# Allt na Moine hydropower scheme:
# Updated salmonid habitat assessment in relation to a range of raised dam height options

Commissioned Report to Hydroplan Ltd.

March 2026

[redacted]

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## Allt na Moine salmonid habitat assessment

Commissioned Report to Hydroplan Ltd., March 2026

Contractor: Waterside Ecology

**SUMMARY**

*Background*

This survey of trout habitat was conducted in relation to proposed changes to the Allt na Moine hydropower scheme at Callakille on the western side of the Applecross peninsula.

Current proposals are in place to alter the height and length of the dam at the outflow of Lochan Dubh to increase storage capacity in the loch. A range of dam heights and lengths are being considered, varying from 1 metre to 4 metres above the current consented spillway height of 247 metres above sea level (asl). An increase in dam height will extend the area of the upstream catchment being inundated by the reservoir, and will mean that an additional un-named lochan will be subsumed into the expanded reservoir.

Hydroplan Ltd. requested a detailed assessment of spawning and nursery habitats in the lochs and inflowing streams which would be inundated under the new proposals. This information is incorporated with previous survey data and subsequent changes to loch height to provide an updated baseline on current fish habitats, and to elucidate the potential impact of the proposed additional changes on trout populations in the upstream catchment.

Increases to the dam height are also predicted to alter downstream flows, specifically by reducing the frequency of spillage over the dam. This has the potential to affect sensitive downstream receptors, so Hydroplan Ltd have therefore also requested a quantitative assessment of fish habitats in the Allt na Moine downstream of the dam to help inform assessment of these potential impacts.

*Methods*

Walkover surveys were carried out in February 2026. These followed the same methodology as the original surveys carried out in 2020 to inform the original hydro scheme construction, and data from the original surveys is also incorporated in the interpretation and assessment reported here. The new 2026 surveys extended the area of survey to include new relevant sections, in particular shallow water spawning habitats in the un-named lochan, habitat above migration barriers which may be subject to inundation, and along the entire downstream stretch of the Allt na Moine between the tidal limit and the dam.

*Main findings*

- Allt na Moine downstream of the dam is suitable for trout production in its middle reaches, but populations are likely to be limited by the presence of impassable waterfalls near the river mouth, and in the gorge below the dam.
- Existing flows appear sufficient to maintain key habitat features, and alterations in flow related to proposed changes at the dam are unlikely to cause significant additional impacts to the trout population in this part of the catchment.
- Raising of the of the dam height will inundate a small lochan, 170 metres in diameter, which is currently isolated to the west of the reservoir. It is not known whether this lochan currently contains trout, but it is deep and large enough, and contains the required features, including suitable spawning substrate in its littoral margins, to sustain a population.
- Inundation of the lochan at heights above 248 m asl will result in the loss of spawning and habitat diversity in the littoral zone of the unnamed lochan. It may result in further biodiversity impacts if the lochan is currently fishless.

- Access for trout to other areas and lochs in the catchment upstream will be unaffected by the proposed increase in dam height.
- Raising of the dam height from the current level of 247 m to between 248 and 251 m asl will inundate between 4 and 19% of the available trout nursery habitat and 6 and 13 % of the available trout spawning habitat in the main inflowing stream.
- The additional impacts on trout habitat are relatively small in the context of the likely changes caused by the existing scheme.

## 1 Introduction

This survey of fish habitats, with a particular focus on trout spawning habitats, was conducted in relation to the proposed modification of the Allt na Moine hydropower scheme at Callakille on the Applecross peninsula in Wester Ross. This 2 MW scheme was built in 2022 and operates by capturing and transferring flows from the headwaters of the neighbouring Allt na h-Eirigh catchment into a newly created storage reservoir at Lochan Dubh in the middle reaches of the Allt na Moine catchment. Water is taken by pipeline to a powerhouse in the lower reaches of Allt na Moine. A baseline compensation flow corresponding to the natural Q95 level is provided at the base of the dam, to mitigate against the most significant impacts of abstraction from the downstream watercourse.

Current proposals are in place to alter the height and length of the dam at the outflow of Lochan Dubh to increase storage capacity in the loch. A range of dam heights and lengths are being considered, varying from 1 metre to 4 metres above the current consented spillway height of 247 metres above sea level. An increase in dam height will extend the area of the upstream catchment being inundated by the reservoir. Any significant raising of the dam height will also mean that an additional un-named lochan to the west of Lochan Dubh will be subsumed into the expanded reservoir. The new reservoir also has the potential to inundate existing barriers to upstream migrating fish, and thereby connect new areas of the upstream catchment with the fish population currently present in the reservoir.

Low-gradient reaches of loch inflow streams often provide important areas of spawning substrate for salmonids, which in the case of this scheme would be resident trout. In the presence of suitable substrate and adequate water movement, loch margins may also be used for spawning. In upland areas such as this, where stream gradients tend to steepen towards the headwaters making the habitat inaccessible or unsuitable for spawning, clean well-oxygenated spawning habitat in accessible low-gradient reaches can be critical in sustaining resident trout populations.

This survey was undertaken in order to identify habitat suitable for trout spawning in both the loch margins and within all watercourse reaches accessible from the loch. These data allow an assessment of the proportion of the currently available spawning habitat likely to be affected by the proposed scheme expansion. Potential impacts of the proposed modification include:

- Reductions in the area of spawning habitat available to the resident trout population in the inflow stream for the Lochan Dubh reservoir;
- Alteration of flow, silt accumulation and reduced aeration in sections of inflow streams to be inundated;
- New artificial connectivity to upstream areas of the catchment currently isolated by impassable waterfalls;
- Reductions in the area of spawning habitat available to the resident trout population, if present, of the unnamed loch to the west of Loch Dubh Deas;
- Possible introduction of trout into a potentially fishless lochan;
- Reduced exposure to wind and water movement in spawning areas along the lochan margins;
- A reduction of productivity in the draw-down zone around the lochan margins;
- Reduction in the frequency of moderate and high flows in the river below the dam as a consequence of reduced spill frequency at the dam.

