Glen Earrach PSH Scheme

River Moriston impact pathways (river mouth and non-physical barrier at canal)

Glen Earrach Energy

February 2026

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Quality information

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Issue History

Revision	Revision date	Details	Authorized	Name	Position
Issue 1	02/02/2026	1st Issue	MC	MC	Principal Project Manager

Distribution List

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Introduction

Note: This document includes reference to the locations of freshwater pearl mussel populations, which should remain confidential. Such records should be redacted if the report is to be made public.

This technical note **(relating to the River Moriston impact pathways (river mouth and non-physical barrier at canal))** supports **Appendix 7.2: Statement to Inform Habitat Regulations Assessment (Volume 5: Appendices)** (hereafter referred to as the HRA) and **Chapter 9: Aquatic & Marine Ecology of the Environmental Impact Assessment Report** (hereafter referred to as the EIAR). It expands on the potential effects of the proposed Glen Earrach PSH scheme (hereafter referred to as the Proposed Development) on the qualifying interests of the River Moriston SAC as assessed in the HRA. More specifically, this note details potential effects on the freshwater pearl mussel (FWPM) *Margaritifera margaritifera* and Atlantic salmon *Salmo salar*, which FWPM depend on for the completion of their lifecycle.

NatureScot formally objected to the Proposed Development pending further information from the Applicant. There were two sections (d & e) in NatureScot's response of 19th January 2026 (page 9 and 10), which relate to aquatic ecology that required further information. Concerns and further information related to the following FWPM and salmon related impact pathways:

- Impacts on the migration of salmon from the River Moriston caused by a proposed acoustic barrier at Dochfour weir (Objection requiring further information, section d); and
- Impacts on salmon spawning habitat in the lower reaches of the River Moriston (Objection requiring further information, section e).

Contextual Background: FWPM at the Mouth of the River Moriston

Potential impacts on FWPM due to changes in water levels in Loch Ness and subsequently at the mouth of River Moriston are detailed in **Section 3.2.23 Changes to Surface Water or Groundwater Hydrology of the HRA**. The River Moriston SAC is listed as a European Site within the Zone of Influence of potential impacts relating to changes of surface water or groundwater hydrology in **Table 3-1 of the HRA**. As the distribution of FWPM in the River Moriston was not known due to the confidentiality of species records, it was assumed that FWPM may be present in the River Moriston to the confluence with Loch Ness (**Section 4.6.1 of the HRA**).

In the Screening Assessment (**Table 5-4 HRA Screening Assessment for River Moriston SAC of the HRA**), changes in water levels at the mouth of the River Moriston were assessed as not resulting in a likely significant effect on the River Moriston SAC. This was concluded from the assessment of potential effects both directly on FWPM in the River Moriston and indirectly through potential effects on Atlantic salmon migrating up the River Moriston. The following justification was used:

- Water levels in the mouth of the River Moriston will remain within current limits, albeit fluctuations will be more regular. Fish passage into the River Moriston will remain unaffected and FWPM further upstream will remain unaffected.
- The mouth of the River Moriston contains sub-optimal habitat for FWPM, where 500 m upstream of the mouth of the River Moriston there is an outfall with water, from the Glenmoriston Power Station beneath Dundreggan dam, is discharged into the River Moriston. From this point downstream, into Loch Ness, the geomorphology of the river channel differs from upstream sections – photos and satellite imagery show that the river is wide (~50 m) and suggest that it is deep and slow moving. NatureScot has confirmed that FWPM are present in this area and surveys from Gavia Environmental in 2023 confirmed the presence of mussel populations at low abundance levels D (0-49 live mussels per 50 x 1 m transect) and C (50-499 live mussels per 50 x 1 m transect).[1] All mussels present were large adult mussels estimated at around 20 years old, suggesting that recruitment was not occurring and confirming that settlement has not occurred in this area in recent years. Populations above the falls at Invermoriston were more abundant (levels A and B) and juveniles had a high contribution to overall population structure (22.01% and 7.4%). This suggests that the habitat above the falls is preferential for FWPM and that the area below the falls is sub-optimal. While FWPM in the "estuary" of

[1] SLR (2023) Loch Kemp Storage, Shadow Habitats Regulations Appraisal (HRA) Report (Stage 1 & 2). Section 5.2.2 2a. (i) https://lochkempstorage.co.uk/assets/documents/shadow-hra/loch-kemp-storage---shadow-habitats-regulations-appraisal-report.pdf

the River Moriston could be affected by changes in water levels, they will remain submerged as levels in the area will remain within current upper and lower limits, only fluctuations will be more regular. Further, any impacts on mussels in this area are unlikely to be detrimental to the wider population due to the absence of juveniles which suggests that recruitment is not occurring[1].

Contextual Background: Atlantic Salmon as a FWPM Host Species

As potential effects on FWPM and Atlantic salmon in the River Moriston and other tributaries of Loch Ness were deemed insignificant, the Screening Assessment for the River Moriston SAC focuses on the potential effects of lower water levels in Loch Ness impeding the downstream migration of Atlantic salmon smolts. This is assessed as having the potential to result in a likely significant effect in the absence of mitigation **(Table 5-4 HRA Screening Assessment for River Moriston SAC)**.

More specifically, HRA screening details how changes in water levels and the frequency of level fluctuations in Loch Ness will result in changes in water levels at Dochfour Weir and may impede the ability for upstream or downstream migrating fish to navigate the weir, which is already impeded in the baseline scenario **(Section 7.5.26 of the HRA)**. As such, the following mitigation is put forward as a suite of potential mitigation, to be confirmed at the detailed design stage in consultation with other stakeholders (**Section 6.3.18 of the HRA**):

- A fish pass or fish passes will be designed and installed on Dochfour Weir to facilitate and improve the upstream and downstream passage of migratory fish compared to the current sub-optimal situation; and
- A non-physical deterrent may be installed at the entrance of the Caledonian Canal adjacent to Dochfour Weir to prevent the diversion of smolts along the canal. The current culvert to direct smolts from the entrance of the canal to the River Ness is inadequate and ineffective. As is the smolt pass on Dochfour Weir itself, and therefore in combination with the fish pass(es) described above, this will serve to enhance fish passage down the River Ness above the current baseline situation.

