Report supporting the Appropriate Assessment Screening of Intensive Aquaculture in Bertraghbuí Bay, Co. Galway (T09-155-1)

Marine Institute

Rinville

Oranmore, Co. Galway

Version	Date	Status	Author	Purpose/Changes
V1.0	October 24	Draft	MI	Original

Table of Content

Executive Summary 1

1 Introduction 3

1.1 Structure of AA Screening Report 3

1.2 Legislative Context 3

1.3 Appropriate Assessment (AA) Process 5

1.3.1 Stage 1: Appropriate Assessment Screening 5

1.4 Data sources 6

1.5 Assumptions made for Appropriate Assessment Reports 7

2 Appropriate Assessment Screening 8

2.1 Assessment of Aquaculture Activities 8

2.1.1 Details of Proposed Aquaculture Activities 8

2.2 Identification of Relevant Natura 2000 Sites and QIs 9

2.2.1 SACs 9

2.2.2 SPAs 14

2.3 Screening of QIs 15

2.3.1 Screening of QIs in the Relevant SACs 16

2.3.2 Screening of QIs in the Relevant SPAs 25

2.3.3 Screening of Potential Effects of Introduction of Non-native Species 31

2.3.4 Consideration of in-combination effects on Natura 2000 site Qualifying Interests 31

3 NIS Review for T09-155-1 36

3.1 Review of the Applicants AA Screening and NIS 36

3.1.1 Review of Stage 1 - Screening for Appropriate Assessment 36

3.1.2 Review of Stage 2 – Appropriate Assessment (AA) – Natura Impact Statement 38

3.1.3 Application NIS versus MI Report 40

4 Conclusions 42

4.1 Appropriate Assessment Screening Conclusions 42

4.2 NIS Review Conclusion 43

5 Appendix 44

List of Figures

Figure 1 The application site with all licensed and application aquaculture sites. 9
Figure 2 SACs within the zone of influence of the proposed site. 11
Figure 3 Map of SPAs overlapping or adjacent to the area of the proposed activity (WS Atkins). 15
Figure 4 Example Source-Pathway-Receptor (S-P-R) link diagram. 16
Figure 5 Currently licenced aquaculture activities in Bertraghbuí Bay. 32
Figure 6 Licensed and applied for aquaculture activities within the vicinity of the proposed activity. 32

List of Tables

Table 1 List and details of Natura sites adjacent to the area of the proposed activity. 10
Table 2 List and details of SPAs overlapping or adjacent to the area of the proposed activity. 14
Table 3 SAC Natura sites adjacent (within 15km) to the area of the proposed activity, with their QI, CF, objectives, and screening outcomes. 18
Table 4 Screening outcomes for QI in relevant SPAs (by WS Atkins Ireland Ltd.) 25

Glossary of Acronyms

AA	Appropriate Assessment
CM	Conservation measure
COs	Conservation Objective(s)
DAFM	Department of Food Agriculture and the Marine
DEHLG	Department of Environment, Heritage, and Local Government
EIAR	Environmental Impact Assessment report
European site	Natura 2000 site
FCS	Favourable conservation status
IROPI	Imperative reasoning of overriding public interest
Natura 2000	Network of nature protection areas, Including the SACs and SPA designated under the Habitats Directive and the Birds Directive
NPWS	National Parks and Wildlife Service
QIs	Qualifying Interest(s)
SAC	Special Area(s) of Conservation
SCI	Special Conservation Interest(s)
SPA	Special Protected Area(s)

Executive Summary

The Marine Institute has been requested to review an application for an aquaculture (review and renewal) application reference T09-155-1, and a foreshore licence, for intensive salmon aquaculture activities at outer Bertraghbuí Bay, Co. Galway and to conduct a review of the NIS supplied by the applicant.

Outer Bertraghbuí (OBB) is one of three salmon aquaculture sites in Bertraghbuí operated by Ardbear Salmon Ltd. The Sealax (T09-107) and Salt Point (T09-155) sites will be used alternatively for the production of salmon while the OBB site is proposed as a back-up site for the production sites. The proposed production operates on an alternating 2-year cycle. The site will remain fallow for 2.5 years while the Salt Point site is being used for production and recommence after the end of the production cycle for the OBB site. Maximum allowable biomass (MAB) is requested to be amended from the current licence operating conditions (annual production of 200 t of salmon) to an MAB of 348 t of salmon every cycle (as per Table 2.2 in applicant's NIS).

The proposed site is adjacent to 10 SACs and 11 SPAs are within the zone of influence.

The stage 1 screening process has identified the following QIs and associated conservation features in the SACs that the proposed aquaculture activities spatially overlap with and/or has the potential to significantly affect, so will be carried forward for Stage 2 Appropriate Assessment.

These are:

SAC QIs

- Annex I Habitats
    - Large Shallow Inlets and Bays [1160]
    - Mudflats and sandflats not covered by seawater at low tide [1140]
    - Coastal Lagoons [1150]
    - Reefs [1170]
- Annex II Species
    - Grey Seal (*Halichoerus grypus*) [1364]
    - Harbour Seal (*Phoca vitulina*) [1365]
    - Otter (*Lutra lutra*) [1355]
    - Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
    - Salmon (*Salmo salar*) [1106]
    - Harbour porpoise (*Phocoena phocoena*)
    - Common Bottlenose Dolphin (*Tursiops truncatus*)

SPA QIs

- Arctic Tern (*Sterna paradisaea*) [A194]
- Black-headed Gull (*Larus ridibundus*) [A179]
- Common Gull (*Larus canus*) [A182]
- Common Tern (*Sterna hirundo*) [A193]
- Cormorant (*Phalacrocorax carbo*) [A017]
- Fulmar (*Fulmarus glacialis*) [A009]
- Gannet (*Morus bassanus*) [A016]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Guillemot (*Uria aalge*) [A199]

- Herring Gull (*Larus argentatus*) [A184]
- Kittiwake (*Rissa tridactyla*) [A188]
- Leach's Storm Petrel (*Oceanodroma leucorhoa*) [A015]
- Lesser Black-backed Gull (*Larus fuscus*) [A183]
- Little Tern (*Sterna albifrons*) [A195]
- Manx Shearwater (*Puffinus puffinus*) [A013]
- Puffin (*Fratercula arctica*) [A204]
- Razorbill (*Alca torda*) [A200]
- Shag (*Phalacrocorax aristotelis*) [A188]
- Sandwich Tern (*Sterna sandvicensis*) [A191]
- Storm Petrel (*Hydrobates pelagicus*) [A014]

On the basis that likely significant effects of the proposed activity on the European sites cannot be excluded, these QIs are brought forward in the Stage 2 Appropriate Assessment.

The review of the AA documentation supplied by the applicant highlighted 2 points to be addressed - when addressed, the NIS supplied by the applicant, in combination with the reports supplied by the Marine Institute, will contain the necessary information/data to proceed to the next stage of the licensing process, and support the carrying out of a Stage 2Appropriate Assessment of the proposed activities.

1 Introduction

The Marine Institute has been requested to review an application for an aquaculture licence (AQ183) (review and renewal) and a foreshore licence, application reference T09-155-1, for intensive salmon aquaculture activities at Bertraghbuí Bay, Co. Galway

This is an Appropriate Assessment Screening document supporting that Appropriate Assessment. The report assesses the potential for the proposed aquaculture activities to have significant effects on the Qualifying Interests (QIs) of the Natura 2000 SACs and any adjacent sites. This report also includes a review of the NIS supplied by the applicant to confirm it contains the necessary information to progress to the next stage of the licensing process.

Intensive fish farming is defined in Aquaculture (Licence Application) Regulations, 1998 (as amended[1]) as "aquaculture activities where the biomass produced is beyond that which could be naturally supported without the provision of additional feed". Fed finfish aquaculture (e.g., salmon, trout) falls within this definition.

This report is to consider if the proposed activities are likely to significantly affect the Qualifying Interests (QIs) of Natura 2000 sites in view of their Conservation Objectives (COs), and any adjacent sites. This is achieved, in the first instance, by following the screening process outlined in this document. If there is potential for the activities considered to likely significantly affect QIs and their conservation features, they will be carried forward for Stage 2 Appropriate Assessment and considered on a cumulative basis with other potentially disturbing activities.

1.1 Structure of AA Screening Report

This report provides:

1. **Introduction -** an outline of the legislative context and the processes.
2. **Appropriate Assessment Screening -** providing details of the AA screening undertaken.
3. **NIS Review** - a review of the NIS supplied by the applicant.
4. **Conclusion** - a summary of the findings from the screening process.

1.2 Legislative Context

Articles 3 - 11 of the European Community (EC) Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (the Habitats Directive[2]) provide the legislative means to protect habitats and species of Community interest through the conservation of an EU-wide network of protected sites, known as Natura 2000 sites[3].

The Habitats Directive was originally transposed into Irish law by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997). The 1997 Regulations were subsequently replaced by the *European Communities (Birds and Natural Habitats) Regulations 2011*[4], as amended (referred to as the *2011 Birds and Natural Habitats Regulations*). Natura 2000 sites are referred to as European sites in these Regulations. The terms Natura 2000 sites and European sites are synonymous - the term Natura 2000 sites is used in this report. Natura 2000 sites in Ireland, form part of the Natura 2000

[1] S.I. No. 236/1998 —Aquaculture (Licence Application) Regulations (consolidated version) https://www.gov.ie/pdf/?file=https://assets.gov.ie/264584/7c297e21-8bea-4d15-abaa-79ef60ecd1d7.pdf#page=null

[2] https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

[3] https://ec.europa.eu/environment/nature/natura2000/index_en.htm

[4] European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 (Unofficial Consolidation) NPWS Link

European network of protected sites, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

SACs are designated under the Habitats Directive, due to their significant ecological importance for habitats and for species protected under Annex I and Annex II respectively of the Habitats Directive. SPAs, designated under EC Directive EC 79/409/EEC (the Birds Directive[5]), are designated for the protection of populations and habitats of bird species. The specific named habitats and/or (non-bird) species for which an SAC or SPA are selected are called the Qualifying Interests (QI), of the site. The specific named bird species for which a SPA is selected is called the 'Special Conservation Interests' (SCI). However, in practice, the common terminology of QI applies also to SCI. The term QI is used throughout this report.

Under Article 6(3) of the Habitats Directive any plan or project likely to significantly affect, either individually or in combination with other plans or projects (and it is not connected with or necessary for the management of a protected site), on the integrity of a Natura 2000 site must be subject to an Appropriate assessment (AA). The AA focuses on the likely significant effects of a plan or project on a Natura 2000 site and considers the implications for the site in view of its Conservation Objectives (COs). Natura 2000 sites have COs which are set out by the National Parks and Wildlife Service (NPWS) - the competent authority for the management of Natura 2000 in Ireland. The AA process must also consider any plan or proposal in combination with other activities that have the potential to significantly affect the integrity of the Natura 2000 site.

DAFM is the aquaculture licensing authority under the *Fisheries (Amendment) Act (1997)*[6] and has responsibility for foreshore licensing functions in respect of activities wholly or primarily for the use, development or support of aquaculture under the Foreshore Act (1933)[7]. They determine applications for new, or renewal of, aquaculture and foreshore licences. They are also the competent authority responsible for undertaking AA of aquaculture licence applications. As part of the licensing process DAFM must determine if the proposed aquaculture activities, individually or in-combination with other activities, are likely to significantly impact the conservation status of QIs and the integrity of the Natura 2000 site. DAFM must base its determination on an AA and is also responsible for ensuring that an AA is carried out.

If the AA process finds that the possibility of significant adverse effects cannot be discounted or that there is a likelihood of negative consequence for the conservation features for which a site is designated, then such activities will need to be mitigated further if they are allowed to continue. The assessment reports are not always explicit on how this mitigation might be achieved but rather indicate whether mitigation is required or not and what results should be achieved.

Aquaculture operations existed in coastal areas prior to the designation of areas as SACs and SPAs under the Directives. Ireland is undertaking AAs of existing and proposed aquaculture activities in SACs and SPAs. This is an incremental process, as agreed with the EU Commission in 2009, and will ultimately cover all aquaculture activities in all Natura 2000 sites. AA of aquaculture operations are carried out against the Conservation Objectives for the conservation features of the Natura 2000 site, as defined by the NPWS.

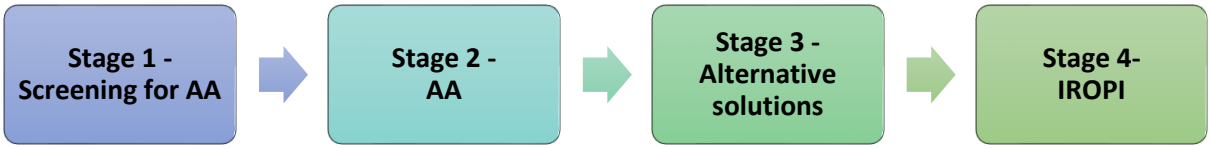
This report supporting the AA, informs part of the assessment process – Stage 1 Screening.

[5] https://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm
[6] Fisheries (Amendment) Act, 1997 Lawreform.ie
[7] Foreshore Act 1933 Revised Acts (lawreform.ie)

1.3 Appropriate Assessment (AA) Process

The requirement for an AA derives directly from Article 6(3), which outlines the decision-making tests for considering plans and projects that may have a significant effect on a Natura 2000 site. No definition of the content or scope of AA is given in the Habitats Directive, but the concept and approach are set out in EC guidance [8]. The *Guidance on Appropriate Assessment of Plans and Projects in Ireland* document[9] published by the Department of Environment, Heritage and Local Government (DEHLG) in 2009, sets out how an AA of plans or proposals in Natura 2000 sites in Ireland should be carried out in alignment with EC guidance. In 2021, the Office of the Planning Regulator (OPR) published a practice note on AA Screening[10], which provides guidance on how a planning authority should screen an application for planning permission for AA.

The *Guidance on Appropriate Assessment of Plans and Projects in Ireland* document identifies a four-stage process of an AA. The four stages are:



The key procedures involved in completing the first two stages of the AA process are described below. Stage 3 and Stage 4 (Imperative reasoning of overriding public interest) are not applicable here.

1.3.1 Stage 1: Appropriate Assessment Screening

Stage 1 AA Screening is the process that addresses and records the reasoning and conclusions in relation to whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of the site's COs. If the effects, on the basis of objective information, are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to *Stage 2 Appropriate Assessment*. Screening should be undertaken without the inclusion of mitigation. A high level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no effect.

1.3.1.1 Stage 2: Appropriate Assessment

This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and can consider any mitigation measures necessary to avoid, reduce or offset negative effects. This stage requires a targeted scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's QIs and COs, taking account of in combination effects.

The sensitivity of identified QIs in relation to the proposed activities is assessed and the significance of any identified adverse effects is then determined. If adverse effects are determined to be likely, then their scale, magnitude, intensity, and duration are considered in light of the COs and relevant guidance

[8] EC 2018. Guidance on Aquaculture and Natura 2000 Sustainable aquaculture activities in the context of the Natura 2000 Network Link
[9] DEHLG, 2009. Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Link
[10] OPR - Office of Planning Regulator (2021). Appropriate Assessment Screening for Development Management. March 2021. 43pp Link

documents. If the assessment is negative, then recommendations on mitigation measures or on licensing decisions will be made.

1.4 Data sources

This process and report relies on data and information from a broad range of diverse sources. Some of the key sources of information that are generally viewed, consulted and/or utilised to inform the screening and AA processes are listed below. Others are consulted as required, and relevant sources are cited in the reports.

Reference documents and Sources of information used to inform this process include:

- The Application
- The Environmental Impact Assessment report (EIAR)
- DAFM Aquaculture & Foreshore Management website
- DAFM - Aquaculture viewer – AquaMIS
- National Parks & Wildlife (NPWS) protected site information for NPWS website, including conservation objectives
- NPWS development applications guidance documents
- BIM aquaculture profiling reports
- Targeted scientific studies
- Primary research literature
- Grey literature, reviews and report documents
- Expert opinion
- Direct queries to applicants through DAFM
- Fisheries (Amendment) Act 1997
- Aquaculture (Licence Application) Regulations, 1998, as amended
- Ireland's Marine Atlas, Marine Institute
- MI/BIM Inshore fishing reports (from websites)
- DHPLG Foreshore licencing database
- Maritime Area Regulatory Authority (MARA)
- EPA GeoHive
- EPA maps tool
- NPWS Article 17 Reports - Status of EU Protected Habitats and Species in Ireland
- Birdwatch Ireland website
- Irish Wetland Bird Survey (I-WeBS)
- EC Article 12 web tool on population status and trends of birds
- Marine Life Information Network
- EPA Catchments.ie dashboard
- Ordnance Survey of Ireland (OSI)
- National Biodiversity Data Centre
- European Environmental agency
- OPR, 2021. Appropriate Assessment Screening for Development Management. March 2021; Office of Planning Regulator.
- Official Journal of the EU. 2021. Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive.
- DEHLG, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. NPWS, 2009 – updated in 2010 with reference to Natura Impact Statement.

- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Edited by: Deirdre Lynn and Fionnuala O'Neill
- Möckel, S., 2017. The European ecological network "Natura 2000" and the appropriate assessment for projects and plans under Article 6 (3) of the Habitats Directive. Nature Conservation, 23.
- EC Article 6 - Managing and protecting Natura 2000 sites
- EC Management of Natura 2000 sites: Best Practice
- EC 2000. Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg.
- EC 2002. Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg.
- EC 2006. Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg.
- EC 2018. Guidance on Aquaculture and Natura 2000 Sustainable aquaculture activities in the context of the Natura 2000 Network.
- EC 2012. Common methodology for assessing the impact of fisheries on marine Natura 2000. Service Contract No. 070307/2010/578174/SER/B. DGEnv Brussels.
- Poelman *et al*., 2022. Study on state-of-the-art scientific information on the impacts of aquaculture activities in Europe.
- Federal Agency for Nature Conservation for the FFH impact assessment
- MI 2023 a-h, ABPMer. Tools for Appropriate Assessment of Fishing and Aquaculture Activities in Marine and Coastal Natura 2000 Sites
- Marlin.ac.uk
- AMBI Sensitivity Scale
- MarESA
- Marine Institute. 2013. A risk assessment framework for fisheries in Natura 2000 sites in Ireland: with case study assessments. Version 1.3. Galway, 31pp.
- Open Street Maps, Google Earth, and Bing aerial photography

1.5 Assumptions made for Appropriate Assessment Reports

Certain assumptions are made for this screening report as it applies to aquaculture licencing, to ensure that it follows a precautionary approach when considering the extent, magnitude, intensity, and duration of the potential significant effects of the proposed activities. These are:

- The aquaculture site considered in this assessment report is assumed to be fully operational and that the operations (as well as environmental impacts) are occurring across the entire area of the site, according to the stated production plan.
- Any aquaculture applications (for consideration of in-combination effects) which were submitted prior to that being considered here, but still pending decisions (e.g., in process, under appeal, etc.), are also assumed to be fully operational of the relevant sites.
- Other assumptions identified on a case-by-case basis are communicated in the relevant section of the report.

2 Appropriate Assessment Screening

2.1 Assessment of Aquaculture Activities

The Marine Institute has been requested to review an application for aquaculture licence (AQ183) Site number T09-155-1 (review and renewal) and a foreshore licence, for intensive salmon aquaculture activities at Bertraghbuí Bay, Co. Galway.

This section identifies, in detail, the proposed aquaculture activities to be considered as part of the screening exercise in this report, and then considers whether the proposed activities are likely to significantly affect the QIs of the Natura 2000 sites, in view of their Conservation Objectives (COs).

This is achieved by following the Screening Process as outlined in Section 0. If there is potential for the activities considered to have likely significant effects on the QI and their conservation features, they will be carried forward for a Stage 2 Appropriate Assessment. These activities are considered in-combination with similar aquaculture practices and on a cumulative basis with other aquaculture activities and other potentially impacting activities (e.g. fisheries).

