Report supporting Appropriate Assessment Screening of Extensive Aquaculture in Slyne Head Peninsula SAC (Site Code: 2074)

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Version: October 2023

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1 Preface

Articles 3 to 16 of the European Community (EC) Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (commonly known the Habitats Directive) 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.

The Habitats Directive was implemented into national law under Regulation 31 of the Habitats Regulations SI 94/1997 and subsequently amended and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011. Following the requirements of Article 6(3) an Appropriate Assessment (AA) is required if a plan or project is likely to have a significant effect on the features for which the site is designated, 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. The AA is to assess whether the plan or project will have any adverse effect on the integrity of Natura 2000 site(s) in view of the Conservation Objectives set for the features (habitats and/or species) for which the site(s) is designated.

Natura 2000 sites in Ireland, that form part of the Natura 2000 European network of protected sites, include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are designated due to their significant ecological importance for species and habitats protected under Annex I and Annex II respectively of the Habitats Directive. SPAs are designated for the protection of populations and habitats of bird species protected under the EU Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds). The features for which SACs and SPAs are designated are respectively called Qualifying Interests and Special Conservation Interests (also collectively referred to as conservation features). The National Parks and Wildlife Service (NPWS) are the competent authority for the management of Natura 2000 sites in Ireland.

Aquaculture operations existed in coastal areas prior to the designation of areas as SACs and SPAs under the Directives. Ireland is undertaking AA 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.

Aquaculture activities are licenced by the Department of Agriculture, Food and Marine (DAFM). DAFM receives applications to undertake such activity and submits a set of applications, and current existing licences, for AA. If the AA process finds that the possibility of significant adverse effect 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.

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

2 Introduction

2.1 Overview of this Assessment

This document assesses the potential effects of a single proposed extensive aquaculture activity in combination with existing aquaculture activities, among others, on the Qualifying Interests (QIs) of the Slyne Head Peninsula Special Area of Conservation (SAC) (Site code: 002074). Extensive aquaculture is defined in Regulation 3(iii) of the Aquaculture (Licence Applications) (Amendment) Regulations 2018 as "aquaculture activities where there is no external supply of feed and the culture depends entirely on natural processes for production and supply of feed". Shellfish (molluscs, echinoderms, bivalves and gastropods) and seaweed aquaculture fall within this definition, finfish aquaculture does not.

The aim of this report is to consider if the proposed aquaculture activity is likely to significantly affect the QIs of Natura 2000 sites in view of their Conservation Objectives (COs). This is achieved by following a screening process. If there is potential for the activities considered to likely significant affect QIs and their conservation features, they will be carried forward for full assessment in subsequent sections and considered on a cumulative basis with other aquaculture activities and other potentially disturbing activities (e.g. fisheries).

This document considers the potential ecological interactions between aquaculture activities and the Conservation Objectives (COs) of the Slyne Head Peninsula Special Area of Conservation (SAC) (Site code: 002074), among others.

2.2 Legislative Context

Articles 3 - 16 of the European Community (EC) Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (the **Habitats Directive**[1]) 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[2].

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*[3], 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 include Special Areas of Conservation (**SACs**) which are designated under the Habitats Directive, and Special Protected Areas (**SPAs**) which are designated under EC Directive EC 79/409/EEC (the **Birds Directive**[4]).

SACs are designated due to their significant ecological importance for habitats and for species protected under Annex I and Annex II respectively of the Habitats Directive. SPAs are designated for the protection of populations

[1] https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
[2] https://ec.europa.eu/environment/nature/natura2000/index_en.htm
[3] European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 - Unofficial Consolidation (Updated to 28 July 2022)(1).pdf (npws.ie)
[4] https://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

and habitats of bird species protected under the Birds Directive. 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 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)**. Every Natura 2000 site has COs which are set out by the National Parks and Wildlife Service (**NPWS**) - the competent authority for the management of Natura 2000 sites 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.

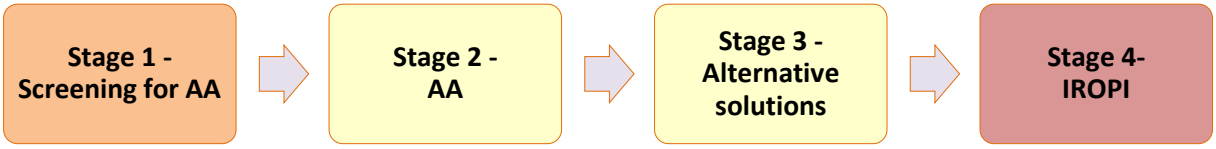
DAFM has responsibility for foreshore licensing functions in respect of activities wholly or primarily for the use, development or support of aquaculture under the 1933 Foreshore Act, as amended. DAFM is also the aquaculture licensing authority under the *Fisheries (Amendment) Act (1997*)[5] and determines applications for new, or renewal of, aquaculture 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.

2.3 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 [6]. The *Guidance on Appropriate Assessment of Plans and Projects in Ireland* document[7] 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[8], 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 promotes a four stage process to complete the AA. The four stages are:

[5] https://revisedacts.lawreform.ie/eli/1997/act/23/revised/en/html
[6] EC 2018. Guidance on Aquaculture and Natura 2000 Sustainable aquaculture activities in the context of the Natura 2000 Network Link
[7] DEHLG, 2009. Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Link
[8] OPR - Office of Planning Regulator (2021). Appropriate Assessment Screening for Development Management. March 2021. 43pp Link



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.

2.3.1 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. The greatest level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no effect.

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

2.4 Structure of AA Report

This screening 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. **Conclusion** - a summary of the findings from the screening process.

2.5 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 significant sources are cited in the reports.

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

- The Application
- DAFM Aquaculture & Foreshore Management website
- DAFM - Aquaculture viewer – AquaMIS
- National Parks & Wildlife (NPWS) protected site information
- NPWS Guidance documents
- BIM 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
- Foreshore Act, 1933
- Aquaculture (Licence Application) Regulations, 1998
- Aquaculture (Licence Application) (Amendment) Regulations 2018
- Ireland's Marine Atlas
- MI/BIM Inshore fishing reports
- DHLGH Foreshore licencing database
- EPA GeoHive
- EPA maps tool
- NPWS Status of EU Protected Habitats and Species in Ireland – Article 17 (Habitats & species
- EU Commission assessments of birds population status and trends web tool
- Marine Life Information Network
- EPA Catchments.ie dashboard
- Ordnance Survey of Ireland (OSI)
- Birdwatch Ireland website
- National Biodiversity Data Centre
- European Environmental agency
- OPR, 2021. Appropriate Assessment Screening for Development Management. March 2021; Office of Planning Regulator.
- 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.
- 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 information for the FFH impact assessment
- ABPMer, 2013a – h. Tools for Appropriate Assessment of Fishing and Aquaculture Activities in Marine and Coastal Natura 2000 Sites. Marine Institute.
- 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

2.6 Assumptions made for Appropriate Assessment Reports

Certain assumptions are made for this screening report 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:

- All aquaculture sites considered in this assessment report are assumed to be fully operational and that the operations (as well as environmental impacts) are occurring across the entire area of the sites, at a minimum.
- Any aquaculture applications 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 across the entire area of the relevant sites. This ensures a conservative approach, in that it assumes these activities will be operational to the maximum extent possible.
- Other assumptions identified on a case-by-case basis and clearly communicated in the AA report.

3 Appropriate Assessment Screening

This document assesses the potential effects of a single proposed extensive aquaculture activity in combination with existing aquaculture activities on the Qualifying Interests (QIs) of the Slyne Head Peninsula Special Area of Conservation (SAC) (Site code: 002074), among others. Extensive aquaculture is defined in Regulation 3(iii) of the Aquaculture (Licence Applications) (Amendment) Regulations 2018 as “aquaculture activities where there is no external supply of feed and the culture depends entirely on natural processes for production and supply of feed”. Shellfish (molluscs, echinoderms, bivalves and gastropods) and seaweed aquaculture fall within this definition, finfish aquaculture does not.