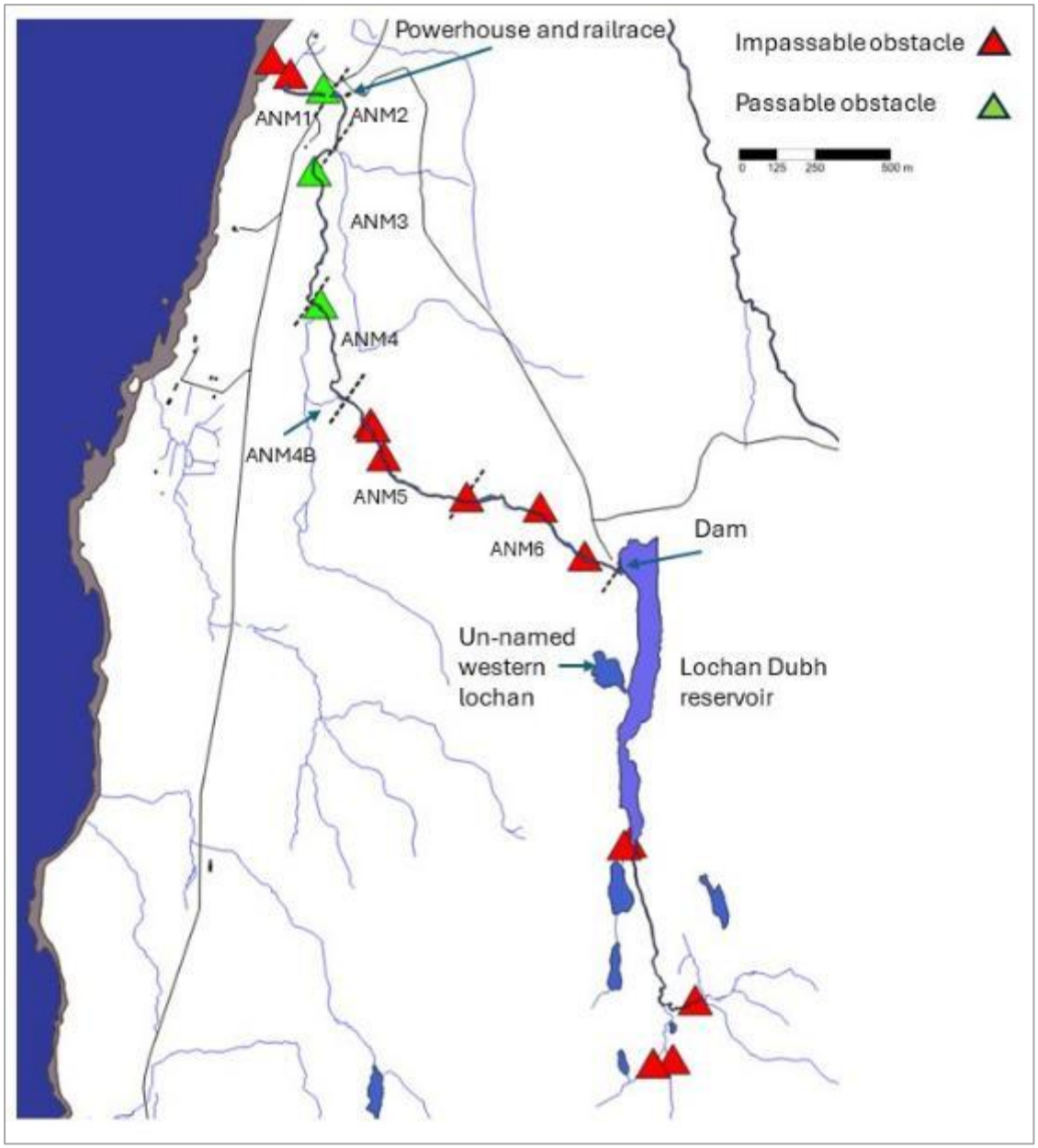
## 2 Fish populations

### *2.1 Species potentially present*

The Allt na Moine is a small river on the western side of the Applecross peninsula. It rises on the high ground on the western flank of Beinn a Chlachain and flows roughly north through a string of small lochs before turning to the north west and dropping steeply to the sea. There are a total of eight small lochs within its catchment. The main river downstream of the lochs is steep and has numerous substantial waterfalls which are impassable to migratory fish.

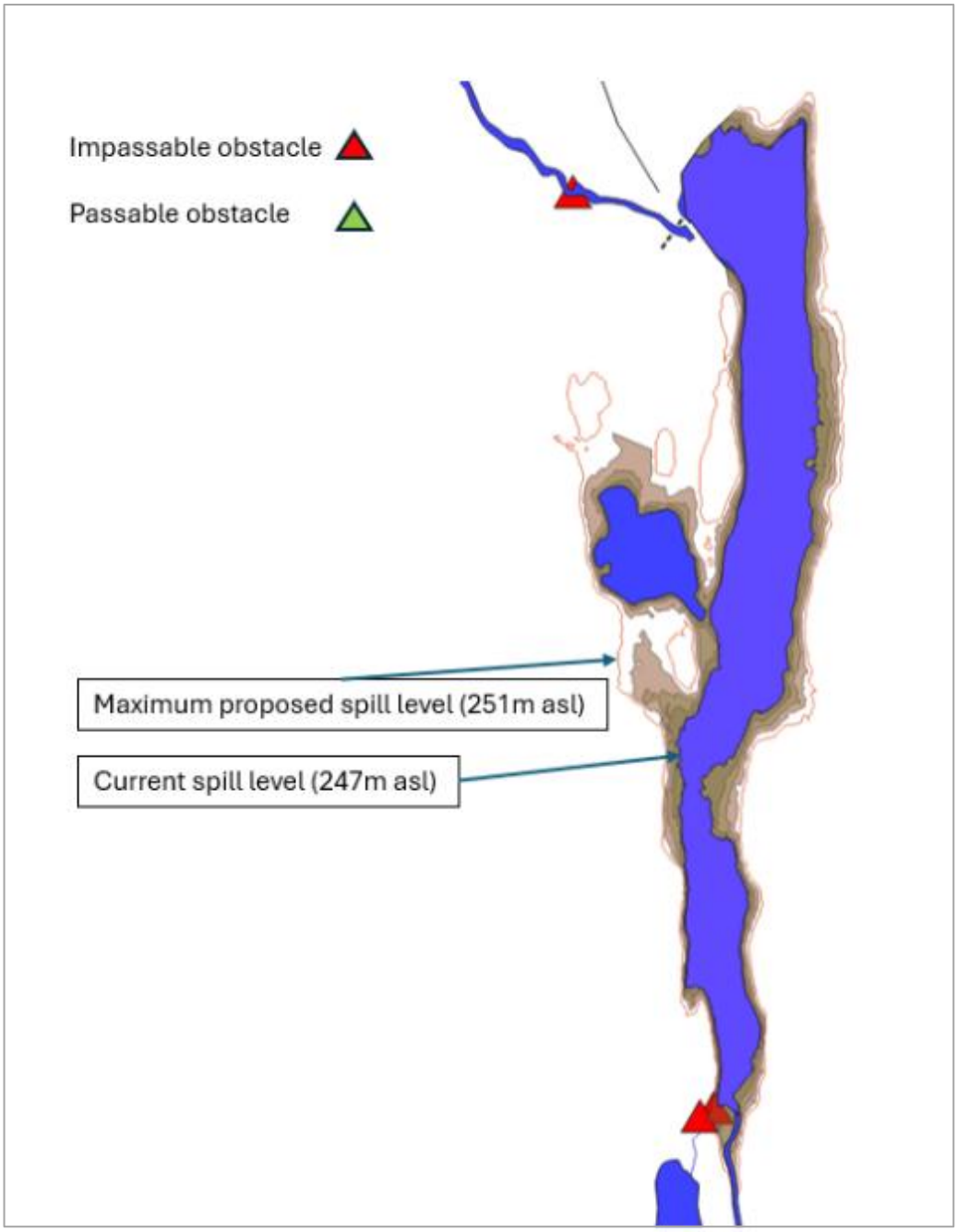
The original fish habitat survey (Waterside Ecology, 2020) takes in the three lochs Lochan Dubh, Loch Dubh Deas and Lochan an Fheòir, along with their connecting rivers and the accessible reaches of their inflow streams. This report assesses this original information in the context of the current operation to provide an updated baseline, for comparative assessment of the potential effect of new proposals for extension. It also provides new information on the un-named lochan to the west of Loch Dubh Deas, assesses habitat above relevant impassable obstacles, and extends the survey information to the Allt na Moine between the sea and the dam. (Figures 1 & 2 and Appendix 1).

*Figure 1. Overview map of key features of the survey area, including survey reach boundaries and codes.*



As the entire survey area is upstream of impassable obstacles (which are described in more detail in later sections using updated survey information) the only fish species expected to be present is resident brown trout *Salmo trutta*, which is widely distributed in the area (National Biodiversity Network Atlas), and were shown to be present throughout the lower Allt na Moine in the 2012 baseline Environmental Statement fish survey (Webb & Moir 2012). Trout may have accessed the area naturally in the early stages of glacial retreat, but local anecdotal accounts also suggest that this may have been historically supplemented by informal stocking by people using shielings for seasonal sheep grazing. The substantial waterfalls downstream of Lochan Dubh are not considered to be passable by eels, but it is possible that they may gain access into the upper catchment via alternative watercourses and areas of bog and wet ground, or through the water transfer tunnel from the Allt na h-Eirigh.

*Figure 2. Detailed map of the reservoir showing indicative extent of current and proposed future water levels, in 1-metre increments.*



### *2.2 Conservation status*

The target species for this survey, brown trout, is listed as priority species on the UK and Scottish Biodiversity Action Plan lists.