With the additional mitigation applied, it is concluded that there would be no adverse effect on site integrity during the operation of the Proposed Development. Furthermore, through appropriately designed mitigation it is proposed that fish passage in the Ness catchment could be improved as a result.

Other potential effects resulting from the operation of the Proposed Development are also considered to constitute a likely significant effect on Atlantic salmon within Loch Ness (and thus affecting FWPM in the River Moriston) in the absence of mitigation. These include effects resulting from the operation of the lower control works and potentially causing the entrainment, impingement, or distraction of migrating fish (**Table 5-4 of the HRA)**. Additional measures of mitigation are proposed, including a non-physical deterrent for Atlantic salmon at the lower control works, and the curtailment of the operation of the Scheme during the smolt migration season **(Section 6.3.18 of the HRA)**, and thus it is concluded that there would be no adverse effect on site integrity during the operation of the proposed development **(Section 7.5.23 of the HRA)**.

Atlantic salmon are also unlikely to be the sole host species being utilised by FWPM in the River Moriston[2]. Ness & Beauly Fisheries Trust state that:

“Prior to 1880 salmon access to the Moriston system was limited by impassable waterfalls a short distance downstream of the village of Invermoriston”.

A fish pass was constructed, and it is likely that the area upstream of Invermoriston was colonised by a salmon population that existed downstream of the falls. This suggests that the FWPM population within the River Moriston upstream of Invermoriston was historically sustained by a resident trout population.

Impacts on the migration of salmon from the River Moriston caused by a proposed acoustic barrier at Dochfour weir (d)

A fish pass will be designed and installed on Dochfour Weir to facilitate and improve the upstream and downstream passage of migratory fish compared to the current sub-optimal situation (**Section 6.3.18 of the**

[2] Ness & and Beauly Fisheries Trust (2014)
Ness System Habitat Survey. http://www.nessandbeauly.org.uk/wp-content/uploads/2014/10/Ness-Habitat-Survey-Report-Updated.pdf

HRA). As part of this, a non-physical deterrent may be installed at the entrance of the Caledonian Canal adjacent to Dochfour Weir to prevent the diversion of smolts along the canal.

The Applicant wishes to confirm that as per **Section 6.3.18 of the HRA** and **sections 9.9.9, 9.9.13, and 9.12.3 of the EIAR** an acoustic barrier was not the only option under consideration, but rather only a "non-physical deterrent" would be used to avoid smolts being lost down the Caledonian canal. The exact nature of this deterrent is to be finalised at the detailed design stage. While acoustic barriers are one potential option, other options include visual, electrical, bubble deterrents and multimodal barriers[3]. Bubble barriers may be particularly effective at guiding downstream migrating Atlantic salmon; one study found that:

"bubbles divert smolts with high efficiency in both a laboratory flume (95%) and in natural settings (90%)".[4]

To conclude, the potential mitigation options will be investigated further and the most appropriate design for the exact location and circumstance at the Dochfour weir will be sought, in consultation and agreement with other stakeholders, including NatureScot prior to the final design options being made.

Impacts on salmon spawning habitat in the lower reaches of the River Moriston (e)

In the Screening Assessment (**Table 5-4 HRA Screening Assessment for River Moriston SAC of the HRA**), changes in water levels at the mouth of the River Moriston were assessed as not resulting in a likely significant effect on the River Moriston SAC. This is based on the justification that water level changes in the mouth of the River Moriston will remain within current limits, albeit fluctuations will be more regular. Fish passage into the River Moriston will remain unaffected and FWPM populations upstream of the falls below Invermoriston will remain unaffected.

Photos and satellite imagery show that the river in the "estuary" of the River Moriston, the area below the falls at Invermoriston, show that the river is wide (~50 m) and suggest that it is deep and lacking in the fast flow required to contain suitable spawning habitat for salmon. Surveys conducted by Gavia Environmental in 2023 determined that spawning habitat at the mouth of the River Moriston was 'not suitable and sub-optimal':

"Spawning habitat at the mouth of the River Moriston was determined to be not-suitable (due to stagnant water and finer sediments, e.g., sand and silt) and sub-optimal in areas (due to stagnant water)".[5]

Conversely, an older 2014 report from Ness and Beauly Fisheries Trust state that electrofishing surveys have confirmed that spawning does take place in the area known as the estuary[6]. Habitat conditions may have changed in the decade between the Ness and Beauly Fisheries Trust surveys and the more recent Gavia Environmental surveys, leading to a difference in assessment of salmon spawning habitat. It is assumed that the more recent surveys which determined that spawning habitat is not suitable or sub optimal are more likely to be representative of the current situation.

Given that spawning habitat in the estuary of the River Moriston is not suitable and sub-optimal in areas, it is considered unlikely that changes in water levels which will maintain levels within current limits will negatively impact salmon populations in the River Moriston. Further, water level changes within Loch Ness are most likely to affect spawning habitat in the River Moriston in the Summer, when river water levels are low and backflow or water stagnation could occur. Given that salmon spawn in the Winter (from approximately November to February) when water levels in the River Moriston are expected to be high, the availability and usability of spawning habitat for salmon will likely remain unaffected.

[3] Nicula, N.-O., & Lungulescu, E.-M. (2026). Barriers for Fish Guidance: A Systematic Review of Non-Physical and Physical Approaches. *Water*, *18*(2), 225. https://doi.org/10.3390/w18020225
[4] J. Leander, J. Klaminder, G. Hellström, M. Jonsson (2021) Bubble barriers to guide downstream migrating Atlantic salmon (*Salmo salar*): An evaluation using acoustic telemetry, Ecological Engineering, 160:106141. https://doi.org/10.1016/j.ecoleng.2020.106141
[5] SLR (2023) Loch Kemp Storage, Shadow Habitats Regulations Appraisal (HRA) Report (Stage 1 & 2). https://lochkempstorage.co.uk/assets/documents/shadow-hra/loch-kemp-storage---shadow-habitats-regulations-appraisal-report.pdf
[6] Ness & and Beauly Fisheries Trust (2014)
Ness System Habitat Survey. http://www.nessandbeauly.org.uk/wp-content/uploads/2014/10/Ness-Habitat-Survey-Report-Updated.pdf

