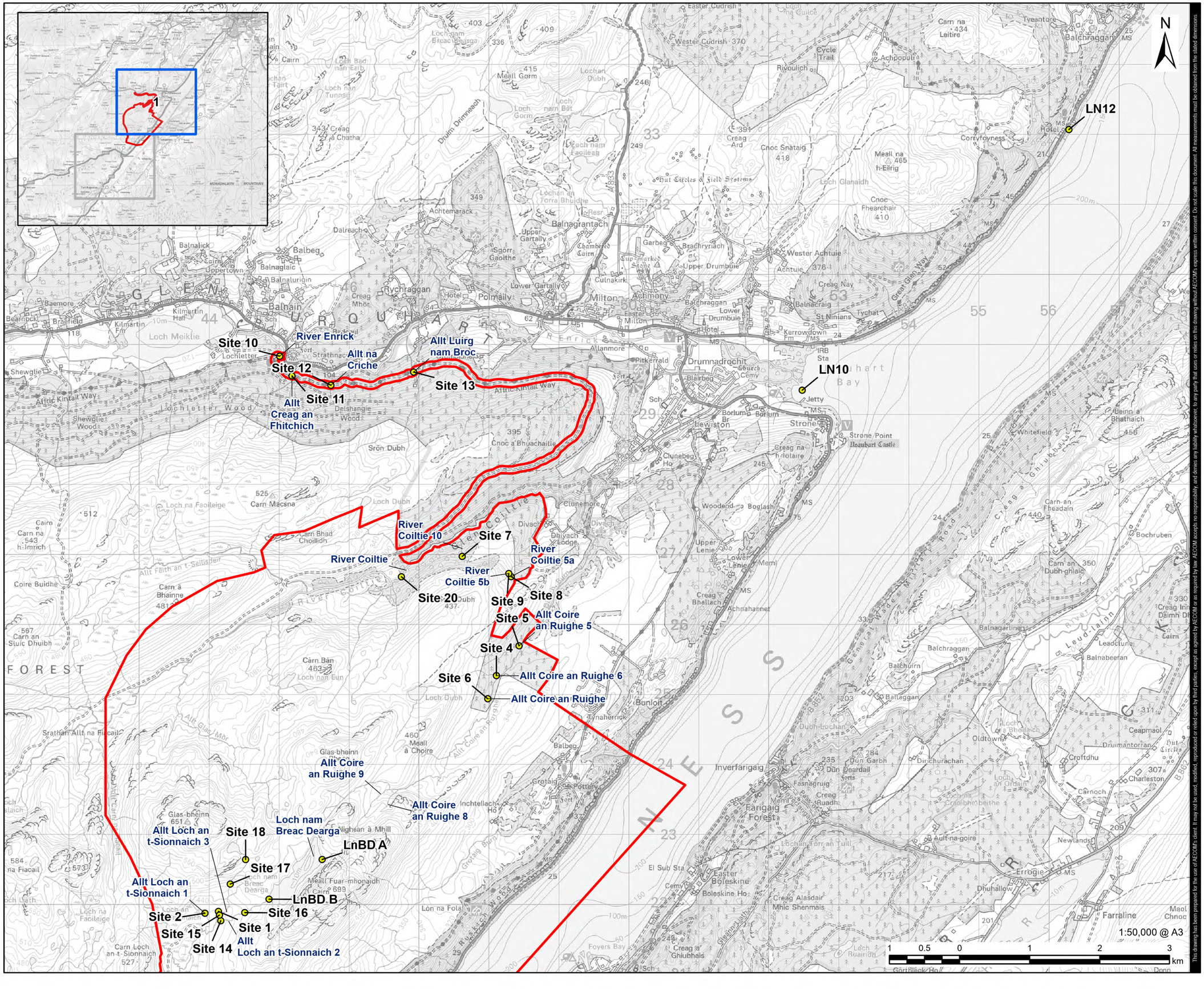

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LEGEND

- Red Line Boundary
- Macroinvertebrates Survey Location
- Watercourse
- Surface Water