2.1.1 Details of Proposed Aquaculture Activities

The Outer Bertraghbuí (OBB), Bertraghbuí site is operated by Ardbear Salmon Ltd. in association with MOWI Ireland and BIFAND Ltd. The production will follow MOWI's Standard operating procedures (SOPS). The licence review requests a licence:

- To amend the current licence operating conditions (annual production of 400 t of salmon) to a Maximum allowable biomass (MAB) of 348 t (as per Table 2.2 in applicant's NIS) every 2 years
- To amend the current licence site area of 11.99 ha to 14.56 ha

A total of 10 pens are being applied for in a 2 x 5 formation. Pens will have a 126 m circumference and net depth to the cone of 8 m (net mesh size 16-22 mm). Total cubic capacity would be approximately 12,600 m^3. The maximum stocking density within the pen will be 10 kg/m^3.

OBB (T09-155-1) (Figure 1) is one of three salmon aquaculture sites in Bertraghbuí operated by Ardbear Salmon Ltd. The Sealax (T09-107) and Salt Point (T09-155) sites will be used alternately for the production of salmon while the OBB site is proposed as a back-up site for the two production sites. The proposed operates on an alternating 2-year cycle. In October Y1, 400,000 smolt (11-month-old MOWI stock from Douglas Valley Hatchery or Lough Altan) introduced to the Sealax site. Harvesting begins in December Y2 and finishes March Y2 until a 1,600t total harvest is reached at the site, and the remaining fish will be transferred to OBB in April. The Sealax site will remain fallow for 2.5 years while the Salt Point site is being used for production and recommence after the end of the production cycle for the OBB site (September Y2 of Salt Point production). The OBB site is proposed as a back-up site for the production cycles at Sealax and Salt Point in the case that fish need to be moved from either site from April to July of Y2 of either production cycle. If used, it is estimated that approximately 400.7 t will be harvested at the OBB site. Table 2.2 production cycle in the NIS application documents propose the first year of production at Salt Point (T09-155-1) will have a maximum biomass of ~80 t (Dec Y1), Year 2 will have ~1,400 t (Jan Y2) with all fish harvested out by March (Y2).

The fish will be fed a dry pellet, produced to organic standards, by feed-barge. The pellet utilises a limited selection of raw materials, mainly comprising trimmings-derived fish meals and marine oils, organic wheat and other organic plant raw materials, natural pigments, natural antioxidants, and only

organic-approved vitamins and minerals. The barge is filled by boats from the shore facility. The site will be accessed by boat from the pier in Killybegs for smolt delivery and the Ardbear Salmon Ltd pier at Letterard.

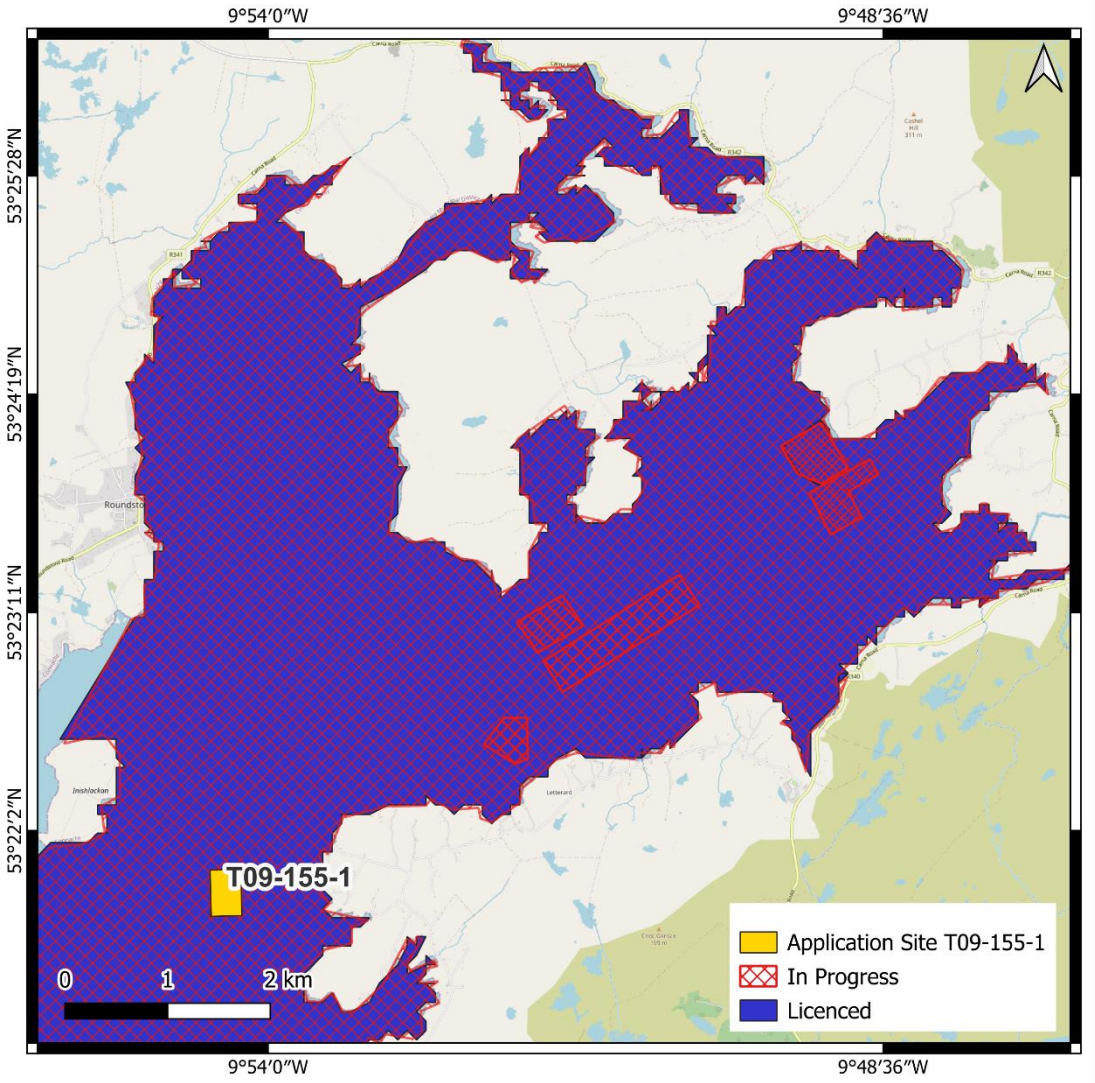


Figure 1 The application site with all licensed and application aquaculture sites.

2.2 Identification of Relevant Natura 2000 Sites and QIs

The proposed site does not overlap with any SACs and is closest to Connemara Bog Complex SAC. The proposed site does not overlap with any SPAs. A key consideration as to whether or not an activity is likely to adversely affect Natura 2000 QI is if there is a pathway of connectivity between the QI and the sources of potential impacts associated with the activity. The relevant Natura 2000 sites (Figure 2 and Figure 3) and their QIs or conservation features, as well as their objectives and targets are detailed in the next sections.

2.2.1 SACs

Based on NPWS guidance[11], SACs within 15 km are considered as within the zone of influence of the project. A list of SACs that could be potentially affected by the proposed project have been identified and are listed in Table 1, and displayed in Figure 2. Their details and QIs are listed and tabulated below.

[11] DEHLG, 2009. Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Link

Table 1 List and details of Natura sites adjacent to the area of the proposed activity.

Natura site	Site code	Distance from Natura site at nearest point (km)	Reference
Connemara Bog Complex SAC	002034	2.6	Link
Rosroe Bog SAC	000324	1.9	Link
Cregduff Lough SAC	001251	2.1	Link
Kilkieran Bay and Islands SAC	002111	4.1	Link
Dog's Bay SAC	001257	2.8	Link
Lough Nageeron SAC	002119	5	Link
Murvey Machair SAC	002129	6.7	Link
The Twelve Bens/ Garraun complex SAC	002031	12.4	Link
Maumturk Mountains SAC	002008	15.4	Link
Slyne Head Peninsula SAC	002074	11.9	Link

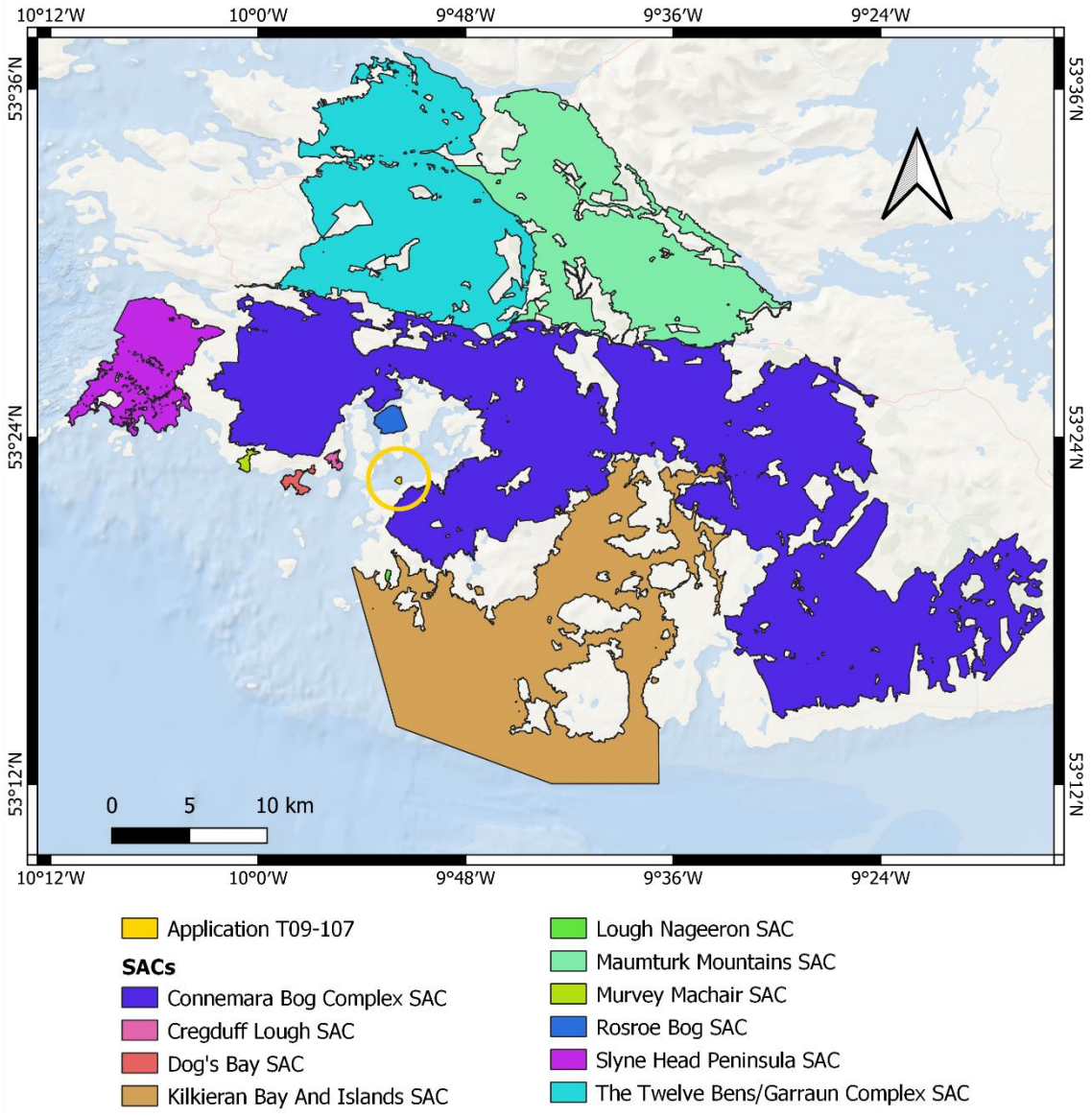


Figure 2 SACs within the zone of influence of the proposed site.

2.2.1.1 Connemara Bog Complex SAC

The Connemara Bog Complex SAC is a large site encompassing the majority of the south Connemara lowlands in Co. Galway. The site is bounded to the north by the Galway–Clifden road and stretches as far east as the Moycullen–Spiddal road. The site supports a wide range of habitats, including extensive tracts of western blanket bog, which form the core interest, as well as areas of heath, fen, woodlands, lakes, rivers and coastal habitats.

2.2.1.2 Rosroe Bog SAC

Rosroe Bog is situated in the north-western corner of the largest peninsula in Bertraghboy Bay, Connemara, Co. Galway. It is bounded on both the northern and western sides by the waters of the bay and on the southern and eastern sides by granitic ridges rising to about 50 m above sea level. The site is characterised by gently undulating areas of blanket bog interrupted by scattered rocky ridges, often with heath, and contains two small lakes, Rosroe Lough and White Lough. The wettest and least disturbed areas of the bog at Rosroe Bog SAC have well- developed bog moss (Sphagnum spp.) lawns, though no natural pool systems occur. The bog vegetation grades into dry heath, which is found mostly in the southern and Western parts of the site.

2.2.1.3 Cregduff Lough SAC

Cregduff Lough is a small coastal lake located 1 km south-west of Roundstone village in Co. Galway. The lake occupies a hollow in rocky, heath-covered, undulating terrain. The bottom of the lake is unconsolidated muddy material and about 60% of the water surface is covered by a scraw of reedswamp vegetation (i.e. It is floating). Encroachment by vegetation has progressed to such a level that there are virtually no areas of open water remaining in the northern half of the lake. The site contains two Red Data Book plant species that are also legally protected under the Flora (Protection) Order, 1999 - Slender Naiad (Najas flexilis) and Slender Cottongrass (*Eriophorum gracile*). Cregduff Lough is an excellent example of an infilling lake, and one that supports a good diversity of vegetation types ranging from open water communities, to quaking transition mire, to species-rich freshwater marsh vegetation

2.2.1.4 Kilkieran Bay and Islands SAC

Kilkieran Bay and Islands SAC is located just north of Galway Bay and extends from Keeraun Point, south of Carraroe, westwards to Mace Head, west of Carna, all in Co. Galway. The site contains a large area of open marine water, many islands and rocky islets, and the coastline is much indented with a series of bays (notably the inter-
connected Kilkieran Bay and Greatman's Bay), channels and inlets. The entrances of the bays face the prevailing south-westerly winds and they are subject to strong tidal streams as the sea funnels between islands and through channels. A number of streams, lakes and lagoons drain into the bays.
The marine habitats found within Kilkieran Bay and Greatman's Bay are of very high conservation value. Both bays have a wide variety of habitats and Kilkieran Bay has a very high diversity of marine species. Communities of particular importance are the extensive and varied beds of free- living red calcareous algae or maerl (which may be known locally as 'coral'). Kilkieran Bay is one of three known localities in Ireland where the maerl species *Lithothamnion corallioides*, *Lithophyllum dentatum* and *Lithothamnion fasciculatum* co- occur. The very rare anemone *Halcampoides elongatus*, known only from Kilkeran Bay and Ards Bay in Ireland, occurs in a narrow bed of clean dead maerl at the edges of some of the live maerl beds.
The site is extremely important for the number of lagoons that it includes - it is considered to be one of the best sites in the country for this habitat and provides an excellent example of a particularly unusual type of saline lake lagoon situated on peat.
Areas of saltmarsh occur frequently throughout the site - a thin fringe of saltmarsh is found along most stretches of coastline. Machair occurs most extensively on Mweenish Island, Finish Island and Mason Island, which lie in the west of the site. The submerged aquatic plant Slender Naiad (*Najas flexilis*) occurs in several of the coastal freshwater lakes. Otter, a species also listed on Annex II of the E.U. Habitats Directive, occurs commonly throughout the site. The site is used by Common Seal (maximum count of 116 in the all-Ireland survey of 2003). Grey Seal is a regular visitor and may breed.

2.2.1.5 Dog's Bay SAC

Dog's Bay is located 3.5 km south-west of Roundstone village in Co. Galway. The site includes a granite 'island' which is linked to the mainland by a sandy spit, a feature which is known as a tombolo. Dog's Bay curves along the west side of this tombolo, with Gorteen Bay to the east. The sands are formed of Foraminfera shells, the calcareous remains of tiny, single-celled marine animals. At Dog's Bay SAC, fixed dune vegetation occurs as a relatively narrow strip between the mainland and the small island. Given the amount of ongoing erosion here, the fixed dune is likely to be a remnant of a once larger system. The other sand dune habitats at the site are more typical of embryonic shifting dunes and Marram dunes, and these occur along both sides of the Dog's Bay promontory. Although the habitat stretches for some considerable length (up to 300 m), the width rarely exceeds 25 m and there are considerable amounts of bare sand present. Substantial areas of dry heath occur on the rocky

headland in the south-west of the site, where the habitat forms a mosaic with rock outcrops and grassland. The diversity of this site is added to by the presence of wetland areas, including brackish pools and a freshwater marsh.

2.2.1.6 Lough Nageeron SAC

Lough Nageeron SAC consists of a small lake and is situated about 9 km west of Kilkieran in Connemara, Co. Galway. It overlooks Ard Bay and is connected to the sea by a small channel. It is, however, raised above sea level and it does not receive any saline water. The lake is an oligotrophic system with apparently good quality water. The aquatic species of most interest is the rare Slender Naiad (Najas flexilis), a species which is found mainly in western oligotrophic lakes. A number of small islands are scattered around the lough. These islands support a dense vegetation, mainly of willows (Salix spp.) and Bracken (Pteridium aquilinum). Reedbeds, mainly of Common Reed (Phragmites australis), are present around the lake shores, though none are extensive. Several areas of freshwater marsh occur, with typical species such as Yellow Iris (Iris pseudacorus), Water Mint (Mentha aquatica) and Marsh Cinquefoil (Potentilla palustris). Wet grassland is the main habitat which borders the lake.

2.2.1.7 Murvey Machair SAC

Murvey machair SAC is located on the coast approximately 6.5 km west of Roundstone in Co. Galway. The main habitat at this site is hill machair, with a typically herb-rich sward characterised by species such as Red Fescue (Festuca rubra), Daisy (Bellis perennis), plantains (Plantago coronopus and P. lanceolata), White Clover (Trifolium repens) and mosses (e.g. Tortula ruraliformis and Brachythecium albicans). Seepage zones and damp hollows also occur and support abundant sedges, mosses, Fool's Water-cress (Apium nodiflorum), Brookweed (Samolus valerandi) and Creeping Bent (Agrostis stolonifera). A population of the rare bryophyte Petalwort (Petalophyllum ralfsii) has recently been discovered associated with the machair habitat. The northern part of the site contains two loughs. These lakes contain two rare plant species - Slender Cottongrass (Eriophorum gracile) and Slender Naiad (Najas flexilis). Both are legally protected under the Flora (Protection) Order, 1999, and listed in the Irish Red Data Book.

2.2.1.8 Twelve Bens/ Garraun Complex SAC

This is an extensive site situated in the north-west of Connemara in Co. Galway and dominated by mountainous terrain. The site is bounded to the south by the Connemara Bog Complex, to the east by the Maumturk Mountains and to the north by Killary Harbour. Included within the site are the Twelve Bens mountain range, the mountains to the north of Kylemore (Doughruagh, Garraun and Benchoona), rivers including the Ballynahinch and Owenglin systems and an area of coastal heath and machair near Glassilaun. The site also includes some extensive tracts of lowland blanket bog which are continuous with the mountains. Irish Hare, Common Frog, Otter and Freshwater Pearl Mussel have been recorded from the site. Bird species reported from the site include Raven, Wheatear, Stonechat, Meadow Pipit, Red Grouse (a declining species of heather moorland), Snipe, Curlew, Woodcock, Hooded Crow, Twite, Ring Ouzel (the latter two both Irish Red Data Book species) and the E.U. Birds Directive Annex I species: Peregrine, Merlin, Golden Plover and Chough.