Summary

- While FWPM in the “estuary” of the River Moriston could be affected by changes in water levels, they will remain submerged as levels in the area will remain within current limits, only fluctuations will be more regular. Further, any impacts on mussels in this area are considered unlikely to be detrimental to the wider population due to the absence of juveniles which suggests that recruitment is not occurring.
- Changes in water levels at the mouth of the River Moriston were assessed as not resulting in a likely significant effect on FWPM in the River Moriston, either directly due to potential effects on the mussels or indirectly through potential effects on Atlantic salmon migrating up the River Moriston.
- Other potential effects on Atlantic salmon resulting from the operation of the Proposed Development, which may lead to indirect impacts on FWPM as a host species, are assessed in the HRA and with the additional mitigation applied, it is concluded that there would be no adverse effect on site integrity during the operation of the Proposed Development through these pathways.
- A non-physical deterrent is currently proposed to prevent salmon smolts being lost down the Caledonian canal (a well-known and long-standing existing issue). While intermittent acoustic barriers are one potential option, other options include visual, electric, bubble deterrents and multimodal barriers. This is not confirmed at this stage, and any appropriate non-physical deterrent would be identified at the detailed design stage in consultation with other stakeholders, including NatureScot for final sign off. A non-physical deterrent is considered an important aspect of the proposed suite of mitigation to achieve a “no adverse effect” outcome, along with other mitigation options. Finalisation of such appropriate mitigation measures for detailed design would ensure there is no resulting adverse effect and would seek to provide benefits to fish migration in the catchment.
- Given that spawning habitat in the estuary of the River Moriston is not suitable and sub-optimal in areas, it is considered unlikely that changes in water levels which will maintain levels within current limits will negatively impact salmon populations in the River Moriston. Further, water level changes within Loch Ness would be most likely to affect spawning habitat in the River Moriston in the Summer, when river levels are low and backflow or water stagnation could occur. Given that salmon spawn in the Winter (from approximately November to February) when water levels in the River Moriston are expected to be high, the availability and usability of spawning habitat for salmon will remain unaffected.
- Overall, it is concluded that there would be no adverse effect on site integrity of the River Moriston SAC during operation of the Proposed Development. The proposed upgrades to the Dochfour Weir, linked to other measures to reduce smolt mortality, would seek to improve fish migration within the catchment to the benefit of salmon within the River Moriston and subsequently the inter-dependent FWPM population.

SITE VISIT REPORT

Lower River Moriston

Mouth of river to vicinity of Invermoriston Falls / Glenmoriston hydro power plant (HPP) outfall

Glen Earrach PSH Scheme – River Moriston special area of conservation (SAC)

Report Author	Peter MacDonald, Glen Earrach Energy
Date of Visit	12 February 2026
Time on Site	Approximately 12:00 – 14:00 (c. 2 hours)
Location	Lower reach of the River Moriston: from the river mouth (confluence with Loch Ness) upstream to the falls at Invermoriston and the Glenmoriston HPP outfall
Access / Permission	Access via Glenmoriston Estate land (north side, off the A82) with permission of the factor, Steven Gray
Purpose	Field reconnaissance to inform assessment of whether loch level fluctuations could affect any Atlantic salmon spawning habitat at/near the River Moriston mouth. Supports NatureScot further information requirement point (e) (letter of 19 January 2026, Ref: CDM173569, Application Ref: ECU0005121).

1. Permissions and Pre-Visit Information

1.1 Access

Access was obtained with the permission of the Glenmoriston Estate factor, Steven Gray. The site was approached from the north side via the A82.

1.2 Context from Factor (Hearsay / Contextual Only)

In a telephone conversation prior to the visit, Steven Gray stated that no salmon spawn in the lower reach of the River Moriston. He indicated that this had been advised to him by the Ness District Salmon Fishery Board (NDSFB). It was not confirmed whether this derives from an NDSFB survey directly or whether the NDSFB was relaying information from other sources (e.g. NatureScot, Marine Scotland).

Note: This is included as context only and is not treated as evidence.

2. Background Context

Surveys conducted by Gavia Environmental in 2023 (as reported in the SLR Shadow HRA for Loch Kemp Storage) determined that spawning habitat at the mouth of the River Moriston was ‘not suitable and sub-optimal’, citing stagnant water and finer sediments (sand and silt) as primary reasons. An older 2014 report from Ness and Beauly Fisheries Trust stated that electrofishing surveys had confirmed spawning does take place in the estuary area, although habitat conditions may have changed in the intervening decade.

The AECOM technical note ‘River Moriston impact pathways (river mouth and non-physical barrier at canal)’ (February 2026) concludes that, given the current unsuitability and sub-optimal nature of spawning habitat in the estuary, changes in water levels within current limits are unlikely to negatively impact salmon populations. It further notes that loch level changes are most likely to affect the estuary reach in summer when river levels are low,

whereas salmon spawn in winter (approximately November to February) when river levels are expected to be high.

This site visit was conducted to provide first-hand observational evidence to supplement the desk-based assessment and existing survey data.