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FIGURE TITLE

Macroinvertebrates Survey Locations

FIGURE NUMBER

Figure 9.1.2 Sheet 1 of 2

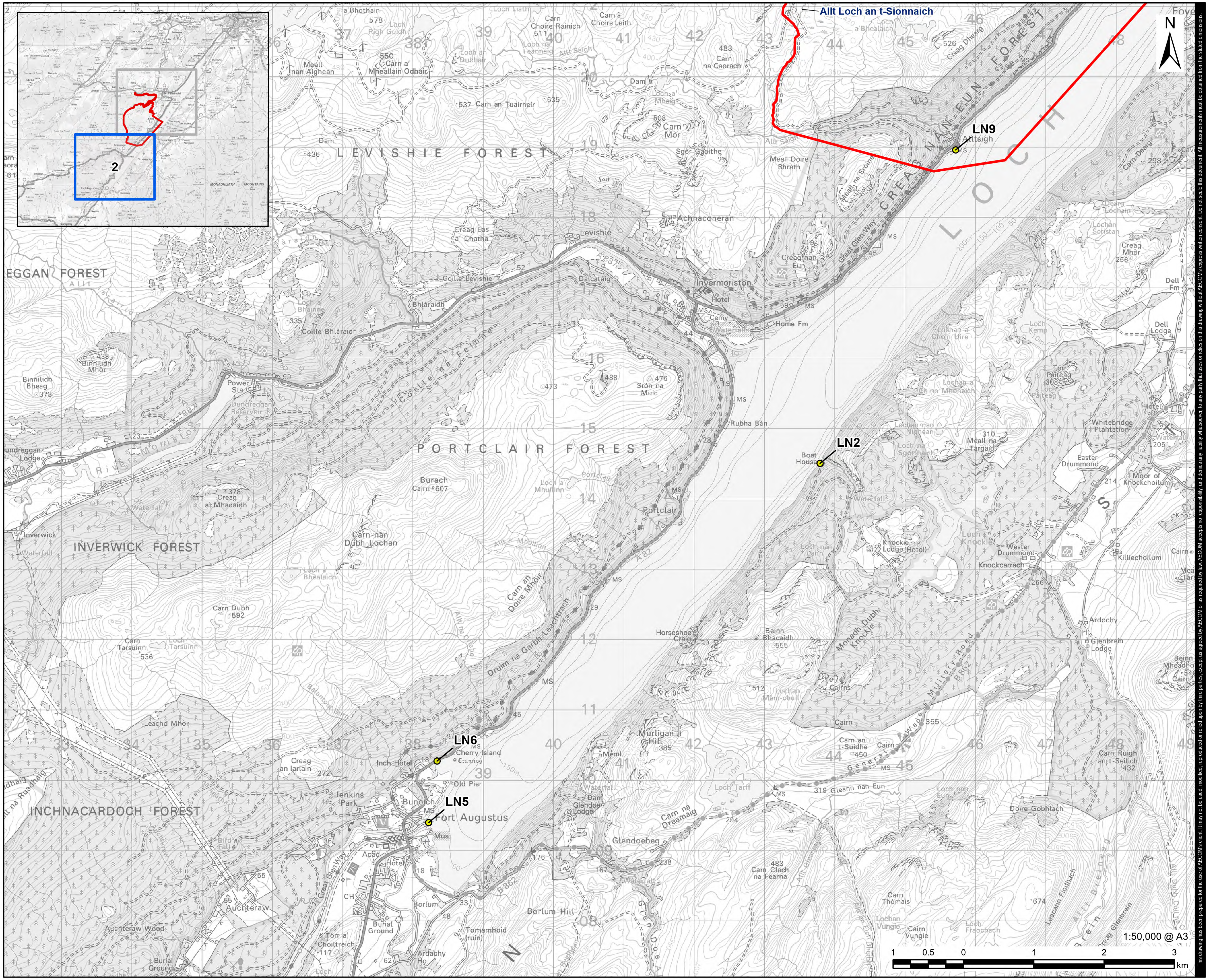

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FIGURE TITLE

Macroinvertebrates Survey Locations

FIGURE NUMBER

Figure 9.1.2 Sheet 2 of 2

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Site 12
Site 11
River Enrick
Allt na Criche
Allt Luirg nam Broc
Allt Creag an Fhitchich
River Coiltie 10
River Coiltie
Site 20
River Coiltie 5a
River Coiltie 5b
Site 8
Site 9
Site 5
Allt Coire an Ruighe 5
Site 4
Site 6
Allt Coire an Ruighe 6
Allt Coire an Ruighe
Allt Coire an Ruighe 9
Allt Coire an Ruighe 8
Loch nam Breac Dearga
Site 18
Site 17
Site 16
Allt Loch an t-Sionnaich 3
Allt Loch an t-Sionnaich 1
Site 1
Site 2
Allt Loch an t-Sionnaich 2
Allt Loch an t-Sionnaich

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LEGEND

- Red Line Boundary
- Macrophytes Survey Location
- Watercourse
- Surface Water

NOTES

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FIGURE TITLE

Macrophytes Survey Locations

FIGURE NUMBER

Figure 9.1.3

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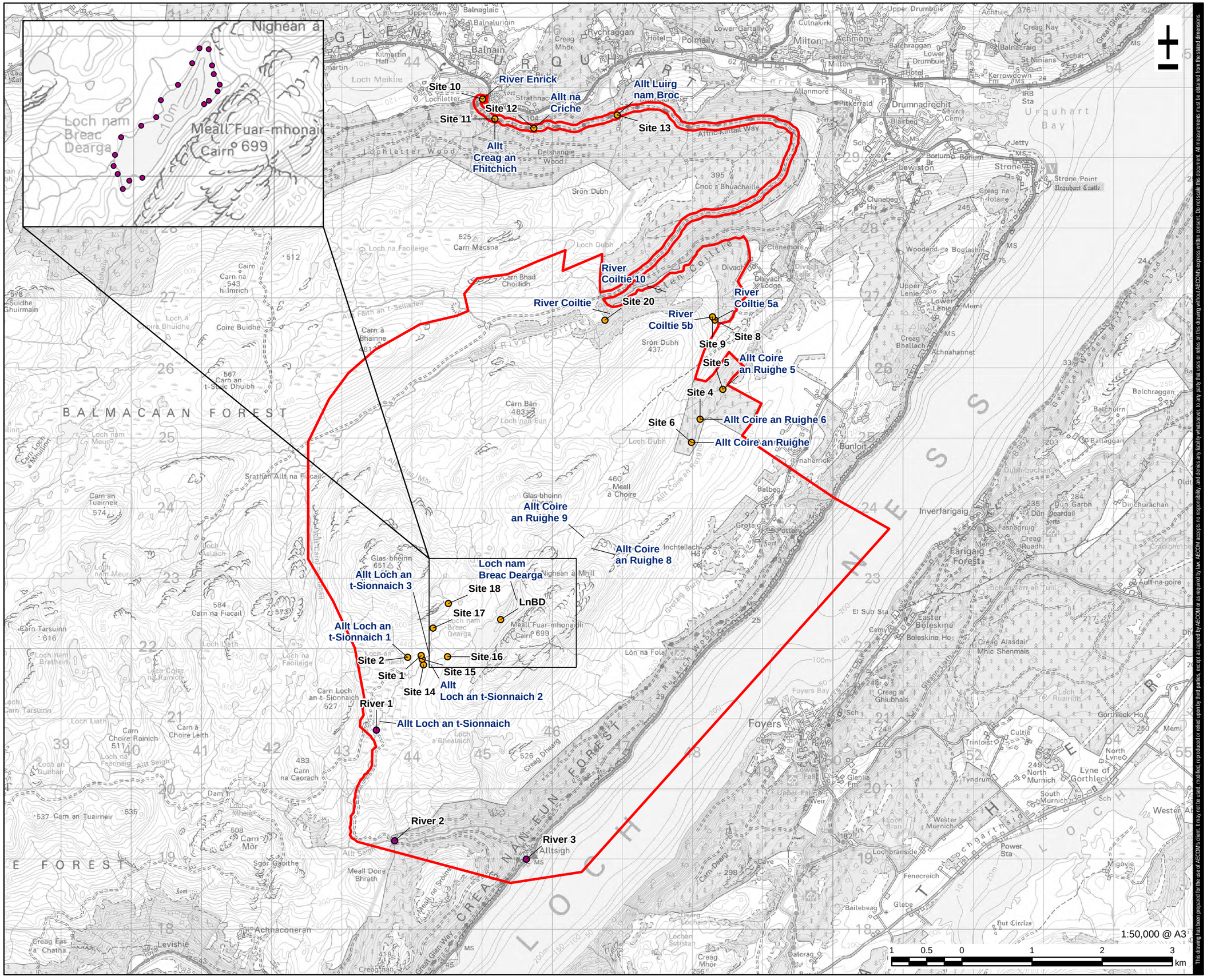