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This document considers the potential ecological interactions between the proposed extensive aquaculture activity and the Conservation Objectives (COs) of the Slyne Head Peninsula Special Area of Conservation (SAC) (Site code: 002074), among others.

3.1 Overview of Aquaculture Activities in the Slyne Head Peninsula Special Area of Conservation (SAC) (Site Code: 002074)

In addition to the single application site for extensive shellfish culture, there are currently, within the Slyne Head Peninsula Special Area of Conservation (SAC), 4 sites licenced for extensive (shellfish) aquaculture (Table 3-1 and Figure 3-1). There is one site (T09 – 140A) for intensive (finfish) aquaculture:

- 4 licenced extensive aquaculture sites for the culture of Pacific oysters (T09-417A, B, C and T09-517A)
- 1 Licenced intensive Aquaculture site for culture of finfish (salmon) (T09-140A)
- 1 Application for intertidal shellfish culture of Pacific oysters (T09-522A)

Table 3-1 Licenced aquaculture and applications for aquaculture activities considered in this report.

Site No.	Status	Activity/Species	Total Area (ha.)
T09-417A	Licensed	Pacific Oyster	4.00
T09-417B	Licensed	Pacific Oyster	5.04
T09-417C	Licensed	Pacific Oyster	3.12
T09-517A	Licensed	Pacific Oyster	7.93
T09-140A	Licenced (review and renewal)	Finfish (Salmon)	4.09
T09-522A	Application	Pacific Oyster	0.96

Existing and proposed aquaculture sites are presented in Figure 3-1.

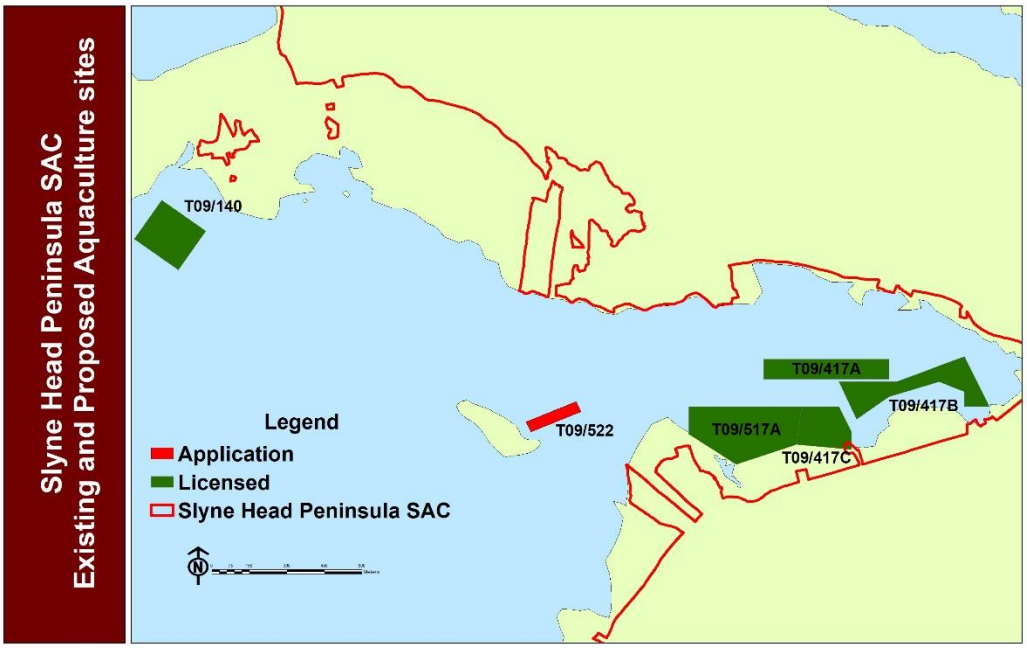

Figure 3-1 Existing and proposed aquaculture sites (Licenced and Applications) in Slyne Head Peninsula SAC.

3.1.1 Intensive Salmon Culture

There is single licence for the culture of salmon in net pens in Mannin Bay. The site (T09-140A) is approximately 4 ha in size and the water depth is approximately 15m. There are up to six pens on site and the site is accessed from the pier at Curhownagh, directly north of the site. The site is used to finish salmon from March to July in each year. The site is fallowed thereafter. Approximately 200 Tonnes of salmon are produced at the site each year.

3.1.2 Extensive Oyster Culture

Intertidal oyster aquaculture of the Pacific oyster, *Magallana gigas*, is a form of shellfish culture with oyster seed cultivated in bags on trestles in the intertidal zone, either to half-grown or fully-grown size. The bag and trestle method uses steel table-like structures arrayed in double rows with wide gaps between the paired rows to allow for access. Trestles used are made from steel are typically 3 metres in length, approximately 1 metre in width and stand between 0.5 metre and 0.7 metre in height. In general, oyster farms are positioned between mean Low Water Spring and mean Low Water Neap, allowing on average between two and five hours' exposure depending on location, tidal and weather conditions. The trestles hold typically six HDPE mesh bags approximately 1m by 0.5m by 10cm, using rubber and wire clips to close the mesh bags and to fasten them to the trestles. The production cycle begins oyster seed is brought in from oyster nurseries to the site either in spring or late summer. The mesh size in the mesh bags can vary (4mm, 6mm, 9mm and 14 mm) depending on oyster stock grade. For example, 6mm seed is put into 4mm mesh bags at a ratio of 1,000 to 1,500 seed per bag.

Oysters are thinned out and graded as they grow and will be taken to the handling / sorting facility twice per year for grading and re-packing then returned to the trestles. In the final stage they will be 'hardened' in the upper intertidal area, before removal, grading, bagging and delivery. Time to harvest, depending on intake size, ranges from 2.5 to 4 years, where they will have reached 60 - 80 to the kilo. At reaching market size oysters are in bags of about 120.

This proposed aquaculture site (T09-522A) in the intertidal area will be accessed during spring tides (at low tide) via boat. Typically, preparatory work is always conducted in onshore service areas in the intervening periods, including grading and packing, preparation of bags and trestles. General maintenance work that occurs on site includes shaking and turning of bags, and hand removal of fouling and seaweed to ensure maintenance of water flow through the bags when submerged. The site will be used for finishing oysters grown at the applicant's other sites in Mannin Bay.

3.1.3 Access Routes

There are a number of access routes for the extensive aquaculture operations in the Slyne Head Peninsula SAC (Figure 2-2). For some of the sites, access is by tractor across the intertidal areas, from a single access point on the south shore of Mannin Bay. The same point is used to access sites T09-417A (Licenced) and the new application T09-522A, by boat.

Calculation of area of the access routes across intertidal habitats in the SAC is linear length (in metres) by a putative route width of 10m, which is considered a sufficiently precautionary estimate, which gives a total spatial overlap of 0.13ha (Figure 2-2).