3. Conditions During Visit

3.1 Loch Ness Level (Fort Augustus Gauge, riverlevels.co.uk)

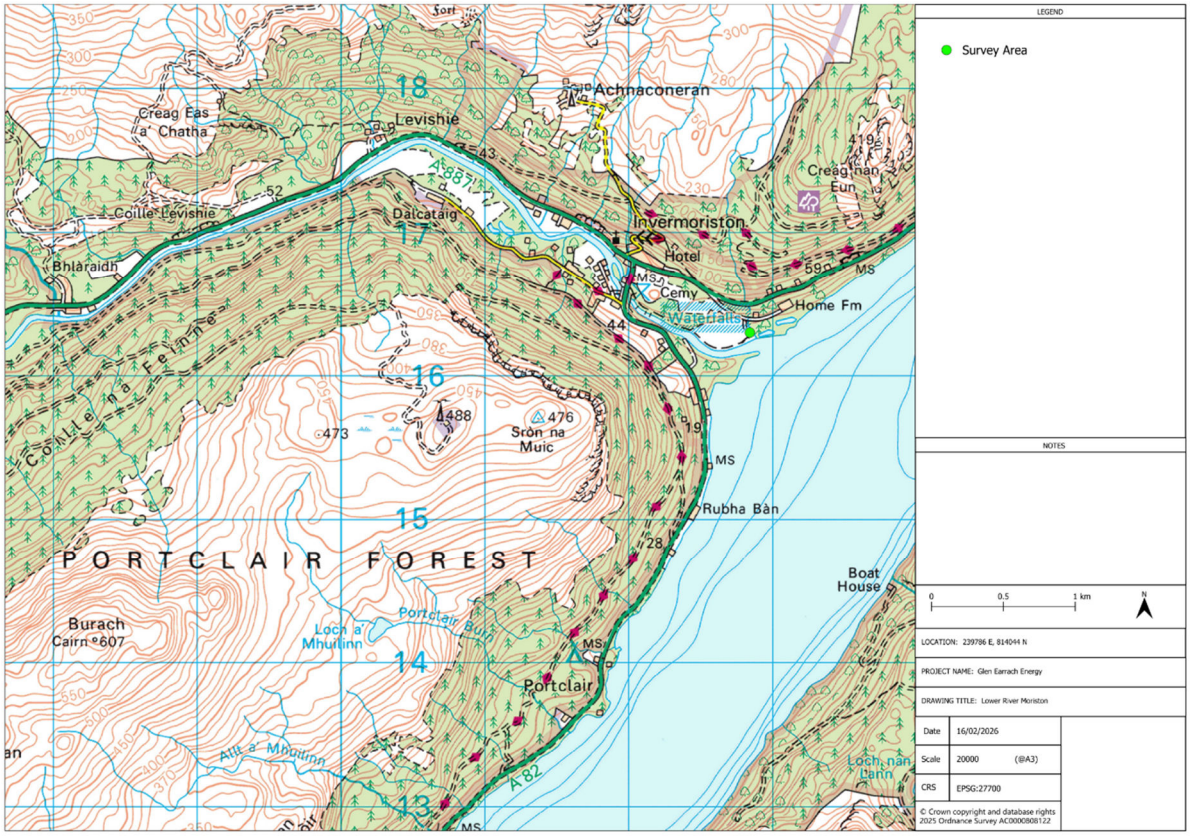
Parameter	Start (~12:00)	End (~14:00)
Local gauge reading	1.25 m	1.26 m
Gauge datum	14.16 m AOD	14.16 m AOD
Estimated level (m AOD)	15.41 m AOD	15.42 m AOD

The loch level was at the low end of the baseline range referenced in prior project materials.

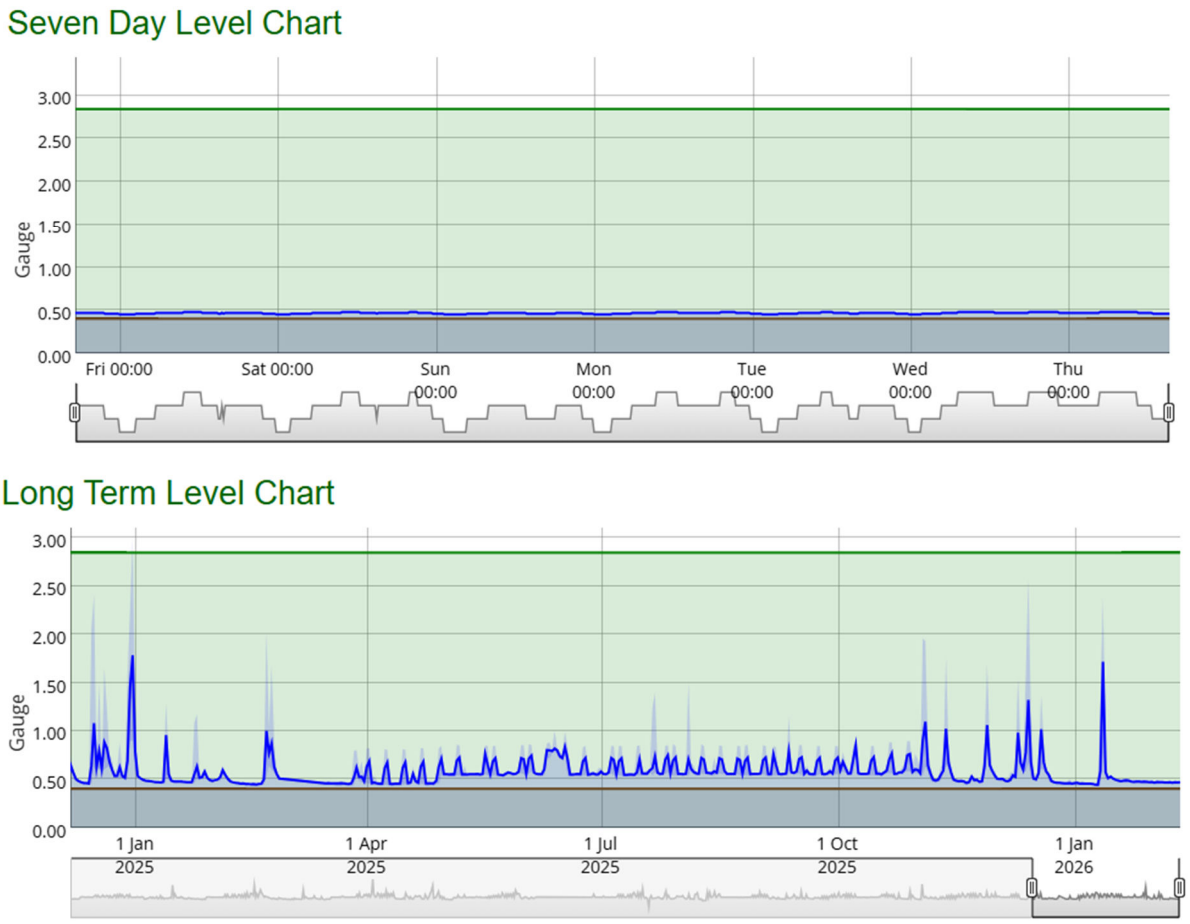
3.2 River Moriston Level (SEPA Gauge at Levishie)