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LEGEND

- Red Line Boundary
- Fish Survey Location
- eDNA Sample Location
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FIGURE TITLE

Fish Survey Locations

FIGURE NUMBER

Figure 9.1.4

Annex B Community Conservation Index (CCI)

The Community Conservation Index (Chadd & Extence, 2004) allows a classification of the nature conservation value associated with a macroinvertebrate community. The CCI score for one sample is derived from individual Conservation Scores (CS), assigned to some species of aquatic macroinvertebrates and relating closely to the available published Red Data Books (Bratton, 1990, 1991; Shirt, 1987). Conservation Scores assigned to individual species vary from 1 to 10, as detailed on the **Table B-1** below. The derived CCI scores generally vary from 0 to > 20, as detailed in the **Table B-2** below. The **Table B-2** below provides a guide to interpreting CCI scores.

Table B-1: Conservation Scores from the Community Conservation Index (from Chadd & Extence, 2004)

Conservation Score	Relation to Red Data Books
10	RDB1 (Endangered)
9	RDB2 (Vulnerable)
8	RDB3 (Rare)
7	Notable (but not RDB status)
6	Regionally notable
5	Local
4	Occasional (species not in categories 10-5, which occur in up to 10% of all samples from similar habitats)
3	Frequent (species not in categories 10-5, which occur in up to >10-25% of all samples from similar habitats)
2	Common (species not in categories 10-5, which occur in up to >25-50% of all samples from similar habitats)
1	Very common (species not in categories 10-5, which occur in up to >50-100 % of all samples from similar habitats)

Table B-2: General guide to CCI scores (from Chadd & Extence, 2004)

CCI Score	Description	Interpretation
0 to 5.0	Sites supporting only common species and/or community of low taxon richness	Low conservation value
> 5.0 to 10.0	Sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	Moderate conservation value
> 10.0 to 15.0	Sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	Fairly high conservation value
> 15.0 to 20.0	Sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	High conservation value
> 20.0	Sites supporting several rarities, including species of national importance and/or a community of very high taxon richness	Very high conservation value

Annex C Whalley, Hawkes, Paisley & Trigg (WHPT) Metric

There are approximately 4,000 species of aquatic macroinvertebrates in the British Isles. To simplify the analysis of the samples and the data we do not identify individual species but only the major types (taxa), mostly at the family taxonomic level. A key piece of information is the number of different taxa at a site. A fall in the number of taxa indicates ecological damage, including pollution (organic, toxic and physical pollution such as siltation, and damage to habitats or the river channel).

The WHPT scoring system (WFD-UKTAG, 2021) is based upon the sensitivity of macroinvertebrate families to organic pollution. It replaces the Biological Monitoring Working Party (BMWP) system (Hawkes, 1997) previously used in the UK.

The WHPT system assigns a numerical value to about 100 different taxa (known as the WHPT-scoring taxa) according to their sensitivity to organic pollution. In addition to the presence of macroinvertebrate taxa at a sampling site, as in the BMWP scoring system, the WHPT system also uses another type of information, this being the abundances of different scoring taxa.

Taxa abundances are classified in four categories (Class 1: 1 to 10 individuals, Class 2: 11 to 100 individuals, Class 3: 101 to 1,000 individuals, and Class 4: > 1,000 individuals). A score (Pressure Sensitivity Scores (PSs) is then assigned to each taxa, depending of the taxa sensitivity and abundances recorded.

The total WHPT score for a sample corresponds to the sum of PSs of scoring taxa recorded. The Average Score Per Taxon (ASPT) values are calculated as the Sum PSs divided by the number of scoring taxa (NTAXA). As such, three metrics are calculated:

- WHPT score
- NTAXA
- ASPT

Some animals are more susceptible to organic pollution than others, and the presence of sensitive species indicates good water quality. This fact is taken into account by the WHPT metrics.

The most useful way of summarising the biological data was found to be one that combined the number of taxa and the ASPT. The best quality is indicated by a diverse variety of taxa, especially those that are sensitive to pollution. Poorer quality is indicated by a smaller than expected number of taxa, particularly those that are sensitive to pollution. Organic pollution sometimes encourages an increased abundance of the few taxa that can tolerate it. However, maximum achievable values will vary between geological regions. For example, pristine lowland streams in East Anglia will always score lower than pristine Welsh mountain streams because they are unable to support many of the high-scoring taxa associated with fast flowing habitat. WHPT scores and ASPT for different types watercourse are dependent on the quality and diversity of habitat, natural water chemistry (associated with geology, distance from source etc.), altitude, gradient, time of year the sample was taken and other factors.