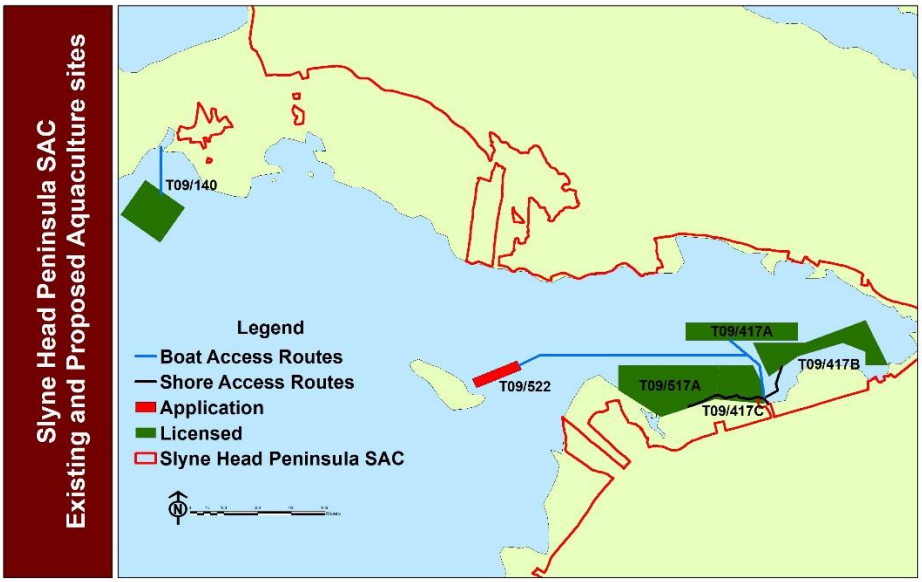

Figure 3-2 Existing and proposed access routes to the existing and proposed shellfish culture sites within the Slyne Head Peninsula SAC.

3.2 Structure of this Report

The report addresses the Stage 1: Appropriate Assessment (AA) Screening for existing and proposed extensive aquaculture operations within in Slyne Head Peninsula SAC. AA Screening is undertaken to identify potential likely significant effects on QIs of Natura 2000 sites. Where the screening exercise cannot exclude on the basis of objective information that the aquaculture activity proposed, will have a likely significant effect on conservation features, the activity is brought forward for further consideration in Stage 2 AA.

3.2.1 Additional Information and Data Sources

In addition to the information sources identified above in Section 2.5, this report has also drawn on information from a number of sources, outlined below:

- The DAFM Aquaculture Viewer (AQUAMIS) – all data on aquaculture sites and Annex I marine habitats.
- Publicly available data and mapping from NPWS on Marine Habitats QIs and marine community types.
- BIM. A profile report on the existing and proposed aquaculture practices in Mannin Bay (unpublished report).
- Publicly available data from NPWS on Annex II marine species conservation features.
- NPWS, 2015a. Conservation Objectives: Slyne Head Peninsula SAC 002074. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Department Arts, Heritage and the Gaeltacht. Version 1 (February 2015); 37pp.

- NPWS, 2015b. Slyne Head Peninsula SAC (site code: 002074): Conservation Objectives supporting document – marine habitats and species. National Parks and Wildlife Service, Department Arts, Heritage and the Gaeltacht. Version 1 (January 2015); 19pp.
- The spatial data for conservation features provided by NPWS (Site-specific Conservation Objectives)
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

3.3 Identification of Relevant Natura 2000 Sites and QIs

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 source[s] of potential impacts associated with the activity. The QIs of the Slyne Head Peninsula SAC (and other Natura sites) could be at risk of significant 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. The S-P-R model considers potential ecological links between the proposed activity and the qualifying interest of Natura 2000 site. It is important to note the link can be direct and facilitated by terrestrial, aquatic and airborne action of a particular pressure on the feature. In addition, 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 (OPR 2021). Identifying such pathways will facilitate the identification of Natura 2000 sites likely to be impacted by the proposed activities.

3.3.1 Slyne Head Peninsula SAC – Qualifying Interests

Slyne Head Peninsula SAC (site code 002074) is located on the west coast of Ireland in northwest Connemara, Co Galway. The SAC 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 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.

Slyne Head Peninsula SAC (site code 002074) is designated for the marine Annex I qualifying interests (Figure 1);

- Large shallow inlets and bays (1160) and
- Reefs (1170).

The Annex I habitat 1160 is a large physiographic feature that may wholly or partly incorporate other Annex I habitats such as Reefs within its area.

A number of coastal habitats can also be found in the SAC, including Coastal lagoons (1150), Annual vegetation of drift lines (1210), Perennial vegetation of stony banks (1220), Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* (1330), Petalwort Petalophyllum ralfsii (1395), Mediterranean salt meadows (*Juncetalia maritimi*) (1410), Slender Naiad *Najas flexilis* (1833), Embryonic shifting dunes (2110), Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120), Machairs (*in Ireland) (21A0), Oligotrophic waters containing

very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110), Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (3140), European dry heaths (4030) *Juniperus communis* formations on heaths or calcareous grasslands (5130), Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) (6210), Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410), Lowland hay meadows (*Alopecurus pratensis, Sanguisorba offvinalis*) (6510) and Alkaline fens (7230). The extent of the SAC is shown in Figure 3-1 below.

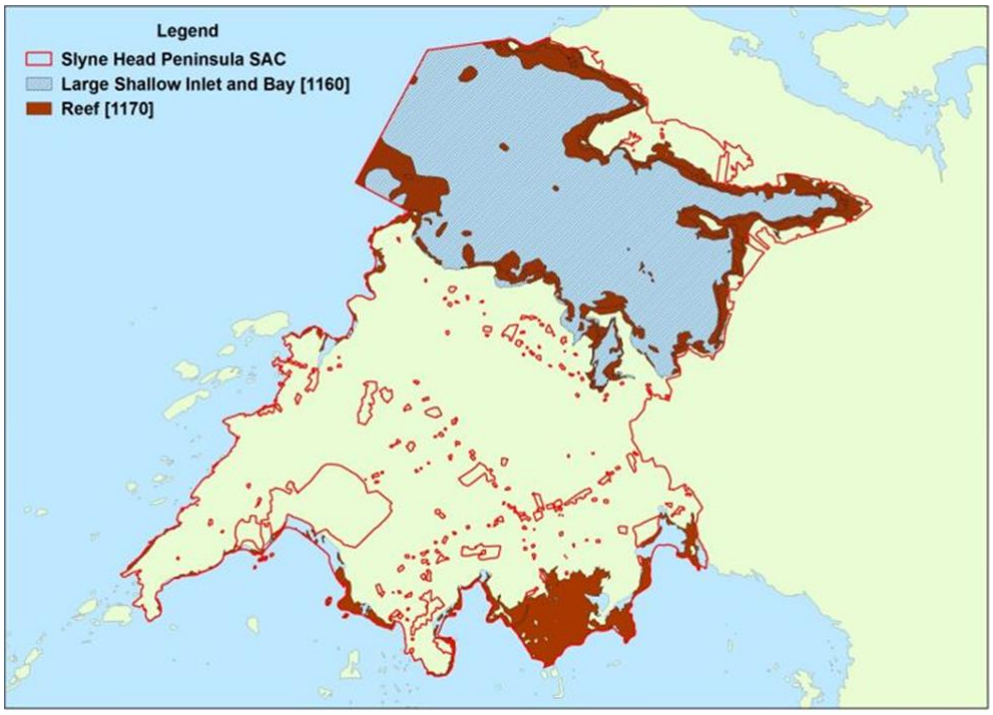

Figure 3-3 The extent of the Slyne Head Peninsula SAC (site code 002074) and marine qualifying interests (habitats).