2.2.1.9 Maumturk Mountains SAC

The Maumturk Mountains are situated east of the Twelve Bens and west of the Maumtrasnas, between the Inagh Valley and the Leenaun/Maam road in Co. Galway. The site is bounded to the north by Killary Harbour and to the south by the Galway/ Clifden road. Most of the mountains exceed 600 m in height and about half of the land within the site lies above an altitude of 250 m. In addition,many rivers criss-cross the site. This site is of conservation interest as it is a good example of an extensive

mountain landscape, containing blanket bog, large areas of heath, siliceous rocky vegetation, oligotrophic lakes and upland grassland.

2.2.1.10 Slyne Head Peninsula SAC

This site comprises the peninsula west of Ballyconneely, Co. Galway. It extends northwards to Errislannan Point to include the shallow waters of Mannin Bay. The peninsula is low-lying and undulating, reaching a maximum height of only 64 m (Doon Hill). The underlying rock is predominantly gneiss, except for schist along the northern shores of Mannin Bay, a granite ridge along the western edge of the peninsula and a conspicuous basalt exposure which forms Doon Hill. The peninsula is fringed with rocky shores and sandy beaches, with some extensive areas of machair and several brackish lakes and lagoons. Inland, the site is a maze of small fields, supporting a mosaic of habitats dominated by grassland and heath, interspersed with numerous lakes and associated swamp, marsh and fen. An important feature of the site is the influence of windblown calcareous sand on these habitats. Mannin Bay is an excellent example of a large shallow bay, with a wide range of sediment types. The islets and rocks at the mouth of the bay give some shelter from Atlantic swells. Conditions become more sheltered towards the head of the bay and are extremely sheltered in Mannin Creek. Tidal streams are weak. Mannin Bay is almost unique as a very large proportion of the bay is dominated by a combination of maerl debris and living maerl. Machair is particularly well developed and forms extensive plains at Mannin Beg and Aillebrack. The machair gives way to bare sand in places with embryonic shifting dunes. Brackish lakes and lagoons are a feature of this site. These include Ballyconneelly Lake, Lough Silverhill, Lough Aillebrack South and Lough Athola. These lakes are shallow, with sandy bottoms and shores, and may be directly connected to the sea. They all receive sea spray and during storms may be flooded by the sea. The largest freshwater lake is Lough Anaserd, a typical oligotrophic (nutrient-poor) lake surrounded by heathland. Lough Aillebrack is considered to be a good example of a hard water lake with Chara formations. Much of the inland peninsula consists of small fields which contain a complex mosaic of habitats ranging from dry grassland, hay meadow and heath through to wet grassland and marsh.

2.2.2 SPAs

The MI engaged a consultant (WS Atkins Ireland Limited) to carry out the process for SPAs in the zone of effect of the site. This review considered SPAs within 50 km of the sites within Bertraghbuí Bay, and considered the full list of QIs for each SPA, based on the latest NPWS documents. Table 2 gives the list of identified SPAs, with Figure 3 showing their locations in relation to the proposed site.

Table 2 List and details of SPAs overlapping or adjacent to the area of the proposed activity.

Natura site - SPAs	Site code	Distance from Natura site at nearest point (km)	Reference
Connemara Bog Complex SPA	004181	5.6	Link
Clare Island SPA	004136	47.6	Link
Cross Lough (Killadoon) SPA	004212	38	Link
Cruagh Island SPA	004170	26.4	Link
High Island, Inishshark and Davillaun SPA	004144	30.2	Link
Illaunnanoon SPA	004221	21.7	Link

Inishbofin, Omey Island and Turbot Island SPA	004231	21.4	Link
Inishmore SPA	004152	22.9	Link
Lough Corrib SPA	004042	29.7	Link
Lough Mask SPA	004062	33	Link
Slyne Head to Ardmore Point SPA	004159	0.38	Link

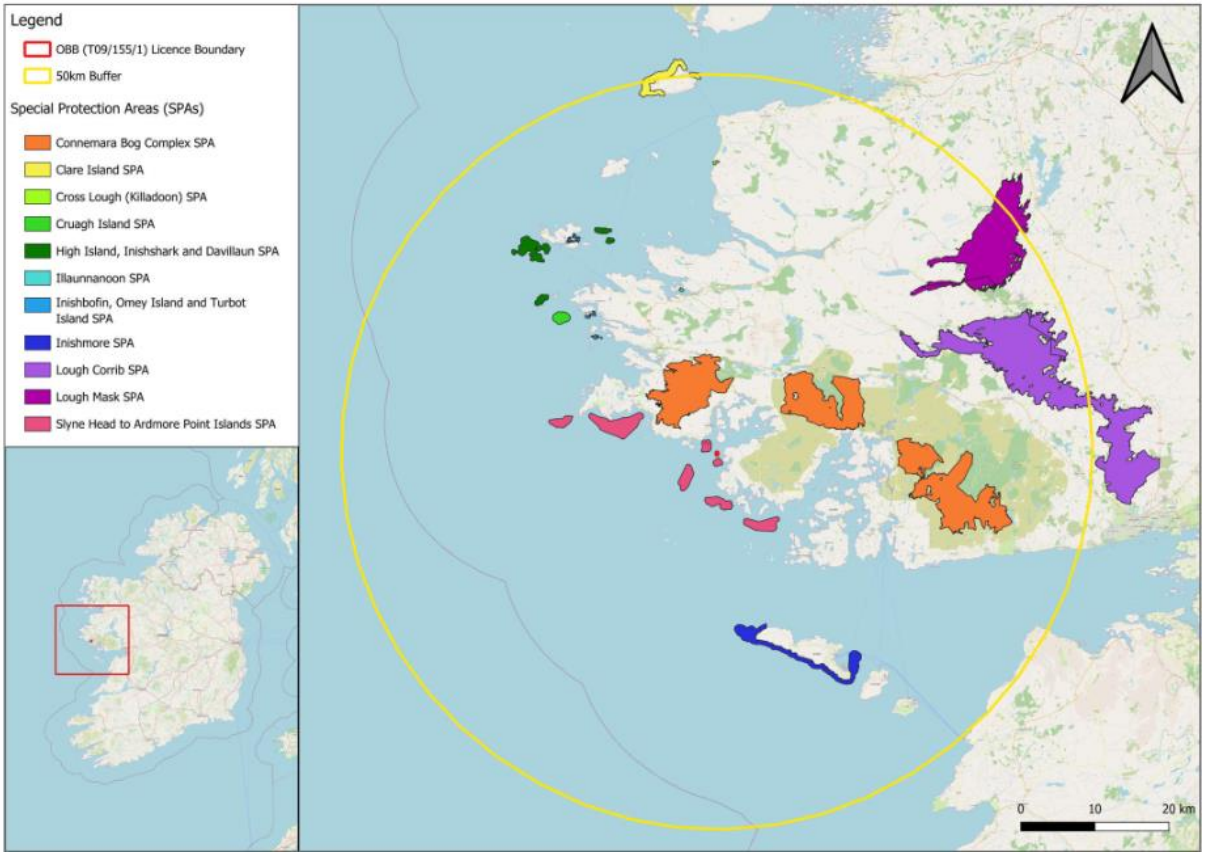


Figure 3 Map of SPAs overlapping or adjacent to the area of the proposed activity (WS Atkins).

Detail of the process is provided in the full report, which is attached to this report as an Appendix.

2.3 Screening of QIs

A key consideration as to whether or not an activity is likely to significantly affect Natura 2000 QIs, is if there is a pathway of connectivity between the QI and the sources of potential impacts associated with the activity. The QIs could be at risk of effects where a Source-Pathway-Receptor (S-P-R) link exists between the proposed activities and the conservation features of the site, and the risk cannot be dismissed (Figure 4).

Figure 4 Example Source-Pathway-Receptor (S-P-R) link diagram.

The S-P-R model considers potential ecological links between the proposed activity and the qualifying interest of Natura 2000 site. The link can be direct and facilitated by terrestrial, aquatic and airborne transfer of a particular pressure, or the nature and location of the activity may be indirect and interact at a functional level, and impact on behaviour or resource acquisition of a qualifying interest[12].

The screening for the presence of a S-P-R link and any potential significant effects of the proposed aquaculture activities on the QIs of the Natura will be presented in this Section. A screening assessment is an initial evaluation of the existence of S-P-R links between the proposed activities and any likely significant effects on the QIs. In this assessment, screening of the QIs against the proposed activities is, in the first instance, considered on the basis of direct spatial overlap. Indirect effects are also considered whereby the likely impact of the activity on behaviour or resources required by mobile species (mammals and birds, among others) is considered. Also considered are indirect effects facilitated by hydrological or other potential links (e.g. foraging range).

Where there is spatial overlap and reasonable potential for likely significant effects on QIs to arise, a Stage 2 Appropriate Assessment is warranted. In the instance where there is no spatial overlap between an activity and a QI, and no likely direct or indirect interactions apparent, the activity, therefore, may be screened out. If there is marginal spatial overlap but no reasonable potential for significant effects on QIs to arise then the activity may also be screened out.

The QIs of the adjacent Natura 2000 sites listed above could be at risk of effects where a S-P-R link exists between the proposed activities and the QIs of the site. The screening for the presence of a S-P-R link and any potential significant effects of the proposed aquaculture activities on the QIs of adjacent SACs and SPAs is presented here. The screening is undertaken without the inclusion of any mitigation measures.

2.3.1 Screening of QIs in the Relevant SACs

2.3.1.1 Screening of QIs of Adjacent Natura 2000 Sites

Guidance has indicated that a screening exercise might consider the likely interactions between the QIs of Natura 2000 sites within a standard distance of 15 km from the proposed activity[13]. While this guide value of 15 km can inform for habitats and also, for species with defined ranges, they may not apply to migratory species (e.g. some fish or mammals) or those with large foraging ranges (e.g. birds

[12] Office of Planning Regulator, (2021). Appropriate Assessment Screening for Development Management. March 2021. 43pp
[13] NPWS. 2009 Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

and mammals). Such species may interact with the proposed activity as a result of the structures impacting their migratory route or impacting on their foraging behaviour, among other effects. It is important such species are identified and the potential interactions should be considered on a case-by-case basis.

The screening of the QIs of adjacent Natura 2000 SAC sites is outlined in Table 3.

Table 3 SAC Natura sites adjacent (within 15km) to the area of the proposed activity, with their QI, CF, objectives, and screening outcomes.

Natura 2000 site	QIs and Conservation Features	Conservation Objective	Screening Outcomes	Screening Outcome
Connemara Bog Complex SAC (002034)	Coastal lagoons [1150]	Maintain	OUT	The Connemara Bog Complex SAC is approximately 2.6 km from the closest boundary of the proposed aquaculture operation. The closest recorded Coastal lagoon habitat in this SAC is over 30 km to the proposed site. Due to lack of proximity of the aquaculture site to this marine habitat, there is no clear S-P-R interaction and therefore no significant effects are posed by the aquaculture activities on this QI. Therefore, Coastal lagoons -1150] are screened out.
	Reefs [1170]	Maintain	IN	The Connemara Bog Complex SAC is approximately 2.6 km from the closest boundary of the proposed aquaculture operation. Due to the proximity of the aquaculture site to these marine habitats, there is potential for significant effects Reefs [1170] are screened in for further consideration.
	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]	Maintain	OUT	These QIs are freshwater features upstream from the aquaculture activities. Given the predominantly freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these terrestrial Annex I Habitats or Annex II Species and therefore there are no significant effects posed by the proposed aquaculture on these QIs of this Natura site. These QIs are therefore screened out.
	Oligotrophic to mesotrophic standing waters with vegetation of *Littorelletea uniflorare* and/or *Isoeto-Nanojuncetea* [3130]	Maintain	OUT	
	Natural dystrophic lakes and ponds [3160]	Maintain	OUT	
	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Maintain	OUT	
	Northern Atlantic wet heaths with *Erica tetralix* [4010]	Restore	OUT	Given the predominantly terrestrial and freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-
	European dry heaths [4030]	Restore	OUT	

	Molinia meadows won calcareous, peaty of clayey-silt-laden soils (*Molinion caeruleae*) [6410]	Maintain	OUT	path-receptor" interactions with these terrestrial Annex I Habitats or Annex II Species and therefore no significant effects posed by the proposed aquaculture on these QIs of this Natura site. These QIs are therefore screened out.
	Blanket bogs (*if active bogs) [7130]	Restore	OUT	
	Transition mires and quaking bogs [7140]	Restore	OUT	
	Depressions on peat substrates of the *Rhynchosporion* [7150]	Restore	OUT	
	Alkaline fens [7230]	Restore	OUT	
	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	Maintain	OUT	
	Euphydryas aurinia (Marsh Fritillary) [1065]	Maintain	OUT	
	Najas flexilis (Slender Naiad) [1833]	Maintain	OUT	
	Salmo salar (Salmon) [1106]	Restore	IN	There is potential for the migratory species, *Salmo salar,* to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Salmon is carried forward to Stage 2.
	Lutra lutra (Otter) [1355]	Maintain	IN	There is potential for the species, *Lutra lutra*, to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Otter is carried forward to Stage 2.
Rosroe Bog SAC (000324)	Blanket bogs (*if active bogs) [7130]	Restore	OUT	The Rosroe Bog SAC is approximately 1.9 km from the aquaculture site. Given the terrestrial nature of these QIs for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore there are no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Depressions on peat substrates of the *Rhynchosporion* [7150]	Restore	OUT	
Cregduff Lough SAC (001251)	Transition mires and quaking bogs [7140]	Maintain	OUT	The Cregduff Lough SAC is approximately 2.1 km from the closest boundary of the proposed aquaculture operation. There is no spatial overlap or likely interactions identified between aquaculture activities and the terrestrial QIs in the SAC, it is considered that there are not

	Najas flexilis (Slender Naiad) [1833]	Maintain	OUT	clear "source-path-receptor" interactions with these Annex I Habitats and therefore no significant effects posed by the aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
Kilkieran Bay and SAC (002111)	Mudflats and sandflats not covered by seawater at low tide [1140]	Maintain	OUT	The Kilkieran Bay and Islands SAC is approximately 4.1 km from the closest boundary of the proposed aquaculture activities. Due to the lack of spatial overlap between these marine QIs and the proposed aquaculture activities, there is no clear "source-path-receptor" interaction with these Annex I Habitats. Therefore, there are no significant effects posed by the salmon aquaculture on these QIs. These QIs are screened out.
	Coastal lagoons [1150]	Maintain	OUT	
	Large shallow inlets and bays [1160]	Maintain	OUT	
	Reefs [1170]	Maintain	OUT	
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	Restore	OUT	There is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Mediterranean salt meadows (*Juncetalia maritime*) [1410]	Restore	OUT	
	Machairs (* in Ireland) [21A0]	Restore	OUT	
	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]		OUT	
	Lowland hay meadows (*Alopercucurs pratensis*, *Sanguisorba officinalis*) [6510]	Maintain	OUT	
	Najas flexilis (Slender Naiad) [1833]	Maintain	OUT	
	Phocoena phocoena (Harbour Porpoise) [1351]		IN	There is potential for the transient species, *Phocoena phocoena,* to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Harbour Porpoise is carried forward to Stage 2.
	Lutra lutra (Otter) [1355]	Restore	OUT	The proposed aquaculture activities are 4.1 km from the closest boundary of the otter habitat of this SAC. Due to the lack of spatial overlap with the preferred habitat of the otter and the proposed aquaculture activities, there is no SPR link identified for this QI and the proposed activities.
	Phoca vitulina (Harbour Seal) [1365]	Maintain	IN	The proposed activities are approximately 4.1 km from the nearest seal haul out site. There is a possible SPR link through disturbance of the species during operation activities at the

				project site. Due to the mobility of this Annex II Species, the Harbour Seal is carried forward to Stage 2.
Dog's Bay SAC (001257)	Annual vegetation of drift lines [1210]	Restore	OUT	The Dog's Bay SAC is located 2.8 km from the closest boundary of the proposed aquaculture operation. There is no spatial overlap or likely interactions identified between aquaculture activities, it is considered that there are not clear SPR links with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura sites. These QIs are therefore screened out.
	Embryonic shifting dunes [2110]	Maintain	OUT	
	Shifting dunes along the shoreline with *Ammophila arenariae* (white dunes) [2120]	Restore	OUT	
	Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Restore	OUT	
	European dry heaths [4030]	Maintain	OUT	
Lough Nageeron SAC (002119)	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]	Restore	OUT	The Lough Nageeron SAC is located 5 km from the closest boundary of the proposed aquaculture operation. Given the freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Najas flexilis (Slender Naiad) [1833]	Restore	OUT	
Murvey Machair SAC (002129)	Machairs (* in Ireland) [21A0]	Restore	OUT	The Murvey Machair SAC is located approximately 6.7 km from the closest boundary of the proposed aquaculture operation. Given the predominantly terrestrial and freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Petalophyllum ralfsii (Petalwort) [1395]	Maintain	OUT	
The Twelve Bens/ Garraun Complex SAC (002031)	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]	Maintain	OUT	The Twelve Bens/ Garraun Complex SAC is located approximately 12.4 km from the closest boundary of the proposed aquaculture operation.

	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]	Maintain	OUT	Given the predominantly terrestrial and freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Alpine and Boreal heaths [4060]	Restore	OUT	
	Blanket bogs (* if active bog) [7130]	Restore	OUT	
	Depressions on peat substrates of the *Rhynchosporion* [7150]	Restore	OUT	
	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110]	Restore	OUT	
	Calcareous rocky slopes with chasmophytic vegetation [8210]	Restore	OUT	
	Siliceous rocky slopes with chasmophytic vegetation [8220]	Restore	OUT	
	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	Maintain	OUT	
	Margaritifera margaritifera (Freshwater Pearl Mussel) [1029]	Restore	IN	Due to the potential interaction with migrating host fish used by this Annex II Species with proposed aquaculture activities, Freshwater Pearl Mussel is carried forward to Stage 2
	Salmo salar (Salmon) [1106]	Maintain	IN	There is potential for the migratory species, *Salmo salar,* to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Salmon is carried forward to Stage 2.
	Lutra lutra (Otter) [1355]	Maintain	OUT	The proposed aquaculture activities are 12.4 km from the closest boundary of the otter habitat of this SAC. Due to the lack of spatial overlap with the preferred habitat of the otter and the proposed aquaculture activities, there is no SPR link identified for this QI and the proposed activities.
	Najas flexilis (Slender Naiad) [1833]	Maintain	OUT	This is a freshwater species with no spatial overlap with the proposed activities. There is no SPR link identified between the proposed activities and this QI.
Maumturk Mountains SAC (002008)	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]	Maintain	OUT	The Maumturk Mountains SAC is approximately 15.4 km from the proposed aquaculture operation. Given the predominantly terrestrial and freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-
	Northern Atlantic wet heaths with *Erica tetralix* [4010]	Restore	OUT	

	Alpine and Boreal heaths [4060]	Restore	OUT	path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Blanket bogs (* if active bog) [7130]	Restore	OUT	
	Depressions on peat substrates of the *Rhynchosporion* [7150]	Restore	OUT	
	Siliceous rocky slopes with chasmophytic vegetation [8220]	Restore	OUT	
	Salmo salar (Salmon) [1106]	Maintain	IN	There is potential for the migratory species, *Salmo salar,* to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Salmon is carried forward to Stage 2.
Slyne Head Peninsula SAC (002074)	Coastal lagoons [1150]	Restore	OUT	The Slyne Head Peninsula SAC is approximately 11.9 km from the proposed aquaculture activities. Due to the lack of spatial overlap with the proposed activities, there is no SPR link between these marine QIs and the proposed aquaculture activities.
	Large shallow inlets and bays [1160]	Maintain	OUT	
	Reefs [1170]	Maintain	OUT	
	Annual vegetation of drift lines [1210]	Maintain	OUT	The Slyne Head Peninsula SAC is approximately 11.9 km from the proposed aquaculture activities Given the predominantly terrestrial and freshwater nature of the QIs (habitats and species) listed here for this SAC and that there is no spatial overlap or likely interactions identified between aquaculture activities in the SAC, it is considered that there are not clear "source-path-receptor" interactions with these Annex I Habitats or Annex II Species and therefore no significant effects posed by the salmon aquaculture on the QIs of this Natura site. These QIs are therefore screened out.
	Perennial vegetation of stony banks [1220]	Maintain	OUT	
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	Restore	OUT	
	Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	Restore	OUT	
	Embryonic shifting dunes [2110]	Restore	OUT	
	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	Restore	OUT	
	Machairs (* in Ireland) [21A0]	Restore	OUT	
	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110]	Maintain	OUT	
	Oligotrophic to mesotrophic standing waters with vegetation of	Maintain	OUT	

	the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]			
	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]	Maintain	OUT	
	European dry heaths [4030]	Maintain	OUT	
	Juniperus communis formations on heaths or calcareous grasslands [5130]	Maintain	OUT	
	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	Maintain	OUT	
	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	Maintain	OUT	
	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510]	Maintain	OUT	
	Alkaline fens [7230]	Maintain	OUT	
	Petalophyllum ralfsii (Petalwort) [1395]	Maintain	OUT	
	Najas flexilis (Slender Naiad) [1833]	Maintain	OUT	
	Tursiops truncatus (Common Bottlenose Dolphin) [1349]	Maintain	IN	There is potential for the transient species, *Tursiops truncatus,* to occur within the vicinity of the proposed project and may be affected by the operations, therefore, Harbour Porpoise is carried forward to Stage 2.