Annex D Proportion of Sediment-sensitive Invertebrates (PSI)

The Proportion of Sediment-sensitive Invertebrates (PSI) index allows an assessment of the extent to which a water body is composed of, or covered by, fine sediments. This follows the method stated in Extence *et al*., 2013. Under this system, individual species of aquatic macroinvertebrates are assigned a Fine Sediment Sensitivity Rating (FSSR) as detailed in **Table D-1**, and abundance rating based on LIFE scores as detailed in **Table D-2.** The PSI score for the aquatic macroinvertebrate sample is then derived from the individual species scores and abundances, as detailed in **Table D-3**. The PSI score corresponds to the percentage of fine sediment-sensitive taxa present in a sample and ranges from 0 to 100, with low scores corresponding to water bodies with high fine sediment cover.

Table D-1: Fine Sediment Sensitivity Rating (FSSR) groups used to derive PSI scores

FSSR group	Description
A	Highly sensitive
B	Moderately sensitive
C	Moderately insensitive
D	Highly insensitive

Table D-2: Abundance categories used to derive PSI scores

FSSR group	Abundance			
	1-9	10-99	100-999	>999
A	2	3	4	5
B	2	3	4	5
C	1	2	3	4
D	1	2	3	4

Table D-3: Interpretation of PSI scores

PSI	Description
81-100	Minimally sedimented
61-80	Slightly sedimented
41-60	Moderately sedimented
21-40	Sedimented
0-20	Heavily sedimented

Annex E Lotic-Invertebrate Index of Flow Evaluation (LIFE)

The Lotic-Invertebrate Index for Flow Evaluation (LIFE) provides an assessment of the impact of variable flows on benthic macroinvertebrate communities. Under the assessment, individual species of aquatic macroinvertebrates are assigned to a flow group varying from I to VI, as detailed on the **Table E-1** below. The LIFE score for a macroinvertebrate sample is then derived (mean of individual scores) from individual species scores and abundances (categorised in **Table E-2**), as detailed on the **Table E-3** below. LIFE scores for a macroinvertebrate sample ranges from 1 to 12, where highest scores describe communities adapted to rapid flows.

Table E-1: Flow groups used to derive LIFE scores (from Extence *et al*., 1999)

LIFE score Group	Description	Mean current velocity
I	Taxa primarily associated with rapid flows	Typically > 100 $cm.s^{-1}$
II	Taxa primarily associated with moderate to fast flows	Typically 20 to 100 $cm.s^{-1}$
III	Taxa primarily associated with slow or sluggish flows	Typically < 20 $cm.s^{-1}$
IV	Taxa primarily associated with (usually slow) and standing waters	
V	Taxa primarily associated with standing waters	
VI	Taxa frequently associated with drying or drought impacted sites	

Table E-2: Abundance categories used to derive LIFE scores (from Extence *et al*., 1999)

Abundance category	Description
A	1 to 9
B	10 to 99
C	100 to 999
D	1,000 to 9,999
E	> 10,000

Table E-3: A guide to interpreting LIFE scores (from Extence *et al*., 1999)

Flow groups	Abundance categories			
	A	B	C	D/E
I	9	10	11	12
II	8	9	10	11
III	7	7	7	7
IV	6	5	4	3
V	5	4	3	2
VI	4	3	2	1

Annex F Macrophyte Taxa

Table F-1: Macrophyte taxa present at running water sites during Summer 2024

Taxa	Common name	1	2	4	5	6	8	9	10	12	16	17	18
*Atrichum undulatum**	Common Smoothcap				1								
Blindia acuta	Moss						2						
Callitriche stagnalis	Water starwort								1				
Caltha palustris	Marsh Marigold								1				
*Campylium stellatum var. stellatum**	Yellow starry feather moss	2	1	2		1	1	2	1	3		1	
Chara sp.	Stonewort												3
*Chara virgata**	Stonewort												3
Cladophora*	Filamentous algae		1									2	
Cladophora glomerata	Filamentous algae		1									2	
*Conocephalum conicum**	Snakeskin liverwort								1				
Dichodontium pellucidum	Moss						2						
*Dicranella heteromalla**	Moss (terrestrial)						2						
*Dicranum majus**	Greater fork moss						2						
*Dicranum scoparium**	Broom fork moss						2						
Eleocharis acicularis	Needle spikerush	2	2									2	
*Fissidens taxifolius var. taxifolius**	Common pocket moss											1	
Fissidens sp. (aggregated)	Moss							2	1				
*Fontinalis squamosa**	Alpine Water-moss							2	1				
Hygrohypnum ochraceum	Moss			1									
*Hylocomium splendens**	Glittering woodmoss			1			2	1		2			
*Hypnum jutlandicum**	Heath plait-moss			1									
Juncus articulatus	Jointed rush			1		2	1						
Juncus bulbosus	Bulbous rush		2	2		2	2		1			3	2
*Juncus effusus**	Soft rush			2		1	2						
Marsupella aquatica	Leafy liverwort			1		1		1					

Taxa	Common name	1	2	4	5	6	8	9	10	12	16	17	18
Mentha aquatica	Water Mint								1				
*Mentha sp**	Mint species								1				
*Mnium hornum**	Horn calcareous moss							1					
Pellia epiphylla	Overleaf pellia		1		1		1			1	1	1	
*Polytrichum commune var. commune**	Common haircap		1				1						
Potamogeton polygonifolius	Bog pondweed	2	2									2	3
*Pseudoscleropodium purum**	Neat feathermoss						2						
Racomitrium aciculare	Yellow fringe moss	1	1	1		1	1	2	1	3		1	1
Ranunculus flammula	Lesser spearwort	1	1	1			1					2	2
*Rhizomnium punctatum**	Dotted thyme-moss			1			2						
*Rhytidiadelphus loreus**	Little shaggy moss							1					1
*Riccardia chamedryfolia**	Jagged germanderwort						1						
Scapania undulata	Water earwort	1					1	1					
*Sphagnum palustre**	Blunt-leaved bogmoss						2						
Sphagnum sp(p)	Bog moss	1	1				2	1		2	2	1	
*Thuidium tamariscinum**	Common Tamarisk-moss						2	1					
Vaucheria sp(p)	Mole pelt alga		1	1									
*Veronica officinalis**	Heath speedwell						2	1					
% Coverage													
RMNI	2.71	3.55	3.23	3.34	2.51	2.09	3.10	4.42	1.86	1.83	3.30	2.50	
NTAXA	4	6	5	0	3	4	4	4	4	0	5	4	
NFG	4	4	5	0	3	3	2	2	3	1	0	4	
ALG	0	0.1	0.05	0	0	0	0	0	0	0	0	0.5	