Parameter	Start (~12:00)	End (~14:00)
Gauge reading	0.467 m	0.457 m
Earlier peak (08:30)	0.482 m	
7-day range	0.45 – 0.48 m	
Typical range	0.40 m (low) – 2.84 m (high)	

The river level was on the downward limb of a pulsed hydrograph. The Levishie gauge is influenced by hydropower operations upstream (the Levishie hydro scheme and/or other upstream schemes), and the pulsed pattern in the gauge data reflects this. However, the Glenmoriston Power Station outfall, which discharges into the lower reach of the Moriston at the upstream end of the surveyed area, is downstream of the Levishie gauge. Consequently, flow pulses from the Glenmoriston HPP outfall into the lower reach are not recorded on this gauge. There are therefore two distinct sources of variable flow into the surveyed reach: river flow (recorded at Levishie, hydro-influenced) and the Glenmoriston HPP outfall discharge (not recorded at Levishie, as it joins the river further downstream). Further information on this is included as an annex to this report.



Variation during the visit window was minor relative to the 7-day range. The river was at low level relative to its typical range.



3.3 Weather / Wind

Wind from the loch was observed blowing upstream at times, which occasionally made the water surface appear to move from loch to river rather than the reverse. Weather was sunny and dry.

4. Survey Approach and Route

4.1 Overview

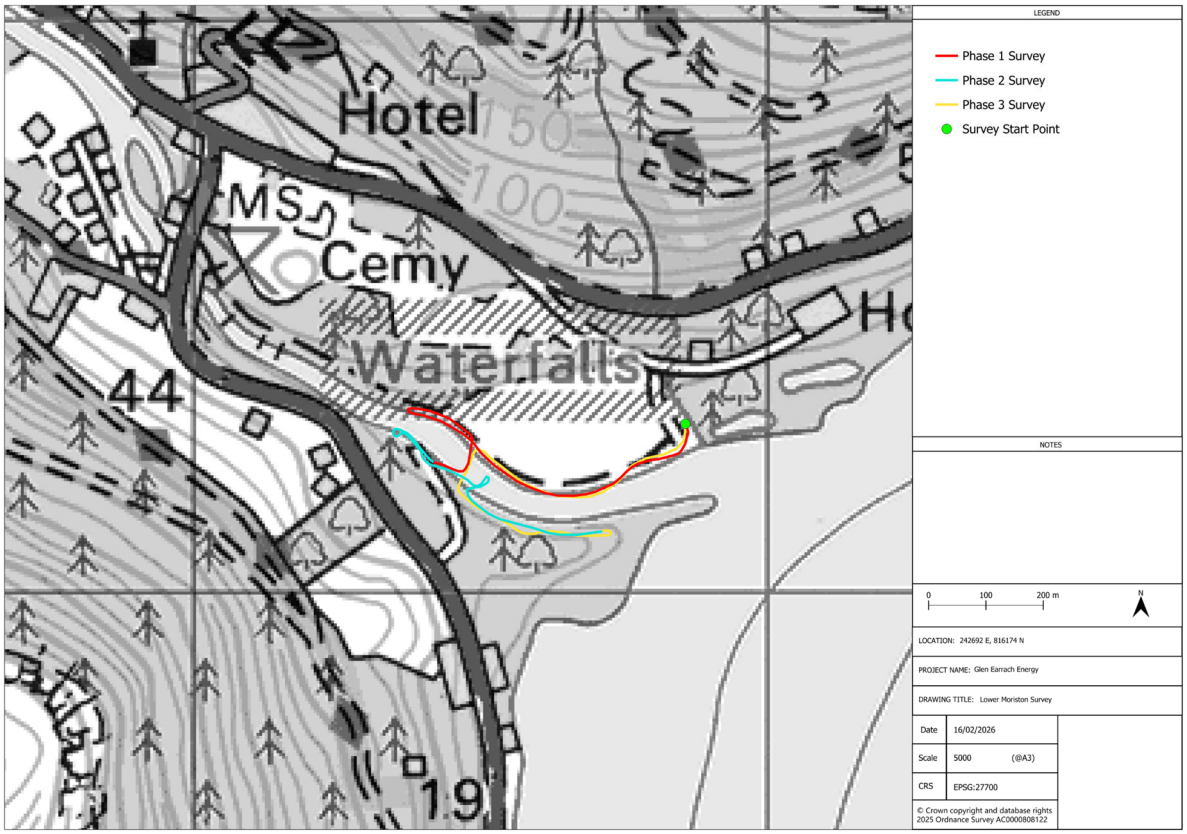
A reconnaissance walk was undertaken, beginning on the north bank at the river mouth and proceeding upstream towards the falls and Glenmoriston HPP outfall. The route then returned to a shallow crossing point, crossed to the south bank, inspected the outfall structure and south bank, then traversed back downstream towards the mouth before returning via the same crossing point. Total length of the reach is approximately 600m from the mouth to the falls.

4.2 Timeline

Times are approximate, derived from image timestamps.

Time	Activity
12:03	Began walk from river mouth (north bank), heading upstream. Videos and photos of the estuary character.

12:31	Reached the furthest safely accessible point on the north bank, opposite the Glenmoriston HPP outfall (south-western end of reach).
12:33	Retraced steps on north bank to the shallow crossing point.
12:33	Crossed the watercourse on foot in waders at the shallowest point, where the two cobble/boulder areas are closest together. Depth ~0.5 m; no perceptible lateral flow.
12:35	Arrived on the south bank.
12:37–12:50	Climbed bank to inspect the Glenmoriston HPP outfall structure. Photos and video recorded from the structure.
12:53 onward	Walked south bank downstream towards the river mouth. Consistent bank character observed. Attempted a second crossing further downstream; water deeper at this point, so continued on south bank.
13:08	Doubled back along south bank towards the original crossing point.
13:16–13:18	Back at the gravel outcrop near the outfall. Short video of the gravel area; images showing aquatic vegetation on the gravel substrate.
13:20	Re-crossed to the north bank at the same shallow point.
13:27	Returned to starting point (river mouth, north bank). Comparison photo/video taken to check for visible change in water level since arrival. No significant change observed.
~13:30–14:00	Drone flights: vertical passes at different heights for a mapped perspective of the reach; angled passes at different heights along the banks.



