Loch Kemp Storage - EIA Report (Additional Information)

AI Appendix 13.2: Response to Norwegian Institute of Nature Research (NINA) Report (Simmonds et al, 2023), commissioned by Ness District Salmon Fisheries Board

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1. Response to NINA Report (Simmonds *et al*, 2023)

1.1 Introduction

1.1.1 Loch Kemp Storage Ltd (the Applicant) has appointed Aztec Management Consultants (Aztec) to provide a response to the main concerns expressed in 'A review of the environmental impacts of proposed pumped storage hydropower projects in Loch Ness: implications for migrating Atlantic salmon' by Olivia M. Simmons, Anders Foldvik, Line Sundt-Hansen and Tonje Aronsen (NINA Report 2318 -2023). This report was commissioned by the Ness District Salmon Fisheries Board (NDSFB) to inform their consultation response to the section 36 application for a proposed pumped storage hydro (PSH) scheme development with an installed capacity of up to 600 MW, referred to as the Loch Kemp Storage Scheme. In the report, Simmons *et al.* (2023) raise two main areas of concern with regard to the operation of the Loch Kemp Storage Scheme, as follows:

- Concern that migrating salmon smolt would be distracted and or delayed in their migration by the operation of the Loch Kemp Storage Scheme during periods when the scheme was abstracting / pumping water from the lower reservoir (Loch Ness) to the upper reservoir (Loch Kemp); and
- Concern that the operation of the proposed Loch Kemp Storage Scheme would result in rapid variations in the surface levels of Loch Ness which would impact on the general ecology of the loch.

1.1.2 This document represents a response to these concerns.

1.2 Salmon Smolt Migration in Loch Ness

1.2.1 The main concern of Simmons *et al.* (2023) relates to the migration of Atlantic salmon smolt through Loch Ness on their seaward migration and speculation that salmon smolt migrating to sea through Loch Ness would be distracted by / attracted by the operation of the proposed Loch Kemp Pumped Scheme. Simmons *et al.* (2023) speculate that during periods when water is being pumped from Loch Ness to Loch Kemp salmon smolt will be attracted to the location by the abstraction flow i.e. the smolt will consider this abstraction flow to be equivalent to an alternative efferent flow from the loch and thus will be distracted and delayed in their migration thus making them more vulnerable to predation by piscivorous birds and fish and also less physiologically adapted to life in the marine environment.

1.2.2 The commissioning agency (the NDSFB) for Simmons *et al.* (2023) expressed concern over the potential impacts of any new PSH projects may have on the Atlantic salmon population in the Loch Ness Catchment and the broader ecology of the loch. The Atlantic salmon population in this system is already under pressure from several factors, including other already developed hydropower schemes, barriers to their migration such as dams and weirs, exploitation from fisheries, aquaculture, and more. Thus, the objective of Simmons *et al.* (2023) was to provide a review of the ways new PSH schemes could affect the environment, followed by a discussion of how the projects currently proposed, including the Loch Kemp Storage Scheme and the consented Loch na Cathrach Pumped Storage (previously Red John) PSH scheme in Loch Ness might affect the salmon population.

1.2.3 Simmons *et al.* (2023) make suggestions for studies to address the knowledge gaps they identified and proposed some mitigation and offsetting measures to help the Atlantic salmon in Loch Ness. Overall, Simmons *et al.* (2023) found a lack of knowledge about how Atlantic salmon migrate through the loch, which is imperative for understanding how closely they will encounter the projects proposed in Loch Ness, including the Loch Kemp Storage Scheme and the consented Loch na Cathrach Pumped Storage PSH scheme. Simmons *et al.* (2023) also found a lack of knowledge about how these new PSH schemes might impact the flow patterns in Loch Ness, which will have implications for migrating salmonids. They speculate that alterations to natural flow patterns during the pumping/discharge regime of PSH schemes could become a problem for migratory fishes and that it is possible that salmon smolt may detect '*the unnatural flow patterns and become attracted to them, thus being 'misguided' away from the outlet of a reservoir they should be aiming for and towards the inlet/outlet of the PSH scheme.*'

1.2.4 On the matter of the migration of salmon smolt through Loch Ness, and natural Scottish lochs in general, a number of reports and scientific publications of recent studies are reviewed, and their main findings are detailed below. These studies have been carried out in the Loch Ness catchment area (Anon. 2020; Lothian,2022), Loch Lomond (Lilly *et al.* 2023; Honkanen *et al.* 2018) and Loch Voil (Thorpe *et al.* 1981)

The Migration of Atlantic Salmon through Lochs

1.2.5 The literature on the nature of the migration of Atlantic salmon smolt is extensive. For this review, the focus will be on environmental and other cues which facilitate the migration of this important life stage through freshwater (rivers and lakes) and, to a much lesser extent, through estuaries and the marine environment.