*Non-scoring taxa

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Annex G Macroinvertebrate Taxa

Table G-1: Spring Macroinvertebrate Community

Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LnBD A	LnBD B	LN9
Flatworms																					
Planariidae	*Polycelis felina*								50												
Snails																					
Lymnaeidae	*Galba truncatula*																				2
Lymnaeidae	*Ampullaceana balthica*																			2	
Limpets and mussels																					
Ancylidae	*Ancylus fluviatilis*								1												
Sphaeriidae	Sphaeriidae (juvenile / damaged)		1																		
Sphaeriidae	*Euglesa*	1							2						12		6				
Worms																					
Oligochaeta	Oligochaeta	12	5		3		3		20		2	1	4	3	4	8	5	4	1		61
Leeches																					
Glossiphoniidae	*Glossiphonia complanata*																		8		
Glossiphoniidae	*Helobdella stagnalis*								3						1				1		
Crustaceans																					
Gammaridae	*Gammarus lacustris*																1				
Asellidae	*Asellus aquaticus*																				2
Mayflies																					
Baetidae	Baetidae (juvenile / damaged)						12					2				6					

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Baetidae	*Baetis sp.*																						4		
Baetidae	*Baetis fuscatus /scambus*									5															
Baetidae	*Baetis rhodani*	3		20	15				5		30														
Baetidae	*Baetis rhodani / atlanticus*					2		10		3		6	10			4		1							
Baetidae	*Baetis scambus*																	2							
Baetidae	*Alainites muticus*		1		30	30	4	24	15	10	50		40	10	25	4		35							
Baetidae	*Nigrobaetis niger/digitatus*											16													
Baetidae	*Nigrobaetis niger*						2							1											
Baetidae	*Centroptilum luteolum*	50	6	4	2								1	20			50	40							
Siphlonuridae	*Siphlonurus lacustris*	2	1	5	2											1	5	3							
Heptageniidae	Heptageniidae (juvenile / damaged)							2		1		10				3			1		2				
Heptageniidae	*Rhithrogena semicolorata*			2	20	2					12	6						1							
Heptageniidae	*Electrogena lateralis*			100	5	5		10		25	100	2	30	40		14	1	70							
Heptageniidae	*Heptagenia sulphurea*								7																
Heptageniidae	*Ecdyonorus sp.*								1												1				
Heptageniidae	*Ecdyonurus venosus*				12	12				15			25	2	2			30							
Leptophlebiidae	Leptophlebiidae (juvenile / damaged)					1										4				2					
Leptophlebiidae	*Leptophlebia vespertina*																1								
Leptophlebiidae	*Paraleptophlebia sp.*														1					4					
Leptophlebiidae	*Paraleptophlebia submarginata*				1	1								5											
Ephemerellidae	*Serratella ignita*					40			200						2										
Caenidae	*Caenis rivulorum*				20	20			30									12							

Stoneflies

Taeniopterygidae	*Brachyptera risi*										5														
Nemouridae	*Amphinemura sulcicollis*												4		2					1		25			
Nemouridae	*Nemoura cinerea*						1																		
Leuctridae	*Leuctra sp.*	3					1	6				4		2											
Leuctridae	*Leuctra hippopus*			10	4	1				12	20							2							

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Leuctridae	*Leuctra fusca*					30			20			2	3		8			10			
Capniidae	Zwicknia bifrons																				2
Perlodidae	*Diura bicaudata*																			3	1
Perlodidae	*Isoperla grammatica*								10		1			1							
Perlidae	*Dinocras cephalotes*			2	6	2		1		4			2		5						
Chloroperlidae	*Siphonoperla torrentium*						1	1	2		1	1	1					5	3		1
Chloroperlidae	*Chloroperla tripunctata*					1															
Damselflies																					
Coenagrionidae	*Pyrrhosoma nymphula*		2														2				
Dragonflies																					
Cordulegasteridae	*Cordulegaster boltonii*														1						
True bugs																					
Veliidae	Veliidae (nymph / damaged)				3			1								1					
Veliidae	*Velia sp.*						1										1				
Veliidae	*Velia caprai*	6									1										
Corixidae	*Sigara sp.*																2				
Beetles																					
Gyrinidae	*Gyrinus substriatus*																1				
Dytiscidae	Dytiscidae (larvae / damaged)						1	1						1	1						
Dytiscidae	*Oreodytes sanmarki*																				1
Dytiscidae	*Oreodytes septentrionalis*																	1			
Dytiscidae	*Agabus sp.*	3			1									1					1		
Dytiscidae	*Agabus biguttatus*										1										
Hydrophilidae	*Anacaena globulus*	2												2							
Hydraenidae	*Hydraena gracilis*									2			1								
Scirtidae	Scirtidae (larvae / damaged)			7	8	7		2	50		2	6		1				4			
Elmidae	*Elmis aenea*	3		1					4				2		3	2					
Elmidae	*Limnius volckmari*								2				2		6	3					
Elmidae	*Oulimnius sp.*		1										1		5		9			2	
Elmidae	*Oulimnius tuberculatus*	7												1	3					1	
Curculionidae	Curculionidae									1	3							1			