Finally, eight constituent communities and community complexes recorded within the qualifying interest Annex 1 habitats (i.e. Large Shallow Inlets and Bays (1160) and Reefs (1170)) are listed in NPWS (2015b) and illustrated in Figure 2-2 and consist of:

- Intertidal sand with *Enchytraeidae* community complex
- Mobile intertidal sand with polychaetes community complex
- *Zostera*-dominated community complex
- Maërl-dominated community complex
- Subtidal sand with polychaetes and bivalves community complex
- Subtidal sand with *Kurtiella bidentata* community complex
- Intertidal reef community complex
- *Laminaria*-dominated community complex

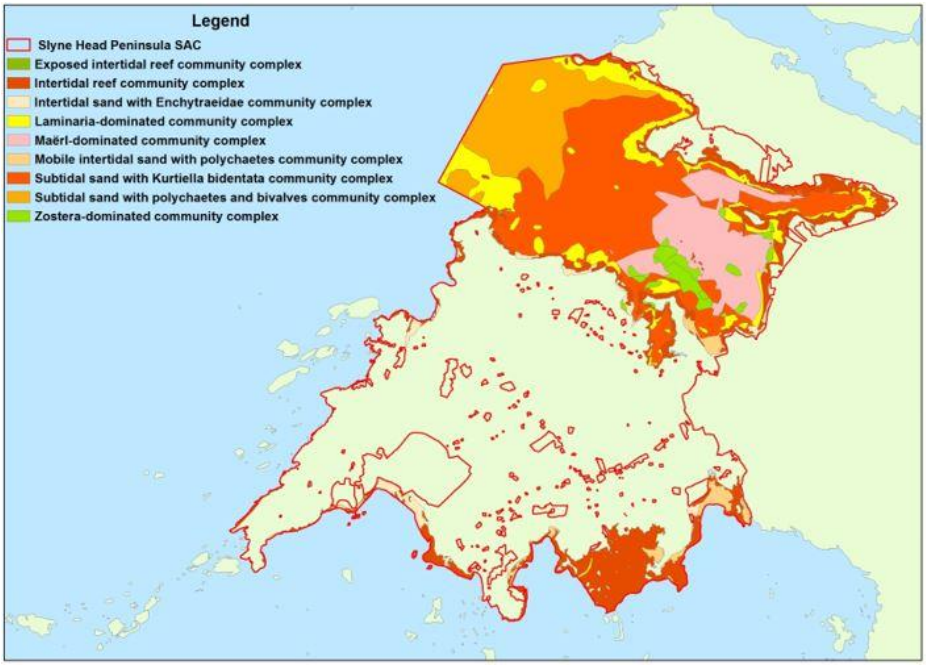

Figure 3-4 Principal benthic communities recorded within the qualifying interests of the Slyne Head Peninsula SAC (Site Code 002074) (NPWS 2015a).

3.3.2 Conservation objectives for Slyne Head Peninsula SAC

The conservation objectives for the qualifying interests (SAC) were identified in NPWS (2015a, b). The natural condition of the designated features should be preserved with respect to their area, distribution, extent and community distribution. Habitat availability should be maintained for designated species and human disturbance should not adversely affect such species. The features, objectives and targets of each of the qualifying interests within the SAC are listed in Table 3-2 below.

Table 3-2 Conservation objectives and targets for marine habitats and species in Slyne Head Peninsula SAC (NPWS 2015a, b). Annex I and II features listed in bold.

Group	Qualifying Interest Community Type	Objective	Targets
Marine Habitat	**Large shallow inlets and bays (1160)**	Maintain favourable Conservation Condition	1540ha; The permanent habitat area is stable or increasing, subject to natural processes. Constituent community types are conserved in a natural condition.
	(Intertidal sand with *Enchytraeidae* community complex)	Maintain favourable conservation condition	14ha; Conserve in a natural condition
	(Mobile intertidal sand with polychaetes community complex)	Maintain favourable conservation condition	11ha; Conserve in a natural condition
	(*Zostera*-dominated community complex)	Maintain favourable conservation condition	33ha; Maintain extent and conserve the high quality of the Zostera-dominated community complex subject to natural processes.
	(Maërl-dominated community complex)	Maintain favourable conservation condition	261ha; Maintain extent and conserve the high quality of the Maërl-dominated community complex subject to natural processes.
	(Subtidal sand with polychaetes and bivalves community complex)	Maintain favourable conservation condition	288ha; Conserve in a natural condition
	(Subtidal sand with *Kurtiella bidentata* community complex)	Maintain favourable conservation condition	574ha; Conserve in a natural condition
	(Intertidal reef community complex)	Maintain favourable conservation condition	159ha; Conserve in a natural condition
	(*Laminaria*-dominated community complex)	Maintain favourable conservation condition	14ha; Conserve in a natural condition
Marine Habitat	**Reefs**	Maintain Favourable Conservation Condition	571ha; The distribution and permanent habitat area is stable or increasing subject to natural processes. Constituent community types are conserved in a natural condition.
	Intertidal reef community complex	Maintain Favourable Conservation Condition	350ha; Conserve in a natural condition
	Laminaria-dominated community complex	Maintain Favourable Conservation Condition	220ha; Conserve in a natural condition

Group	Qualifying Interest Community Type	Objective	Targets
Coastal Habitat	**Coastal lagoons (1150)**	Restore favourable conservation condition	22.30ha; The habitat area is stable, subject to slight natural variation. No decline in habitat distribution, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	1210 Annual vegetation of drift lines	Maintain favourable conservation condition	0.78ha, Estimate as this habitat is very difficult to measure due to its dynamic nature; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	1220 Perennial vegetation of stony banks	Maintain favourable conservation condition	Area unknown; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Restore favourable conservation condition	4.06ha, Further un-surveyed areas may be present within the site; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	1395 Petalwort *Petalophyllum ralfsii*	Maintain favourable conservation condition	Three known populations; No decline in population distribution or size. No decline in area of suitable habitat. Maintain favourable hydrological conditions and vegetation structure.
Coastal Habitat	1410 Mediterranean salt meadows (*Juncetalia maritimi*)	Restore favourable conservation condition	6.53ha, Further un-surveyed areas may be present within the site; The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.

Group	Qualifying Interest Community Type	Objective	Targets
Coastal Habitat	1833 Slender Naiad *Najas flexilis*	Maintain favourable conservation condition	No change to the spatial extent of Najas flexilis within the lake, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining the population distribution and, viability and habitat quality and extent.
Coastal Habitat	2110 Embryonic shifting dunes	Restore favourable conservation condition	2.52ha, Estimate as this habitat is very difficult to measure due to its dynamic nature; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Restore favourable conservation condition	0.15ha, Estimate as this habitat is very difficult to measure due to its dynamic nature; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	21A0 Machairs (*in Ireland)	Restore favourable conservation condition	276.29ha; The habitat area is stable or increasing, subject to natural processes, including erosion and succession. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)	Maintain favourable conservation condition	The distribution and classification of lake habitats in the c.29 lakes/ponds in the SAC is not fully known and, therefore, habitat area targets cannot be set. Area stable or increasing subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining water quality and function and diversity of typical species.
Coastal Habitat	3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining water quality and function and diversity of typical species.

Group	Qualifying Interest Community Type	Objective	Targets
Coastal Habitat	4030 European dry heaths	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	5130 *Juniperus communis* formations on heaths or calcareous grasslands	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites)	Maintain favourable conservation condition	
Coastal Habitat	6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba offvinalis*)	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Coastal Habitat	7030 Alkaline fens	Maintain favourable conservation condition	Area unknown: The habitat area is stable or increasing, subject to natural processes. Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.

3.4 Identification of Adjacent Natura sites for *ex-situ* effects

In addition to the Slyne Head Peninsula SAC there a number of other Natura 2000 sites which are proximate to the proposed activities or may have some potential via a S-P-R link to interact with the activities proposed.

