Ardbear Salmon Ltd.

Supplemental Information Request for Sealax T09-107, Bertraghbui Bay, Co. Galway

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List of Acronyms/ Glossary

Abbreviation	Full term
AA	Appropriate assessment
AGD	Amoebic Gill Disease
NIS	Natura Impact Statement
SAC	Special Area of Conservation
SCI	Special Conservation Interest
SPA	Special Protection Area

1. Introduction – Required Supplemental Information

A Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) was prepared by the Marine Institute in November 2024 to support the licence review and renewal application for the Ardbear Salmon Ltd. site Sealax (T09-107) at Bertraghbui Bay, Co. Galway. The review highlighted that the following areas required further information in order for the AA to be undertaken:

1. Size of mesh nets to be used for smolts have not been detailed; there could be significance in relation to feeding/diving birds in this.

2. The treatment for Amoeba gill parasite is to bath the fish in freshwater. It is detailed in SOP 33878 AGD monitoring protocol (NIS appendices) that either de-salinated sea water or freshwater from a stream can be used. The source of freshwater or the quantities required has not been given. The abstraction of water from watercourse has the potential to impact on wetland bird species. This could potentially affect the zone of influence of the project and the screening of bird species for the purpose of the AA process.

3. The potential impacts of the wild wrasse fishery on food availability for species such as Cormorant, Shag, red-throated diver etc. will need to be considered in the NIS. Wrasse, notably Ballan wrasse (*Labrus bergylta*) is known to frequently occur in the diet of coastal Cormorant (Tierney et al, 2011).

The screening assessment carried out in this review has screened in 2 bird species that were not brought forward to Stage 2 AA by the applicant. These were Black-headed Gull and Leach's Storm Petrel.

The following sections of this report provide sufficient information to support the aforementioned points to ultimately enable the AA of the Sealax aquaculture site (T09-107) to be undertaken.

2. Supplemental Information

2.1. Size of mesh nets

The applicant is requested to provide further information on the size of mesh nets to be used for smolts, having regard to the potential implications for feeding performance, fish behaviour and interactions with diving birds. The applicant confirms that 15 mm and 16 mm knotless nylon mesh are deployed during the first seven to eight months of the production cycle, while the fish remain in the smolt phase within the pens. Once the fish have attained a larger size and are transferred to the adult production phase, the nets are replaced with 20/22 mm knotless nylon mesh. These specifications are intended to balance containment and water exchange during the juvenile phase, whilst also reflecting the welfare requirements of larger fish as they grow.

The selected mesh size is intended to maintain secure containment while preserving adequate water exchange, given that net-panel solidity and porosity are known to influence drag, wake formation, oxygen flux and cage deformation (Klebert et al. 2012).

While mesh dimensions are not prescribed in Irish or European legislation as a general requirement, aquaculture licencing is regulated by the Department of Agriculture, Food and the Marine, with scientific and technical input from the Marine Institute, and the proposed net specification is consistent with the licence design applicable to this site. The smolts introduced to the site have an average weight of 0.12 kg and are approximately 11 months old. At this intermediate growth stage, the use of a smaller mesh is considered appropriate to reduce the risk of escape while maintaining suitable hydrodynamic performance and feeding conditions.

In relation to diving and feeding birds, the available literature indicates that seabird entanglement risk at finfish aquaculture sites is primarily associated with net configuration, visibility, twine diameter/material, mesh aperture, slackness, biofouling and maintenance condition. Bath et al. (2023), in a global review of protected species interactions with marine aquaculture, note that large mesh sizes, small-diameter twine and transparent monofilament nets are more likely to cause seabird entanglement, and that bird mortality is strongly influenced by net visibility. They further report that fewer birds were entangled in dark-coloured woven nylon nets with 20–30 mm mesh, and that maintaining nets taut, undertaking frequent maintenance, removing debris and controlling biofouling can reduce attraction and entanglement risk. The proposed smolt-phase nets comprise relatively small-aperture knotless nylon mesh and do not represent the large-mesh, fine transparent monofilament or slack netting configurations identified in the literature as presenting higher seabird entanglement risk.

Accordingly, the use of 15 mm and 16 mm knotless nylon mesh during the smolt phase is not considered likely to increase entanglement risk for feeding or diving birds relative to the later production-phase netting, provided that normal operational controls are maintained. These include maintaining net tension and structural integrity, routine inspection and repair, control of biofouling, removal of loose netting or debris, and standard husbandry practices to minimise feed wastage and promptly remove mortalities, thereby reducing potential attraction of birds to the pens.