### *2.3 Habitat requirements*

The physical habitat requirements of juvenile salmonids have been subject to a considerable amount of detailed study (for reviews see e.g. Crisp 1993; Hendry & Cragg-Hine 2003; Klemetsen *et al*. 2003; Summers *et al*. 1996). Trout spawn in late autumn and early winter, depositing their eggs in redds which they excavate in gravel and pebble substrates. Eggs are often deposited in areas of accelerating flow, such as the tails of pools and glides, upstream from riffles. However, in upland streams eggs may be deposited in any areas of gravel that can be physically moved and trout may spawn in lochs where no spawning stream is available. Loch spawning usually takes place on clean gravel in locations, such as spits or promontories, where wave action results in some water movement (Maitland & Campbell 1992). A good supply of oxygen is essential for eggs to develop and this is facilitated by a flow of water through the gravel. Clogging with fine sediment such as silt and fine sand reduces water flow resulting in egg mortality due to lack of oxygen. Egg survival in streams is also affected by redd 'washouts' during winter spates – the direct, physical, scouring out of eggs from the gravel.

After hatching the young fry remain in the gravel, absorbing nutrient from the remaining yolk sac. On emergence, usually between March and early May, the young fry disperse and set up territories which they defend aggressively. Trout fry prefer areas of relatively low velocity water near the streambed. Cover from stones, plants or debris is required and good cover is essential for maintaining high fry densities.

Trout parr generally favour areas of relatively low current speed where cover is available. Juvenile trout are often to be found in cover alongside the banks, in undercuts, among tree roots or in marginal vegetation. However, where lochs are present and spawning streams are small, the majority of juvenile trout are likely to descend into still-water habitats at the end of their fry year. Cover remains important for adult trout, particularly in smaller streams. In larger rivers and lochs this may be less important, as deep water provides refuge.

## 3 Objectives

SEPA requirements for fish surveys at hydroelectric schemes are set out in the Guidance for Applicants on Supporting Information Requirements for Hydropower Applications (SEPA 2010). Fish habitat assessment is required for all schemes and electric fishing to determine species composition and abundance may be required in some circumstances. The guidance is mainly aimed at run-of-river schemes, not storage schemes such as Allt na Moine. In this case, the proposed new modification to the consented scheme would result in raised water levels in Lochan Dubh, affecting the un-named lochan, and the connecting and tributary streams.

The aims of the current surveys were to:

- Map the distribution, extent and quality of spawning habitats for trout in the margins of the un-named lochan to the west of the Lochan Dubh reservoir.
- Map the distribution, extent and quality of spawning habitats for trout in the Allt na Moine between the sea and the dam, and in the streams above any impassable barriers which may be inundated.
- Incorporate this new information with previous survey data and subsequent changes to loch height to provide an updated baseline on fish habitats, with particular reference to brown trout, in the watercourse survey reaches;
- Provide guidance on potential impacts on fish habitats and populations that might result from the range of new proposed dam heights and associated increases in water levels.

## 4 Methods

Walkover surveys of fish habitats were carried out by Alistair Duguid of Waterside Ecology on the 17th and 18th March 2026. The method followed was identical to that used in the original 2020 survey, but is described again here for completeness. Water levels were moderate to low, skies were clear and sunny and the water was very clear, creating excellent survey conditions. Visibility in the loch extended down to at least 1 m depth.

The target species for the walkover survey was trout. The survey method was based on the protocols described by Summers et al. (1996), Hendry and Cragg-Hine (1997), and SEPA (2010). These characterise in-stream habitats according to depth, substrate, flow and thus suitability for different age classes of salmonid. The habitat categories used during the survey and in this report are set out in Table 1. Surveys were based on contiguous sections of varying length (see Appendices). Areas of each habitat category were marked on 1:10000 maps of the river in the field, using colour codes.

Particular attention was paid to the location, quality, and extent of suitable spawning substrate. Spawning locations were recorded individually and data were collected on location (using GPS), extent and quality of each patch of suitable habitat. Locations of spawning habitats were marked on maps in the field.

*Table 1 Habitat categories used for walkover survey*

| Habitat category | Description |
|---|---|
| Fry habitat | For salmon, shallow fast flowing habitat with substrate of pebble and cobble. For trout, shallow slow flowing habitats with substrate of pebble and cobble. |
| Mixed juvenile habitat | Habitats with mixed depth and coarse substrates including cobble, boulder and pebble that provide cover for salmonid fry and parr. Depth typically 10 to 50 cm. |
| Deep pool | Over 1 m deep. Slow or eddying current. Suitable for adult salmonids if cover is present. If >1 m deep cover may be less important, as depth can provide refuge. |
| Spawning | Ideally well oxygenated, stable & not compacted. Typically comprising gravel and pebble. Fines (sand & fine gravel <2 mm) less than 20%. Not silted. |
| Bedrock | Sheet bedrock or compacted earth covering majority of streambed. No cover. Unproductive habitat. |

In order to assess the impact of the proposed scheme, the proportion of habitat to be inundated needs to be assessed as a proportion of the full available amount. Obstacles to migration were therefore described, recorded and photographed. Their likely passability for adult brown trout was assessed. Where possible, the height (lip to water surface at base/plunge pool) and length (upstream to downstream) of obstacles was measured. The likelihood of obstacles being passable was assessed based on data provided by SEPA (2010), SNIFFER (2010) and the surveyors' own wide experience of fish population survey.

Other variables recorded in each survey section were: (i) up and downstream grid reference, (ii) wet width, (iii), stability of substrate, (iv) compaction of substrate and (v) availability of cover for fish alongside banks. The surveyor also made a subjective assessment of typical habitat quality for juvenile salmon and trout in each section.

There are no widely accepted methods for assessment of lake spawning habitat for brown trout, but most comments on lake spawning suggest trout have a requirement for: i) suitable substrate (gravel, pebble and small cobble), ii) water movement (wave-washed, exposed shorelines), iii) lack of fines and, where present, iv) upwelling water (e.g. springs). The last cannot easily be assessed in the field, so the survey described the extent of suitable clean, wave-washed substrates. The location, area and water depth (maximum and minimum) over potential spawning habitats was recorded. The survey was restricted to visible, shallow (wadeable) loch marginal habitats.

# 5 Results

Results are separated into the new survey sections in the lower Allt na Moine catchment, and the updated re-evaluation of the sections upstream of the reservoir.

## *5.1 Allt na Moine between seashore and dam*

The Allt na Moine was surveyed in its entirety between the tidal limit and the dam. It was separated into 6 sections, separated by obvious geographic features or broad changes in habitat features.

### 5.1.1 Obstacles to migration

The most significant obstacles to fish passage identified during the current survey are listed in Table 2 and shown on the map in Figure 1, alongside obstacles identified in the original 2020 survey. Photographs are provided as Appendix 8.1.