1.2.6 It is well-known that migrating salmon smolt follow the main flow in a river and predominantly swim near the surface (usually in the top few metres) where the water has a higher velocity. Thus, the principal directional cue is the flow of the river and by going with the flow of the river, actively or passively and during the hours of daylight or in darkness, smolt will reach their goal which is the marine environment.

1.2.7 When salmon smolt reach an estuarine environment or a fully marine environment, the migration pathway chosen appears to be determined and directional. Lilly *et al.* (2023) acoustically tagged a total of 1008 wild and 60 hatchery smolt in Irish and Scottish rivers of which 527 (52.3%) wild and 55 (91.7%) hatchery Atlantic salmon smolts successfully migrated from their natal river into estuarine and marine waters. The results strongly indicate that post-smolts migrating through the coastal marine environment of the Irish Sea / North Channel / Atlantic Ocean off Ireland and Scotland:

- Are not simply migrating by current following;
- Engage in active directional swimming;
- Have an intrinsic sense of their migration direction; and
- Can use cues other than water current direction to orientate during this part of their migration.

1.2.8 Lilly *et al.* (2023) expressed minimum migration success rate for salmon as proportionate to the distance travelled in kilometres (km) (%. km^{-1}). Minimum migration success rate for Atlantic salmon smolts that entered the Irish sea directly from the exit of their natal river ranged from 0.02%.km^{-1} for River Nith smolts to 1.35%.km^{-1} for River Bann post-smolts. Furthermore, minimum migration success rate for Atlantic salmon smolts that entered the Irish sea directly from the exit of their natal estuary ranged from 0.14%.km^{-1} for river Endrick post-smolts to 2.51%.km^{-1} for River Faughan post-smolt.

1.2.9 The study of the migration of salmon smolt through lakes has been quite extensive in recent years. Typically, salmon smolt are intercepted during their seaward migration using a variety of collection methods (Wolf traps, rotary screw traps, fyke nets etc), anaesthetised and then have acoustic tags surgically implanted in the peritoneal cavity before recovery and release. However, it is not known if a study has been undertaken to determine the impact of this treatment on salmon smolt. No study retained a similarly treated group of smolt as controls to see if any mortality resulted from the treatment and this is a common weakness in all studies. For example, Haraldstad *et al*. (2023) showed that wild salmon smolt which were handled twice (initial capture and PIT tag insertion / recapture and tag check at the smolt stage) had significantly lower adult return rates than smolt handled once for PIT tagging purposes (whether or not they subsequently migrated downstream via a surface bypass or hydroelectric turbine on the Nidelva River in Norway).

1.2.10 Atlantic salmon smolt tracking studies have been carried out in:

Loch Voil (surface area 2.25km^2)

1.2.11 Thorpe *et al.* (1981) tracked 22 sonic (acoustic) tagged salmon smolt in Loch Voil in 1979 and 1980. This loch extends to 2.25km^2 (5.7 x 0.4km). The movements of smolt in the loch were mainly nocturnal and apparently undirected and resulted in average velocities of 0.6 bls^{-1} (body lengths per second). The direction of displacement of smolt and the movement of water at a depth of 1m was positively correlated and overall smolt displacement was biased slightly ahead of water movement. The results agreed with a model of passive smolt displacement in the loch and inferred that the active component required to ensure passage through the loch was very small. During 1979 and 1980 the 22 tagged smolt were actively tracked for an average of 2.6 days (SD = 2.2 days). However, according to Thorpe *et al.* (1981) the rates of downstream displacement i.e. the velocity component parallel to the long axis of Loch Veil, were low at 0.04bls^{-1} (0.07bls^{-1} at night) in 1979 and 0.01bls^{-1} (0.015bls^{-1} at night) in 1980. At these displacement rates it would take the average 14.4cm long smolt 10.9 and 47.1 days, respectively, to travel through Loch Voil, under the varying wind conditions experienced during the two tracking years.