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Caddisflies																					
Rhyacophilidae	*Rhyacophila sp.*												1								
Rhyacophilidae	*Rhyacophila dorsalis*								30					1	2						
Glossosomatidae	*Glossosoma conformis*										1										
Glossosomatidae	*Agapetus fuscipes*									1											
Philopotamidae	Philopotamidae (juvenile / damaged)												1	2	2						
Philopotamidae	*Philopotamus montanus*					1								1							
Philopotamidae	*Wormaldia sp.*					5															
Philopotamidae	*Chimarra marginata*								6												
Polycentropodidae	Polycentropodidae (juvenile / damaged)												1								
Polycentropodidae	*Plectrocnemia sp.*		1																		
Polycentropodidae	*Plectrocnemia conspersa*	2		2			8	3		2	5	2		4		5					
Polycentropodidae	*Plectrocnemia geniculata*										3										
Polycentropodidae	*Polycentropus flavomaculatus*					1			12					2	7			6			1
Polycentropodidae	*Cyrnus trimaculatus*																	1			
Psychomyiidae	*Tinodes waeneri*																				1
Hydropsychidae	*Hydropsyche siltalai*					2			30	1			3	1	35						
Hydropsychidae	*Diplectrona felix*							1													
Hydroptilidae	*Hydroptila sp.*												1			1				3	
Hydroptilidae	*Ithytrichia lamellaris*								25												
Limnephilidae	Limnephilidae (juvenile / damaged)						2	2						2		6					
Limnephilidae	*Halesus radiatus*	3		1											1						
Limnephilidae	*Chaetopteryx villosa*	6	3	2	1										1		5				
Beraeidae	*Beraea pullata*						1														
Odontoceridae	*Odontocerum albicorne*				1	3				2		1	1	1							
Leptoceridae	*Ceraclea albimacula*								1												
Lepidostomatidae	*Crunoecia irrorata*										3										
Lepidostomatidae	*Lepidostoma hirtum*								35												
Sericostomatidae	*Sericostoma personatum*					1				1					1			4			
Trueflies																					
Chironomidae	Chironomidae (damaged / pupea)																				4

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Chironomidae	Tanypodinae	10	4	6			1	1	40	1		2	2	5	3	15	30	10		1
Chironomidae	Orthocladiinae	2	1		2	9			220	13	12	1	20		2			5		7
Chironomidae	Chironomini								10		5	1	3				5	3		
Chironomidae	Tanytarsini	1	10	10	3	1	1	1	20	2	5		10	5	60	1	150	5		
Tipulidae	Tipulidae									1										1
Pediciidae	Dicranota sp.	1			1	1				2	1		3		6					
Limoniidae	*Eloeophila sp.*			3			1													
Limoniidae	*Neolimnomyia sp.*		1																	
Simuliidae	Prosimulium sp.									1										
Simuliidae	*Simulium sp.*						1		100				5		3					
Simuliidae	*Simulium cryophilum*			12	3	10								1						
Simuliidae	Simulium ornatum group					10			30											
Simuliidae	*Simulium argyreatum/variegatum*					20			50											
Psychodidae			1								1						1			
Empididae	Chelifera sp. Hemerodromiinae		1						2		1		1		3					
Ceratopogonidae	Ceratopogoninae				1									1						
Thaumaleidae	*Thaumalea verralli*							1												
Other Taxa																				
Collembola					1	1	1		1	2	1									
Nematomorpha		2																		

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Table G-1: Autumn Macroinvertebrate Community

Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Flatworms																						
Planariidae	Planariidae (juvenile / damaged)																			1		
Planariidae	*Polycelis sp.*										1											
Planariidae	*Polycelis felina*								2			2										
Snails																						
Lymnaeidae	Lymnaeidae (juvenile / damaged)																			2		
Lymnaeidae	*Galba truncatula*																			15		
Lymnaeidae	*Ampullaceana balthica*								4													
Hydrobiidae	*Potamopyrgus antipodarum*								1													
Limpets and mussels																						
Ancylidae	*Ancylus fluviatilis*								3													
Sphaeriidae	Sphaeriidae (juvenile / damaged)						1															
Sphaeriidae	*Sphaerium sp.*																					1
Sphaeriidae	*Pisidium/Euglesa/Odhneripisidium*				4				3												2	3
Sphaeriidae	*Euglesa casertana*																2					
Sphaeriidae	*Euglesa subtruncata*														3		3					
Sphaeriidae	*Euglesa nitida*								5						1		1					
Worms																						
Oligochaeta	Oligochaeta		10	3	3		2		7		5	4	10	2	2	2	2	50	40	150	50	8
Leeches																						
Glossiphoniidae	Glossiphoniidae (juvenile / damaged)																				4	
Glossiphoniidae	*Glossiphonia complanata*																				3	
Glossiphoniidae	*Helobdella stagnalis*														1			1				
Crustaceans																						
Ostracoda							1															

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Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Asellidae	*Asellus aquaticus*																		3			
Mayflies																						
Baetidae	*Baetis rhodani*								5	8	40	20	40		25	40	25	1				
Baetidae	*Baetis rhodani / atlanticus*		2	1	20	4	3	20	5													
Baetidae	*Alainites muticus*		2		4			30			1		4		8	40	3					
Baetidae	*Centroptilum luteolum*	5	1		10	1								3								
Baetidae	*Procloeon bifidum*																					20
Ameletidae	*Ameletus inopinatus*																				8	50
Heptageniidae	*Rhithrogena sp.*			100		80					35	100	30					20				
Heptageniidae	*Rhithrogena semicolorata*				120					100												
Heptageniidae	*Electrogena lateralis*			2	12	7		3		3		2				5	1					
Heptageniidae	*Ecdyonurus sp.*								3													
Heptageniidae	*Ecdyonurus venosus*		2		12	7							18		10	1		50				
Leptophlebiidae	Leptophlebiidae (juvenile / damaged)	120			4																15	
Leptophlebiidae	*Leptophlebia sp.*		4									1		3		2		5				12
Leptophlebiidae	*Leptophlebia marginata*	10												8					1		10	2
Leptophlebiidae	*Paraleptophlebia sp.*															5		12				
Leptophlebiidae	*Paraleptophlebia cincta*	1	2											8								
Leptophlebiidae	*Paraleptophlebia submarginata*		4			6						1	5				12					
Caenidae	*Caenis rivulorum*				5				15										4			
Stoneflies																						
Nemouridae	Nemouridae (juvenile / damaged)						10									1						
Nemouridae	*Protonemura sp.*			2	10				2													
Nemouridae	*Protonemura praecox*			3						2	5	20	20		2	2						
Nemouridae	*Protonemura montana*									40	15	20	20		2	6		1				
Nemouridae	*Protonemura meyeri*		1		7	8		3	50	2		7	6		3	2	1	15				