The screening of adjacent Natura sites is carried to determine if the proposed activity is likely to impact on the QIs of these sites. It is primarily based upon indirect links between the proposed activity and those QIs. 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. 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 fishes or mammals) or those with large foraging ranges (e.g. birds and mammals). However, given the small spatial extent and secluded nature of the existing and proposed activities and Mannin Bay generally, it is unlikely that migratory or wide-foraging species may interact with the proposed activity as a result of the structures along their migratory route, or affect their foraging behaviour such that it would have a likely significant impact on their population status. Therefore, only QIs for SPAs within 15 km of the proposed development site are considered in this screening. A list of Natura 2000 sites identified using these selection criteria are identified in Table 3-3 and Figure 3-5.

Table 3-3 List and details of Natura sites adjacent to the area of the proposed activity.

Natura site - Site Code	Approximate distance between proposed aquaculture activity (T09-522) and Natura site (at nearest point) (km)
SAC (15 km)	
Aughrusbeg Machair and Lake SAC [001228]	11.8 km
Connemara Bog Complex SAC [002034]	2.5 km
Cregduff Lough SAC [001251]	11.5 km
Dogs Bay SAC [001257]	11.8 km
Kingstown Bay SAC [002265]	6.5 km
Barnahallia Lough SAC - 002118	8.8 km
Murvey Machair SAC [002129]	8.1 km
Omey Island Machair SAC [001309]	9.5 km
Rosroe Bog SAC [000324]	12.8 km
Slyne Head Islands SAC [000328]	38.8 km
Tully Mountain SAC [000330]	13.7 km
Tully Lough SAC	14.9 km
The Twelve Bens/Garraun Complex SAC [002031]	4.2 km
West Connacht Coast SAC [002998]	3.5 km
SPA (15 km)	
Inishbofin, Omey Island and Turbot Island SPA [004231]	6.6 km
Cruagh Island SPA [004170]	11.5 km
High Island, Inishshark and Davillaun SPA [004144]	15.5 km
Illaunnanoon SPA [004221]	12.2 km
Connemara Bog Complex SPA [004181]	2.9 km
Slyne Head to Ardmore Point Islands SPA [004159]	5.3 km

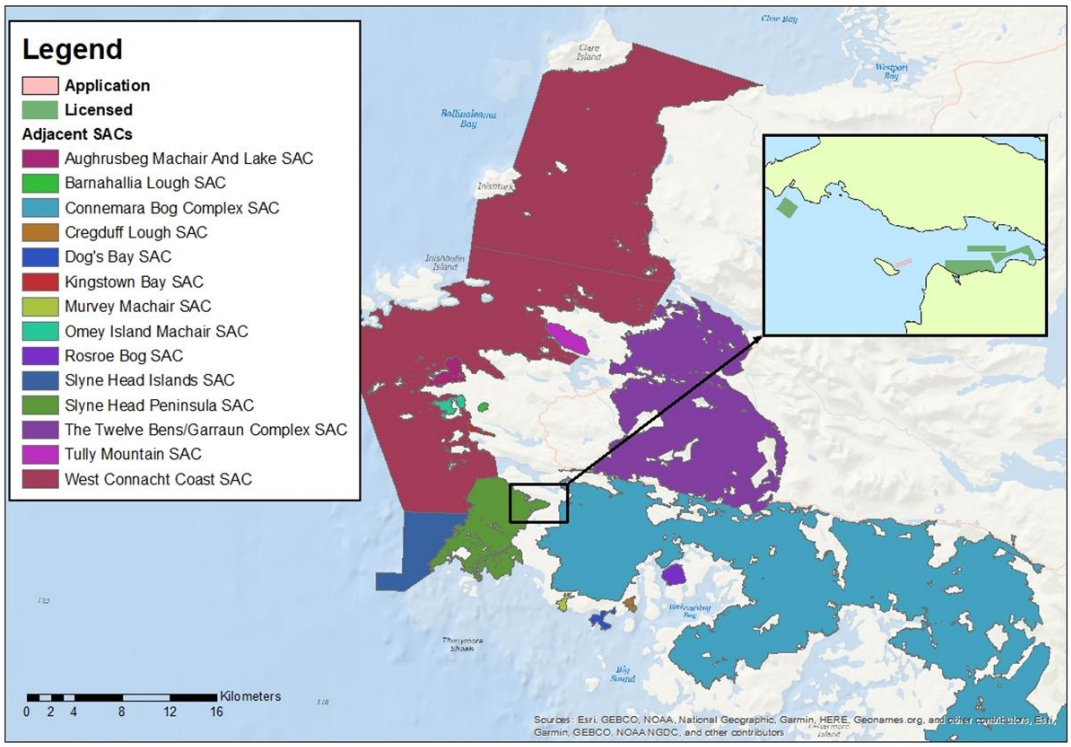

Figure 3-5 SAC sites considered as adjacent to proposed aquaculture activities in Mannin Bay, Slyne Head Peninsula SAC.

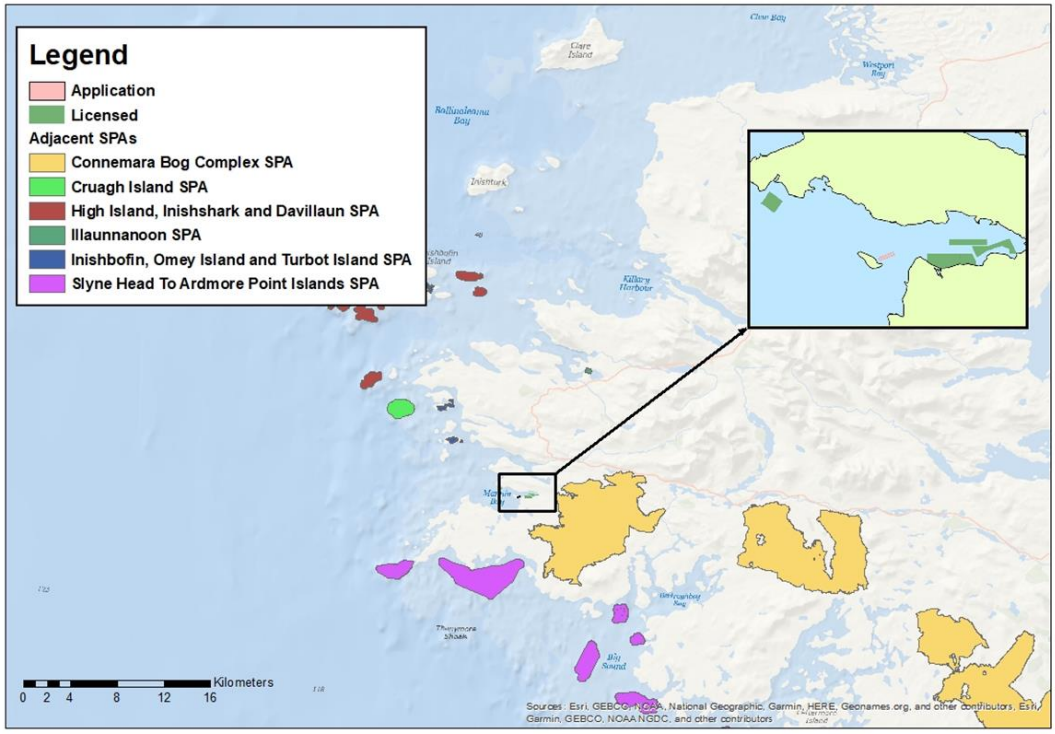

Figure 3-6 SPA Sites adjacent to the proposed aquaculture site in Mannin Bay, Slyne Head Peninsula SAC.

The characteristic features of all Natura 2000 sites considered are identified below in Tables 3-4 and 3-5 where a screening assessment is carried out on the likely interaction with aquaculture activities based primarily upon the likelihood of spatial overlap and/or the existence of and S-P-R link. Screening outcomes in relation to the proposed activities are outlined.