Loch Lomond (surface area 71 km^2)

1.2.12 What might be called preliminary work was reported on by Honkanen *et al.* (2018) who assessed the movement of a small number of acoustically tagged (10) Atlantic salmon smolt through Loch Lomond, Scotland, using a small array of acoustic receivers. The estimated loss rate of smolt through Loch Lomond was high (60% – 6 of 10). Additionally, smolt made frequent movements away from the River Leven, travelling at a slow estimated rate of 0.05 ms^{-1}.

1.2.13 Lilly *et al.* (2022) investigated three main hypotheses relating to salmon smolt movement through Loch Lomond as follows:

- the loss rate of Atlantic salmon smolts through Loch Lomond would be high,
- due to a potential lack of directional current in the main body of Loch Lomond, both successful and unsuccessful migrants would exhibit indirect migration pathways;
- once near the lake outlet where the direction of the current flowing into the River Leven might be detected, Atlantic salmon smolt would orientate towards the outflowing river and make a direct exit.

1.2.14 Lilly *et al.* (2022) concluded from the recorded movements of acoustically tagged salmon smolt in Loch Lomond that:

- they experienced a high rate of mortality in the loch (approximately 43%), with 14% potentially preyed upon by birds and 4% by Northern pike; no explanation is provided for the remaining 25% mortality; and
- the movement direction in the main body of Loch Lomond appeared to be random.

1.2.15 Lilly *et al.* (2022) also provided a simple summary of tagged smolt survival as follows:

- 125 smolt tagged and released into the River Endrick;
- 39% (n=49) successfully migrated into Loch Lomond;
- 22.4% (n=28) successfully migrated out of the loch and into the outflowing River Leven;
- Of those fish that migrated into Loch Lomond (n=49), 18% (n=9) were likely preyed upon, with 14% (n=7) likely preyed upon by a bird and 4% (n=2) by Northern pike. The remaining causes of mortality (n=12) were unknown;
- Successful smolts (n=28) migrated at an estimated average minimum speed of 0.13 ms^{-1} (SD=0.04) and spent an average of 5.23 days (SD=4.2 days) in the loch (range 0.86–21.90 days); and
- With regard to their migration trajectories / pathways, successful smolt (n=28) travelled an estimated minimum total distance of 55.87km around the loch during their average time of 5.23 days in the loch.

1.2.16 Thus, the likelihood of Atlantic salmon smolts released from the River Endrick (n=125) and completing a successful migration through Loch Lomond was very low, with only 22.4% (n=28) being detected in the River Leven. The highest loss rate occurred within the Endrick, with only 39% (n=49) successfully migrating into Loch Lomond. This is consistent with Honkanen *et al.* (2018) who reported a smolt loss rate of 40% in the River Endrick.

1.2.17 Atlantic salmon smolts in Loch Lomond appeared to migrate primarily during the night, which is thought to decrease the likelihood of being preyed upon. However, the benefit of this tactic was likely mitigated by their slow migration speed and apparently random migration pathways which delayed lake exit.

1.2.18 While the migratory behaviour of successful smolts through Loch Lomond appears to be random, there was a distinctive difference in the behaviour of successful smolts once they came within approximately 2 km of the River Leven (Loch Lomond efferent river), the “Goldilocks zone”. This zone was effectively defined as an important area in the lake, as once the fish entered the area, they had a high chance of migrating out of Loch Lomond, and successful migrants had a significantly higher number of movements in that area compared with outside of the zone. We may hypothesise this is because the cues available to them allow for much more directed migration into the River Leven.

1.2.19 In conclusion, Lilly *et al.* (2022) state that salmon smolt migration in lochs appears to be through a series of random movements that continue until the smolt are near the loch outflow at which point the migration returns to directed movements informed by environmental cues.

River Conon System

1.2.20 Honkanen *et al.* (2021) carried out a study using acoustically tagged salmon smolt to compare migration through impounded and natural standing waters. They tested for any effect on (1) smolt migration speed, (2) the number and directionality of lake movements, (3) lake migration duration and (4) migration success in the following waterbodies of the River Conon system:

- Loch Meig – an impoundment extending to 0.45 km^2 (2.54 x 0.18);
- Loch Achonachie – an impoundment extending to 0.69 km^2 (1.92 x 0.36); and
- Loch Garve - a natural loch extending to 1.83 km^2 (2 x 0.91).