4.3 Media Collected

An extensive photographic and video record was made using both a camera phone and a drone. The imagery is stored in the associated folder and includes:

- Camera phone stills and videos of the bank, shoreline, waterline, and substrate conditions from both banks.
- Underwater/through-water photos where water clarity permitted, showing substrate character.
- Photos and video of the Glenmoriston HPP outfall structure.
- Drone imagery: vertical and angled passes at multiple heights, providing a comprehensive mapped perspective of the entire reach.
- Comparison images taken at the start and end of the visit to record any changes in water level.

Images are sorted chronologically by timestamp within the folder.

5. Field Observations

This section records what was observed during the visit. Interpretation is provided separately in Section 6.

5.1 Hydraulic Character / Flow

- The water surface gradient from the river mouth upstream towards the falls and HPP outfall was visually imperceptible during the visit.
- At the approximate midpoint of the reach, the channel was crossed in waders. Water depth at the crossing was approximately 0.5 m. There was no perceptible lateral flow pressure on the waders; the observer reported no sense of river flow at this location.

- No obvious riffle or run structure was observed anywhere in the reach, despite both loch level and river level being low.
- Wind from the loch at times created a visual impression that water was moving from the loch upstream into the river, rather than the reverse.
- The entire lower reach presented as an extension of Loch Ness reaching up to the waterfalls, rather than as a flowing river channel.

5.2 Substrate / Bed Character

- Sections of bedrock with little or no loose overlying material.
- Areas of larger cobbles and boulders.
- Small pockets of gravel observed only in sheltered positions behind larger rocks. No extensive gravel beds or gravel bars were observed.
- Areas of silty sand/sediment, particularly along the southern bank towards the river mouth and at the bank margins. Also present on the northern bank, but more at the area nearest the mouth

5.3 Aquatic Vegetation and Biofilm

- Aquatic vegetation, algae, and other aquatic growth was observed on rocks, particularly on the south bank and around the gravel outcrop area.
- Some aquatic vegetation was noted growing in the silted areas near the river mouth on the north bank.

Note: The observer is not an ecologist. The photos should allow for specialist identification of species if required.

5.4 Freshwater Pearl Mussel

No live freshwater pearl mussels (FWPM) were observed during the visit, despite the low water level (both river and loch) providing relatively favourable conditions for visual detection. (A single half shell was seen on a bank, could have been moved by predator?) This is consistent with the Gavia Environmental 2023 survey findings of low abundance (density classes C and D) in this area, and only at depth, with only large adult mussels present and no evidence of recent recruitment.

5.5 Hydropower Influence

The Glenmoriston Power Station outfall is located at the south-western end of the surveyed reach, adjacent to the base of the waterfalls. Steven Gray (factor) advised that flow in the lower reach can be materially higher when the power station generates (stated pattern: mornings and evenings) and when the river itself is in spate from upstream. During the visit, the outfall did not appear to be discharging, and conditions reflected low-flow/low-energy conditions.

Two distinct sources of water enter the surveyed reach: the river flowing over the falls at Invermoriston, and discharge from the Glenmoriston HPP outfall. The river flow upstream is itself hydro-influenced (recorded at the Levishie gauge), whilst the HPP outfall discharge is an additional, unrecorded input.

5.6 Bank Character

On the north bank, the shoreline progressed from the estuary mouth (with areas of highly silted ground and some aquatic vegetation) through to the cobbled/boulder area opposite the HPP outfall. On the south bank, there was a fairly consistent character along the downstream stretch: a grassy vegetated upper bank, a short steep section of rougher

boulders, then the water. Exposed cobble was limited to the area near the gravel outcrop adjacent to the HPP outfall.

5.7 Semi-quantitative observations relevant to spawning habitat parameters

The following observations were made during the site visit, relevant to physical parameters associated with salmon spawning habitat:

Depth

- At the shallow crossing point near mid-reach, water depth was approximately 0.5 m.
- Extensive marginal areas were observed to be shallow (<0.2 m).
- No areas visually consistent with extensive, uniform shallow gravel beds were observed.

Velocity

- No perceptible lateral flow was experienced while standing mid-channel in approximately 0.5 m depth.
- No riffles, standing waves, or visible turbulent flow features were observed anywhere in the surveyed reach during the visit.
- Wind-driven surface movement from Loch Ness upstream was observed at times.

Substrate

- Substrate was visually dominated by bedrock, cobble, and boulder.
- Small isolated pockets of gravel were present in sheltered locations behind larger rocks.
- No continuous gravel beds or gravel bars were observed.

These observations are based on direct visual inspection and physical presence within the channel.

Parameter	Observation	Basis
Depth	Approximately 0.5 m at crossing; extensive shallow margins; no extensive uniform shallow gravel beds observed	Direct observation while wading
Velocity	No perceptible lateral flow; no riffles or visible flow structures	Direct observation while wading and visual inspection
Substrate	Predominantly bedrock, cobble, and boulder; only small isolated gravel pockets	Direct visual inspection and photographs

6. Interpretation (Non-Specialist, for Ecological Review)

The following points are offered as a structured interpretation for ecological review. The observer is an engineer, not an ecologist, and these observations should be confirmed or qualified by the project ecologist.

1. **Hydraulic suitability:** The lack of perceptible current and the absence of riffle morphology during low loch/low river conditions suggests hydraulic conditions not

consistent with spawning requirements, which typically require moving, oxygenated flow through suitable gravels.