3.5 Screening of QIs of Slyne Head Peninsula SAC [002074]

A screening assessment is an initial evaluation of the existence of Source Pathway Response (S-P-R) links between the proposed activities resulting in a likely adverse effects on the QIs. The screening exercise is a filter, which may lead to exclusion of certain activities or qualifying interests from appropriate assessment proper, thereby simplifying the assessments, if this can be justified unambiguously using clear criteria. Screening is a conservative filter that minimises the risk of false negatives.

In this assessment screening of habitat QIs against the proposed activities is, in the first instance, considered on the basis of direct spatial overlap i.e. if the qualifying interests overlap spatially with the proposed activities then significant impacts due to these activities on the conservation objectives for the qualifying interests are not discounted (not screened out) except where there is absolute and clear rationale for doing so. Where there is spatial overlap and reasonable potential for likely significant effects on QIs to arise, a full assessment (Stage 2) is warranted. In the instance that there is no spatial overlap between an activity (direct links) and a QI and no likely indirect interactions apparent, then likely significant effects can be discounted and the activity may be screened out. If there is marginal spatial overlap but no reasonable potential for significant effects on QIs to arise, then the activity also be screened out on the basis of objective consideration. 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 effects facilitated by hydrological or other links.

The following section provides spatial overlap extent between designated habitat features and aquaculture activities within the qualifying interests of Slyne Head Peninsula SAC.

3.5.1 Aquaculture Activity Screening- Marine Habitats

Aquaculture pressures on a given habitat are related to its vulnerability to the pressures induced by culture activities. Vulnerabilities consider the likely interactions measured by spatial overlap or exposure of the habitat to the equipment, activities or culture organism, combined with the sensitivity of the habitat. To this end, the location and orientation of structures associated with the culture organism, the density of culture organisms, the duration of the culture activity, and the type of activity are all important considerations when considering risk of disturbance to habitat features and species. Table 3-4 highlights the spatial overlap between (existing and proposed) aquaculture activities and the qualifying interests of Site 2074 (i.e. Large Shallow Inlet and Bay and Reefs).

The screening is largely based on spatial overlap. This is due to the fact that the proposed activity is extensive aquaculture activities, as proposed, have been have demonstrated to result in accumulation of organic matter beneath culture structures (Chamberlain et al 2001; Wilding 2012), however, negative impacts on benthic

community composition have not been fully demonstrated (Wilding and Nickell 2013) or are considered negligible and confined very closely to the footprint of the structures (Chamberlain et al 2001; Christensen et al., 2003; Crawford et al., 2003; see review by McKindsey et al 20011; Forde et al., 2015; O'Carroll et al., 2016; Casado-Coy et al., 2022; Sean et al 2022). Any effects on marine community types from suspended shellfish culture is generally confined to the area beneath the structures. On this basis, there is unlikely to be a hydrological link from this immediate area to distant habitats. Similarly, for finfish aquaculture, interactions with habitats is based primarily on spatial overlap. The intensive nature of this activity will result in organic enrichment on the seafloor beneath the cages as a result of faecal and waste food deposition. Impacts on marine habitats have been clearly identified (Wilding and Hughes, 2010; Wilding et al 2012).

Access to extensive culture sites, particularly using vehicles over the foreshore, can also present a potential risk of adverse effects on marine species and communities (Forde et al., 2015; O'Carroll et al., 2016). In the Slyne Head Peninsula SAC, operators access the existing and proposed culture sites using a combination of boats and tractors across the shore to farm areas. Calculation of area of access routes across the shore in the SAC is generated by assigning a putative route width of 10m, which is considered a sufficiently precautionary estimate. The resulting estimates represent the maximum length of travel route to/from and between the culture locations. The spatial coverage of access routes on QI habitats is also presented in Table 3-4.

Table 3-4: Spatial extent of aquaculture activities overlapping with the qualifying interests 1160-Large shallow inlets and bays and 1170-Reefs in Slyne Head Peninsula SAC, presented according to culture species, location and license status.

Site ID	Status	Species	Location	1160 - Large Shallow Inlets and Bays 1,540 ha		1170 - Reefs 571 ha	
				Area (ha)	*% QI*	Area (ha)	*% QI*
T09-417A	Licensed	Pacific Oyster	Subtidal	4.00	0.26	0.05	0.01
T09-417B	Licensed	Pacific Oyster	Intertidal	5.04	0.33	4.39	0.77
T09-417C	Licensed	Pacific Oyster	Intertidal	3.12	0.20	2.6	0.46
T09-517A	Licensed	Pacific Oyster	Intertidal	7.93	0.51	5.71	1.00
T09-140A	Licenced (review and renewal)	Finfish	Subtidal	4.09	0.27	0	0
T06-522A	**Application**	**Pacific Oyster**	**Intertidal**	**0.96**	**0.06**	**0.88**	**0.15**
Access Routes				0.13	0.01	0.13	0.02

On the basis of spatial overlap with the proposed activity, the likely significant effects on QIs cannot be discounted and the following QIs from the Slyne Head Peninsula SAC are carried forward for further consideration:

- Annex I Habitat 1160 - Large shallow inlets and bays
- Annex I Habitat 1170 - Reefs

3.5.2 Aquaculture Activity Screening- Coastal Habitats

The Annex I habitat 1150 (Coastal lagoons) of Site 002074 is located approximately 1km by water northwest of the proposed site, notwithstanding this relatively short distance from the lagoon there are no pathways for interaction and given the very localized effects of shellfish culture. The potential effects from the proposed intertidal shellfish culture on the Qualifying Interest and Habitat Coastal Lagoon (1150) can be screened out from further consideration.

Annex I coastal habitats of Site 002074 include the following:

- 1210 Annual vegetation of drift lines
- 1220 Perennial vegetation of stony banks
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1395 Petalwort *Petalophyllum ralfsii*
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)
- 1833 Slender Naiad *Najas flexilis*
- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
- 21A0 Machairs (*in Ireland)
- 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)
- 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- 4030 European dry heaths
- 5130 *Juniperus communis* formations on heaths or calcareous grasslands
- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites)
- 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba offvinalis*)
- 7030 Alkaline fens

Given the predominantly terrestrial and freshwater nature of these coastal SAC features and that there is no spatial overlap or likely interactions identified between these and the proposed aquaculture activity in Slyne Head Peninsula SAC. On the basis that any effects resulting from the proposed shellfish aquaculture will be localized to the footprint of the licence area, it is considered that there will be no clear "source–pathway–

receptor" interactions with the QIs identified above. Therefore, no likely significant effects posed by the intertidal extensive shellfish aquaculture on the terrestrial, freshwater and coastal Qualifying Interests of Slyne Head Peninsula SAC Natura 2000 site. Likely significant effects on these QIs from the proposed shellfish culture activity, at site T09-522A, can be discounted.

3.6 Screening of QIs of adjacent Natura 2000 sites

The screening of adjacent Natura sites is carried out to determine if the proposed activity is likely to impact on the QIs of these sites. It is primarily based upon indirect links (i.e., S-P-R) between the proposed activity and those QIs. Table 3-5 shows the relevant QIs and their conservation objectives for adjacent SACs, along with their screening outcome.

Table 3-5 SAC Sites adjacent to Slyne Head Peninsula SAC and qualifying features with initial screening assessment on likely interactions with proposed aquaculture activities.

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
Aughrusbeg Machair and Lake SAC [001228]	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Northern Atlantic wet heaths with *Erica tetralix* [4010]	This SAC is 11.8km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the predominantly terrestrial and freshwater nature of this SAC and that there is no spatial overlap or likely interactions identified between the proposed aquaculture activity in Slyne Head Peninsula SAC, and the conservation features in Aughrusbeg Machair and Lake SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'qualifying interests' of this Natura 2000 site.
Barnahallia Lough SAC [002118]	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] *Najas flexilis* (Slender Naiad) [1833]	This SAC is 8.8km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the predominantly freshwater nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Barnahallia Lough SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the intertidal culture of shellfish on the 'qualifying interests' of this Natura 2000 site.