*Table 2 Obstacles to fish movement*

| Section | NGR | Type | Passable? | Notes |
|---|---|---|---|---|
| ANM1 | NG 6900 054266 | Waterfall | No | 2 m high waterfall with no pool at foot. |
| ANM1 | NG 69073 54209 | Waterfall | No | 3 m waterfall, limited depth at foot |
| ANM1 | NG 69205 54154 | Culvert | S/F | 25 m long culvert, water depth c 20 cm, fast flow, no baffles, high velocity, likely partial barrier |
| ANM3 | NG 69166 53827 | Waterfall | S/F | 70 cm waterfall. Passable, but would need elevated flows for trout |
| ANM4 | NG 69190 53303 | Waterfall | S/F | Series of small waterfalls, up to 1m high which would be passable at higher flows, but need elevated flow above baseline |
| ANM5 | NG 69392 52831 | Waterfall | No | Bedrock chute, 2 m high, 12 metres long, depth <10 cm. |
| ANM5 | NG 69400 52818 | Waterfall | No | Vertical falls 2 m high. A short distance above ANM5.1 |
| ANM5 | NG 69441 52704 | Waterfall | No | Bedrock chute 4 m high and 20 metres long, with complex chute and falls 2 m high at top. Then a series of 7 further falls between 1 and 7 metres high, all impassable. |
| ANM6 | NG 69768 52544 | Waterfall | No | Cascades 40+ metres high. |
| ANM6 | NG 70057 52500 | Waterfall | No | 5 m high bedrock fall and chute. |
| ANM6 | NG 70235 52308 | Waterfall | No | Series of 6+ cascades, 1-2 metres high each, and finally a cascade 6 m high at upper end. |

S/F: passability of obstacle likely to depend on size of fish and flow conditions

The lowest section, ANM1, between the tidal limit and the public road close to the powerhouse, contains three significant barriers to migration. Firstly, there is a 2-metre-high waterfall immediately upstream of the sea shore which was judged impassable to migratory salmonids both because of its height and structure, as well as a lack of water depth at the foot preventing leaping behaviour. Shortly above this there is a further 3-metre-high waterfall which was also judged to be impassable. At the top of this section the river flows through a culvert under the public road. This does not have any mitigation for fish passage and is likely to be a significant obstacle due to its 20-metre length, shallow depth and high water velocity. It may be passable by smaller fish and eels at low flows, but its proximity to much larger natural waterfalls means that it will not be a significant influence on fish communities in any case.

Section ANM3 contains a small rock outcrop which creates a low 70 cm high waterfall. This will be readily passable to trout under moderate and high flows, but would not have been passable under the low flows observed at the time of the survey.

Section ANM4 has a series of small falls immediately above the confluence with the unnamed left bank tributary. The largest of these is approximately 1 metre high. There is a sufficiently deep pool below this, and it is likely to be passable to larger brown trout, but would require elevated flows.

The character of the Allt na Moine changes substantially above NG 6936 5286, a short distance above the sheepfold in the lower part of section ANM5. From this point upstream the gradient increases dramatically, and there are a succession of large impassable waterfalls and bedrock cascades throughout section ANM5 and ANM6. The most significant ones are recorded in Table 1 and Figure 1, but there are several other smaller cascades and falls between these points. The largest feature is an impressive series of cascades which are approximately 40 metres high in total, and will be impassable to all fish species, including eels.

### 5.1.2 Stream habitats

Table 3 provides summary data for the different habitat categories across the 6 survey sections, which are also shown in representative photographs provided in Appendix 1. Mixed juvenile habitat and bedrock were the most common habitat types, together making up approximately 90% of all stream habitat, with each accounting for approximately equal proportions of the total. Pool and glide habitat were less frequent, each making up less than 5% of the total area. Spawning habitat was rare, with just 12m$^2$ being clearly identified as suitable, although there are smaller cobbles and gravels scattered throughout the mixed juvenile habitat sections which are also likely to offer small pockets of spawning potential for trout.

Overall habitat changes abruptly with distance upstream, from a short bedrock-dominated stretch between the sea and the powerhouse, through a lower gradient middle section dominated by mixed gravel/cobble/boulder substrate offering reasonable juvenile habitat, until an upper section which is much higher gradient and is dominated by bedrock shelves, offering little or no potential for fish production. This last section covers almost half of the total length of the lower Allt na Moine between the dam and the sea.

*Table 3 Estimated areas of each habitat type*

| **Survey section** | **Wet Width** (m) | **Estimated area of habitat type** (m$^2$) | | | | |
|---|---|---|---|---|---|---|
| | | Mixed juvenile | Pool | Glide | Bedrock | Spawning |
| ANM1 | 4 | 592 | 128 | 88 | 620 | 0 |
| ANM2 | 2.5 | 370 | 0 | 245 | 0 | 1 |
| ANM3 | 3 | 1809 | 0 | 141 | 174 | 7 |
| ANM4 | 2 | 670 | 126 | 0 | 52 | 4 |
| ANM4B | 1 | 400 | 0 | 0 | 0 | 0 |
| ANM5 | 3 | 438 | 162 | 0 | 1515 | 0 |
| AM6 | 5 | 715 | 50 | 0 | 2885 | 0 |
| Total | | 4994 | 466 | 474 | 5246 | 12 |

#### 5.1.2.1 Section ANM1

This 350-metre-long section between the shoreline and the public road is dominated by bedrock shelves in its lower half, with large obstacles interspersed with deeper pool areas, which are more than 1 metre deep in parts. There is limited cover for juvenile fish in this part, but the deeper pools may offer potential for larger trout. The upper half of this section is lower gradient, with a stable bed composed mainly of boulders and larger cobbles. It provides good cover for juvenile trout, particularly parr. Depths are mostly between 20 and 50 cm, and flows are mixed run and glide. Bed substrate in this section is generally too large for trout spawning, although there may be small pockets of smaller gravel in the deepest areas, which were difficult to observe clearly. Although limited in length, this section provides over 10% of the total area of mixed juvenile habitat available in the Allt na Moine because it is a relatively large watercourse at this point.

#### 5.1.2.2 Section ANM2

Section AM2 is a 250 m long reach of stream between the road and a confluence with a small unnamed tributary joining from the right bank. This stretch includes the powerhouse and tailrace, which provides a short section of deeper glide, providing good habitat for trout parr. Above the tailrace, the stream is noticeably smaller, narrow and shallower, and the impact of the existing abstraction was evident. The section immediately above the tailrace is a long section of glide habitat, mostly about 30 cm deep with good bed cover- this would be suitable for trout parr in particular. The upper half of the section provides good mixed juvenile habitat. It is shallower, mostly run and riffle flows, between 10 and 20 cm deep. The bed substrate is cobble and boulder, and it offers good cover for trout fry in particular, being too shallow in most places to provide good parr cover. Pockets of suitable spawning sized gravels were seen between larger cobbles, particularly over a 2 $m^2$ patch in the lower part of this stretch, although even this was too large to be considered good quality.

#### 5.1.2.3 Section ANM3

This longer section covers 700 metres between the right bank tributary up to a confluence with an un-named tributary entering from the left bank. It has a 50-metre-long section of glide in its lower part, which is 30-40 cm deep. Above this, the reach is composed of mixed juvenile habitat. It is shallow, mostly less than 30cm deep, with a mixed cobble-boulder substrate, and run and riffle flows. It provides good cover for both fry and parr, although depth is likely to be limiting for parr. There are several stretches of exposed dry side bar in this stretch.

Overall, this section provides the most extensive reach of good quality habitat in the whole of the surveyed lower catchment, although a lack of depth is likely to be a limiting factor for fish production. It contributes over 1/3 (36%) of the total mixed juvenile habitat and most (c.60%) of the spawning potential for the trout population of the lower Allt na Moine. Most of the spawning is of limited quality, in small pockets of gravel among larger cobles, but there was a good 1$m^2$ patch of spawning in the stretch immediately downstream of a notable area of eroding terrace on the right bank. This is the only actively eroding section of bank observed anywhere in the Allt na Moine, and it appears to be the main source of spawning grade substrate for the stream channel. This spawning section is upstream of a small 70 cm waterfall (described earlier), so free access up to this spawning section would require elevated flows above the baseline conditions seen at the time of the survey.

#### 5.1.2.4 Section ANM4

Section ANM4 covers 420 metres of the main stem of the Allt na Moine between the left bank confluence and the sheepfold marked on the OS map. It runs down a short rock outcrop in its lowest reaches, which increases the channel gradient and has created several small pools, up to 1 metre deep, as well as several small waterfalls. Above this short stretch, the stream is again mostly mixed juvenile habitat, although there is also a small pool and a short glide section in the middle of the reach. Other than the pool, the stream in this part of the section is shallow, less than 30 cm deep, with cobble/boulder substrate providing good instream cover for trout fry and parr. There is some spawning potential in this reach, with 4 $m^2$ of suitable spawning gravel identified in small patches scattered between larger cobbles and boulders.