2.2. Freshwater Source for Amoebic Gill Disease treatment

The applicant is requested to provide additional information on the source and planned quantities of freshwater to be utilised for Amoeba gill disease (AGD) treatments at the Sealax site (T09-107).

The Water Environment (Abstractions and Associated Impoundments) Act 2022 and the Water Environment (Abstractions and Associated Impoundments) Regulations 2024 came into effect in August 2024 with the purpose of regulating water abstractions and their associated impoundments to give effect to the EU Water Framework Directive. The legislation is primarily focused on water abstractions of 25 m^3 or more in any 24-hour period. Abstraction of water under these Regulations applies to the removal or diversion of water from rivers, lakes, streams, springs, groundwater wells or boreholes and does not apply to seawater.

The site currently operates a nano-filtration unit as its Desalination System, which is considered a sustainable and forward-looking solution for supplying freshwater for AGD treatment via reverse osmosis, a method well accepted in recent aquaculture practices. When commissioned, the unit is deployed on a boat or barge and transported to the site of use. Water is drawn from the sea into a suitably sized tarpaulin which is generally 70 m in diameter holding 1,200 m^3 nano-filtered water. Non-filtered water used in the tarpaulin is desalinated in around 24 hours, and once ready, fish are treated with this water and then released back into the pens. The water is then returned to the marine environment, therefore removing the requirement for water to be drawn from freshwater sources.

During treatment, salinity should be maintained at or below 5 ppt, oxygenation kept high, and gentle circulation ensured to safeguard fish welfare. This detailed operational context supports a robust understanding of water demand and supply logistics associated with AGD treatment at the site.

The utilisation of a desalination system represents a forward-thinking and sustainable method to meet freshwater demand while minimising impacts on natural water bodies. The historical reliance on freshwater obtained from a well-established facility with abundant freshwater provides reassurance regarding water quality and availability. However, any potential impacts linked to water extraction, transportation, and treatment processes must be carefully managed to avoid adverse effects on local ecosystems. Overall, with

appropriate mitigation and monitoring measures, significant environmental effects are not anticipated from the proposed water sourcing and AGD treatment methods.

2.3. Potential impacts of wild wrasse fishery on food availability for cormorant, shag and red-throated diver

The Marine Institute's review of the Sealax NIS highlighted the need to consider whether the sourcing of wild wrasse for use as cleaner fish could affect prey availability for bird species such as Cormorant, Shag and Red-throated Diver. In particular, the review noted that Ballan wrasse (*Labrus bergylta*) has been recorded as a frequent component of the diet of coastal Cormorant (Tierney et al., 2011). The following assessment therefore considers whether the proposed use of wild-caught wrasse by Ardbear Salmon Ltd. is likely to give rise to a reduction in prey availability for relevant Special Conservation Interest bird species.

The use of cleaner fish, including wrasse and lumpfish, forms part of an integrated sea lice management strategy and reduces reliance on chemical treatments. At the Sealax site, wrasse are proposed to be used primarily during the warmer months, between approximately June and November, when they are naturally active. During the winter period, when wrasse activity is reduced, hatchery-reared lumpfish may be used instead. Wrasse are deployed at a minimum ratio of approximately 7 cleaner fish per 100 salmon, with stocking adjusted if required to maintain sea lice control efficacy. Wild wrasse are sourced from local fishers operating in Bertraghbui Bay when required, and the fishery is subject to national management requirements governing the harvesting and use of wild-caught cleaner fish.

Cormorant is the bird species for which a potential prey-availability pathway is most relevant, as wrasse are known to occur in the diet of coastal Cormorants. However, the available literature indicates that Cormorants are opportunistic fish predators with a varied diet. Irish studies have recorded wrasse, eels, salmonids, flatfish and other fish taxa in Cormorant diet, with the relative contribution of prey groups varying between studies and locations (Kennedy and Greer, 1988; MacDonald, 1987; Warke et al., 1994; Warke and Day, 1995; West et al., 1975; Tierney et al., 2011). Wrasse may therefore form an important prey component in some coastal contexts, but they are not the sole prey resource used by the species.