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
Omey Island Machair SAC [001309]	Machairs (* in Ireland) [21A0] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] *Petalophyllum ralfsii* (Petalwort) [1395]	This SAC is 9.5km from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the predominantly terrestrial and freshwater nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Omey Island Machair SAC, it is considered that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the intertidal culture of shellfish on the 'qualifying interests' of this Natura 2000 site.
Kingstown Bay SAC [002265]	Large shallow inlets and bays [1160]	This SAC is 6.5km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the hydrological distance is even great (>11km) between the SAC and aquaculture operations and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Kingstown Bay SAC, it is considered that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on this 'qualifying interest' of this Natura 2000 site.
Tully Mountain SAC [000330]	European dry heaths [4030] Alpine and Boreal heaths [4060]	This SAC is approx. 13.7km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the terrestrial nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Tully Mountain SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'qualifying interests' of this Natura 2000 site.
Connemara Bog Complex SAC [002034]	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or Isoeto-Nanojuncetea [3130] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the *Ranunculion*	This SAC is approx. 2.5km (line of sight distance) from the closest aquaculture site. Given the terrestrial nature of the features listed from this SAC and that there is no spatial overlap or likely interactions identified between the proposed aquaculture activity in Slyne Head Peninsula SAC and the conservation features in Connemara Bog Complex SAC, it is considered that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on this 'qualifying interests' of this Natura 2000 site.

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
	fluitantis and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the Rhynchosporion [7150] Alkaline fens [7230] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] *Euphydryas aurinia* (Marsh Fritillary) [1065] Najas flexilis (Slender Naiad) [1833]	
	Salmo salar (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Given the predominantly freshwater nature of the qualifying interests for these species, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no significant effects posed by the suspended aquaculture on these 'qualifying interests' of this Natura 2000 site. These species, however, may interact with the proposed aquaculture operations either during foraging (Otter) or migrating to/from natal streams (Salmon). Given the small size of the proposed site (1ha) and the intertidal location adjacent to coastline, both species can move freely among the structures. They do not present a barrier to movement. In the case of disturbance, activities at the site occur during daylight hours and will not overlap with the crepuscular foraging of otter. Given these observations it is concluded there are no likely significant effects posed by the proposed intertidal aquaculture on salmon and otter in The Connemara Bog Complex SAC.

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
The Twelve Bens/Garraun Complex SAC [002031]	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the Rhynchosporion [7150] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] *Najas flexilis* (Slender Naiad) [1833] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	This SAC is 4.2km (line of sight distance) from the proposed aquaculture site. The hydrological distance is even greater (>19km) between the SAC and proposed aquaculture operation. Given the predominantly terrestrial and freshwater nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and these conservation features in The Twelve Bens/Garraun Complex SAC, it is considered that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the intertidal culture of shellfish on these 'qualifying interests' of this Natura 2000 site.
	Salmo salar (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Given the predominantly freshwater nature of the qualifying interests for these species, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no significant effects posed by the suspended aquaculture on these 'qualifying interests' of this Natura 2000 site. These species, however, may interact with the suspended aquaculture operations either during foraging (Otter) or migrating to/from natal streams (Salmon). Given the small size of the proposed site (1ha) and the intertidal location adjacent to coastline, both species can move freely among the structures. They do not present a barrier to movement. In the case of disturbance, activities at the site occur during daylight hours and will not overlap with the crepuscular foraging of otter. Given these observations it is concluded there are no likely significant effects posed by the proposed intertidal aquaculture on salmon and otter in The Twelve Bens/Garraun Complex SAC.

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
Slyne Head Islands SAC [00328]	Reefs [1170]	This SAC is approx. 4.8km (line of sight distance) from the closest aquaculture site. There is no spatial overlap or likely interactions identified between the proposed aquaculture activity in Slyne Head Peninsula SAC and the conservation feature reef in Slyne Head Islands SAC, it is considered that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on this 'qualifying interests' of this Natura 2000 site
	Tursiops truncatus (Common Bottlenose Dolphin) [1349]	Bottlenose Dolphin from Slyne Head Islands SAC will likely migrate into the Slyne Head Peninsula SAC. It is possible that those individuals may interact with the proposed aquaculture operation if they forage inshore. However, given the relatively small footprint of the aquaculture locations (approx. 1ha), the shallow nature of the intertidal site (at high water) and the locations adjacent to shorelines, they do not present a barrier to movement of this species and will likely avoid the structures (Watson-Capps & Mann 2005). In addition, there is no energy sources likely to result from activities at the sites that pose a risk to dolphin. Given these observations it is concluded there are no likely significant effects posed by the proposed intertidal aquaculture on bottlenose dolphin in Slyne Head Peninsula SAC.
	Halichoerus grypus (Grey Seal) [1364]	Grey Seal within Slyne Head Islands SAC may migrate into the Slyne Head Peninsula SAC. It is possible that those individuals (seals) may interact with the proposed shellfish aquaculture operation if they forage inshore. However, given the distance to Slyne Head Islands SAC, it is unlikely that the existing or proposed activities will negatively impact on those conservation targets relating to haul-out locations (i.e. breeding, moulting and resting sites). In addition, the proposed activities do not result in those pressures considered to be threats to the species (NPWS 2019), (i.e., Geotechnical Surveying – man made noise and Marine fish and shellfish harvesting using tangle nets) and are not to be found therein. The structures associated with suspended aquaculture may act as fish attraction devices and thus, may prove beneficial to the seal. On this basis, it is unlikely that this species will negatively interact with the existing and proposed intertidal aquaculture activities. Given these observations, it is concluded there are no likely significant effects posed by the

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
		proposed intertidal aquaculture on Grey Seal in Slyne Head Peninsula SAC.
West Connacht Coast SAC [002998]	*Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	Bottlenose Dolphin from West Connacht Coast SAC will likely migrate into the Slyne Head Peninsula SAC. It is possible that those individuals may interact with the proposed aquaculture operation if they forage inshore. However, given the relatively small footprint of the aquaculture locations (approx. 1ha), the shallow nature of the intertidal site (at high water) and the locations adjacent to shorelines, they do not present a barrier to movement of this species and will likely avoid the structures (Watson-Capps & Mann 2005). In addition, there is no energy sources likely to result from activities at the sites that pose a risk to dolphin. Given these observations it is concluded there are no likely significant effects posed by the proposed intertidal culture of shellfish culture on bottlenose dolphin in Slyne Head Peninsula SAC.
Cregduff SAC [001251]	Transition mires and quaking bogs [7140] *Najas flexilis* (Slender Naiad) [1833]	This SAC is approx. 11.5km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the terrestrial nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Cregduff SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'qualifying interests' of this Natura 2000 site.
Dogs Bay SAC [001257]	Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] European dry heaths [4030]	This SAC is approx. 11.8km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the terrestrial nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Dogs Bay SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'qualifying interests' of this Natura 2000 site.
Rosroe Bog SAC [000324]	Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the Rhynchosporion [7150]	This SAC is approx. 12.8km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the terrestrial nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities

Natura site	Qualifying features (habitat/species code)	Aquaculture AA Screening
		in Slyne Head Peninsula SAC and the conservation features in Rosroe Bog SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on these 'qualifying interests' of this Natura 2000 site.
Murvey Machair SAC [002129]	Machairs (* in Ireland) [21A0] *Petalophyllum ralfsii* (Petalwort) [1395]	This SAC is approx. 8.1km (line of sight distance) from the proposed aquaculture site in Slyne Head Peninsula SAC. Given the terrestrial nature of this SAC and that there is no spatial overlap or likely interactions identified between the aquaculture activities in Slyne Head Peninsula SAC and the conservation features in Murvey Machair SAC, it is considered that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'qualifying interests' of this Natura 2000 site.