2.3.2 Screening of QIs in the Relevant SPAs

A Technical Review of Screening for Appropriate Assessment for SPA was carried out by WS Atkins Ireland Limited. The full report is attached as an Appendix in this report. The outcomes for this screening process for SPAs are presented in Table 4.

Table 4 Screening outcomes for QI in relevant SPAs (by WS Atkins Ireland Ltd.)

Qualifying Species	Closest SPA	Screened	Comments
Fulmar (*Fulmarus glacialis*) [A009]	30.2	In	There is overlap with the study site and foraging range of this species. OBB is in close proximity to the shore (800m) and potential breeding habitat for this species. There is the potential for birds to be attracted to pens. This species is a breeding resident across Ireland along the coast feeding on fish, crustaceans, and discards from trawlers. Applicant was correct to Screen In.
Cormorant (*Phalacrocorax carbo*) [A017]	5.6	In	There is overlap of the study site with feeding and breeding habitat. The closest confirmed breeding of this species is on the Dauvillaun Islands ca. 80.2km from the study area (NPWS, 2019) which lies >40km outside the foraging range of this species[14]; however, there is potential breeding habitat on land surrounding the study site (800m straight line distance at closest point). Applicant was correct to Screen In.
Shag (*Phalacrocorax aristotelis*) [A018]	47.6	In	There is overlap of the study site with feeding habitat and foraging range; there is potential breeding habitat on land surrounding the study site (800m straight line distance at closest point). Clare Island SPA (ca. 47.6km) is designated for breeding Shag. Applicant was correct to Screen In.
Greenland Whitefronted Goose (*Anser albifrons flavirostris*) [A395]	29.7	Out	No overlap with feeding or breeding habitat. Offshore roosting is a feature of Greylag and Barnacle Geese, however there are no records of this species roosting on islands or mainland in proximity to the study site within Bertraghbuí Bay. Greenland White-fronted Geese traditionally occur in peatland areas but now extensively forages on improved grassland. There is no suitable grazing habitat in the vicinity of the OBB site. Not a fish eating species – negative impacts not likely to occur. Review Screened Out.
Barnacle Goose (*Branta leucopsis*) [A045]	0.38	Out	No overlap with feeding or breeding habitat. Winter visitor to Ireland, breeding in Greenland. Offshore roosting is a feature of Barnacle Geese, however there are no records of this species

[14] Thaxter (2012) Thaxter C.B., Lascelles, B., Sugar, K., Cook, A.S., Roos, S., Bolton, M., Langston, R.H. and Burton, N.H., 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. Biological Conservation, 156, pp.53-61.

			roosting on islands or mainland in proximity to the study site within Bertraghbuí Bay. Grazing species on coastal pastures including improved grassland; no suitable grazing habitat in the vicinity of OBB site. Not a fish-eating species – negative impacts not likely to occur. Applicant was correct to Screen Out.
Gadwall (*Anas strepera*) [A051]	29.7	Out	No overlap with feeding or breeding habitat. No recent records of breeding in nearby lakes, wetlands. Gadwalls tend to prefer heavily vegetated freshwater waterbodies, where it feeds on a mixed diet of seeds, insects, and aquatic vegetation. Review Screened Out.
Shoveler (*Anas clypeata*) [A056]	29.7	Out	No overlap with feeding or breeding habitat. This species predominantly feeds on zooplankton found on ephemeral wetlands, molluscs, insects, and plant material, though it can also occur in saltmarsh habitat in estuarine areas during the winter. No local records. Records of breeding in Ireland of this species centred around Lough Neagh and mid-Shannon basin. Review Screened Out.
Pochard (*Aythya ferina*) [A059]	29.7	Out	No overlap with feeding or breeding habitat. Wintering diving duck species with a diet consisting of plant material. Breed in nests on the ground among waterside vegetation. No suitable breeding or foraging habitat in the vicinity of OBB. Records of this species occur within L73 grid square from 1984. No recent records from this area. Review Screened Out.
Tufted Duck (*Aythya fuligula*) [A061]	29.7	Out	No overlap with feeding or breeding habitat. No records of this species occur within L73 grid square. This species shows a preference for large open freshwater lakes for breeding location, though it can occasionally nest in smaller vegetated waterbodies. Can also winter in estuarine waters. The study site does not hold suitable habitat for breeding. There are no breeding records from the nearby lakes / waterbodies. Even if small numbers were to frequent local lakes the proposed activities would not negatively impact upon them. Review Screened Out.
Common Scoter (*Melanitta nigra*) [A065]	29.7	Out	No overlap with breeding habitat[15]. Unlikely to affect summer population as nesting birds feed on freshwater lakes within which they breed. During winter, Common Scoter are largely present in Mayo in The Mullet, Broadhaven & Blacksod Bay

[15] Heffernan ML. & Hunt, J. (2022) Breeding Status of Common Scoter in Ireland, 2020. Irish Wildlife Manuals, No. 136 National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

			SPA and off the north coast of Mayo. Not known to occur in large numbers in Bertraghbuí Bay. Depth at site is between 15m and 30m which falls within the range of favoured feeding waters of Common Scoter (<20m). However, negative impacts are not anticipated in the absence of a population of scoter in this area. Review Screened Out
Hen Harrier (*Circus cyaneus*) [A082]	29.7	Out	Terrestrial species with no overlap of study site with known breeding habitat or associated foraging areas. Hen Harrier do occur more widely during the winter months. However, only one record exists within the L73 grid square of this species from 1984. Review Screened Out.
Merlin (*Falco columbarius*) [A098]	5.6	Out	Terrestrial species with no overlap of aquaculture site with known breeding and associated feeding habitat. There are breeding records in L73 & L74 on the mainland bordering Bertraghbuí Bay (most recent record – 2011). Does occur more widely in the landscape during winter months including along the shoreline. Feeds on small birds – unlikely to be impacted by finfish farm activities. Review Screened Out.
Corncrake (*Crex crex*) [A122]	21.4	Out	Terrestrial species with no overlap with feeding or breeding habitat. Feed on terrestrial invertebrates and plant material. There are no recent nesting records form the lands adjoining Bertraghbuí Bay (most recently recorded from L73 in 1991). Review Screened Out.
Coot (*Fulica atra*) [A125]	29.7	Out	No overlap with breeding or feeding habitat. Records exist within Bertraghbuí Bay (within L73 grid square from 1991). This species is omnivorous with a clear preference for plants and animals taken from the surface of large, sheltered bodies of water. Demonstrates a strong preference for large bodies of freshwater habitats. Review Screened Out.
Golden Plover (*Pluvialis apricaria*) [A140]	5.6	In	Wading bird which breeds in heather moors, blanket bogs, and acidic grasslands, feeding on invertebrates and plant materials. No overlap with breeding habitat, potential foraging habitat on mainland (c. 800m) from the OBB site. As a wintering bird, its distribution is widespread in Ireland in a variety of coastal and inland habitats, often roosting on intertidal flats. It has been recorded nesting in 10km grid square L73 (most recently in 2011). Given proximity to SPA of which this species is a QI (Connemara Bog Complex ca. 5.6km), impacts cannot be ruled out at this stage. Applicant was correct to Screen In.

Black-headed Gull (*Larus ridibundus*) [A179]	29.7	In	Overlap with potential breeding habitat within 10km grid square. Potential to overlap with feeding habitat and to attract birds to pens. Feeds on insects in arable fields and also exploits domestic and fisheries waste. Impacts cannot be ruled out at this stage. Closest SPA for which they are designated (Lough Corrib SPA ca. 29.7) is within the maximum foraging range stated in the NIS (40km). Review Screened In.
Common Gull (*Larus canus*) [A182]	5.6	In	Overlap with feeding and breeding habitat. Potential for birds to be attracted to pens, feed on invertebrates, fish, and fisheries waste. Applicant was correct to Screen In.
Lesser Blackbacked Gull (*Larus fuscus*) [A183]	33	In	No overlap with potential breeding habitat. Overlap with feeding habitat. Potential for birds to be attracted to pens, feed on invertebrates, rubbish, young birds, fish, and fisheries waste. Applicant was correct to Screen In.
Kittiwake (*Rissa tridactyla*) [A188]	22.9	In	Overlap with feeding/foraging habitat; there is potential for the birds to be attracted to pens. Feed on fish, waste from commercial fishing and invertebrates. There is no overlap with breeding area. This species winters at open sea. Applicant was correct to Screen In.
Little Tern (*Sterna albifrons*) [A195]	0.38	In	No direct overlap with feeding or breeding habitats. Potential breeding habitat lies within close proximity to OBB on the surrounding mainland (closest point c. 800m from shore); this has the potential to give rise to impacts on this species. Nests on the ground on shingle beaches and feeds predominantly on marine fish. Close proximity to SPA (Slyne Head to Ardmore Point SPA ca. 380m) which they are a QI. Applicant was correct to Screen In.
Sandwich Tern (*Sterna sandvicensis*) [A191]	0.38	In	Overlap with feeding/foraging habitat (foraging range c. 54km which encompasses Cross Lough (Killadoon) SPA, Illaunnanoon SPA, and Slyne Head to Ardmore Point Islands SPA; of which SPAs this species is a QI). Feeds on surface dwelling fish taken from a shallow dive. Potential to attract birds to pens. Applicant was correct to Screen In.
Common Tern (*Sterna hirundo*) [A193]	29.7	In	Overlap with potential breeding habitat within 10km grid square. This species nests on the ground, breeding on the coast in large colonies and on some occasions on inland islets in freshwater lakes. Given presence of species due to proximity to breeding habitat and diet of fish, there is some potential for impacts. Applicant was correct to Screen In.
Arctic Tern (*Sterna paradisaea*) [A194]	0.38	In	Overlap with breeding habitat (within 10km grid square on mainland in close proximity (closest

			point ca. 800m)). Overlap with feeding habitat and foraging range (30km) from Slyne Head to Ardmore Point Islands SPA, Lough Corrib SPA, and Inishmore SPA - of which this species is a QI. Given the presence of species due to proximity to breeding and foraging habitat and diet of fish, there is some potential to attract birds to pens. Applicant was correct to Screen In.
Guillemot (*Uria aalge*) [A199]	22.9	In	No overlap with potential breeding habitat. Overlap with feeding habitat and foraging range; feed on small fish via surface diving, has the potential to attract birds to pens. No overlap with breeding habitat. Applicant was correct to Screen In.
Razorbill (*Alca torda*) [A200]	47.6	In	Overlap with feeding and foraging area; feeds on small fish via surface diving, has the potential to attract birds to pens. No overlap with breeding habitat. Applicant was correct to Screen In.
Chough (*Pyrrhocorax pyrrhocorax*) [A346]	47.6	Out	No overlap with breeding or feeding habitat (feeds predominantly on subterranean invertebrates). Review Screened Out.
Manx Shearwater (*Puffinus puffinus*) [A013]	26.4	In	No overlap with breeding habitat. Overlap with feeding and foraging habitat. This species feeds from the sea by diving for small fish, plankton, molluscs, and crustaceans; potential to attract birds to pens. Applicant was correct to Screen In.
Gannet (*Morus bassanus*) [A016]	179.5	In	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species. Overlaps with feeding habitat. No overlap with breeding habitat. Closest SPA Skelligs SPA lies ca. 179.5km from the site at OBB. This seabird species feeds on fish taken from diving. Note recent declines due to bird flu[16]. Applicant was correct to Screen In.
Herring Gull (*Larus argentatus*) [A184]	84	In	Overlap with breeding and feeding/foraging habitat. Greater than 50km from the site, identified by the Applicant due to long foraging range (OBB lies within foraging range (92km) of Inishkea Islands SPA and Inishglora and Inishkeeragh SPA - SPAs of which this species is a QI). Species feeds on marine fish, following fishing boats and utilises landfill sites. Potential for birds to be attracted to pens. Applicant was correct to Screen In.

[16] Giralt Paradell, O., Goh, T., Popov, D., Rogan, E. and Jessopp, M., 2023. Estimated mortality of the highly pathogenic avian influenza pandemic on northern gannets (Morus bassanus) in southwest Ireland. Biology Letters, 19(6), p.20230090.

Puffin (*Fratercula arctica*) [A204]	59.4	In	No overlap with breeding habitat. Overlap with feeding and foraging habitat. Greater than 50km from the site, identified by the Applicant due to long foraging range (OBB lies within foraging range (200km) from Bills Rock SPA, Blasket Islands SPA, Cliffs of Moher SPA, Puffin Island SPA, Skelligs SPA, of which this species is a QI). Feed on marine fish and crustaceans. Applicant was correct to Screen In.
Storm Petrel (*Hydrobates pelagicus*) [A014]	59.4	In	There is no overlap with breeding habitat (no suitable terrestrial habitat in the immediate vicinity of OBB) however breeding of this species occurs on the nearby Cruagh, Omey, Turbot, and Inishturk Islands. Unlikely to overlap with feeding habitat as this species usually feed further out to sea, however the study area does occur within the foraging range (65km) of this species as a QI for Bills Rock SPA and Duvillain Islands SPA. Applicant was correct to Screen In.
Eider (*Somateria mollissima*) [A063]	256.2	Out	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species (80km[17]). Designated as a QI for a single SPA in Ireland - Lough Foyle SPA (> 250km away) No overlap of breeding or foraging area. Applicant was correct to Screen Out.
Great Blackbacked Gull (*Larus marinus*) [A187]	250	Out	Greater than 50km from the site (species foraging range of 60km). QI of a single SPA, the North-west Irish Sea SPA significantly outside the foraging range of this species (ca. 250km from OBB site). No direct overlap with foraging area or breeding habitat within the SPA; however, known to breed widely around the coast. Applicant was correct to Screen Out.
Leach's Storm Petrel (*Oceanodroma leucorhoa*) [A015]	111.1	In	Greater than 50km from the site. Identified by Applicant due to long foraging distances of this species (120km). No overlap with breeding habitat. Overlaps with feeding habitat. Feed on small fish, plankton, molluscs, and crustaceans. Generally, feed well offshore however some potential to attract birds to pens. The site is within the foraging range for the nearest SPA (Stags of Broad Haven SPA ca. 111.1km from OBB site) for which this species is designated. Review Screened In.
Mediterranean Gull (*Larus melanocephalus*) [A176]	237.4	Out	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species (20km). No overlap with breeding or

[17] Thaxter (2012) Thaxter C.B., Lascelles, B., Sugar, K., Cook, A.S., Roos, S., Bolton, M., Langston, R.H. and Burton, N.H., 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. Biological Conservation, 156, pp.53-61.

			foraging habitat. The nearest SPA for which this species is designated (Seas off Wexford SPA ca. 237.4km from OBB site) as a QI is significantly outside the foraging range for this species. Review Screened Out.
Red-throated Diver (*Gavia stellata*) [A001]	74.2	Out	There is no overlap with breeding or foraging area for this species. Does not breed close to the OBB site; restricted to breeding further north in Co. Donegal (Crowe et al. 2021). The maximum foraging range stated in the NIS for this species is 9km, the closest SPA for which this species is designated as a wintering QI is 74.2km from the site. Applicant was correct to Screen Out.
Roseate Tern (*Sterna dougallii*) [A192]	250	Out	Greater than 50km from the site. QI of SPAs including Seas off Wexford SPA (250km from OBB site), all SPAs of which this species is a QI is outside of Thaxter *et al*., 2012 foraging ranges (30km). No overlap with breeding or foraging habitat. No evidence of post breeding dispersal to this area. Applicant was correct to Screen Out.

2.3.3 Screening of Potential Effects of Introduction of Non-native Species

The proposed finish aquaculture site (T09-155-1) will be farming Atlantic salmon, which is native to Ireland. There is the potential to utilise cleaner fish in the control of sea-lice. The species that may be used include 5 wrasse species (Ballan *Labrus bergylta*, Goldsinny *Ctenolabrus rupestrus*, Corkwing *Symphodus melops*, Rockcook *Centrolabrus exoletus*, and Cuckoo *Labrus mixtus*) and lumpfish (*Cyclopterus lumpus*). These are all native species and the cleaner fish will be sourced from Irish suppliers or fished locally.

2.3.4 Consideration of in-combination effects on Natura 2000 site Qualifying Interests

It is important to consider, for those QIs that may screen out during the initial AA screening exercise, if the pressures deriving from the proposed activities acts in-combination with other activities such that additive or synergistic effects are realised on the QIs. It is possible that such combined effect may cause the QI, therefore, to screen in and be considered further in the AA process. It should be noted that, interactions are additive when their combined effect is the sum of each independently, synergistic when the combined effect is greater than the sum of each independently, and antagonistic when the combined effect is less than the sum of each independently.

To this end, existing and proposed licensing activities in the vicinity of the proposed intensive aquaculture activities have been reviewed.

2.3.4.1 Other Aquaculture activities

There is 1 other finfish production licence in the Clifden/Ardbear Bay area. There are 4 shellfish licences (3 blue mussel, 1 blue mussel and great Atlantic scallop) and one fisheries order (for oyster) in Ardbear Bay (east of Clifden Bay) (Figure 5).