In the upper 100 metres below the sheepfold the channel widens considerably across a fan area where the gradient decreases and large boulders and cobbles have been deposited as the channel exits the confined gorge upstream. This section is very shallow, mostly less than 10 cm deep, and half of the bed is dry. This part of the stream is not suitable for trout, and may have been impacted at least partly by the existing flow abstraction.

#### 5.1.2.5 Section AM4B

Section ANM4B is an unusual subsidiary channel, formed where the main Allt na Moine splits into 2 separate channels at the sheepfold. It is not obvious whether it has been artificially created, or is the result of natural erosion as the stream flows through this lower gradient area.

It covers a short stretch approximately 200 metres long, flowing due west and linking the main river with the unnamed tributary on the left (southern) part of the valley. It is less than 10 cm deep until reaching the unnamed tributary, and the channel runs below the bed surface in parts. Overall, this channel is not suitable for fish production and would not normally provide an alternative upstream migration route, other than possibly during extreme high flows when the channel may be sufficiently wetted. The tributary which this channel flows into is small, narrow and incised, with the cobble and boulder bed. It provides very good bankside cover under overhanging, heather-draped banks, and would be particularly suitable for trout parr.

#### 5.1.2.6 Section ANM5

Section ANM 5 is wide and shallow in its lower 100 metres, with cobbles and boulders providing good cover, although depth may be limiting suitability for parr. Above NG 6936 5286 the gradient increases substantially, and the bed is mainly composed of bedrock, offering very limited cover for fish. There are many obstacles from this point upwards, as described in earlier sections, leaving a series of small, isolated areas of habitat which offer little or no potential for fish production.

#### 5.1.2.7 Section ANM6

Section ANM6 beings with a series of large cascades and waterfalls, over 40 metre high and extending for over 10 metres. Above this point the channel remains dominated by bedrock, with isolated short stretches of pool and glide separated by waterfalls and cascades. This section has very limited potential to support trout production.

The channel gradient eases for the final 100 metre reach below the dam, but even here the bed remains mainly composed of bedrock and large boulders, offering little cover for juvenile trout and no spawning potential.

### *5.2 Upper catchment above dam*

The aims of the survey here were to assess habitat in the lochs and streams which would be affected by inundation under the proposed increases in water level at the reservoir. Results are separated into the loch habitat in the unnamed lochan to the west of the reservoir, and the relevant features in the inflowing streams to the south of the reservoir.

### 5.2.1 Lacustrine habitats in the unnamed lochan

The unnamed lochan west of the reservoir is a small circular lochan, with an area of 12,200 $m^2$ and a perimeter of approximately 510 metres. It is approximately 170 metres across at its widest point. It is similar in size and character to some of the named lochs in the catchment such as Loch nan Eun to the south (see Figure 1). Although it is small, it contains a varied range of habitat features in its littoral zone, and a diverse depth profile.

The outfall of the lochan lies just a few metres to the west of the main reservoir, from which it is separated by a steep drop. At the time of the survey this was c. 3 metres high, although it will be as little as 60 cm from the current spill level height, as evident from the trash line. There is very little flow from the outfall though, and although the vertical drop is not substantial when the reservoir is full to capacity, it appears very unlikely that trout can currently migrate into the lochan from the main reservoir.

There is no inflowing stream entering the lochan capable of supporting fish. The main inflow appears to be from the north, where there is seepage through wetlands.

The lochan has a large sandy bay in its far northern end, which has a few buried boulders, and roots of emergent vegetation. The eastern part of the north shore also has a gently sloping shallow littoral zone, but this is rockier, mainly composed of large boulders and cobbles, with small pockets of potential spawning gravels. This shore appears to be washed by waves, and the substrate is largely clear of fine sediment. The eastern and southeastern shores drop off steeply to >1m depth, and are composed of large angular boulders and cobbles which offer good cover for fish, but are too coarse to offer good quality potential for spawning. The southern shore is shallower and more sheltered, with sand accumulations. A smaller patch of potentially suitable spawning gravels was identified in the south west

corner. The west shore has one sandy shallow bay, but then drops off more steeply to <1m in the north west part of the lochan. Substrate on the western shore has more moss growth and appears to be less washed by waves, which would be expected as it is sheltered from prevailing south westerly winds.

In total, 17 $m^2$ of potentially suitable spawning was identified, most of this being on the exposed north eastern shore. Most of this was of moderate quality at best, due to the general lack of small gravel. There is no suitable spawning around the outflow, which carried very little flow and was dominated by large boulders. Photographs of the habitat features around the lochan are provided in Appendix 1.

#### 5.2.2 Inflowing streams

Two main issues were examined relating to habitat in the inflowing streams, firstly the presence of any migration barriers in relation to proposed loch level changes, and secondly the type and quality of fish habitat in areas subject to inundation.

##### 5.2.2.1 Migration barriers potentially affected by loch level changes

Figure 1 shows the location of barriers which were previously identified during the 2020 habitat survey. These were compared against a GIS shapefile provided by Hydroplan showing the predicted inundation extent under different scenarios, as shown in Figure 2. It can be seen that barrier AM3.1 would be at the shoreline of the proposed extended reservoir, and is likely to be inundated, at least partially. This barrier was therefore reassessed in more detail, and the catchment upstream was surveyed to identify any additional obstacles which might limit further migration upstream if this waterfall were to be inundated.

Updated photos of the barrier AM3.1 are provided in Appendix 1. Its location was checked with GPS and updated slightly to NG 70408 51180. This is a complex area which contains a 1m high vertical waterfall, with a further bedrock chute upstream and a cluster of large boulders immediately downstream. The total vertical height of the overall structure was estimated at 3.5 metres. It is currently preventing trout migrating from the reservoir to Loch nan Eun, and potentially the catchment further upstream. The watercourse between this point and the reservoir shore is extremely small and flows underground in places.

The extended survey identified a second waterfall (AM 3.2) approximately 15 metres upstream of this point at NG 70391 51169 - photos can be seen in Appendix 1. This is also a complex structure, composed of a stepped bedrock fall, on top of several large boulder blocks, with water flowing between these. It has a total vertical height of 2 metres, although the waterfall itself is less than 1 m. While the vertical height in itself would not necessarily be impassable, the nature of the obstacle means that there is no viable route for migrating fish to ascend between the boulders, and it was also judged to be impassable.

The base of this waterfall was estimated to be 50 cm above the top of barrier AM3.1, and in total, the vertical drop between the bottom of the lowest part of obstacle 3.1 and the top of obstacle 3.2 was estimated to be approximately 6 metres.

Above this point the watercourse is undefined, and water flow seeps through a wetland area, with no discernible channel for 20 metres. There is no apparent migration route for fish through this section. In its upper 50 metres the channel becomes more defined towards the outfall of Loch nan Eun, at which point it is 30 cm wide and flows over a substrate of large cobbles and boulders.

##### 5.2.2.2 Stream habitat in proposed areas of inundation

The watercourses which would be inundated under the new proposals are the bottom reaches of the unnamed tributary leading from Loch nan Eun, and, more significantly, the lower reaches of the Allt na Moine to the south of the reservoir.

During the 2026 field survey, a rapid walkover was carried out of habitat in these stretches, to compare with the outputs of the original 2020 habitat survey. This confirmed that the relevant area upstream of

the current reservoir inundation remained qualitatively unchanged. Detailed estimates to provide an updated 2026 baseline of habitat availability, and changes subsequently predicted under the new proposals, are therefore taken from the original 2020 survey maps, which were updated against GIS shapefiles provided by Hydroplan showing both the currently licensed and proposed new inundation levels.

The unnamed tributary from Loch nan Eun is extremely small, and has already been inundated along most of its accessible length by existing loch level changes. The remaining accessible stream habitat is less than 20 metres long, and 40 cm wide, providing little significant opportunity for trout production.