National Cormorant population trends also do not indicate a long-term pattern consistent with prey limitation associated with aquaculture or cleaner-fish harvesting. Breeding Cormorants in Ireland increased between the 1969–70, 1985–88 and 1998–2002 census periods, although the most recent Seabirds Count assessment recorded an 8% decline between 1998–2002 and 2015–2021, largely attributed to declines at coastal colonies (Tierney and Newton, 2023). Aquaculture has been present in Bertraghbui Bay for several decades, yet the long-term national Cormorant trend has not shown a sustained decline over that period. Recent work by

Berrow et al. (2025) also illustrates that Cormorant colony trends can vary strongly between sites, with all three colonies surveyed in the Shannon Estuary and adjacent waters showing increases over time. On this basis, there is no evidence that Cormorant population trends in Ireland are being driven by aquaculture production or by the use of wrasse as cleaner fish in Bertraghbui Bay.

Recent research on the Irish mixed wrasse fishery also provides relevant context. Brennan (2025) undertook field surveys, mark-recapture population estimates and genetic analysis of corkwing wrasse across Irish bays, including Bertraghbui Bay. The study recorded substantial wrasse populations in surveyed bays, including an estimated population of approximately 490,000 wrasse in Bertraghbui Bay, and estimated that annual catches across the fishery represented approximately 10–12% of surveyed wrasse populations, with actual exploitation rates likely to be lower because wrasse are harvested from additional bays not included in the population surveys. The study also found no significant population structure among Irish corkwing wrasse populations, indicating high gene flow and genetic connectivity among Irish bays. Although the genetic component of the study related to corkwing wrasse rather than Ballan wrasse specifically, the findings provide useful baseline evidence that the Irish wrasse fishery is not currently indicative of isolated or depleted local populations. Brennan (2025) nevertheless notes the importance of continued monitoring and potentially bay-specific management, particularly given differences in species composition and size structure between bays.

For Shag and Red-throated Diver, the likelihood of a prey-availability effect is lower. Shag diet is typically dominated by sandeels and other small fish, although the species can exploit a broad range of prey depending on local availability (Howells et al., 2017). Wrasse are not identified as a preferred prey resource for Shag in the available long-term dietary literature. Red-throated Diver similarly feeds primarily on small fish such as sandeel, sprat, clupeids, juvenile gadoids, mackerel and flatfish, with some use of invertebrate prey; wrasse are not considered a principal prey resource for this species (BirdWatch Ireland, 2026; Kleinschmidt et al., 2019). Therefore, the removal of wrasse for cleaner-fish use does not represent a credible prey-depletion pathway for Shag or Red-throated Diver.

Overall, while it is acknowledged that wrasse, including Ballan wrasse, can form part of the diet of coastal Cormorants, the proposed use of wild-caught wrasse by Ardbear Salmon Ltd. is not considered likely to result in a significant reduction in food availability for Cormorant, Shag or Red-throated Diver. This conclusion is supported by: the varied diet and dietary plasticity of Cormorant; the absence of evidence linking Irish Cormorant population trends to aquaculture activity in Bertraghbui Bay; the low relevance of wrasse as prey for Shag and Red-throated Diver; and recent evidence indicating substantial wrasse populations and strong genetic connectivity among Irish bays. Continued adherence to national cleaner-fish fishery management requirements, catch recording, use of size-selective wrasse pots, and ongoing monitoring of local wrasse catches will further reduce the potential for localised depletion of wrasse resources.

2.4. Updated Screening for SCI Species

The screening assessment carried out in the review by the Marine Institute in November 2024 screened in two bird species, the Black-headed gull, and Leaches storm petrel.

2.4.1. Stage 1 – Appropriate Assessment

An updated screening assessment has been prepared to incorporate and respond to the findings of the Marine Institute AA determination for Sealax (T09-107) issued in November 2024. The purpose of the update is to ensure that the screening assessment reflects the current Site-Specific Conservation Objectives published by NPWS (2025) and that the relevant SCI species are assessed consistently against the present conservation objective framework. The additional SCI species screened in for Stage 1 Appropriate Assessment, and where applicable Stage 2 Natura Impact Statement, are identified in the following sections.

The SCIs of the SPAs and their relevant conservation objectives are listed in Table 2-1, alongside screening assessments of potential significant effects of Impact Mechanism 3 Disturbance and Impact Mechanism 4 Entanglement in Table 2-2.

Table 2-1: SPAs identified within the foraging range of QIs.