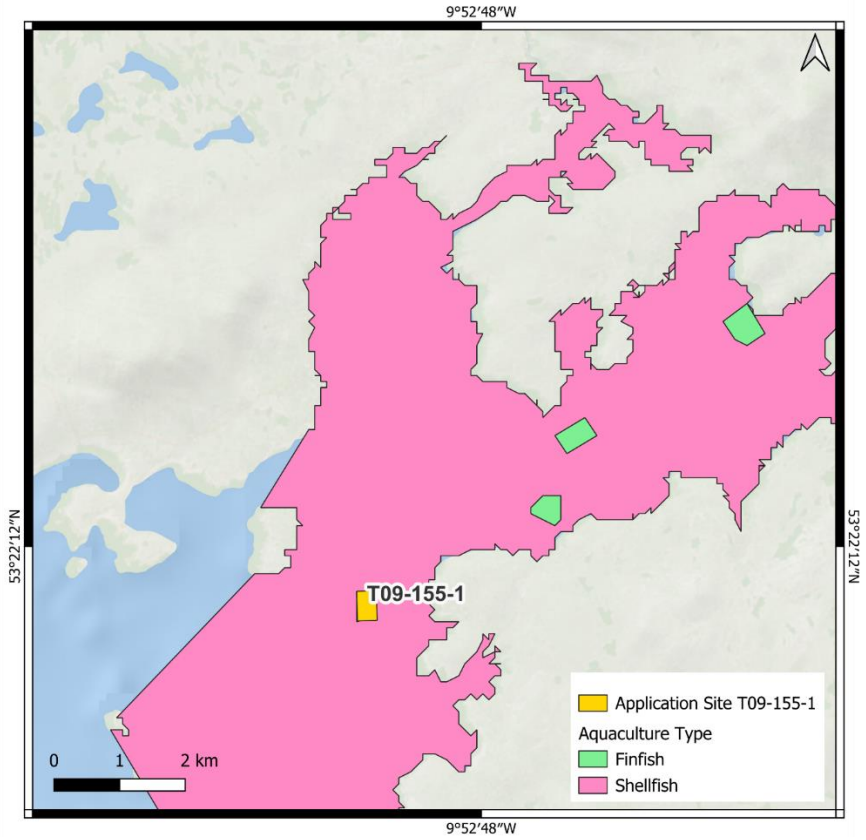


Figure 5 Currently licenced aquaculture activities in Bertraghbuí Bay.

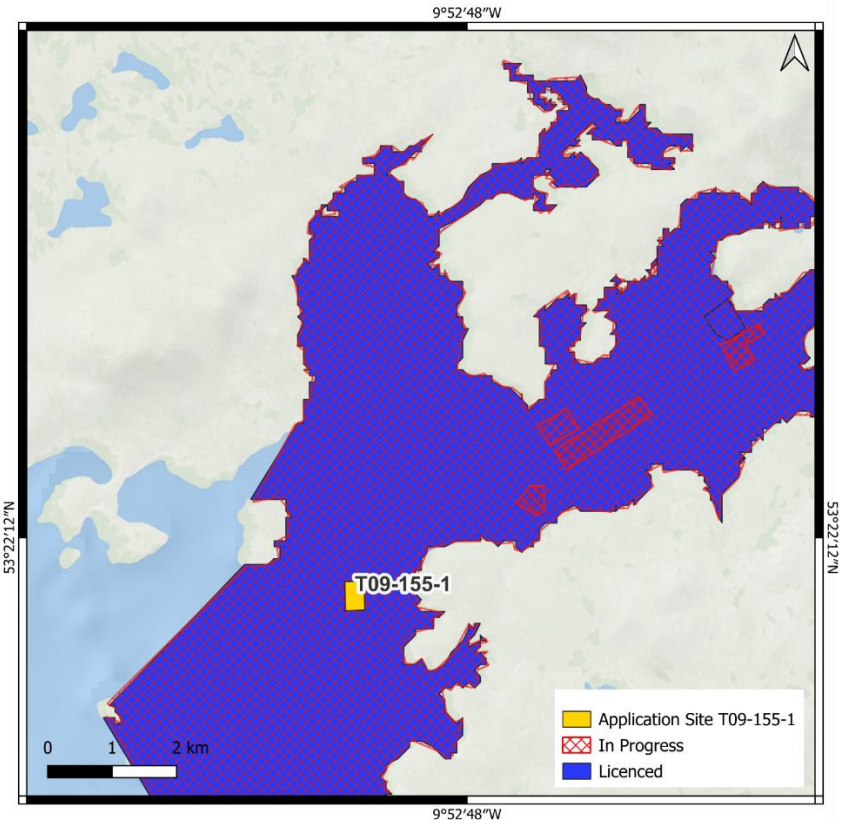


Figure 6 Licensed and applied for aquaculture activities within the vicinity of the proposed activity.

2.3.4.1.1 Salmon Culture

The salmon farming locations are in Figure 5 and Figure 6. The nearest licensed finfish site (T09-107) is approximately 2.7 km. Potential in-combination risk factors include farm discharge (feed waste, fish excretion, release of chemoterapeutants) and biological dispersion (diseases, sea lice).

All sites are operating according to EU Organic Aquaculture standards, which include low stocking densities (10 kg/m^3) and the use of organically certified food. The nets are made of knotless netting and no anti-fouling treatment is allowed. Nets are checked weekly for integrity and are cleaned by replacing the nets and sending to a specialist independent contractor to clean, repair and test.

The hydrodynamic modelling supporting the NIS was carried out independently for each site as combined production is not proposed for the three sites (T09-107, T09-155, T09-155-1), according to the applicant.

The modelling indicates that:

- The settable solids discharge plume from the site and adjacent sites will not overlap and there will not be an in-combination effect.
- The biological oxygen demand (BOD), dissolved inorganic nitrogen (DIN), and molybdate reactive phosphorous (MRP) plumes, from the site will be within limits for transitional waters and will not have in-combination effects as this site will not be in production when the adjacent sites will be in production.
- There will be no in-combination effects from the proposed sea lice treatment (using Slice®) between the three sites as this site will not be in production when the adjacent sites will be in production.

There is also a licensed site T09-093A in Lehanagh Pool, approximately 6.6 km northeast of the proposed site. This is a multispecies research licence operated by the Marine Institute. The site is licensed for finfish (cod, salmonids and cleaner fish [wrasse and lumpsucker]), shellfish (blue mussels (*Mytilus edulis*), bivalves, sea urchins and crustaceans) and seaweed (*Alaria* and *Laminaria*).

Given the lack of temporal hydrological connectivity, the potential for direct in-combination effects between the proposed site and current and planned finfish sites is minimal.

There is a shellfish aquaculture site (T09-078-1) of 16,951.37 ha which extends from Bertraghbuí Bay to Kilkieran Bay. The main cultured species in the Bertraghbuí Bay area is scallops (*Pectin maximus*). Impacts from extensive aquaculture are minimal and localised. The scallops will be grown from wild-collected seed and supplemented using hatchery produced spat. Longlines and collectors will be prepared in April/May and put out in the sea in May through July at a time to coincide with the peak period of spat settlement. After sorting spat will be placed into pearl nets or trays and put back in the water. While there is an overlap of the modelled discharges between the extensive aquaculture site and the proposed sites, the area of the shellfish aquaculture site is 3 orders of magnitude larger than the finfish sites; therefore, there is not likely to be any significant in-combination effects with these activities.

According to the documentation provided by the applicant, the potential for direct in-combination effects between the proposed site and current and planned extensive aquaculture sites is minimal. There are no clear S-P-R interactions between the extensive aquaculture sites and the proposed sites, therefore there is not likely to be any in-combination effects with these activities.

2.3.4.2 Commercial fisheries

Pot Fisheries -The main pot fisheries in Bertraghbuí Bay are brown crab and shrimp. The proposed aquaculture site overlaps with the lobster and shrimp fisheries. The overlap accounts for 0.1% of the shrimp fishery (13,209 ha = shrimp fishery; 13.5 ha = licence site overlap) and 0.07% of the lobster fishery (20,328 ha = lobster fishery; 13.5 ha). Due to the size of the pot fisheries compared to the size of the overlap of this site, there are no expected adverse effects on the fishery.

Trawl Fisheries – There are no trawl fishery operations present in Bertraghbuí Bay. There is a pollack and mackerel line fishery offshore.

Line Fisheries – There are no line fishery operations present in Bertraghbuí Bay.

Net Fisheries – There is a net fishery for bait fish (dogfish, wrasse) in Bertraghbuí Bay. There is a net fishery for crayfish just outside of Clifden Bay. The proposed aquaculture site overlaps with the bait fish fishery. The overlap accounts for 0.01% of the bait fishery (96,532 ha = bait fishery; 13.5 ha = site). Due to the size of the net fishery compared to the size of the overlap of this site, there are no expected adverse effects on the fishery.

Dredge Fisheries – There are scallop, razor clam and surf clam dredge fisheries in Bertraghbuí Bay. The scallop fishery is seasonal and managed by the local co-operative (Comharcuman Sliogeisc Conamara) under and aquaculture licence issued by the co-op. The opening of the fishery is dependent on markets, stock levels and biotoxins. Fishing occurs in late autumn and winter. The surf clam fishery in Bertraghbuí Bay is not fished at present. Razor clam beds are also in the area but are currently inactive. The proposed aquaculture activities do not overlap with any of the dredge fisheries.

The Owengowla river, which drains into Bertraghbuí Bay, is important for salmonids. Salmon, brown trout, and sea trout can be fished (with a licence) from February to October (depending on the species). While Salmon (*Salmo salar*) are a protected Annex II Species, there are no SACs that overlap with Bertraghbuí Bay that list salmon. The closest SAC with protected salmon (in the Owenglin River) is the Twelve Bens/Garraun Complex SAC (002031), the SAC being approximately 2.8 km east of the proposed aquaculture site. Salmon is carried forward for Stage 2 as a qualifying interest for Connemara Bog Complex. SAC.

Where there is overlap with fisheries, the overlap does not cover a significant amount of the respective areas, and pressures are such that they will not significantly impact. The proposed aquaculture activities will not be significantly increasing the area of the currently licensed sites. The applicant has provided a Single Bay Management Plan to coordinate husbandry practices with the other fish farms in the bay to address parasite control and disease control in the stocks.

2.3.4.3 Other Plans or Projects

Activities reviewed are accessed at the following locations:

- DECCC Foreshore Licencing (https://www.gov.ie/en/foreshore-notices/ accessed 18/10/2024)
- Galway County Council planning (Link Map Viewer - accessed 18/10/2024)
- EPA pressures maps (https://gis.epa.ie/EPAMaps/Water - accessed 18/10/2024)
- MARA – (https://www.maritimeregulator.ie/applications/ - accessed 18/10/2024)

The review of these sources has identified no existing activities on the foreshore or adjacent to the foreshore that may interact with the proposed shellfish culture activities resulting in an additive or,

more importantly, a synergistic cumulative effects, such that those QIs already screened out may now be included.

The result of this search has meant that screening conclusions identified above (and summarised below) are considered valid and the process can progress to the Stage 2 Appropriate Assessment.

3 NIS Review for T09-155-1

It is the responsibility of the proponent of the plan or project to have the NIS prepared for submission to the Competent Authority, to provide them with sufficient detail on the project to allow them to undertake a screening for Appropriate Assessment. This information supplied must be of a level sufficient to allow the competent authority to decide on whether or not the plan or project is likely to have significant effects on the Natura 2000 site, either alone or in-combination with other plans or projects. Assessments should be undertaken based on the best scientific evidence and methods. Having satisfied itself that the NIS is complete and objective, the Competent Authority carries out the AA based on the statement and any other necessary information.

- The Marine Institute has been requested to review the *Review and Renewal of Marine Finfish Aquaculture Licences in Bertraghbuí Bay, Co. Galway. Site Refs: T09/107, T09/155, T09/155/1 Screening for Appropriate Assessment & Natura Impact Statement Volume 1 – Main Report and Volume 2 - Appendices* documents relating to application to renew and review an intensive aquaculture licence at site T09-107 at Bertraghbuí Gay, Co. Galway, as to whether it contains the necessary information to progress to the next stage of the licensing process, enabling the carrying out of an Appropriate Assessment, and the drafting of a Conclusion Statement. This section gives a review of the applicants AA screening and NIS. The following elements are considered:
- *Description of plan or project*
- *Identification of relevant Natura 2000 sites*
- *Assessment of likely effects*
- *Screening Conclusions (Assessment of the Phase 1 Screening for AA determination)*

[This section is compiled by the Marine Institute, with review elements from WS Atkins Ireland Limited].

3.1 Review of the Applicants AA Screening and NIS

The project proponent must provide sufficient detail on the project to a level sufficient to allow the competent authority to decide on whether or not the plan or project is likely to have significant effects on the Natura 2000 site, either alone or in-combination with other plans or projects. The applicant submitted, with their application, a number of AA reports for consideration by the licencing body. The reports submitted are:

- Review and Renewal of Marine Finfish Aquaculture Licences in Bertraghbuí Bay, Co. Galway. Site Refs: T09/107, T09/155, T09/155/1. Screening for Appropriate Assessment and Natura Impact Statement Volume 1 – Main Report
- Review and Renewal of Marine Finfish Aquaculture Licences in Bertraghbuí Bay, Co. Galway. Site Refs: T09/107, T09/155, T09/155/1. Screening for Appropriate Assessment and Natura Impact Statement Volume 2 – Appendices

This Section assesses the comprehensiveness of the information included in these documents to inform the AA process.

3.1.1 Review of Stage 1 - Screening for Appropriate Assessment

AA screening is the first test to establish whether, in relation to a particular plan or project, Appropriate Assessment is required. The purpose is to determine, based on a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or

projects, could have significant effects on a Natura 2000 site in view of the site's Conservation Objectives (CO).

3.1.1.1 Description of plan or project

A description of the plan or project, including its nature, size and location, and possible or likely effects, and draft policies, objectives, associated strategies in the case of plans, should be provided.

A comprehensive description of the project, its nature and practices are supplied providing:

- Detail of the location of the site, including graphics displaying the current site and proposed new site.
- Detailed description, and graphics, of the infrastructure to be used (pens, moorings, nets).
- Description of the access routes and supporting shore-based facilities and vessels.
- Detail of the production plans and cycles.
- Detail of the husbandry and management practices and methods (feed and feeding, stock delivery, grading, harvesting and processing).
- Detail, tables and graphics on site discharges.
- Details on process and management regarding waste, mortalities, health management, diseases, parasite monitoring and control, predator control, and accidents and emergencies (including escapes).
- Detail on decommissioning.

3.1.1.2 Identification of relevant Natura 2000 sites

A comprehensive description of receiving environment and the physical and biological characteristics (or aspects) of the marine environment at Inver Bay and surrounds is provided.

This includes:

- Identification of SACs and SPAs within 15 km of the proposed aquaculture sites with ecological group, QI and conservation objective identified for the respective SACs and SPAs

3.1.1.3 Assessment of likely effects

The screening must establish if plan is likely to have an effect and determine whether there is a risk that the effects could be significant, using a precautionary approach where uncertain. Any element that has the potential to affect the Conservation Objectives (CO) of a site, including structure and function, should be considered likely significant.

- Identification of the pressures/impact mechanisms likely to be exerted from the proposed activities on each QI and SCI (within 15 km) and marine community type that had the potential to be significantly affected by the proposed project activities.
- Identification of the pressures/impact mechanisms likely to be exerted from the proposed activities on QIs and SCIs in areas greater than 15 km from the project. These include marine mammals and seabird species.
- Identification of plans or projects that might act in-combination with the proposed project.

3.1.1.4 Screening Conclusions

The findings and conclusions of the Screening process must be documented (with supporting evidence and objective criteria) - especially if the QI is screened out.

- A number of QIs were screened out based on distance and/or no pathway for interaction (S-P-R).
- For the SACs Habitats and Fauna, the following QIs are screened in with impact mechanisms identified:
    - Tidal mudflats and sandflats not covered by seawater at low tide [1140]
    - Coastal lagoons [1150]
    - Large shallow inlets and bays [1160]
    - Reefs [1170]
    - Otter (*Lutra lutra*) [1355]
    - Common Bottlenose Dolphin (*Tursiops truncatus*) [1349]
    - Harbour porpoise (*Phocoena phocoena*) [1351]
    - Grey Seal (*Halichoerus grypus*) [1364]
    - Harbour seal (*Phoca vitulina*) [1365]
    - Salmon (*Salmo salar*) [1106]
    - Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
- For the SPAs, the following SCIs are screened in with impact mechanisms identified:
    - Arctic Tern (*Sterna paradisaea*) [A194]
    - Common Gull (*Larus canus*) [A182]
    - Common Tern (*Sterna hirundo*) [A193]
    - Cormorant (*Phalacrocorax carbo*) [A017]
    - Fulmar (*Fulmarus glacialis*) [A009]
    - Gannet (*Morus bassanus*) [A016]
    - Guillemot (*Uria aalge*) [A199]
    - Golden Plover (*Pluvialis apricaria*) [A140]
    - Herring Gull (*Larus argentatus*) [A184]
    - Kittiwake (*Rissa tridactyla*) [A188]
    - Lesser Black-backed Gull (*Larus fuscus*) [A183]
    - Little Tern (*Sterna albifrons*) [A195]
    - Manx Shearwater (*Puffinus puffinus*) [A013]
    - Puffin (*Fratercula arctica*) [A204]
    - Razorbill (*Alca torda*) [A200]
    - Sandwich Tern (*Sterna sandvicensis*) [A191]
    - Shag (*Phalacrocorax aristotelis*) [A018
    - Storm Petrel (*Hydrobates pelagicus*) [A014]

3.1.2 Review of Stage 2 – Appropriate Assessment (AA) – Natura Impact Statement

The AA is a focused and detailed impact assessment of the implications of the plan or project, alone and in combination with other plans and projects, on the integrity of a Natura 2000 site in view of its COs.

3.1.2.1 AA Information Required, Conservation Objectives, and Impact Prediction

An AA report aims to provide information to the Competent Authority to carry out the AA to determine whether or not the proposed project would adversely affect the integrity of Natura sites as defined by COs and status of site, individually or in combination with other factors. The NIS must identify aspects of the plan that will affect the COs and provide adequate information to complete the AA. The predictions of impacts must be addressed, and objective and scientifically bounded conclusions drawn.

In the applicants NIS:

- The following Annex I Qualifying Features are considered, providing information regarding habitat description:
    - Tidal and mudflats [1140]
    - Coastal Lagoons [1150]
    - Large shallow inlets and bays [1160]
    - Reefs [1170]
- Potential impact mechanisms for these habitats are identified as organic enrichment.
- Three-dimensional hydrodynamic simulation modelling was used to determine potential impacts. Overlap is considered, with graphics and tables provided.
- The following Annex II Qualifying Features (marine and aquatic mammal) are considered, providing information regarding populations, their foraging ranges, and the SACs located within their potential foraging ranges from the project, on each of these species
    - Grey seal (*Halichoerus grypus*)
    - Harbour seal (*Phoca vitulina*)
    - Harbour porpoise (*Phocoena phocoena*)
    - Common Bottlenose Dolphin (*Tursiops truncatus*)
    - Otter (*Lutra lutra*)
- Potential impact mechanisms for these habitats are identified as underwater noise, physical disturbance and collision risk and entanglement on nets from the site.
- The following Habitats Directive Annex II Species – Migratory Fish Species and Aquatic Molluscs are considered:
    - Freshwater pearl mussel (*Margaritifera margaritifera*)
    - Atlantic salmon (*Salmo salar)*
- Of the potential impact mechanisms identified, the introduction of therapeutants, increasing lice infection rate in wild salmon, disease spread and genetic interaction between farmed and wild Atlantic salmon are identified as a main source of potential direct impacts to the diadromous salmon and potential indirect impacts to freshwater pearl mussel.
- Sea lice biology and epidemiology is described, and a 3-D hydrodynamic simulation modelling was undertaken to determine the transport and dispersion of sea lice (*L. salmonis*) larvae from the farm. Graphics and tables of model results are presented. Relevant research on sea lice induced mortality on wild salmon are presented.
- Information regarding the degradation of chemicals that may be used is provided.

- Information on escapees, disease, and therapeutants is provided.
- Information on potential for indirect effects on the wild salmon population to otter prey availability and foraging success.
- The potential impacts to bird species are identified and detailed, with comment on the risk, for:
    - Disturbance risk (from structures and activity)
    - Entanglement/Mortality
    - Impacts on foraging and habitat suitability
- A comprehensive risk assessment to examine the potential impacts these species is carried out, using criteria for disturbance; population sensitivity; habitat suitability; habitat flexibility; to determine the overall level of impact and the significance of the impact, for each of the listed species.

3.1.2.2 Mitigation Measures

Mitigation measures are measures to minimise, cancel, or avoid negative impacts, and can be an integral part of the specifications or an add-on. They must be planned and sufficient to mitigate the risk and be practical and achievable to avoid the risk.