The main stem of the Allt na Moine is considerably larger, and essentially provides all of the potential habitat for juvenile trout spawning and production for the reservoir. At the currently licensed spill level (247 m asl), loch level changes have inundated the water course to approximately NG 70433 51092, covering the lowest 140 metres of the watercourse, compared to the 2020 baseline. This leaves a total stream length of 1,330 metres and an area of approximately 3,800m$^2$ remaining currently available to trout migrating up from the reservoir, until they reach impassable barriers in the three main headwaters. The breakdown of different habitat types within this updated 2026 baseline of available habitat is provided in Table 4 below.

*Table 4. Summary of availability and distribution of stream habitats*

| **Watercourse** | **Estimated area of habitat type** (m$^2$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Mixed juvenile | Pool | Glide | Bedrock | Peat channel | Spawning | All (excl. spawning) |
| AM4-AM10 | 1,991 | 70 | 1,230 | 110 | 12 | 16 | 3,429 |

## 6 Interpretation and potential scheme impacts

### *6.1 Survey limitations*

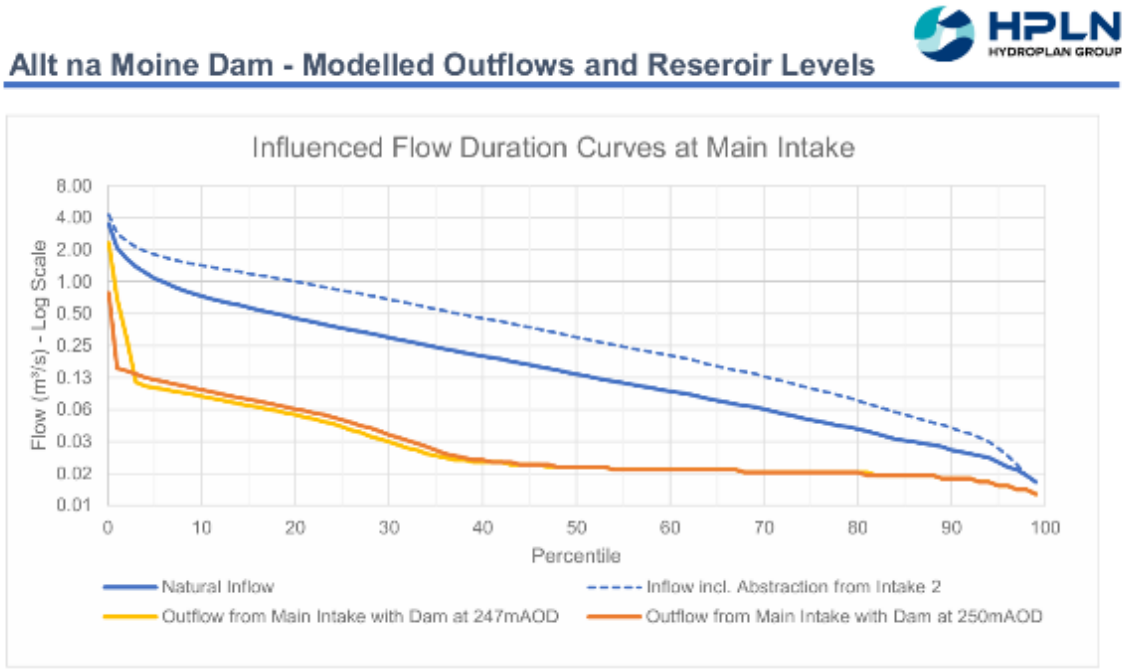
Conditions for the survey were ideal, with strong sunlight and very clear water. Wind was light and there was little wave action on the lochs. While the survey was restricted to wadeable areas of the lochs, it is improbable that spawning habitat is present in the deeper parts. Overall, data from both streams and lochs are considered to be of good quality.

### *6.2 Habitat features and sensitivity to flow alterations in the lower catchment*

An estimated total area of 11,200 m$^2$ of riverine habitat is present in the Allt na Moine between the tidal limits and the dam. About half (53%) of the total area is considered to be productive for trout, most of which is of mixed juvenile type, providing a suitable range of depth, flow and bed substrate for juvenile growth. This is a relatively low proportion overall, reflecting the high gradient nature of the upper half of the watercourse which is almost entirely unsuitable for trout. The middle reach is clearly the most important to consider in terms of future impacts, as this contains all of the nursery habitat and the best spawning potential. Although habitat here is suitable for trout juveniles, production is likely to be limited by reduced water depth, particularly for parr, as much of the stream in the middle reach is less than 20 cm deep, and the channel has lost wetted width in several places, particularly around the sheep fank.

Figure 3 shows the predicted changes to flows under the revised proposals, as provided by Hydroplan. It can be seen that baseline low flows are expected to remain unaltered. The heightened dam (as predicted for a height of 250 m asl in the figure supplied) is predicted to spill less frequently however, although the mid-range flows between Q70 and Q30 which are most significant for migration and spawning will not change significantly, as these are already abstracted under the current arrangement. The largest change is in the frequency of spill events, with these predicted to be reduced from 3% of the time to 1%.

*Figure 3. Flow duration curves for natural, current, and proposed future flows downstream of the dam, provided by Hydroplan.*




Existing baseline flows, as provided under current arrangements, would appear to be sufficient to maintain suitable conditions for trout in this section, albeit with a reduction in depth and wetted width which is likely to be impacting trout parr habitat in particular.

The most significant obstacles to migration are in the lowest and upper sections, and these will remain impassable under any flows. In the middle section there are a few smaller obstacles which will require elevated flows above baseline to be passable. Obstacle ANM3.1 is in a sensitive location, as it is found in the middle of the best juvenile trout habitat, between areas of deeper glide and the best quality spawning habitat. The new proposed alterations in flow are unlikely to make a meaningful difference to the passability of this obstacle for trout, as the changes in spill frequency only affect the highest flows which currently occur very rarely. These spills are, in themselves, unlikely to be sufficient to allow migration often enough. This is only a small, 70cm high, waterfall however, and may only require a small increase in water depth to become passable. Unabstracted parts of the lower catchment may contribute sufficient flow for this during wet weather, particularly because the obstacle is downstream of the largest unabstracted tributary. This drains a section of hillside to the south of the main catchment, running for about 1.5 km before joining the main stream on the left bank. This is not a large watercourse, but will provide important additional flow variability in periods of high rainfall.

The channel generally shows very little evidence of active erosion, with banks being stable and composed of either bedrock or well consolidated heather and turf. This is likely to be a long-term, natural pattern and not related to the abstraction regime. Only one short section of eroding bank was evident, in the middle reaches, and this had a clear effect in providing the small amount of spawning grade substrate which was observed in the reach downstream. Changes to the magnitude and frequency of spill events may reduce the active erosion of this bank, although there are still predicted to be occasions when spills will occur, with a predicted reduction on average of 10 days a year to 3 days a year. Spawning gravels are therefore still likely to be replenished, although possibly at a slower rate. The main eroding bank is also downstream of the largest unabstracted tributary described earlier, which will also contribute to high flows during wet weather.

Overall, the naturally impassable waterfalls in the upper and lower sections are likely to be the biggest single limitation on trout production in the stream, as they are effectively isolating trout here from any

significant areas of adult rearing habitat such as the sea, river pools, or lochs. The stream will only contain a small isolated population of resident trout, and juvenile rearing habitat is unlikely to be a limiting factor. A large part of the abstracted reach is also composed of bedrock and is unsuitable for trout production. The limitations of the habitat, and the relatively small magnitude of the additional abstraction changes proposed, suggest that the significance of any future impact on trout below the dam is likely to be low.

### *6.3 Changes in the habitat upstream of the reservoir*

There are three main issues which are important to consider when assessing the habitat features which will be affected by the proposed increases in loch level:

1. Potential changes to the accessibility of isolated sections of the upper catchment, through the inundation of current barrier to migrating fish;
2. Potential impacts of any loch level changes on lacustrine environments; and
3. The significance of any inundation of stream sections which are currently provide spawning and nursery potential for the fish community in the reservoir.