1.2.21 The main findings of this work are:

- migration success through the lochs was very low (total loss rates range: 31 to 55%; 22.2 to 53%.km^{-1});
- 49% of directional movements were in a direction opposite to the migration pathway, indicating that a lack of navigational cues might in-part be responsible for low migration success;
- With regard to estimates of fish movement speeds, individuals in Garve had the highest mean movement speed at 0.15 ms^{-1}, followed by Achonachie at 0.12 ms^{-1} and Meig at 0.09 ms^{-1};
- Mortality rates related to passage through each loch were 24.6%km^{-1} for Loch Garve, 22.2%km^{-1} for Loch Meig and 53.3%km^{-1} for Loch Achonachie; and
- The time taken for successful fish to exit their respective lochs was highly variable. Table 1 details various statistics associated with loch transit times.

Table 1: Salmon transit times through three lochs (data taken from Honkanen *et al.* (2021))

Loch	No. smolt	Mean (days)	Standard Deviation (SD)	Median (days)	Range (days)
Garve	12	1.5	1.4	1.1	0.09-4.3
Meig	6	14.9	17.5	8.3	2.6-50
Achonachie	5	19.6	7.6	21.1	10.6-28.5

Lough Erne (Ireland)

1.2.22 Kennedy *et al.* (2018) carried out an investigation with acoustic telemetry of the passage of *Salmo salar* smolts through a large natural lake (Lough Erne, Ireland) and found heavy mortality occurred at the river-to-lake confluences (mean 31.2%km^{-1}) but was lower in the main body of the lake (mean 2.4%km^{-1}). Predation was a significant pressure on emigrating smolts as tagged pike *Esox lucius* aggregated at river-to-lake confluences during the peak of the smolt run.

Loch Ness

1.2.23 The following information has been taken from Anon. (2020) a report entitled 'Missing salmon project 2019' and is a summary of the findings relating to salmon smolt acoustically tagged and released in the Ness system:

- A total of 100 salmon smolts were tagged with acoustic tags over a 2-week period (12/04/2019 – 26/04/2019) in the River Garry of which nine were estimated to have reached the final river receiver with eight reaching the Spey Bay array;

- Rather than travelling east towards the Moray Firth, 22% of tagged smolts were estimated to have travelled southwest in Loch Oich and entered the west bound section of the Caledonian canal at Laggan. However, half of these smolts subsequently turned around and returned east through Loch Oich;
- Overall, loss rate in freshwater was 1.65 $\%km^{-1}$. Loss rate was highest between the mouth of the River Garry and the downstream end of Loch Oich at 7.75$\%km^{-1}$. This decreased to 3.32$\%km^{-1}$ when those known to have travelled west are taken into account. The lowest freshwater loss rate was 0.9$\%km^{-1}$ found between the entry to and exit from Loch Ness;
- Loss rate between the River Ness and Chanonry was 0.05$\%km^{-1}$;
- The estimated median speed for confirmed successful migrants (e.g., only smolts that were detected leaving freshwater) was 0.052 ms^{-1} for freshwater travel;
- Confirmed successful migrant smolt took a median of 12.1 days to travel from the first river receiver to the furthest downstream river receiver;
- Of those detected at Loch Oich's confluence with River Oich and the Caledonian Canal (57 individuals), 43 (75.4%) migrated into River Oich, with 40 successfully reaching the final River Oich receiver at its confluence with Loch Ness. Thirteen smolts appeared to travel into the Caledonian Canal (24.6%), with only one smolt successfully exiting into Loch Ness. Further downstream, all the smolts that were successfully detected in the marine environment did so by passing through the River Ness, not the Caledonian Canal; and
- Once in the marine environment, the tagged smolt showed strong marine directional movement, heading east and north-east.

1.2.24 Lothian, A.J. (2022) provided the following information in a draft report on the 2022 Moray Firth Tracking Project:

- A total of 124 smolts were tagged and released into the Ness system, with 74 smolts tagged at Garry and 50 tagged at Oich trapping sites;
- of the 124 smolt released into the Ness system, 87(70.2%) were subsequently detected on any Automated Listening Station (ALS) within the array, with 14 also being detected on the last ALS at Chanonry Point. This indicates an overall survival of 11.29% from release to Chanonry array;
- Within the two release groups, six Garry smolt (out of 74) and eight Oich smolt (out of 50) were detected on the last ALS at Chanonry Point. This equates to 8.1% and 16.0% survival for the Garry and Oich release groups, respectively, and minimum estimated loss rates from release to the Chanonry array of 1.25$\%km^{-1}$ and 1.21$\%km^{-1}$, respectively;
- Of the 74 fish tagged upstream of Loch Oich, 41 were detected exiting Loch Oich through either the River Oich or the Caledonian Canal, equating to 55.4% survival through the loch, and a mortality rate of 11.3$\%km^{-1}$ through the loch. Of the 73 smolt that were available to enter Loch Ness (combining fish from the two release sites), 31 were detected exiting the loch through either the River Ness or the Caledonian Canal, equating to 42.5% survival through the loch and a mortality rate of 1.47$\%km^{-1}$;

1.2.25 In Table 2 of Lothian (2022), the following statistics are presented for each smolt release group, as replicated in Table 2 below.

Table 2: Smolt Transit in Loch Ness (taken from Table 2 of Lothian (2022))

Release group	Number entering Loch Ness	Number exiting Loch Ness	Mortality in Loch Ness (%km^{-1})
Garry	30	15	1.28
Oich	43	16	1.61

1.2.26 Transit time through Loch Ness varied significantly, with the minimum transit time of 3.3 days and the maximum transit time 42.9 days. The median transit time through Loch Ness was 14.2 days.

1.2.27 In comparison to the other years of the Moray Firth Tracking Project, the overall survival of 11.29% to Chanonry Point in the 2022 study year was similar to both the 2019 (8.0%) and 2021 (14.78%) study years.

Conclusion

1.2.28 It is now well known that Atlantic salmon smolt migration through lentic habitat / loch environments is rather aimless (in terms of finding and reaching the efferent river) and comprises a combination of active and passive phases and indeed phases of inactivity where little or no displacement occurs. Loch Ness is such a huge waterbody with a turnover close to 1,000 days (using the volume of Loch Ness and the mean flow in the efferent River Ness) and it should come as no surprise to investigators that migrating salmon smolt take time to adjust to the directional cues provided by the loch's wind generated surface current which is predominantly directed towards the efferent River Ness.

1.2.29 The following table summarises minimum and maximum recorded loch transit times for acoustically tagged salmon smolt which have been presented earlier in this report.

Table 3: Summary of Salmon smolt Loch Transit Times (obtained from scientific literature)

		Transit time range (days)	
Loch	Area (km^2)	Minimum	Maximum
Voil	2.25	10.9	47.1
Lomond	71	0.86	21.9
Meig	0.45	2.6	50
Achonachie	0.69	10.6	28.5
Garve	1.83	0.09	4.3
Ness	56	3.3	42.9

1.2.30 It is clear from the information detailed in Table 3 that regardless of loch size, minimum and maximum transit times are quite variable and of long duration.

1.2.31 While Simmons *et al.* (2023) are correct in stating that little is known about the migratory pathways taken by salmon smolt as they migrate through Loch Ness, the reality is that this knowledge gap is irrelevant. The scientific literature, as noted in this report, suggests that migrating smolt traverse the loch randomly under the general influence of the prevailing north-easterly directed wind generated surface current. Because of these random movements, smolt may occupy most areas of the loch at one time or another. However, Loch Ness has a surface area of ~56 km^2 and a perimeter of ~86 km. The likelihood of a smolt occupying a particular square metre of the loch area / linear metre of the loch shoreline is related to the number of smolt in the loch and their transit time.

1.2.32 Hydraulic assessment undertaken by the Applicant demonstrates there would be no discernible influence on flows in Loch Ness out with ~27 m from the inlet screens when the Loch Kemp Storage scheme is in its maximum pumping rate (i.e., the water velocity arising from the flow through the inlet screens would be equal to or less than natural water velocities within Loch Ness at ~27 m distance from the inlet screens, even under very calm conditions)[1]. This area represents ~0.0053% of the total area of Loch Ness. Accordingly, the statistical probability that any one salmon smolt migrating through Loch Ness would enter this area of the loch during a pumping cycle is low.

1.2.33 Taken together and interpreting the overall data on salmon in the Ness catchment, it would appear that smolt migrating from the River Moriston perform better (as evidenced by the annual adult salmon counts on the River Moriston and also by the positive findings of electric fishing surveys in the River Moriston catchment area) than those migrating from the River Garry. Smolt from both rivers migrate through Loch Ness. However, it would appear that the difference in survival for both is related to the complex hydrological route choice to which smolt migrating from the River Garry are exposed to before they reach Loch Ness.