- Mitigation measures to address risks from disease and parasite (lice control) risk, and escapee risk are specified.
- Monitoring plans are described for sea lice.

3.1.2.3 In-Combination Effects

- Projects that could have the potential to give rise to in-combination effects are commercial fisheries and finfish, shellfish and seaweed aquaculture. The Lehanagh Pool site, T09-093A, has localised impacts beneath the cages and impacts are small due to the non-commercial character of the site (<100 tonnes production). As the adjacent fish farms (T09-107 and T09-155) will not be operating at the same time as the proposed site, the dispersal plumes were not modelled for synchronous discharge.
- Conclusions are provided.

3.1.3 Application NIS versus MI Report

The Competent Authority must carry out the AA to determine whether or not the proposed project would adversely affect the integrity of Natura sites as defined by COs and status of site, individually or in combination with other factors. The MI have been asked (by the licencing authority DAFM) to review the Screening for AA and Natura Impact Statement provided for completeness, to ensure it contains the necessary information to progress to the next stage of the licensing process. To do this the MI conducts their own screening process and assessment, on behalf of the Competent Authority, i.e. DAFM.

The MI screening for SAC features agrees the outcomes of the applicant's report, screening in and out almost all the same QIs. The MI screening has not included the QIs Mudflats and sandflats not covered by seawater at low tide [1140] and Coastal lagoons [1150] due to the lack of spatial overlap (distance over 7 km from aquaculture site) between the habitats associated with the relevant SACs and the proposed aquaculture activities.

The MI engaged the services of an environmental consultant (with expertise in ornithology) (WS Atkins Ireland Limited) to carry out the AA screening process for SPAs in the zone of effect of the site. The two screening processes agreed substantially on the majority of the QIs considered. The following

species were screened by the applicant but not screened in to Stage 2 in the applicant's supplied NIS. They are included and considered in the MI assessment (WS Atkins):

- Black-headed Gull
- Leach's Storm Petrel

As part of the review process these points are highlighted as areas where detail may be lacking:

- It is stated that stocking density is low compared to international standards without providing a reference to confirm this.
- The treatment for Amoeba gill parasite is to bath the fish in freshwater. 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.
- A request for clarification on the methods for correct installation or detail of netting mesh size are needed as incorrect installation of top nets may cause entanglement issues for birds.
- 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[18].
- The screening has brought forward Black-headed Gull and Leach's Storm Petrel, in addition to the birds previously screened in by the applicant, to be included for Stage 2 Appropriate Assessmentin the MI report.

[18] Tierney, N., Lusby, J. and Lauder, A., 2011. A preliminary assessment of the potential impacts of Cormorant Phalacrocorax carbo predation on salmonids in four selected river systems. Report Commissioned by Inland Fisheries Ireland and funded by the Salmon Conservation Fund

4 Conclusions

4.1 Appropriate Assessment Screening Conclusions

The Stage 1 screening report has identified the following QIs and associated conservation features in the SACs that the proposed aquaculture activities spatially overlap with and/or has the potential to significantly affect, so will be carried forward for assessment in Stage 2.

SAC QIs

- Annex I Habitats
    - Large Shallow Inlets and Bays [1160]
    - Mudflats and sandflats not covered by seawater at low tide [1140]
    - Coastal Lagoons [1150]
    - Reefs [1170]
- Annex II Species
    - Grey Seal (*Halichoerus grypus*) [1364]
    - Harbour Seal (*Phoca vitulina*) [1365]
    - Otter (*Lutra lutra*) [1355]
    - Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
    - Salmon (*Salmo salar*) [1106]
    - Harbour porpoise (*Phocoena phocoena*)
    - Common Bottlenose Dolphin (*Tursiops truncatus*)

SPA QIs

- Arctic Tern (*Sterna paradisaea*) [A194]
- Black-headed Gull (*Larus ridibundus*) [A179]
- Common Gull (*Larus canus*) [A182]
- Common Tern (*Sterna hirundo*) [A193]
- Cormorant (*Phalacrocorax carbo*) [A017]
- Fulmar (*Fulmarus glacialis*) [A009]
- Gannet (*Morus bassanus*) [A016]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Guillemot (*Uria aalge*) [A199]
- Herring Gull (*Larus argentatus*) [A184]
- Kittiwake (*Rissa tridactyla*) [A188]
- Leach's Storm Petrel (*Oceanodroma leucorhoa*) [A015]
- Lesser Black-backed Gull (*Larus fuscus*) [A183]
- Little Tern (*Sterna albifrons*) [A195]
- Manx Shearwater (*Puffinus puffinus*) [A013]
- Puffin (*Fratercula arctica*) [A204]
- Razorbill (*Alca torda*) [A200]
- Shag (*Phalacrocorax aristotelis*) [A188]
- Sandwich Tern (*Sterna sandvicensis*) [A191]
- Storm Petrel (*Hydrobates pelagicus*) [A014]

On the basis that likely significant effects of the proposed activity on the European sites cannot be excluded, these QIs are brought forward for Stage 2 Appropriate Assessment.

4.2 NIS Review Conclusion

Following a review of the NIS supplied by the applicant the following areas require more detail:

- A request for clarification on the detail of netting mesh size is needed as there could be significance in relation to feeding/diving birds in this.
- A request to identify the source of freshwater and the planned quantities to be used for the treatment for Amoeba gill parasite should be made to the applicant.
- The screening has brought forward Black-headed Gull and Leach's Storm Petrel, in addition to the birds previously screened in by the applicant. These will be included for Stage 2 assessment in the MI report.

When the above points are addressed, the NIS supplied by the applicant, in combination with the reports supplied by the Marine Institute, will contain the necessary information/data to proceed to the next stage of the licensing process, and support the carrying out of an Appropriate Assessment and ultimately to support the drafting of a Conclusion Statement by Competent Authority.

5 Appendix

ATKINS

Member of the SNC-Lavalin Group

OBB Fish Farm (T09/155/1)

Technical Review of Screening for Appropriate Assessment: SPAs

Marine Institute (MI)

01/11/2024

Notice

This document and its contents have been prepared and are intended solely as information for Marine Institute (MI) and use in relation to Appropriate Assessment Screening.

AtkinsRéalis assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0.0	Draft for comment	CD	KMC	KMC	POD	18-10-24
Rev 1.0	Final	CD	KMC	KMC	POD	01-11-24

Client signoff

Client	Marine Institute
Project	OBB Finfish Farm (T09/155/1)
Job number	0087883
Client signature / date	

Contents

Chapter		Page
1.	**Introduction**	**4**
1.1.	Background	4
1.2.	Legislative Context	5
1.3.	Appropriate Assessment Process	6
2.	**Review Methodology**	**8**
3.	**Project Description**	**9**
4.	**Receiving Environment**	**11**
5.	**Identification of Relevant SPAs**	**12**
6.	**Assessment of Screening Determination**	**23**
6.1.	Preliminary Findings	23
6.2.	In-Combination Impacts	23
6.3.	Conclusion	23
7.	**References**	**24**

Tables

Table 3-1 - Assessment of project description. 9
Table 4-1 - Assessment of Receiving environment. 11
Table 5-1 - SPAs within 50km of OBB finfish farm. 14
Table 5-2 - SPAs within 50km of OBB finfish farm and their qualifying interests. 15
Table 5-3 - Assessment of identified SPA Qualifying Species. 17

Figures

Figure 1-1 – OBB salmon farm licence boundary. 4
Figure 1-2 - Stages of the Appropriate Assessment process (EC, 2021). 7
Figure 5-1 - SPAs within 50km of T09/155/1 (OBB) finfish farm. 13

1. Introduction

1.1. Background

Atkins Ireland have been commissioned by the Marine Institute to carry out a technical review of Appropriate Assessments carried out for Finfish Aquaculture Licence renewal in Bertraghbui Bay, focusing on SPAs (Special Protected Areas).

This report deals specifically with the AA Screening for Outer Bertraghbui Bay (OBB) salmon farm operated by Comhlucht Bradain Chonamara Teo (CBCT) in association with both MOWI Ireland and BIFAND Ltd. Management and personnel is supplied by Bifand Ltd and CBCT are the non-trading subsidiary of Bifand. Equipment, marine vessels, and related infrastructure are provided by MOWI Ireland. The farm is located in Bertraghbui Bay, Co. Galway and will act as a grow out and harvest site for salmon stock. The licence renewal requests that the existing T09/155/1 site licence be amended to reduce the maximum allowable biomass (MAB) to 600 tonnes of salmon every 2 years from 600 tonnes of salmon per year. There is no proposed change to the physical licence area.

The information used in this review has been taken from the Aquaculture and Foreshore Licence Application (09/02/2024), EIAR (08/03/2024), and NIS (08/03/2024), along with associated appendices provided to the department by the Applicant.

Figure 1-1 – OBB salmon farm licence boundary.

1.2. Legislative Context

1.2.1. Natura 2000

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora ("the Habitats Directive") is a legislative instrument of the European Union (EU) which provides legal protection for habitats and species of Community interest. Article 2 of the Directive requires the maintenance or restoration of such habitats and species at a favourable conservation status, while Articles 3 to 9, inclusive, provide for the establishment and conservation of an EU-wide network of special areas of conservation (SACs), known as Natura 2000, which also includes special protection areas (SPAs) designated under Article 4 of Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds ("the Birds Directive"). Both SACs and SPAs are commonly referred to as "European sites" or "Natura 2000 sites".

SACs are selected for natural habitat types listed on Annex I to the Habitats Directive and the habitats of species listed on Annex II to the Habitats Directive. SPAs are selected for species listed on Annex I to the Birds Directive and other regularly occurring migratory species. The habitats and species for which a Natura 2000 site is selected are referred to as the "qualifying interests" of that site and each is assigned a "conservation objective" aimed at maintaining or restoring its "favourable conservation condition" at the site, which contributes to the maintenance or restoration of its "favourable conservation status" at national and European levels.

1.2.2. Appropriate Assessment

Article 6 of the Habitats Directive deals with the management and protection of Natura 2000 sites. Articles 6(3) and (4) set out the decision-making process, known as "Appropriate Assessment" (AA), for plans or projects in relation to Natura 2000 sites. Article 6(3) states:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

The first sentence of Article 6(3) provides a basis for determining which plans and projects require AA, i.e., those "*not directly connected with or necessary to the management of [one or more Natura 2000 sites] but likely to have a significant effect thereon, either individually or in combination with other plans or projects*". In *Waddenzee* (C-127/02), the Court of Justice of the European Union (CJEU) ruled that significant effects must be considered "likely" if "*it cannot be excluded, on the basis of objective information*", that they would occur. This clearly sets a low threshold, such that AA is required wherever there is a reasonable possibility of significant effects on a Natura 2000 site. In the same judgment, the CJEU established that the test of significance relates specifically to the conservation objectives of the site concerned, i.e., "significant effects" are those which, "*in the light, inter alia, of the characteristics and specific environmental conditions of the site*", could undermine the site's conservation objectives. In addition to the effects of the plan or project on its own, the combined effects arising from the plan or project under consideration and other plans and projects must also be assessed.

The last part of the first sentence of Article 6(3) defines AA as an assessment of the "*implications [of the plan or project] for the site in view of the site's conservation objectives*". In the second sentence, Article 6(3) requires that, prior to agreeing to a plan or project, the competent authority must "ascertain" that "*it will not adversely affect the integrity of the site concerned*". In *Sweetman v. An Bord Pleanála* (C-258/11), the CJEU ruled that a plan or project "*will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of sites*". On that basis, EC (2018) described the "integrity of the site" as "*the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated*". As such, the "integrity" of a specific site is defined by its conservation objectives and is "adversely affected" when those objectives are undermined. In *Waddenzee*, the CJEU ruled that the absence of adverse effects can only be ascertained "*where no reasonable scientific doubt remains*".

The “precautionary principle” applies to all of the legal tests in AA, i.e., in the absence of objective information to demonstrate otherwise, the worst-case scenario is assumed. Where the tests established by Article 6(3) cannot be satisfied, Article 6(4) applies (see explanation below).

1.2.3. Competent Authority

The requirements of Articles 6(3) and (4) are transposed into Irish law by, inter alia, Part 5 of the European Communities (Birds and Natura Habitats) Regulations, 2011 (as amended) (“the Habitats Regulations”) and Part XAB of the Planning and Development Act, 2000 (as amended) (“the Planning and Development Acts”). As per the second sentence of Article 6(3), it is the “competent national authorities” who are responsible for carrying out AA and, by extension, for determining which plans and projects require AA. The competent authority in each case is the authority responsible for consenting to or licensing a plan or project, e.g., local authorities, An Bord Pleanála, the Environmental Protection Agency (EPA) or a Government Minister. In all cases, it is the competent authority who is ultimately responsible for determining whether or not a plan or project requires AA and for carrying out the AA, where required.

1.3. Appropriate Assessment Process

The AA process can be described as being made up of three distinct stages, as described below, the need to progress to each stage being determined by the outcome of the preceding stage.

Stage 1: Screening – This stage involves a determination by the competent authority as to whether or not a given plan or project required AA. As explained in Section 1 above, AA is required in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site, but for which the possibility of likely significant effects on one or more Natura 2000 sites cannot be excluded. In *People Over Wind* (C-323/17), the CJEU ruled that measures intended to avoid or minimise harmful effects on a Natura 2000 site cannot be considered in making this determination. Consideration of the potential for in-combination effects is also required at this stage.

Stage 2: Appropriate Assessment – This stage involves a detailed assessment of the implications of the plan or project, individually and in combination with other plans and projects, for the integrity of the Natura 2000 site(s) concerned. This stage also involves the development of appropriate mitigation to address any adverse effects and an assessment of the significance of any residual impacts following the inclusion of mitigation. In *Kelly v. An Bord Pleanála* (IEHC 400), the High Court ruled that a lawful AA must contain complete, precise, and definitive findings based on examination and analysis, and conclusions and a final determination based on an evaluation of the findings. In the same judgment, the High Court stressed that, in order for the findings to be complete, precise, and definitive, the AA must be carried out in light of best scientific knowledge in the field and cannot have gaps or lacunae. In *Holohan v. An Bord Pleanála* (C-461/17), the CJEU clarified that AA must “*catalogue the entirety of habitat types and species for which a site is protected*” (i.e. the qualifying interests of the site) and assess the implications of the plan or project for the qualifying interests, both within and outside the site boundaries, and other, non-qualifying interest habitats and species, whether inside or outside the site boundaries, “*provided that those implications are liable to affect the conservation objectives of the site*”. The proposer of a plan or project requiring AA is furnishes the competent authority with the scientific evidence upon which to base its AA by way of a Natura Impact Statement (NIS) or Natura Impact Report (NIR). If it is not possible to ascertain that the plan or project will not adversely affect one or more Natura 2000 sites, authorisation can only be granted subject to Article 6(4).

Stage 3: Article 6(4) – If a plan or project does not pass the legal test at Stage 2, alternative solutions to achieve its aims must be considered and themselves subject to Article 6(3). If no feasible alternatives exist, authorisation can only be granted where it can be demonstrated that there are imperative reasons of overriding public interest (IROPI) justifying its implementation. Where this is the case, all compensatory measures must be taken to protect the overall coherence of Natura 2000.

The three stages described above are illustrated in Figure 1-2 below.

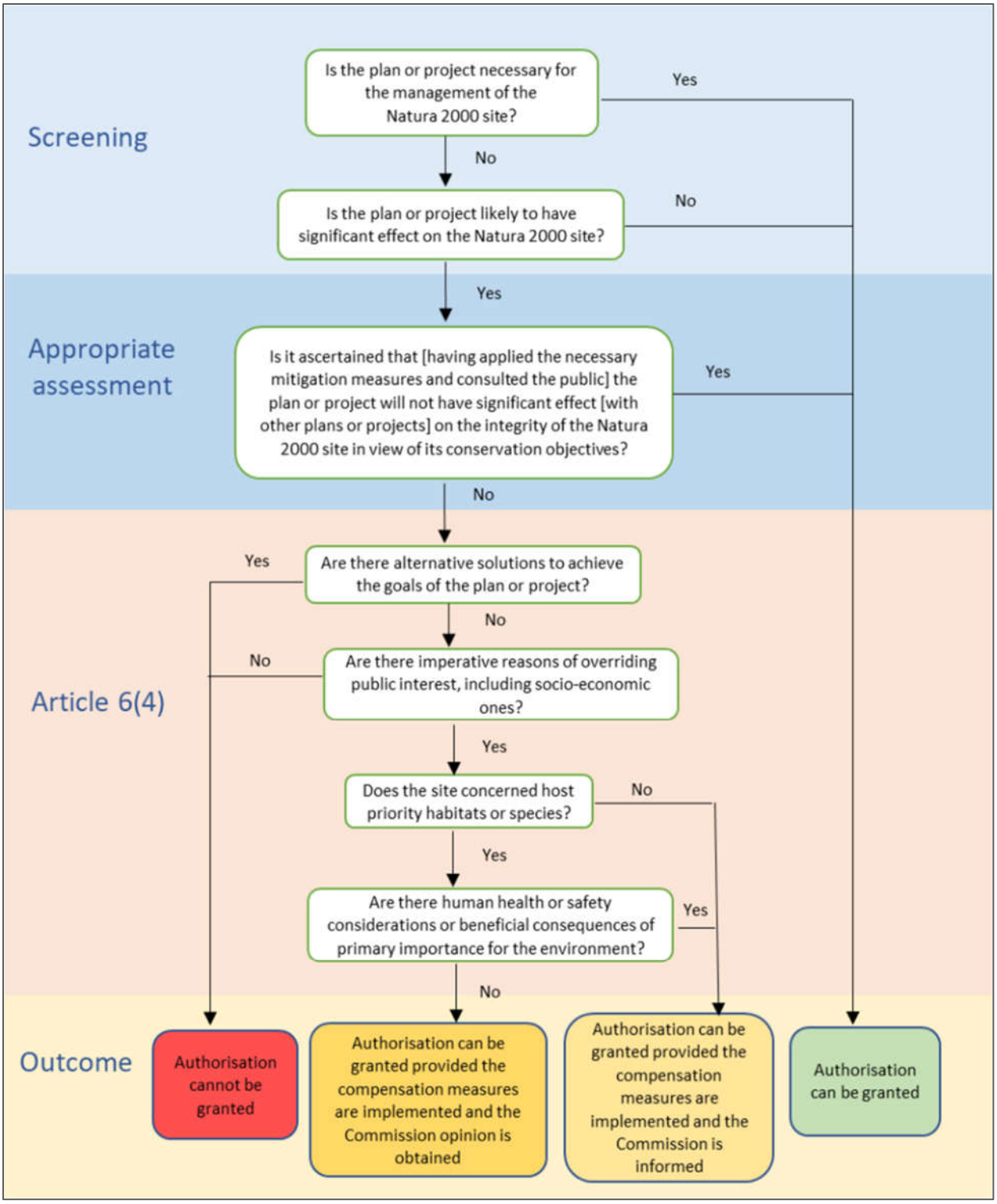


Figure 1-2 - Stages of the Appropriate Assessment process (EC, 2021).

2. Review Methodology

As part of the AA screening process the applicant is required to provide the competent authority with sufficient detail on the project to allow them to undertake a screening for Appropriate Assessment. This information must be of a level sufficient to allow the competent authority to decide on whether or not the plan or project is likely to have significant effects on the Natura 2000 site, either alone or in-combination with other plans or projects.

This report includes a review of the robustness of the AA screening carried out by AQUAFACT on behalf of CBCT. The following elements were considered: -

- Description of the Project and its potential impacts.
- Identification of Natura 2000 sites with the potential to be impacted.
- Assessment of the Phase 1 Screening for Appropriate Assessment determination.