The significance of each of these impacts will depend, at least to an extent, on the level to which the dam is increased, so impacts are considered under different scenarios, from the currently licensed dam height level of 247 metres asl to the maximum proposed level of 251 metres.

#### 6.3.1 Changes to upper catchment accessibility

Two parts of the upper catchment which are currently isolated have the potential to become newly available to fish migrating up from the reservoir under the proposed changes. Figure 2 shows that the first of these, the small unnamed lochan to the west of the reservoir, will inevitably be subsumed into the larger reservoir with any increase in dam height, even at the lowest proposed scenario of 248 metres asl. At this level the steep section which currently prevents fish migrating into the loch will be inundated, and fish will be able to pass freely to and from the reservoir.

The composition of the fish community in the lochan is currently unknown. However, it is in close proximity to the main reservoir, and is directly connected in a downstream direction, so it is very unlikely to contain any fish species which are not already present in the main reservoir. If the lochan is currently fishless, then the introduction of trout would have implications for the ecological community in the lochan and could cause the loss of some species including amphibians and larger predatory invertebrate species such as dragonflies, particularly when combined with greater drawdown and loss of littoral habitats. It appears large and deep enough to contain trout however, and is a similar size to the neighbouring lochs in which trout were observed in the initial 2020 survey. Although the lochan lacks any inflowing stream to provide spawning potential, it is not unusual for lochs without inflowing stream to contain trout populations, and this survey has shown that it contains areas of potential spawning in its littoral zone to sustain trout.

Given the proximity of the lochan to the main reservoir, if trout are present, it is highly likely that they are from the same provenance as those in the neighbouring lochs, whether this is from natural colonisation or artificial stocking. The lochan is considered too small and shallow to sustain other high conservation status species such as arctic charr.

The other relevant habitat feature is the currently impassable obstacle on the small tributary between the reservoir and Loch nan Eun. Figure 1 shows the location of this, and the newly identified barrier a short distance upstream, in relation to the proposed new loch level heights. It can be seen that above a level of 248 metres the lower barrier will begin being become inundated, and is likely to be entirely submerged at the highest height of 251 m asl. The upper barrier, however will remain above the new water level, even at the highest proposed spill level of 251 m asl.

The reservoir water level under the highest scenario will be very close to the upper obstacle however, and is possible that at this height there may be sufficient depth for fish to attempt to leap the upper falls,

although the tiny size of the watercourse here would seem to make this highly unlikely. Even if they were able to attempt this, the flow above this point seeps through wetland, and lacks any obvious migration channel. Overall, it is therefore reasonable to conclude that even the highest dam height rise will not allow fish to migrate into this part of the upper catchment.

### 6.3.2 Potential impacts on lacustrine habitats

The additional level increases will increase drawdown in the littoral zone of the existing reservoir, as well as affecting the diversity and productivity of littoral zone of the unnamed lochan. The reservoir itself is already substantially altered from its natural condition, with a large drawdown zone leaving the littoral zone composed of flooded heather and peat bog, and an absence of any suitable lacustrine spawning habitat. The proposals will essentially extend this, increasing the reservoir perimeter from the current 2720 metres to a maximum of over 3,300 metres under the highest scenario of 251 m.

In the unnamed lochan, the current littoral zone is diverse, offering a range of different habitat types, including emergent vegetation, sandy bays, cobble and boulder areas and potential trout spawning. A height of 248 m asl would result in inundation to a depth of 50cm at the spill level, and a new drawdown zone of 50 cm along the loch perimeter. At this level some functional habitat diversity will remain in the littoral zone, and water depth may be shallow enough to maintain spawning on the shallower gravel beds. Above this height, drawdown would progressively increase, eliminating emergent vegetation and reducing diversity and productivity of invertebrates across the current loch perimeter of 510 metres. The water would be too deep under these scenarios for wave action to provide aeration and cleaning action over spawning gravels, leading to the loss of 17 $m^2$ of spawning habitat. The area of the lochan will increase, particularly at the highest 250 and 251 metre scenarios, as shown in Figure 1. At 251 metres the reservoir would cover an extensive area of flat ground to the south of the lochan, and would presumably require extensive additional bunding works to the north to contain the reservoir.

### 6.3.3 Potential impact of scheme on riverine habitat

The predicted inundation levels under the different scenarios are shown in Figure 2. All of these scenarios result in inundation of stream habitat in the main Allt na Moine to the south of the reservoir; no other streams of any significance to trout are affected. The extent of inundation under the different scenarios are summarised in Table 5, relative to the current baseline (dam height 247m).

*Table 5. Summary of predicted quantitative changes to trout habitat in the inflowing stream under the four dam height scenarios.*

| **Proposed dam height (m AOD)** | **Riverine habitats ($m^2$)** | | | |
|---|---|---|---|---|
| | Productive habitat inundated (% of total currently available) | Productive habitat unaffected | Spawning habitat inundated (% of total currently available) | Spawning habitat unaffected |
| 247 | 0 | 3291 | 0 | 16 |
| 248 | 135 (4.3%) | 3156 | 1 (6.3%) | 15 |
| 249 | 221 (7.5%) | 3071 | 1 (6.3%) | 15 |
| 250 | 319 (12.2%) | 2973 | 2 (12.5%) | 14 |
| 251 | 406 (18.4%) | 2885 | 2 (12.5%) | 14 |

The section which would be inundated under these scenarios is typical of the habitat found in this part of the catchment, being composed of mixed juvenile habitat type, with some small pockets of spawning scattered throughout the reach. The first metre of additional dam height results in the largest amount of habitat loss (a 39 m long reach, and 135 $m^2$ of habitat), because the gradient of the stream is lowest in the bottom part of the reach. The amount of habitat loss is consistent for the remaining incremental increases in dam height, with each additional metre inundating approximately 25 metres more stream

length, and 90 $m^2$ of habitat. At its maximum extent, raising the dam level to 251 metres would result in the loss of 18.4% of the productive juvenile trout habitat currently available to trout in the reservoir.

Spawning habitat is scattered through the section, with specific patches being noted in the middle of the inundated reach. Overall, inundation to the 251-metre level would result in the loss of 2 $m^2$ of spawning, or 12.5% of the total currently available to the trout population of the reservoir

### *6.4 Concluding comments*

A full assessment of the population dynamics of the trout population is beyond the scope for this report, but the level of habitat loss predicted under the proposed scenarios may affect recruitment into the trout population of the reservoir if spawning or juvenile habitat is limiting. This is made more likely given the previous impact on naturally occurring littoral and stream spawning from the existing dam. If the availability of spawning areas is limiting then it is likely that juvenile trout production, and recruitment to the population of adult trout in the reservoir, would decline under these proposals. This in turn would be expected to result in increased growth rates by trout in the lochs, through density-dependent compensation if lacustrine rearing habitat remains suitable, as has been shown by comparative studies across a range of Highland lochs (Campbell 1971).

The balance between spawning availability and impact on loch ecology, and trout growth potential, is likely to have been significantly changed already by the existing licensed development. This will have already had an impact on invertebrate and macrophyte communities and food availability for trout, and led to degradation of the shallow littoral zone. In this context, the additional changes under the current proposals affect a relatively small proportion of the remaining spawning and juvenile habitat available, even under the highest dam raising proposal.