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Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Nemouridae	*Amphinemura sp.*														4							
Nemouridae	*Amphinemura sulcicollis*		3	5	8	20		3	40	5	2		8					10	3	6		
Nemouridae	*Nemurella picteti*						40															
Nemouridae	*Nemoura sp.*	1		13	4		2	4		1	5	15									1	
Nemouridae	*Nemoura cinerea*																				1	
Nemouridae	*Nemoura avicularis*				1	3							3	25	1						1	
Leuctridae	*Leuctra sp.*			2	10																	
Leuctridae	*Leuctra inermis*			3								3	4		3							
Leuctridae	*Leuctra hippopus*	12	8	30	35	20	2	50	10	8	2	6	100		100	30	100	30		2		
Leuctridae	*Leuctra nigra*	1		2			7				4	10										
Capniidae	*Capnia atra*																	1			4	15
Perlodidae	*Perlodes mortoni*									1	6	2	2				1	1				
Perlodidae	*Diura bicaudata*																			1		4
Perlodidae	*Isoperla grammatica*		1	3	10	5	10	1	8	1	5	3	12		3	2	9	2				
Perlidae	*Dinocras cephalotes*				13			1		1			1		8			1				
Chloroperlidae	*Siphonoperla torrentium*		3		3	1	3				2	3	2		3					1	1	1
Dragonflies																						
Cordulegasteridae	*Cordulegaster boltonii*						4								1						1	
True bugs																						
Veliidae	*Velia caprai*				5		6										4					
Beetles																						
Dytiscidae	*Nebrioporus depressus*																					3
Dytiscidae	*Oreodytes sanmarkii*									1										1		
Dytiscidae	*Agabus guttatus*						2															
Dytiscidae	*Ilybius sp.*						1															
Hydraenidae	*Hydraena gracilis*			3	1	1				3	8					3						

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Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Hydraenidae	*Limnebius truncatellus*	1																				
Dryopidae	*Dryops sp.*														1		1			1		
Scirtidae	Elodes sp.	2	2	9	2					1	10	15				10	1	3		1		
Elmidae	*Elmis aenea*	1			1			4	3	3		2	5	1		1	15					
Elmidae	*Esolus parallelepipedus*									1										1		
Elmidae	*Limnius volckmari*												1		3	1						
Elmidae	*Oulimnius sp.*	30	6						2				2	3	4		4				100	
Elmidae	*Oulimnius tuberculatus*																		2			10
Curculionidae	Curculionidae				1							1										
Alderflies																						
Sialidae	Sialidae (juvenile / damaged)																					
Sialidae	*Sialis fuliginosa*				1													1				
Caddisflies																						
Rhyacophilidae	*Rhyacophila sp.*								1		1								1			
Rhyacophilidae	*Rhyacophila dorsalis*									2		2	3		1	1	1	1				
Glossosomatidae	*Agapetus fuscipes*																			1		
Philopotamidae	*Philopotamus montanus*					1		2							4	6		1				
Philopotamidae	*Wormaldia occipitalis/mediana*									1												
Philopotamidae	*Chimarra marginata*								1													
Polycentropodidae	Polycentropodidae (juvenile / damaged)			1				4														
Polycentropodidae	*Plectrocnemia sp.*											1				1	2					
Polycentropodidae	*Plectrocnemia conspersa*	20	6				12				4						8				7	5
Polycentropodidae	*Plectrocnemia geniculata*							1														
Polycentropodidae	*Polycentropus flavomaculatus*								10				2	5	6						50	30
Psychomyiidae	*Tinodes waeneri*																		2	20	15	6

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Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Hydropsychidae	*Hydropsyche pellucidula*								2													
Hydropsychidae	*Hydropsyche siltalai*								40				6		10		3					
Hydroptilidae	*Hydroptila sp.*		5						5	3			7	5	2	1	1			1	20	20
Hydroptilidae	*Ithytrichia lamellaris*								10													
Hydroptilidae	*Oxyethira sp.*		1				2						3	2	7	2	4					1
Phryganeidae	*Agrypnia sp.*																					1
Limnephilidae	Limnephilidae (juvenile / damaged)	1	3	2	2	4	15	10	6	7	8	12	1	10			6	1	1	9		
Limnephilidae	*Apatania wallengreni*																				1	10
Limnephilidae	*Potamophylax sp.*				5	7		1			1	4										
Limnephilidae	*Halesus sp.*	1																				
Beraeidae	*Beraea pullata*																				1	
Beraeidae	*Beraea maurus*						4															
Odontoceridae	*Odontocerum albicorne*				1																	
Lepidostomatidae	*Crunoecia irrorata*										1											
Lepidostomatidae	*Lepidostoma hirtum*								50	1								1				1
Sericostomatidae	*Sericostoma personatum*				2					1									1		1	4
Trueflies																						
Chironomidae	Tanypodinae	20	20	2		1	30	10	5				1	4		1	1		4	2	10	3
Chironomidae	Orthocladiinae	1	3		2		2	2	15	2	1		1		4	1	4		2		2	1
Chironomidae	Chironomini								5										120			1
Chironomidae	Tanytarsini	100		1	2				4		1	1	12		20		3				2	10
Chironomidae	Diamesinae								2			1							20			
Tipulidae	*Tipula sp.*										2								1	5	5	
Pediciidae	Pedicia sp.									1												
Pediciidae	Dicranota sp.		3	4	3					1	6	1	3		1	2	1				1	
Limoniidae	Eloeophila sp.	1			1		9			3			2									