3. Project Description

The Applicant provided details on aspect of the project. This section assesses the completeness on this information and whether or not other aspects have been omitted. The assessment can be seen in Table 3-1 below.

Table 3-1 - Assessment of project description.

Project Element	Assessment
Location and Site Layout	Maps have been included showing the licence boundary in relation to its position within Bertraghbui Bay and in relation to other existing licences within the bay. Coordinates for the licence area have been given. Includes detailed schematics showing all aspects of the pens and mooring layout.
Pen details	The dimensions and components, along with cleaning and maintenance procedures have been explained thoroughly within the AA Screening and associated appendices. Mentions that smolt nets will be used at the beginning of the cycle before being changed for grower nets. Mesh size of nets is not detailed. Specified that no net antifouling will be used and measures of predator control throughout the production cycle are detailed.
Shore-based Facilities	CBCT owns and operated an existing land-based facility at Glinsk which provides offices, workshop, a laboratory feedstore, facilities, and a pier. The pier at Letterard, Glinsk will act as the access point for service vessels to and from shore. The location of the pier in relation to the licenced site has been provided on a map along with the access routes from land and photos of facilities. Source and transport of smolts is detailed. Information on vehicles which are involved with the running of the site have been provided along with the aspects of the project they will be involve in. Procedure of travelling vessels and vehicles in relation to the movement of Invasive Alien Species (IAS), transporting feed and mortality removal is detailed.
Production Model	Detail is provided on source, numbers, and weights of smolts added, modelled estimate of biomass for each month of the 2-year production cycle in OBB fish farm, maximum biomass, peak stocking density, fallow periods, and when harvesting will start. The advantages of low stocking density are stated but no references have been given to back statements up.
Feed and feeding	Feed is used that meets the EU requirements for organic standards. A breakdown of the main nutritional components of the feed has also been included. The report provides specifics on the feed barge and automatic feed system which includes an underwater camera for monitoring of feeding.
Husbandry	The information provided on smolt delivery, grading, harvesting, and processing is sufficient to allow for an assessment of the potential impacts. This section also gives details on site discharge totals for BOD, solids, carbon, nitrogen, and phosphorus.
Waste Management	This section within the AA Screening and appendices details the management of fish waste from harvesting and mortalities. Procedures for the handling and disposal of general waste, dead fish, freshwater effluent, metals, and pen nets are detailed. Mass mortality procedure detailed. Sufficient text on procedure to prevent the spread of disease/water contamination provided. Dispersion modelling of waste outputs from the fin-fish farm is provided in terms of nutrients and settleable solids..

Project Element	Assessment
Health Management	The procedure followed to monitor fish health is provided including the primary goals and actions to be taken. Full permitted list of vaccinations and details of the vaccinations fish receive before being added to the sea farm and methods of treatment for common disease/parasites while at sea are discussed. Pest management documents previous sea lice records at the farm are also provided. Particular detail is provided on sea lice treatment and monitoring. Source of cleaner fish is detailed, hatchery raised lump suckers and locally caught wrasse at a rate of 7% of the salmon pen population to be used. Details given within appendices on wild caught wrasse include management, introduction and removal from pens, cleaning and biosecurity and supplementary feeding. Potential ecological impacts of removal of wild wrasse from site location are not discussed. AGD (Amoeba Gill Disease) is treated using freshwater baths, 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 potential impacts on the abstraction of freshwater from local watercourses are not discussed.
Predator Control	It is stated that bird netting is used to prevent bird predation. This method is used principally as a method of protecting the fish stock as opposed to a mitigation measure to protect birds and so can be considered at the screening stage. Measures against seal predation also discussed and further detailed in the appendices.
Accidents and Emergencies	Emergency procedure is provided in relation to staff, vehicles, vessels, and fish farm installations including fish mass mortality, fish mass escape and damage due to weather eventualities. These procedures are detailed further within the appendices and can be found in full within the company's SOP's. Preventative guidelines for fish escapes and mass mortality are also provided.
Single Bay Management	This section summaries the Single Bay Management Plan for Bertraghbui Bay (full plan is included in the appendices to the NIS report). All finfish farms in the bay are considered in the plan. The 3 no. MOWI & Bifand sites include Sealax, Salt Point and OBB as well as a 4th farm operated by the Marine Institute at Lehannah Pool (T09/093A) in Cashel Bay in the east of Bertraghbui Bay. The 3 no. MOWI & Bifand sites have aquaculture licences due for renewal. The renewal applications for the licences include proposals to amend the operating conditions of the licences. The plan aims to coordinate aspects of the farms such as disease / pest monitoring and treatment on a whole bay approach.
Decommissioning	As there are no permanent aspects to the operation at sea, decommissioning involves removal of the farm components to shore.
Omitted project detail	• For *Amoeba* treatment it is detailed that desalinated water or freshwater can be used. Source of freshwater for *Amoeba* treatment not given if freshwater is to be taken from local watercourses. Freshwater abstraction to be discussed further. • Mesh size of nets is not detailed. • Potential ecological impacts of removal of wild wrasse from site location not discussed.

4. Receiving Environment

Details on the receiving environment in the vicinity of the project were included in the AA screening. This section assesses the completeness of the info gathered. As this review is focused on SPAs and bird species unrelated species such as cetaceans or otters have not been assessed in terms of the receiving environment. The assessment can be seen in Table 4-1 below.

Table 4-1 - Assessment of Receiving environment.

Receiving Environment	Assessment
Depth and Hydrography	Detail is provided on depths in the bay and specifically in the farm area within the main report and the Appendices. The tidal range and current speeds at different tidal stages are included in the report.
Habitats	Description of benthic habitats under the site provided within the accompanying EIA report. Results of benthic audits are included in full within the appendices and sufficient details given in EIA report.
Birds	SPAs within 15km of the immediate area of the site briefly discussed. 2 no. SPAs identified. Text provided details a single QI species of SPA within 15km to be excluded; 'Barnacle Goose [A045]'. 25 long foraging range bird species were also considered, which are present outside 15km.
Potential Impact	Impacts identified in the EIA included disturbance, entanglement, and mortality risk, foraging impacts, and introduced therapeutants. A risk assessment of impact significance, species population sensitivity, species habitat flexibility and licenced area habitat suitability is provided. It is noted that pest and disease impacts are not identified under bird specific information; inclusion of information regarding this risk would be useful for clarity of reading and given the recent avian influenza epidemic. Such information would include assessment of the potential increased risk of disease spread for species which are attracted to the farm and therefore may interact to a higher degree than in the wider environment.

5. Identification of Relevant SPAs

As part of the AA Screening process all Natura 2000 sites which have the potential of being impacted by the plan or project must be identified. It is important that the criteria used for selection of sites is not overly restrictive leading to site that could be impacted not being assessed. This review is concerned only with the identification of relevant SPAs with the potential to be impacted by the project. The approach taken by the Applicant was to initially consider all SPAs within 15km of the site. The search was then extended based on 25 seabird species with long foraging range. The bird species considered were based on available data from three papers Thaxter *et al*. (2012), Jovani *et al*. (2015) and Wakefield *et al.* (2017). All species with coastal or terrestrial habits were not considered.

Initially to assess for potentially missed species this review considered SPAs within 50km of OBB finfish farm within Bertraghbui Bay (See Table 5-1 and Figure 5-1).

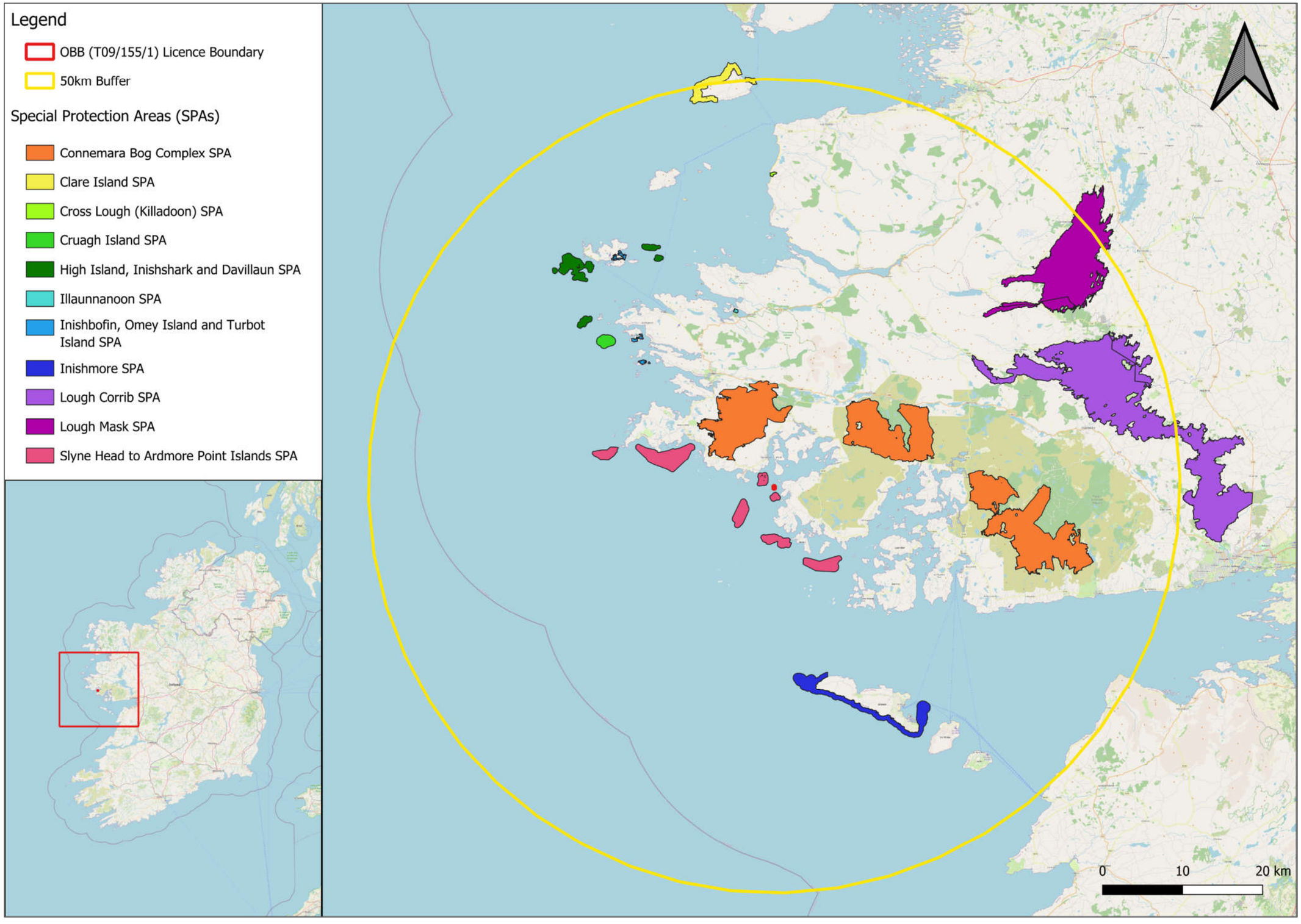


Figure 5-1 - SPAs within 50km of T09/155/1 (OBB) finfish farm.

The full list of qualifying interest for each of the SPAs considered are listed in Table 5-2. In each case the Conservation Objectives documents utilised in this assessment are also referenced. This is important as it can be seen that many of these documents were updated by the NPWS in 2022.

The QI species identified by both methods can be seen in Table 5-3 (NBDC online database for records[1] consulted in this section).

Based on the Applicants approach 27 bird species were identified, of which 18 were screened in by the Applicant. An additional Applicant identified species; Black Guillemot was listed; the only species identified which currently is not covered by the SPA network in Ireland

Based on the approach taken by this review a further 10 species were identified along with the species identified by the Applicant. Out of the total 37 species considered within the assessment, 20 were screened in.

Two species were screened in post this review that were not originally identified through the Applicants review: Leach's Storm Petrel and Black-headed Gull. Reasons for screening in of these species can be seen in Table 5-3 below.

Table 5-1 - SPAs within 50km of OBB finfish farm.

SPAs (within 50km)	SPAs (site code)	Distance to Site (km)
Connemara Bog Complex	004181	5.6
Clare Island	004136	47.6
Cross Lough (Killadoon)	004212	38
Cruagh Island	004170	26.4
High Island, Inishshark and Davillaun	004144	30.2
Illaunnanoon	004221	21.7
Inishbofin, Omey Island and Turbot Island	004231	21.4
Inishmore	004152	22.9
Lough Corrib	004042	29.7
Lough Mask	004062	33
Slyne Head to Ardmore Point	004159	0.38

[1] https://maps.biodiversityireland.ie/Map

Table 5-2 - SPAs within 50km of OBB finfish farm and their qualifying interests.

SPAs (within 50km)	Qualifying Interests
Connemara Bog Complex SPA[2] **IE004181**	Cormorant (*Phalacrocorax carbo*) [A017] Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140] Common Gull (*Larus canus*) [A182]
Clare Islands SPA[3] **IE004136**	Fulmar (*Fulmarus glacialis*) [A009] Shag (*Phalacrocorax aristotelis*) [A018] Common Gull (*Larus canus*) [A182] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346]
Cross Lough (Killadoon) SPA[4] **IE004212**	Sandwich Tern (*Sterna sandvicensis*) [A191]
Cruagh Island SPA[5] **IE004170**	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]
High Island, Inishshark and Davillaun SPA[6] **IE004144**	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]
Illaunnanoon SPA[7] **IE004221**	Sandwich Tern (*Sterna sandvicensis*) [A191]
Inishbofin, Omey Island and Turbot Island SPA[8] **IE004231**	Corncrake (*Crex crex*) [A122]
Inishmore SPA[9] **IE004152**	Kittiwake (*Rissa tridactyla*) [A188] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199]
Lough Corrib SPA[10] **IE004042**	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125]

[2] NPWS (2023). Conservation Objectives: Connemara Bog Complex SPA 004181. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
[3] NPWS (2022). Conservation objectives for Clare Island SPA [004136]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[4] NPWS (2021). Conservation Objectives: Cross Lough (Killadoon) SAC 000484. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
[5] NPWS (2022). Conservation objectives for Cruagh Island SPA [004170]. First Order Site specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[6] NPWS (2022). Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[7] NPWS (2022). Conservation objectives for Illaunnanoon SPA [004221]. First Order Site specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[8] NPWS (2022). Conservation objectives for Inishbofin, Omey Island and Turbot Island SPA [004231]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[9] NPWS (2022). Conservation objectives for Inishmore SPA [004152]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[10] NPWS (2023). Conservation Objectives: Lough Corrib SPA 004042. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

SPAs (within 50km)	Qualifying Interests
	Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]
Lough Mask SPA[11] **IE004062**	Tufted Duck (*Aythya fuligula*) [A061] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]
Slyne Head to Ardmore Point Islands SPA[12] **IE004159**	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]

[11] NPWS (2022). Conservation objectives for Lough Mask SPA [004062]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.
[12] NPWS (2022). Conservation objectives for Slyne Head to Ardmore Point Islands SPA [004159]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

Table 5-3 - Assessment of identified SPA Qualifying Species.

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
Fulmar (*Fulmarus glacialis*) [A009]	Seabird (br.)	30.2	Yes	Yes	In	In	There is overlap with the study site and foraging range of this species. OBB is in close proximity to the shore (800m) and potential breeding habitat for this species. There is the potential for birds to be attracted to pens. This species is a breeding resident across Ireland along the coast feeding on fish, crustaceans, and discards from trawlers. Applicant was correct to Screen In.
Cormorant (*Phalacrocorax carbo*) [A017]	Fish eating diving species (r.)	5.6	Yes	Yes	In	In	There is overlap of the study site with feeding and breeding habitat. The closest confirmed breeding of this species is on the Dauvillaun Islands ca. 80.2km from the study area (NPWS, 2019) which lies >40km outside the foraging range of this species (Thaxter *et al*., 2012); however, there is potential breeding habitat on land surrounding the study site (800m straight line distance at closest point). Applicant was correct to Screen In.
Shag (*Phalacrocorax aristotelis*) [A018]	Fish eating diving species (r.)	47.6	Yes	Yes	In	In	There is overlap of the study site with feeding habitat and foraging range; there is potential breeding habitat on land surrounding the study site (800m straight line distance at closest point). Clare Island SPA (ca. 47.6km) is designated for breeding Shag. Applicant was correct to Screen In.
Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Terrestrial goose: grazer (w.)	29.7	No	Yes	N/A	Out	No overlap with feeding or breeding habitat. Offshore roosting is a feature of Greylag and Barnacle Geese, however there are no records of this species roosting on islands or mainland in proximity to the study site within Bertraghbui Bay. Greenland White-fronted Geese traditionally occur in peatland areas but now extensively forages on improved grassland. There is no suitable grazing habitat in the vicinity of the OBB site. Not a fish-eating species – negative impacts not likely to occur. Review Screened Out.
Barnacle Goose (*Branta leucopsis*) [A045]	Terrestrial goose: grazer (w.)	0.38	Yes	Yes	Out	Out	No overlap with feeding or breeding habitat. Winter visitor to Ireland, breeding in Greenland. Offshore roosting is a feature of Barnacle Geese, however there is no records of this species roosting on islands or mainland in proximity to the study site within Bertraghbui Bay. Grazing species on coastal pastures including improved grassland; no suitable grazing habitat in the vicinity of OBB site. Not a fish-eating species – negative impacts not likely to occur. Applicant was correct to Screen Out.
Gadwall (*Anas strepera*) [A051]	Wetland duck (r.)	29.7	No	Yes	N/A	Out	No overlap with feeding or breeding habitat. No recent records of breeding in nearby lakes, wetlands. Gadwalls tend to prefer heavily vegetated

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
							freshwater waterbodies, where it feeds on a mixed diet of seeds, insects, and aquatic vegetation. Review Screened Out.
Shoveler (*Anas clypeata*) [A056]	Wetland duck (r.)	29.7	No	Yes	N/A	Out	No overlap with feeding or breeding habitat. This species predominantly feeds on zooplankton found on ephemeral wetlands, molluscs, insects, and plant material, though it can also occur in saltmarsh habitat in estuarine areas during the winter. No local records. Records of breeding in Ireland of this species centred around Lough Neagh and mid-Shannon basin. Review Screened Out.
Pochard (*Aythya ferina*) [A059	Diving duck (w.)	29.7	No	Yes	N/A	Out	No overlap with feeding or breeding habitat. Wintering diving duck species with a diet consisting of plant material. Breed in nests on the ground among waterside vegetation. No suitable breeding or foraging habitat in the vicinity of OBB. Records of this species occur within L73 grid square from 1984. No recent records from this area. Review Screened Out.
Tufted Duck (*Aythya fuligula*) [A061]	Freshwater duck (r.)	29.7	No	Yes	N/A	Out	No overlap with feeding or breeding habitat. No records of this species occur within L73 grid square. This species shows a preference for large open freshwater lakes for breeding location, though it can occasionally nest in smaller vegetated waterbodies. Can also winter in estuarine waters. The study site does not hold suitable habitat for breeding. There are no breeding records from the nearby lakes / waterbodies. Even if small numbers were to frequent local lakes the proposed activities would not negatively impact upon them. Review Screened Out.
Common Scoter (*Melanitta nigra*) [A065]	Diving marine duck (w)	29.7	No	Yes	N/A	Out	No overlap with breeding habitat (Heffernan and Hunt, 2022). Unlikely to affect summer population as nesting birds feed on freshwater lakes within which they breed. During winter, Common Scoter are largely present in Mayo in The Mullet, Broadhaven & Blacksod Bay SPA and off the north coast of Mayo. Not known to occur in large numbers in Bertraghbui Bay. Depth at site is between 15m and 30m which falls within the range of favoured feeding waters of Common Scoter (<20m). However, negative impacts are not anticipated in the absence of a population of scoter in this area. Review Screened Out
Hen Harrier (*Circus cyaneus*) [A082]	Raptor (br.)	29.7	No	Yes	N/A	Out	Terrestrial species with no overlap of study site with known breeding habitat or associated foraging areas. Hen Harrier do occur more widely during the winter months. However, only one record exists within the L73 grid square of this species from 1984. Review Screened Out.