Site (site code)	Special Conservation Interest (SCI)	Distance to Aquaculture site	Ecological Group	Conservation Objective
Lough Corrib SPA [004042]	Black-headed gull (*Larus ridibundus*) [A179]	26.3 km	Species foraging in marine and coastal areas.	To restore the favourable conservation condition of the SCI, including population, distribution and supporting habitat.
Stags of Broad Haven SPA [004072]	Leach's storm petrel (*Oceanodroma leucorhoa*) [A015]	109.5 km	Species foraging in marine and potential coastal areas.	To maintain the favourable conservation condition of the SCI, including population, distribution and supporting habitat.

Table 2-2: S-P-R assessment of QI's.

Special Conservation Interest (SCI)	Impact Mechanism	Relevant SPAs	S-P-R Assessment	Potential for Significant Effects
Black-headed gull (*Larus ridibundus*) [A179]	3. Disturbance 4. Entanglement	Lough Corrib SPA [004042]	Species may occur within or adjacent to the project area and be affected by the impact mechanisms identified. Black-headed gull is a wide-ranging marine seabird and may utilise waters within and beyond SPA boundaries as supporting habitat. The aquaculture site has the potential to result in disturbance and displacement from foraging habitat as well as entanglement. In the context of conservation objectives, a SPR linkage cannot be excluded.	Yes – likely significant effects cannot be excluded. There is potential for significant effects on Black-headed gulls due to their foraging range and an overlap with feeding habitat. As such the SCI is brought forward to Stage 2 - Natura Impact Statement.
Leach's storm petrel (*Oceanodroma leucorhoa*) [A015]	3. Disturbance 4. Entanglement	Stags of Broad Haven SPA [004072]	Species may occur within or adjacent to the project area and be affected by the impact mechanisms identified. Leach's storm petrel is a wide-ranging marine seabird and may utilise waters within and beyond SPA boundaries as supporting habitat. The aquaculture site has the potential to result in disturbance and displacement from foraging habitat as well as entanglement. In the context of conservation objectives, a SPR linkage cannot be excluded.	Yes – likely significant effects cannot be excluded. There is potential for significant effects on Leach's storm petrel) due to their foraging range and an overlap with feeding habitat. As such the QI is brought forward to Stage 2 - Natura Impact Statement.

2.4.2. Stage 2 - Natura Impact Statement

Introduction

Two Special Conservation Interest (SCI) species Black-headed gull (*Larus ridibundus*) [A179], and Leach's storm petrel (*Oceanodroma leucorhoa*) [A015] have been carried forward for additional Stage 2 assessment (Table 2-1 and Table 2-2).

Assessment

Lough Corrib SPA, designated for Black-headed gull (*Larus ridibundus*) is located approximately 26.3 km from the Sealax site. The assessment originally applied a maximum foraging range of 40 km (Thaxter et al., 2012); however, Woodward et al. (2019) provides updated values of 18.5 km maximum and 7 km mean. For this assessment, the updated mean foraging range is considered the most appropriate metric. On a precautionary basis, Black-headed gull was screened in at Stage 1 because it may use waters beyond the SPA boundary as supporting foraging habitat, and because disturbance, displacement, and entanglement could not be excluded as potential pathways of effect. In Stage 2, the likely interaction between the project and this SCI was re-examined having regard to conservation objectives for the SPA and proposed mitigation measures. On that basis, significant adverse effects on the conservation objectives of Lough Corrib SPA are not anticipated.

The Stage 1 screening for Leach's storm petrel was also precautionary, on the basis that the species may range widely at sea and that a pathway of effect could not be excluded solely by reference to SPA distance. Stags of Broad Haven SPA, the nearest SPA designated for Leach's storm petrel, lies approximately 109.5 km from the Sealax site. The assessment applied the maximum foraging range of 120 km reported by Thaxter et al. (2012) as a precautionary screening metric, while Woodward et al. (2019) is recognised as indicating a much larger mean maximum foraging range for the species. For the purposes of this report, the 120 km maximum foraging range has been used. The Stage 2 assessment considered whether the proposed development would result in disturbance, displacement or entanglement capable of affecting the conservation objectives of the SPA.

Mitigation

The relevant mitigation for both SCI species comprises dark-coloured nylon nets of the specified mesh size, as set out in Section 2.1, together with taut net tension and anti-predator netting, all of which are intended to reduce access to the pens and minimise the likelihood of interaction with birds. On that basis, likely significant adverse effects on the conservation objectives of Stags of Broad Haven SPA are not anticipated.

Conclusion

This updated assessment supplements the original NIS and does not alter the conclusions reached in the assessment. The overall conclusion is that, subject to implementation and maintenance of the identified mitigation measures, the project is not expected to give rise to adverse effects on the conservation objectives of either SPA.

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