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Family	Species	Site 1	Site 2	Site 4	Site 5	Site 6	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17	Site 18	Site 20	LN5	LN9	LnBD A	LnBD B
Limoniidae	Antocha vitripennis																			1		
Simuliidae	Simuliidae (damaged / juvenile)						4		1							5						
Simuliidae	Simulium sp.		1	6	2	1						2	6		7		3	3				
Simuliidae	*Simulium angustitarse*						1															
Simuliidae	*Simulium cryophilum*		2							9	20											
Dixidae	*Dixa puberula*											1										
Psychodidae					5				1						1							
Empididae													1								1	
Ceratopogonidae			1				1	1										1				
Rhagionidae				1																		
Thaumaleidae	*Thaumalea verralli*							1														
Muscidae	*Limnophora sp.*								1													
Other Taxa																						
Collembola		1																				
Oribatida										1												

Table G-2: Loch Ness Spring 2025 Macroinvertebrate Community

Family	Species	LN2	LN5	LN6	LN10	LN12
Flatworms						
Planariidae	*Polycelis nigra / tenuis*		12			
Snails						
Lymnaeidae	*Galba truncatula*					1

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Family	Species	LN2	LN5	LN6	LN10	LN12
Lymnaeidae	*Ampullaceana balthica*					1
Limpets and mussels						
Ancylidae	*Ancylus fluviatilis*		1			
Sphaeriidae	*Pisidium/Euglesa/Odhneripisidium*		1	4		
Worms						
Oligochaeta	Oligochaeta	36	104	60	10	75
Leeches						
Glossiphoniidae	*Helobdella stagnalis*			4		
Erpobdellidae	Erpobdellidae (juvenile / damaged)		1		3	
Erpobdellidae	*Dina lineata*			1		
Crustaceans						
Gammaridae	*Gammarus pulex/fossarum agg.*	1				
Gammaridae	*Gammarus pulex*	2				
Crangonyctidae	*Crangonyx floridanus/pseudogracilis*		12	46	1	
Asellidae	*Asellus aquaticus*		20	42	1	
Mayflies						
Baetidae	*Baetis sp.*				9	
Baetidae	*Baetis rhodani / atlanticus*		2		16	
Baetidae	*Alainites muticus*				1	
Heptageniidae	Heptageniidae (juvenile / damaged)				1	
Heptageniidae	*Rhithrogena semicolorata*		1		22	

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Family	Species	LN2	LN5	LN6	LN10	LN12
Heptageniidae	*Electrogena lateralis*	1			1	
Heptageniidae	*Heptagenia sulphurea*		2			
Heptageniidae	*Ecdyonurus sp.*	12			58	33
Leptophlebiidae	Leptophlebiidae (juvenile / damaged)		2	3		
Leptophlebiidae	*Leptophlebia marginata*			1		
Caenidae	*Caenis rivulorum*		3			
Stoneflies						
Nemouridae	*Amphinemura sulcicollis*	23	4		6	24
Nemouridae	*Nemoura sp.*	1	1			
Nemouridae	*Nemoura avicularis*			7		
Leuctridae	*Leuctra sp.*		1		2	
Leuctridae	*Leuctra hippopus*	3	1		5	4
Perlodidae	*Perlodes mortoni*					1
Perlodidae	*Diura bicaudata*	2				6
Perlodidae	*Isoperla grammatica*		1		3	
Chloroperlidae	*Siphonoperla torrentium*	12	1		6	1
True bugs						
Corixidae	*Callicorixa praeusta*			1		
Corixidae	*Sigara dorsalis*			14		
Corixidae	*Sigara distincta*			13		
Corixidae	*Sigara scotti*			1		
Beetles						

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Family	Species	LN2	LN5	LN6	LN10	LN12
Haliplidae	*Haliplus lineaticollis*			4		
Dytiscidae	*Nebrioporus sp.*			1		
Dytiscidae	*Nebrioporus depressus*			1		
Elmidae	*Esolus parallelepipedus*				1	
Elmidae	*Limnius volckmari*				6	
Elmidae	*Oulimnius sp.*			1		
Alderflies						
Sialidae	Sialidae (juvenile / damaged)					
Sialidae	*Sialis lutaria*			3		
Caddisflies						
Rhyacophilidae	*Rhyacophila dorsalis*				1	
Glossosomatidae	*Agapetus fuscipes*	12				
Polycentropodidae	Polycentropodidae (juvenile / damaged)			1		
Polycentropodidae	*Polycentropus flavomaculatus*		1	1		
Psychomyiidae	*Tinodes waeneri*			1		
Psychomyiidae	*Tinodes unicolor*			1		
Hydroptilidae	*Hydroptila sp.*					1
Phryganeidae	*Agrypnia varia*			1		
Limnephilidae	Limnephilidae (juvenile / damaged)			6	3	
Limnephilidae	*Limnephilus marmoratus*		1	4		
Limnephilidae	*Limnephilus lunatus*			4		
Limnephilidae	*Anabolia nervosa*			6		

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Family	Species	LN2	LN5	LN6	LN10	LN12
Limnephilidae	*Potamophylax cingulatus*				1	
Lepidostomatidae	Lepidostomatidae (juvenile / damaged)				1	
Sericostomatidae	*Sericostoma personatum*				1	3
Trueflies						
Chironomidae	Chironomidae (damaged / pupae)					1
Chironomidae	Tanypodinae		2	25		
Chironomidae	Orthocladiinae		2	13	2	1
Chironomidae	Chironomini		100		8	
Chironomidae	Tanytarsini		2	30	2	
Chironomidae	Prodiamesinae			5		
Tipulidae	*Tipula sp.*				1	
Limoniidae	Limoniidae				1	
Ceratopogonidae		1		2		

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