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
Merlin (*Falco columbarius*) [A098]	Raptor (br.)	5.6	Yes	Yes	Out	Out	Terrestrial species with no overlap of aquaculture site with known breeding and associated feeding habitat. There are breeding records in L73 & L74 on the mainland bordering Bertraghbui Bay (most recent record – 2011). Does occur more widely in the landscape during winter months including along the shoreline. Feeds on small birds – unlikely to be impacted by finfish farm activities. Review Screened Out.
Corncrake (*Crex crex*) [A122]	Terrestrial crake (br.)	21.4	No	Yes	N/A	Out	Terrestrial species with no overlap with feeding or breeding habitat. Feed on terrestrial invertebrates and plant material. There are no recent nesting records form the lands adjoining Bertraghbui Bay (most recently recorded from L73 in 1991). Review Screened Out.
Coot (*Fulica atra*) [A125]	Aquatic crake (r.)	29.7	No	Yes	N/A	Out	No overlap with breeding or feeding habitat. Records exist within Bertraghbui Bay (within L73 grid square from 1991). This species is omnivorous with a clear preference for plants and animals taken from the surface of large, sheltered bodies of water. Demonstrates a strong preference for large bodies of freshwater habitats. Review Screened Out.
Golden Plover (*Pluvialis apricaria*) [A140]	Wader (w.)	5.6	Yes	Yes	In	In	Wading bird which breeds in heather moors, blanket bogs, and acidic grasslands, feeding on invertebrates and plant materials. No overlap with breeding habitat, potential foraging habitat on mainland (c. 800m) from the OBB site. As a wintering bird, its distribution is widespread in Ireland in a variety of coastal and inland habitats, often roosting on intertidal flats. It has been recorded nesting in 10km grid square L73 (most recently in 2011). Given proximity to SPA of which this species is a QI (Connemara Bog Complex ca. 5.6km), impacts cannot be ruled out at this stage. Applicant was correct to Screen In.
Black-headed Gull (*Larus ridibundus*) [A179]	Coastal (br.)	29.7	Yes	Yes	Out	In	Overlap with potential breeding habitat within 10km grid square. Potential to overlap with feeding habitat and to attract birds to pens. Feeds on insects in arable fields and also exploits domestic and fisheries waste. Impacts cannot be ruled out at this stage. Closest SPA for which they are designated (Lough Corrib SPA ca. 29.7) is within the maximum foraging range stated in the NIS (40km). Review Screened In.
Common Gull (*Larus canus*) [A182]	Seabird (br.)	5.6	Yes	Yes	In	In	Overlap with feeding and breeding habitat. Potential for birds to be attracted to pens, feed on invertebrates, fish, and fisheries waste. Applicant was correct to Screen In.
Lesser Black-backed Gull (*Larus fuscus*) [A183]	Seabird (br.)	33	Yes	Yes	In	In	No overlap with potential breeding habitat. Overlap with feeding habitat. Potential for birds to be attracted to pens, feed on invertebrates, rubbish, young birds, fish, and fisheries waste. Applicant was correct to Screen In.

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
Kittiwake (*Rissa tridactyla*) [A188]	Seabird (br.)	22.9	Yes	Yes	In	In	Overlap with feeding/foraging habitat; there is potential for the birds to be attracted to pens. Feed on fish, waste from commercial fishing and invertebrates. There is no overlap with breeding area. This species winters at open sea. Applicant was correct to Screen In.
Little Tern (*Sterna albifrons*) [A195]	Seabird (s.)	0.38	Yes	Yes	In	In	No direct overlap with feeding or breeding habitats. Potential breeding habitat lies within close proximity to OBB on the surrounding mainland (closest point c. 800m from shore); this has the potential to give rise to impacts on this species. Nests on the ground on shingle beaches and feeds predominantly on marine fish. Close proximity to SPA (Slyne Head to Ardmore Point SPA ca. 380m) which they are a QI. Applicant was correct to Screen In.
Sandwich Tern (*Sterna sandvicensis*) [A191]	Seabird (s.)	0.38	Yes	Yes	In	In	Overlap with feeding/foraging habitat (foraging range c. 54km which encompasses Cross Lough (Killadoon) SPA, Illaunnanoon SPA, and Slyne Head to Ardmore Point Islands SPA; of which SPAs this species is a QI). Feeds on surface dwelling fish taken from a shallow dive. Potential to attract birds to pens. Applicant was correct to Screen In.
Common Tern (*Sterna hirundo*) [A193]	Seabird (s.)	29.7	Yes	Yes	In	In	Overlap with potential breeding habitat within 10km grid square. This species nests on the ground, breeding on the coast in large colonies and on some occasions on inland islets in freshwater lakes. Given presence of species due to proximity to breeding habitat and diet of fish, there is some potential for impacts. Applicant was correct to Screen In.
Arctic Tern (*Sterna paradisaea*) [A194]	Seabird (br.)	0.38	Yes	Yes	In	In	Overlap with breeding habitat (within 10km grid square on mainland in close proximity (closest point ca. 800m)). Overlap with feeding habitat and foraging range (30km) from Slyne Head to Ardmore Point Islands SPA, Lough Corrib SPA, and Inishmore SPA - of which this species is a QI. Given the presence of species due to proximity to breeding and foraging habitat and diet of fish, there is some potential to attract birds to pens. Applicant was correct to Screen In.
Guillemot (*Uria aalge*) [A199]	Seabird (br.)	22.9	Yes	Yes	In	In	No overlap with potential breeding habitat. Overlap with feeding habitat and foraging range; feed on small fish via surface diving, has the potential to attract birds to pens. No overlap with breeding habitat. Applicant was correct to Screen In.
Razorbill (*Alca torda*) [A200]	Seabird (r.)	47.6	Yes	Yes	In	In	Overlap with feeding and foraging area; feeds on small fish via surface diving, has the potential to attract birds to pens. No overlap with breeding habitat. Applicant was correct to Screen In.

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Coastal terrestrial corvid (r.)	47.6	No	Yes	N/A	Out	No overlap with breeding or feeding habitat (feeds predominantly on subterranean invertebrates). Review Screened Out.
Manx Shearwater (*Puffinus puffinus*) [A013]	Diving seabird (s.)	26.4	Yes	Yes	In	In	No overlap with breeding habitat. Overlap with feeding and foraging habitat. This species feeds from the sea by diving for small fish, plankton, molluscs, and crustaceans; potential to attract birds to pens. Applicant was correct to Screen In.
Gannet (*Morus bassanus*) [A016]	Diving fish eating seabird (r.)	179.5	Yes	No	In	In	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species. Overlaps with feeding habitat. No overlap with breeding habitat. Closest SPA Skelligs SPA lies ca. 179.5km from the site at OBB. This seabird species feeds on fish taken from diving. Note recent declines due to bird flu (Giralt Paradell *et al*., 2023). Applicant was correct to Screen In.
Herring Gull (*Larus argentatus*) [A184]	Seabird (r.)	84	Yes	No	In	In	Overlap with breeding and feeding/foraging habitat. Greater than 50km from the site, identified by the Applicant due to long foraging range (OBB lies within foraging range (92km) of Inishkea Islands SPA and Inishglora and Inishkeeragh SPA - SPAs of which this species is a QI). Species feeds on marine fish, following fishing boats and utilises landfill sites. Potential for birds to be attracted to pens. Applicant was correct to Screen In.
Puffin (*Fratercula arctica*) [A204]	Seabird (s.)	59.4	Yes	No	In	In	No overlap with breeding habitat. Overlap with feeding and foraging habitat. Greater than 50km from the site, identified by the Applicant due to long foraging range (OBB lies within foraging range (200km) from Bills Rock SPA, Blasket Islands SPA, Cliffs of Moher SPA, Puffin Island SPA, Skelligs SPA, of which this species is a QI). Feed on marine fish and crustaceans. Applicant was correct to Screen In.
Storm Petrel (*Hydrobates pelagicus*) [A014]	Fish, mollusc, and crustacean seabird (s.)	59.4	Yes	No	In	In	There is no overlap with breeding habitat (no suitable terrestrial habitat in the immediate vicinity of OBB) however breeding of this species occurs on the nearby Cruagh, Omey, Turbot, and Inishturk Islands. Unlikely to overlap with feeding habitat as this species usually feed further out to sea, however the study area does occur within the foraging range (65km) of this species as a QI for Bills Rock SPA and Duvillain Islands SPA. Applicant was correct to Screen In.
Eider (*Somateria mollissima*) [A063]	Diving seabird (r.) feeding on molluscs,	256.2	Yes	No	Out	Out	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species (80km (Thaxter *et al*., 2012)). Designated

Qualifying Species	Guild	Closest SPA (km)	Applicant Identified	Review Identified	Applicant Screened In/Out	Review Screened In/Out	Comments
	crustaceans, and echinoderms						as a QI for a single SPA in Ireland - Lough Foyle SPA (> 250km away) No overlap of breeding or foraging area. Applicant was correct to Screen Out.
Great Black-backed Gull (*Larus marinus*) [A187]	Seabird (r.)	250	Yes	No	Out	Out	Greater than 50km from the site (species foraging range of 60km). QI of a single SPA, the North-west Irish Sea SPA significantly outside the foraging range of this species (ca. 250km from OBB site). No direct overlap with foraging area or breeding habitat within the SPA; however, known to breed widely around the coast. Applicant was correct to Screen Out.
Leach's Storm Petrel (*Oceanodroma leucorhoa*) [A015]	Fish, mollusc, and crustacean seabird (s.)	111.1	Yes	No	Out	In	Greater than 50km from the site. Identified by Applicant due to long foraging distances of this species (120km). No overlap with breeding habitat. Overlaps with feeding habitat. Feed on small fish, plankton, molluscs, and crustaceans. Generally, feed well offshore however some potential to attract birds to pens. The site is within the foraging range for the nearest SPA (Stags of Broad Haven SPA[13] ca. 111.1km from OBB site) for which this species is designated. Review Screened In.
Mediterranean Gull (*Larus melanocephalus*) [A176]	Mollusc and fish-eating seabird (w.)	237.4	Yes	No	Out	Out	Greater than 50km from the site. Identified by the Applicant due to long foraging distances of this species (20km). No overlap with breeding or foraging habitat. The nearest SPA for which this species is designated (Seas off Wexford SPA ca. 237.4km from OBB site) as a QI is significantly outside the foraging range for this species. Review Screened Out.
Red-throated Diver (*Gavia stellata*) [A001]	Diving fish eating seabird (w.)	74.2	Yes	No	Out	Out	There is no overlap with breeding or foraging area for this species. Does not breed close to the OBB site; restricted to breeding further north in Co. Donegal (Crowe et al. 2021). The maximum foraging range stated in the NIS for this species is 9km, the closest SPA for which this species is designated as a wintering QI is 74.2km from the site. Applicant was correct to Screen Out.
Roseate Tern (*Sterna dougallii*) [A192]	Seabird (s.)	250	Yes	No	Out	Out	Greater than 50km from the site. QI of SPAs including Seas off Wexford SPA (250km from OBB site), all SPAs of which this species is a QI is outside of Thaxter *et al*., 2012 foraging ranges (30km). No overlap with breeding or foraging habitat. No evidence of post breeding dispersal to this area. Applicant was correct to Screen Out.

[13] NPWS (2022). *Conservation objectives for Stags of Broad Haven SPA [004072]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

6. Assessment of Screening Determination

6.1. Preliminary Findings

The applicant has provided a detailed description of almost all aspects of the project. Areas where detail has been lacking are as follows: -

- 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.
- 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.
- 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 include Black-headed Gull and Leach's Storm Petrel.

6.2. In-Combination Impacts

OBB is one of three finfish farm applications currently being considered (and one of four operating finfish farms within Bertraghbui Bay). The full list of sites is as follows: -

- Sealax
- Salt Point
- Outer Bertraghbui Bay (OBB)
- Lehannah Pool

While the potential for cumulative or in-combination impacts must be considered as part of the Appropriate Assessment process, it is clear from the review presented that the proposal to farm finfish at OBB must progress to Stage 2 and a Natura Impact Statement should be prepared. It is at this stage that a comprehensive assessment of potential cumulative impacts must also be undertaken.

6.3. Conclusion

It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, individually or in combination with other plans and projects, would be likely to have a significant effect on European sites as listed above.

As a result, a Stage Two Appropriate Assessment is required, and it is concluded that the Applicant was correct to prepare a Natura Impact Statement.

7. References

AQUAFACT (2024). *Screening for Appropriate Assessment and Natura Impact Statement*. Volume 1 – Main Report. Review and Renewal of Marine Finfish Aquaculture Licence in Bertraghbuí Bay, Co. Galway. Site Refs: T09/107, T09/155, T09/155/1. Produced by AQUAFACT on behalf of Comhlucht Bradain Chonamara Teo.

AQUAFACT (2024). *Environmental Impact Assessment*. Volume 2 – Main Report. Renewal of Marine Finfish Aquaculture Licence in Bertraghbuí Bay, Co. Galway. Site Refs: T09/107, T09/155, T09/155/1. Produced by AQUAFACT on behalf of Comhlucht Bradain Chonamara Teo.

Balmer, D. E., S. Gillings, B. J. Caffrey, R. L. Swann, I. S. Downie & R. J. Fuller, R.J. (2013). *Bird Atlas 2007–2011: the breeding and wintering birds of Britain and Ireland*. BTO Books, Thetford.

Burke, B., Fitzgerald, N., Boland, H., Murray, T., Gittings, T. and Tierney, T.D. (2020). *Results from the first three years of monitoring post-breeding tern aggregations in Ireland*. Irish Birds 42: 35-44.

Burnell, D., Perkins, A.J., Newton, S.F., Bolton, M., Tierney, T.D. & Dunn, T.E. (2023). *Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015–2021)*. Lynx Nature Books, Barcelona.

CIEEM (2018, Updated April 2022) G*uidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. *Official Journal of the European Communities* L 206/7-50.

Crowe, O., Austin, A. and Boland, H. (2012). Waterbird populations on non-estuarine coasts in Ireland: results of the 2006/07 Non-Estuarine Coastal Waterbird Survey (NEWS). *Irish Birds* 9: 385-396.

Crowe, O., Tierney, T.D. and Burke, B. (2021). *Status of Rare Breeding Birds across the island of Ireland, 2013–2018*. Irish Birds 43: 29–38.

Cummins, S., Lauder, C., Lauder, A. & Tierney, T. D. (2019). The Status of Ireland's Breeding Seabirds: Birds Directive Article 12 Reporting 2013 – 2018. *Irish Wildlife Manuals*, No. 114. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

DEHLG (2010a). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. Revised 11/02/2010. Department of the Environment, Heritage and Local Government, Dublin.

DEHLG (2010b). Circular NPW 1/10 & PSSP 2/10. Dated 11/03/2010. Department of the Environment, Heritage and Local Government, Dublin.

DG Env (2013). *Interpretation Manual of European Union Habitats – EUR28*. April 2013. Directorate-General for the Environment, European Commission, Brussels.

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Official Journal of the European Union L 20/7-25.

EC (2018). *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. European Commission, Brussels.

EC (2021). *Assessment of plans and projects in relation to Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC*. European Commission, Brussels

Heffernan ML. & Hunt, J. (2022) Breeding Status of Common Scoter in Ireland, 2020. *Irish Wildlife Manuals*, No. 136 National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D. & Kelly, S. (2019) Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. *Irish Wildlife Manuals*, No. 106. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

NPWS (2022). *Conservation objectives for Clare Island SPA [004136]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022) *Conservation objectives for Cruagh Island SPA [004170]. First Order Site-specific Conservation Objectives Version 1.0*. Department of Housing, Local Government and Heritage.

NPWS (2022). *Conservation Objectives: Cross Lough (Killadoon) SPA 004212. Version 1.* National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2022). *Conservation objectives for Lough Mask SPA [004062]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022). *Conservation objectives for Illaunnanoon SPA [004221]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022). *Conservation objectives for Inishbofin, Omey Island and Turbot Island SPA [004231]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022) *Conservation objectives for Inishmore SPA [004152]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022). *Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]. First Order Site-specific Conservation Objectives Version 1.0.* Department of Housing, Local Government and Heritage.

NPWS (2022) *Conservation objectives for Slyne Head to Ardmore Point Islands SPA [004159]. First Order Site-specific Conservation Objectives Version 1.0*. Department of Housing, Local Government and Heritage.

NPWS (2023.) *Conservation Objectives: Lough Corrib SPA 004042. Version 1.* National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2023). *Conservation Objectives: Connemara Bog Complex SPA 004181. Version 1.* National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

Thaxter (2012) Thaxter C.B., Lascelles, B., Sugar, K., Cook, A.S., Roos, S., Bolton, M., Langston, R.H. and Burton, N.H., 2012. *Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas.* Biological Conservation, 156, pp.53-61.

Background Sources: -

Balmer, D, Gillings, S., Caffrey, B., Swann, B., Downie, I and Fuller, R. (2013). *Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland.* T and A D Poyser, London.

Cramp, S. and Simmons, K.E.L. (2004). *Birds of the Western Palaearctic interactive* (DVD-ROM).

Gibbons, D.W., Reid, J.B. and Chapman, R.A. (1993). *The New Atlas of Breeding Birds in Britain and Ireland*: 1988-1991. T and A D Poyser, London.

Gilbert, G. Stanbury, A. and L. Lewis (2021). *Birds of Conservation Concern in Ireland* 4: 2020–2026. Irish Birds 43: 1–22.

Giralt Paradell, O., Goh, T., Popov, D., Rogan, E. and Jessopp, M., 2023. Estimated mortality of the highly pathogenic avian influenza pandemic on northern gannets (*Morus bassanus*) in southwest Ireland. *Biology Letters*, 19(6), p.20230090.

Gray, N., Thomas, G., Trewby, M. and Newton, S.F. (2003). *The status and distribution of Choughs Pyrrhocorax in the Republic of Ireland 2002/03*. Irish Birds 7: 147-156.

Jovani, R., Lascelles, B., Garamszegi, L.Z., Mavor, R., Thaxter, C.B. & D. Oro. (2016). Colony size and foraging range in seabirds. *Oikos*, 125(7), 968-974

Lack, P. (1986). The Atlas of Wintering Birds in Britain and Ireland. T and A D Poyser, London.

Newton, S., Lewis, L. and Trewby, M. (2015). *Results of a Breeding Survey of Important Cliff-Nesting Seabird Colonies in Ireland 2015 – with an interim analysis on population changes*. A report prepared by BirdWatch Ireland for National Parks & Wildlife Service.

Sharrock, J.T.R. (1976). *The Atlas of Breeding Birds in Britain and Ireland*. T & AD Poyser, London.

Ratcliffe, D. (1993). *The Peregrine Falcon*, 2nd edition. T & AD Poyser, London.

Tierney, N., Lusby, J. and Lauder, A., 2011. A preliminary assessment of the potential impacts of Cormorant Phalacrocorax carbo predation on salmonids in four selected river systems. *Report Commissioned by Inland Fisheries Ireland and funded by the Salmon Conservation Fund*.

Trewby, M.; Gray, N.; Cummins, S.; Thomas, G. & Newton, S. (2006). *The status and ecology of the Chough Pyrrhocorax in the Republic of Ireland, 2002-2005*. BirdWatch Ireland.

Wakefield, E.D, Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S., Bolton., M. (2017). Breeding density, fine-scale tracking, and large-scale modeling reveal the regional distribution of four seabird species. *Ecological Applications*, 27(7), 2074–2091.

Unit 2B
2200 Cork Airport Business Park
Cork
T12 R279

© WS Atkins Ireland Limited except where stated otherwise