2. **Substrate suitability:** The absence of loose, open gravel beds and gravel bars, combined with the presence of bedrock, cobbles, and fine sediment, suggests limited or no usable spawning substrate in the surveyed reach. Gravel appears to be retained only where sheltered by larger rocks.
3. **Flow regime and habitat stability:** The reach appears to alternate between very low/stagnant conditions (as observed) and short-duration high flows from hydropower generation and river spates. Neither condition falls within the range typically suitable for salmon spawning. The alternation between stagnation and scour may also prevent the development of stable spawning habitat (e.g. fine sediment deposition during quiescent periods, gravel mobilisation during pulses). This requires ecologist/hydromorphology input.
4. **Backwater character:** The reach behaved visually as an extension of Loch Ness during the visit, with wind-driven surface movement *upstream* at times appearing to dominate. This is consistent with a backwater zone near a loch mouth, where velocities are low and fine sediments can accumulate, conditions generally not supportive of salmon spawning.
5. **Aquatic vegetation:** The extensive aquatic vegetation and algal growth on the substrate further indicates prolonged periods of low or no flow, which is incompatible with the scoured, clean gravel habitat required for spawning.
6. **FWPM absence:** No FWPM were observed despite conditions being relatively favourable for visual detection, consistent with the low abundance and absence of recruitment reported in the 2023 surveys.

These observations provide factual physical context for ecological assessment of spawning habitat suitability.

7. Relevance to NatureScot Point (e)

Based on conditions observed at low loch level (~15.41–15.42 m AOD) and low river level:

- The reach between the mouth and the falls/outfall showed no obvious spawning-habitat features: no riffles, no evident gravel beds or bars, fine sediment and vegetation present near margins, and stagnant conditions at mid-reach.
- If confirmed by ecological assessment, this would suggest that loch level fluctuations affecting this reach would have limited relevance to salmon spawning habitat, because suitable spawning habitat appears absent or extremely limited at the mouth reach.
- The Glen Earrach scheme will maintain loch water levels within current upper and lower limits (with only the frequency of fluctuations changing), providing a further basis for concluding that spawning habitat will not be adversely affected.
- The seasonal consideration is also relevant: salmon spawn in winter (approximately November to February) when water levels in the Moriston are expected to be high and the lower reach will be subject to river-driven flow rather than loch-level-driven stagnation
- Note that the SAC is cited in relation to the FWPM populations which are dependant on upstream migrating salmon for transport of larvae which become encysted in the host salmon gills. Salmon do not generally continue migrating upstream after spawning, and hence any salmon which did spawn in the mouth of the Moriston would be irrelevant to the support of the FWPM population. Furthermore, and in addition to the un-suitability of the habitat for spawning in the river mouth, any redds which were deposited are likely to be washed out by the highly variable flows caused

by the Glenmoriston hydropower operations. Finally, the habitat which is essentially loch during non-hydro periods, and then peaking river during generation periods, is unsuitable for the development of salmon through their juvenile life stages.

These conclusions should be confirmed or qualified by a suitably qualified aquatic ecologist.

Appendix A — Data Sources

Data	Source
Loch Ness level	riverlevels.co.uk – Fort Augustus gauge (datum 14.16 m AOD, as stated in field)
River Moriston level	SEPA gauge at Levishie. Note: this gauge is hydro-influenced by upstream schemes; the Glenmoriston HPP outfall discharge into the lower reach is not recorded on this gauge.
Gavia Environmental 2023 surveys	As reported in SLR (2023) Loch Kemp Storage Shadow HRA Report (Stage 1 & 2), Section 5.2.2.2a.(i)
AECOM technical note	River Moriston impact pathways (river mouth and non-physical barrier at canal), February 2026
Ness & Beauly Fisheries Trust	Ness System Habitat Survey (2014)

Report prepared by:	Peter MacDonald
Organisation:	Glen Earrach Energy
Date:	12 February 2026

This Site Visit Report, together with the associated photographic and video record, has been reviewed by an AECOM aquatic ecologist. The review confirmed that from the survey evidence presented from 12th February 2026 that the physical observations documented herein would not change the conclusions of the original AECOM (2026) assessment provided in response to NatureScot point (e) in their letter of 19 January 2026.

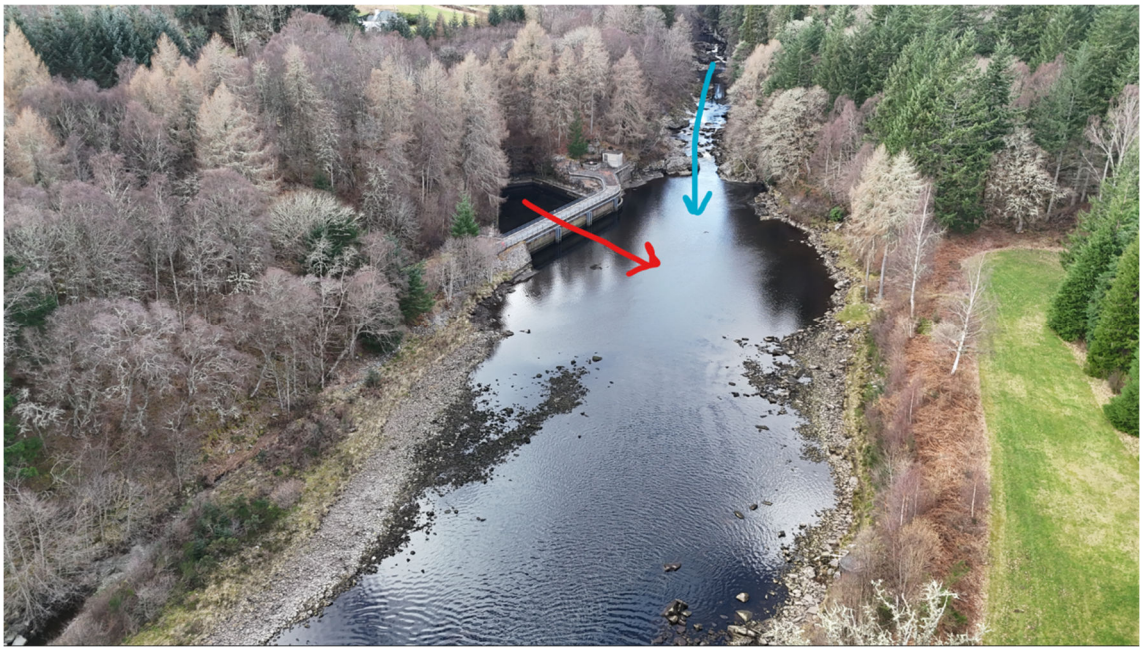
Appendix B — River Moriston Flow Regime – Below Invermoriston Falls

The key hydraulic fact
The lower River Moriston below Invermoriston Falls receives water from two fundamentally different sources with distinct hydraulic and temporal characteristics:

1. **The natural river channel**, carrying residual flows released from Dundreggan Dam, comprising compensation flow, freshets, and tributary inflows, as measured at the Levishie gauging station.
2. **The Glenmoriston Hydroelectric Power Station (HPP) tailrace**, discharging directly at the foot of Invermoriston Falls via a 6.6 km long, 6.1 m diameter tailrace tunnel originating beneath Dundreggan Dam.