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# 8 Appendices

## *8.1 Obstacles to migration*

| | | |
|---|---|---|
|  | ANM1.1 | NG 6900 054266 |
|  | ANM1.2 | NG 69073 54209 |
|  | ANM1.3 | NG 69205 54154<br><br>20 metre long culvert, water depth <20 cm through culvert and across apron. |

| | | |
|---|---|---|
|  | ANM3.1 | NG 69166 53827<br><br>Small waterfall c. 70 cm high. |
|  | ANM4.1 | NG 69190 53303<br><br>Small waterfalls, maximum 1 metre high in total, with deep pool below. |

| | | |
|---|---|---|
|  | ANM5.1 | NG 69392 52831 |
|  | ANM5.2 | NG 69400 52818 |

| | | |
|---|---|---|
|  | ANM5.3 | NG 69441 52704 |
|  | ANM6.1 | NG 69768 52544<br><br>Series of cascades c. 40 metres high in total. |

| | | |
|---|---|---|
|  | ANM6.2 | NG 70057 52500 |
|  | ANM6.3 | NG 70235 52308 |

| | | |
|---|---|---|
|  | AM3.1 | NG 70408 51180<br><br>1 metre high vertical waterfall, with large boulder field below, through which the stream disappears. Total vertical height 3 + metres. Deer fence posts c. 2 metres high for scale |
|  | AM3.2 | NG 70391 51169<br><br>Vertical fall approximately 1 metre high, with small stream flowing (disappearing) between large boulder blocks. |
|  | AM3.3 | NG 70390 51158<br><br>Channel drains into wetland and disappears before draining out of the wetland and down obstacle 3.2 |

*8.2 Stream survey sections and habitat descriptions*

| Section code | NGR | | Instream habitat notes | Banks |
|---|---|---|---|---|
| | Downstream | Upstream | | |
| ANM1 | NG 69000 54266 | NG 69231 54149 | Bedrock shelves separated by cobble boulder stretches providing good juvenile cover but no spawning. Several impassable obstacles. | Steep bedrock/ boulder banks with heather and rough grass. Limited bankside cover |
| ANM2 | NG 69231 54149 | NG 69248 53940 | Much smaller and shallower channel above powerhouse tailrace. Mostly mixed juvenile habitat, cobble/boulder, with pockets of smaller gravels. C.40% glide, mainly in reach above powerhouse- more riffle/run as gradient increases up the reach. | Turf and heather banks, stable. |
| ANM3 | NG 69248 53940 | NG 69156 53329 | Mixed juvenile, shallow, mainly cobble/boulder, good cover for fry and parr. Some dry side bars evident and loss of channel width. Good patch of spawning below area of bank erosion | Mostly stable boulder and turf banks, but one area of erosion providing gravel input. Some evidence of recent high flows- trash lines on bank at upper end of section at tributary confluence. |
| ANM4 | NG 69156 53329 | NG 69293 52946 | Higher gradient, coarser substrate and bedrock appearing. Several small waterfalls in lower section. Upper part of section is shallower gradient again, much wider channel across floodplain and much of the coarse boulder bed is exposed. Some limited spawning in lower half of section, small pockets of gravel amongst bigger cobbles. | Heather and turf banks, stable, limited cover due to low water levels. |
| ANM4B | NG 69156 53329 | NG 69293 52946 | Side channel running from sheepfank, and joining tributary. Upper part is largely dry and unusable, but habitat in tributary below confluence with tributary is better, providing very good bankside cover. Substrate mostly boulders and cobbles, no spawning, good cover for parr in tributary. | Heather, providing good bankside cover in lower half of section. Stable. |
| ANM5 | NG 69293 52946 | NG 69767 52565 | Gradient increases substantially above NG69362 52862. Above that point channel is largely bedrock. Several impassable obstacles from this point up. | Stable bedrock banks, little or no bankside cover. |
| ANM6 | NG 69767 52565 | NG 70365 52275 | Huge cascades and entirely bedrock in lower end of reach. Upper 100 metres lower gradient below dam. Still mostly bedrock and boulders. | Mainly bedrock, all stable, little or no cover. |

*8.3 Stream survey data*

| Section code | Length (m) | % visible streambed | Width (m) | | Substrate | | Instream cover | Bankside cover (% of bank length) | | Habitat quality for trout | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Wet | Bank | Stability | Compaction | | left | right | Fry | Parr |
| ANM1 | 357 | 50 | 4 | 4 | stable | uncompacted | moderate | <10 | <10 | poor | moderate |
| ANM2 | 246 | 100 | 2.5 | 2 | stable | uncompacted | moderate | 10-25 | 10-25 | good | moderate |
| ANM3 | 708 | 100 | 3 | 2.5 | stable | uncompacted | good | 10-25 | 10-25 | good | good |
| ANM4A | 424 | 100 | 2 | 1.5 | stable | uncompacted | good | 10-25 | 10-25 | good | moderate |
| ANM4B | 157 | 100 | 0.5 | 1 | stable | uncompacted | moderate | >25 | >25 | good | good |
| ANM5 | 705 | 100 | 3 | 2.5 | stable | uncompacted | poor | <10 | <10 | poor | poor |
| ANM6 | 730 | 100 | 8 | 5 | stable | uncompacted | poor | <10 | <10 | poor | poor |

### *8.4 Riverine spawning habitats*

| Section | NGR | Area ($m^2$) | Quality | Notes |
|---|---|---|---|---|
| ANM2.1 | Various | 1 | Moderate | Small pockets of suitable gravels between larger cobbles |
| ANM3.1 | NG 69206 53929 | 2 | Poor | Mostly too coarse for trout spawning, but pockets of smaller substrate |
| ANM3.2 | NG 69181 53901 | 2 | Poor | Mostly too coarse for trout spawning, but pockets of smaller substrate |
| ANM3.3 | NG 69166 53827 | 1 | Good | Good, but small, patch of gravel behind large boulder |
| ANM3.4 | NG 69212 53558 | 2 | Good | Suitable smaller gravels downstream of right bank erosion cut |
| ANM4.1 | Various | 3 | Moderate | Small pockets of gravel amongst larger cobbles |
| ANM4.2 | NG 69243 53013 | 1 | Moderate | Small pockets of gravel amongst larger cobbles |

### *8.5 Loch margin spawning habitats*

| Loch | NGR | Area ($m^2$) | Depth (cm) | Quality | Notes |
|---|---|---|---|---|---|
| Unnamed western lochan | NG 70306 51953 | 12 | 10-40 | Mod | Patches of suitable loose spawning gravel in littoral strip. Clear of sediment and wind washed. |
| Unnamed western lochan | NG 70369 51817 | 2 | 20-30 | Good | Patch of clear gravel, sediment free and suitable size |
| Unnamed western lochan | NG 70351 51818 | 5 | 20-20 | Good | Patch of clear gravel, sediment free and suitable size |

*8.6 Stream habitat photographs*

| | |
|---|---|
|  | Section ANM1<br>NG 68975 54266<br>Mouth of the Allt na Moine |
|  | Section ANM1<br>NG 69114 54133<br>Mixed juvenile habitat with coarse boulder bed |
|  | Section ANM2<br>NG 69287 54065<br>Glide and mixed juvenile habitat in the lower part of the reach |

| | |
|---|---|
|  | Section ANM3<br>NG 69186 53730<br>Shallow mixed juvenile habitat in middle reaches. |
|  | Section ANM3<br>NG 69176 53425<br>Eroding banks in the middle of ANM3 |
|  | Section ANM3<br>NG 69187 53461<br>Small patch of spawning gravel below eroding bank |

| | |
|---|---|
|  | Section ANM4<br>NG 69238 53146<br>Mixed juvenile habitat in the middle part of ANM4 |
|  | Section ANM4<br>NG 69235 52987<br>Glide section looking up towards wider boulder channel, partly dried, in upper part of section |

| | |
|---|---|
|  | Section ANM4B<br>NG 69191 52919<br>Dried channel in ANM4B subsidiary channel. |
|  | Section ANM5<br>NG 69349 52884<br>View upstream showing gradient beginning to increase. |
|  | Section ANM6<br>NG 70135 52369<br>Bedrock shelf habitat typical of section |

## *8.7 Loch habitat photographs*

| | |
|---|---|
|  | Lochan Dubh<br>Overview of the unnamed lochan, looking west. |
|  | Sandy substrate and emergent macrophyte roots in the northern bay.<br>NG 70295 51938 |
|  | Clean spawning grade gravels on the northeastern shore of the loch<br>NG 70382 51844 |
|  | Shallow littoral zone with boulders and large cobble substrate on the south eastern shore.<br>NG 70356 51907 |