1.2.34 The above text provides indirect evidence that the operation of the Foyers PSH has not impacted on the migration of salmon smolt since its commissioning in 1974. It is clear that the existence of the Caledonian Canal is a cause of distraction and loss for Atlantic salmon smolt, particularly for smolt originating in the upper catchment area (River Garry etc) and that any suggestion that the operation of the existing Foyers PSH or any proposed schemes will cause additional distraction / delay in migration of salmon smolt in Loch Ness is purely speculative.

1.2.35 According to Thorpe *et al.* (1981), independent evidence for the influence of surface water currents on smolt movements is implied in Berry (1933) who recorded increased numbers of smolt emigrating from Loch Ness at times of west winds and decreased numbers with east winds. West winds would increase the surface flow out of Loch Ness. A possible mechanism for this is wind setup / seiche whereby prevailing winds blowing from the south-west along the axis of Loch Ness not only generate a north-easterly surface current (and a deeper counter current) but also elevate the loch surface level at its northerly end by up to 11 cm (Maclagan-Wedderburn, E. (1904)).

1.3 Variation in Loch Ness Water Levels and Potential Impact on the Ecology of Loch Ness

1.3.1 The second concern raised by Simmons *et al.* (2023) is that the operation of the Loch Kemp Storage Scheme would result in rapid variations in the surface levels of Loch Ness which would impact on the general ecology of the loch.

1.3.2 The Applicant accepts that the PSH scheme would be curtailed, similar to other PSH operators on Loch Ness. Curtailment is physically controlled by stop pumping and stop generating levels. The curtailment

[1] See AI Appendix 13.1: Update to Mitigation Measures Proposed for Fish in the Loch Kemp Storage EIA Report, and the Shadow Habitats Regulations Appraisal Report (part of the Additional Information submitted for the Loch Kemp Storage Scheme Application).

proposed for the Loch Kemp Storage Scheme is described in paragraphs 7.5.2 and 7.9.1-7.9.2 of **Volume 1, Chapter 7: Water Management** of the EIA Report. The stop pumping level assigned to the proposed Loch Kemp Storage Scheme would be set above the stop pumping level of the existing Foyers PSH scheme which is set at 15.27 mAOD and would be enforced by SEPA through the CAR Licence. This means that the Loch Kemp Storage Scheme would operate within the existing water level range of Loch Ness, although it is acknowledged that there would be more frequent fluctuations in water levels within this range if multiple PSH schemes were to operate in Loch Ness simultaneously.

1.3.3 The potential impacts, including cumulative impacts with other PSH schemes, of the operation of the Loch Kemp Storage Scheme (subject to curtailment), on the ecology of Loch Ness due to changes is water fluctuations have been assessed in the EIA Report. Therefore, reference should be made to the following sections of the EIA Report for further details:

- Volume 1, Chapter 10: Terrestrial Ecology, paragraphs 10.8.128 – 10.8.137;
- Volume 1, Chapter 10: Terrestrial Ecology, Table 10.13: Cumulative Effects Assessment;
- Volume 1, Chapter 12: Aquatic Ecology, paragraphs 12.8.13 – 12.8.14;
- Volume 1, Chapter 12: Aquatic Ecology, paragraphs 12.8.25 – 12.8.26;
- Volume 1, Chapter 12: Aquatic Ecology, Table 12.13: Operational Phase Residual Effects;
- Volume 1, Chapter 12: Aquatic Ecology, Table 12.14 Operational Phase Residual Cumulative Effects;
- Volume 1, Chapter 13: Fish, paragraphs 13.8.31-13.8.40;
- Volume 1, Chapter 13: Fish, paragraphs 13.8.53-13.8.64;
- Volume 1, Chapter 13: Fish, Table 13.12 Likely Operational Phase Cumulative Impacts and Effects on IEFs Prior to Mitigation;
- Volume 1, Chapter 13: Fish, Table 13.14 Operational Phase Residual Effects; and
- Volume 1, Chapter 13: Fish, Table 13.15 Cumulative Operational Residual Effects; and
- Volume 4, Appendix 10.6: Eco-hydrological Assessment of the Impacts of the Loch Kemp Pumped Storage Scheme on Urquhart Bay Wood SAC.

1.4 References

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