These two sources combine immediately downstream of the falls before entering Loch Ness.

The images below shows this – blue is Source 1, the river channel coming down the falls, red is Source 2 the Glenmoriston HPP outfall.



Source 1: Residual river flow (Levishie gauge)
Levishie gauging station (NRFA Station 6009 / SEPA 234262)
Discharge record period: 1994–2011
(Level monitoring continues to present day; discharge calculations ceased in 2011)

Flow statistics

Parameter	Value
Mean flow	5.657 m³/s
Q50 (median)	2.367 m³/s
Q70	1.895 m³/s
Q95	0.708 m³/s
Q10	9.919 m³/s
Q5	24.01 m³/s

Level statistics

Parameter	Value
Normal level range	0.408 m – 2.726 m
Highest recorded level	3.661 m (8 March 2015)
Lowest recorded level	0.280 m

Typical residual flows in the lower Moriston channel are therefore approximately **1–3 m³/s under normal conditions**, with low-flow conditions around **0.7 m³/s**, (this makes sense as compensation release from Dundreggan Dam).

Although discharge calculation ceased in 2011, **level monitoring continues and live level data remain available.** Recent level observations indicate minor daily fluctuations in compensation flow level, with small amplitude variations observed each day at approximately 10:30 and 20:30. However, these variations are extremely small in magnitude, typically ranging only from approximately 0.45 m to 0.48 m at the gauge, and therefore represent negligible hydraulic variation in terms of channel energy or sediment mobilisation.

Source 2: Glenmoriston Hydroelectric Power Station discharge
Station characteristics

Parameter	Value
Installed capacity	~37 MW
Turbines	Two Francis turbines (~18 MW each)
Gross head	~93 m
Maximum turbine discharge	~45 m³/s combined
Per turbine discharge	~22–23 m³/s
Tailrace discharge location	Foot of Invermoriston Falls

The station is understood to operate as a **peaking hydroelectric facility**, with generation occurring intermittently rather than continuously.

Site observations during a field visit on Thursday 12 February (12:00–14:00) confirmed that the station was not generating during that period. Operational timing information obtained from the estate factor indicated that generation typically occurs during morning and evening periods, although this has not yet been independently verified through instrumented generation records.

Attempts were made to obtain detailed operational dispatch data for the station via publicly available electricity market data systems. However, Glenmoriston forms part of a wider Moriston cascade operating under a Balancing Mechanism Unit (BMU), and clearly attributable individual station generation data are not readily accessible from publicly available market datasets within the time available.

Freshet regime at Dundreggan Dam (Licence condition 4.2.5)
Dundreggan Dam provides regulated freshets to support downstream ecological function, particularly salmon migration.

Parameter	Value
Freshet season	1 April – 1 November
Frequency	Weekly
Standard freshet timing	11:00 Tuesday to 16:00 Wednesday (29 hours)
Minimum freshet volume	736,467 m³
Total annual allocated volume	16,938,741 m³
Total available volume	43,778,866 m³
Approximate freshet discharge rate	~7 m³/s additional flow

Compensation flow and compensation hydro
A small compensation hydro turbine at Dundreggan Dam provides additional confirmation of compensation discharge magnitude:

Parameter	Value
Capacity	0.16 MW
Head	~18 m
Inferred compensation discharge	~1 m³/s

Combined hydraulic regime at the foot of Invermoriston Falls
Baseline conditions (outside HPP operation and freshets)

Component	Flow
Residual river channel	0.7–3 m³/s
HPP discharge	0 m³/s
Total	~1–3 m³/s

This represents a low-energy hydraulic regime.

During hydroelectric generation

Component	Flow
Residual river channel	0.7–3 m³/s
HPP discharge	up to ~45 m³/s
Total	up to ~48 m³/s

This represents an abrupt order-of-magnitude increase in discharge.

During freshets (1 April to 1 Nov)

Component	Flow
Residual channel base flow	1–3 m³/s
Freshet addition	~7 m³/s
Total residual channel flow	~8–10 m³/s

HPP generation may or may not coincide with freshet events.

Hydraulic and geomorphological implications

The lower River Moriston downstream of Invermoriston Falls therefore exhibits a strongly bimodal and highly artificial hydraulic regime characterised by:

Low-energy baseline conditions

- Flow typically 1–3 m³/s;
- Low velocities;
- Strong backwater influence from Loch Ness; and
- Locally lacustrine hydraulic characteristics.

Intermittent high-energy pulses during generation

- Rapid discharge increases up to ~45 m³/s;
- Significant short-duration increases in hydraulic energy; and
- Abrupt transition between low and high flow states.

Weekly ecological freshets (between 1 April and 1 Nov)

- Moderate increases (~7 m³/s); and
- Provide important ecological function for fish migration.

Channel morphology seems to reflect this regime, with:

- Bedrock and coarse cobble dominance;
- Armoured bed;
- Limited mobile gravel; and
- Fine sediment accumulation in low-energy zones.

Data confidence and sources

Parameter	Confidence	Basis
Levishie gauge discharge record	High	NRFA verified data
Levishie level monitoring (current)	High	SEPA live gauge
Glenmoriston HPP installed capacity and head	High	SSE engineering data
Turbine discharge estimates	High	Hydropower equation
Freshet regime	High	Licence conditions
Compensation flow magnitude	Moderate–high	Gauge data and compensation turbine
Operational frequency/profile	Moderate	No access to market data yet, anecdotal advice from estate factor