Table 3-5 shows the relevant qualifying features for SPAs adjacent (within 15Km) of the proposed extensive aquaculture operation in the Slyne Head Peninsula SAC and qualifying features for those SPAs. The relevant QIs are identified and assessed in this table.

Table 3-6 SPA Sites adjacent (within 50Km) to Slyne Head Peninsula SAC and qualifying features

Natura site	Qualifying features (Species code)	Aquaculture AA Screening
Inishbofin, Omey Island and Turbot Island SPA [004231]	Corncrake (*Crex crex*) [A122]	This closest point of this SPA is approx. 6.6km (line of sight distance) from the proposed aquaculture site. Inishbofin, Omey Island and Turbot Island SPA is designated for **Corncrake**. The Corncrake is included on the red list of Birds of conservation concern due to significant declines in the Irish breeding populations; due in a large part to agricultural intensification. It overwinters in Africa and breeds from April to August on a number of coastal islands. In terms of habitat use Corncrake favour dense vegetation such as hay meadows. Proposed and existing aquaculture activities in Slyne Head Peninsula SAC will not negatively impact on Corncrake either directly or indirectly through loss of prey / habitat. It is concluded that there will be no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal

Natura site	Qualifying features (Species code)	Aquaculture AA Screening
		aquaculture on the 'qualifying interest-Corncrake' of this Natura 2000 site.
High Island, Inishshark and Davillaun SPA [004144]	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	High Island, Inishshark and Davillaun SPA is designated for Fulmar (830 pairs) (counts from 2000; NPWS site synopsis), Barnacle Goose (371- counts from 1993-2003) and Arctic Tern (64 pairs - 1995 count). **Fulmar** will all tend to forage at sea rather than in sheltered inshore areas where the existing and proposed aquaculture operations are located. Given the continued increase in the **Barnacle Goose** flock nationally and internationally; it would appear that aquaculture activities are unlikely to negatively impact on Barnacle Geese using the High Island, Inishshark and Davillaun SPA. Due to the proposed scale of operations, distance from High Island, Inishshark and Davillaun (≈15km) and possible influence of structures as fish attracting devices - it is unlikely that the proposed aquaculture operations would have a negative impact on **Arctic Tern** breeding at this SPA. Proposed and existing aquaculture activities in Slyne Head Peninsula SAC will not negatively impact on this SPA special conservation interests either directly or indirectly through loss of prey / habitat or disturbance. It is concluded that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'special conservation interests' of this Natura 2000 site.
Cruagh Island SPA [004170]	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]	Cruagh Island SPA is located at approx. 11.5km from the closest aquaculture operation in Slyne Head Peninsula SAC. Cruagh Island SPA is designated for Barnacle Goose and Manx Shearwater. Given the continued increase in the **Barnacle Goose** flock nationally and internationally; it would appear that aquaculture activities are unlikely to negatively impact on Barnacle Geese using the Cruagh Island SPA. Cruagh Island SPA has an internationally

Natura site	Qualifying features (Species code)	Aquaculture AA Screening
		important population of nesting Manx Shearwater. Colony estimates of 3,286 pairs have been reported (NPWS Site synopsis). They forage at sea during daylight hours and return to the nests at night. It is unlikely they will forage inshore close to the existing and proposed aquaculture operations. Proposed and existing aquaculture activities in Slyne Head Peninsula SAC will not negatively impact on this SPA special conservation interests either directly or indirectly through loss of prey / habitat or disturbance. It is concluded that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'special conservation interests' of this Natura 2000 site.
Illaunnanoon SPA [004221]	Sandwich Tern (*Sterna sandvicensis*) [A191]	The site is of national importance for breeding terns. Aquaculture activities within the Slyne Head Peninsula SAC take place approx. 12.2km from the Illaunnanoon SPA. Sandwich Tern have a mean foraging range of 15km which would place them predominantly in waters west of the aquaculture sites of interest. Overall, due to the proposed scale of activities, distance from the Illaunnanoon breeding colony and the possible influence of structures as fish attracting devices - it is unlikely that the existing and proposed aquaculture sites in Slyne Head Peninsula SAC would have a negative impact on Sandwich Tern breeding at Illaunnanoon SPA directly or indirectly through loss of prey / habitat or disturbance. It is concluded that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'special conservation interests' of this Natura 2000 site.
Connemara Bog Complex SPA [004181]	Cormorant (*Phalacrocorax carbo*) [A017] Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140] Common Gull (*Larus canus*) [A182]	This SPA is approx. 2.9km (line of sight distance) from the closest aquaculture site. This SPA is an important breeding site for the listed special conservation interests. Structures in the intertidal are considered likely to have neutral or positive impacts on the availability of prey resources for **Cormorant** in the areas occupied by the activity. Therefore, existing and proposed

Natura site	Qualifying features (Species code)	Aquaculture AA Screening
		aquaculture operations are not likely to cause any displacement of Cormorant or impact at the population level. The aquatic and subtidal nature of the location of the aquaculture operations are not considered suitable feeding areas for **Merlin**. It is unlikely that aquaculture activities will impact on the breeding populations of **Golden Plover**. These species will feed close to their breeding grounds and are unlikely to forage to the coast from the bog and heath breeding habitats. There is a diverse range of agricultural grassland; freshwater loughs; and sheltered intertidal and subtidal waters offering a diverse array of foraging habitat close to the breeding grounds. Furthermore, recent studies of Irish breeding colonies suggest that during the breeding season terrestrial habitat use and prey items dominate (Kelly et al., 2012). Thus, it is very unlikely that breeding **Common Gull** from the Connemara Bog Complex SPA colonies would be affected by the existing and proposed aquaculture activities. Given the observation above, it is concluded that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'special conservation interests' of this Natura 2000 site.
Slyne Head to Ardmore Point Islands SPA [004159]	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Given the continued increase in the **Barnacle Goose** flock nationally and internationally; it would appear that aquaculture activities are unlikely to negatively impact on Barnacle Geese using the Slyne Head to Ardmore Point Islands SPA. Aquaculture activities within the Slyne Head Peninsula SAC take place approx. 5.3km from the Slyne Head to Ardmore Point Islands SPA. **Sandwich Tern** have a mean foraging range of 5.5km which would place them predominantly in waters south of the aquaculture sites of interest. Overall, due to the proposed scale of activities, distance from the Slyne Head to Ardmore Point Islands SPA and the possible influence of structures as fish attracting devices - it is

Natura site	Qualifying features (Species code)	Aquaculture AA Screening
		unlikely that the existing and proposed aquaculture sites in Slyne Head Peninsula SAC would have a negative impact on Sandwich Tern breeding at Slyne Head to Ardmore Point Islands SPA directly or indirectly through loss of prey / habitat or disturbance. Due to the proposed scale of operations, distance from Slyne Head to Ardmore Point Islands SPA and possible influence of structures as fish attracting devices - it is unlikely that proposed intertidal aquaculture operations would have a negative impact on **Arctic Tern** breeding at this SPA. The available literature[9] indicates that **Little Terns** are relatively tolerant of human disturbance. In addition, tern species are generally very tolerant of human disturbance when foraging. Given the size of the proposed site and its location (among reef habitat) it is unlikely to disturb foraging terns. It is concluded that there is no clear "source–pathway–receptor" interactions and therefore, no likely significant effects posed by the proposed intertidal aquaculture on the 'special conservation interests' of this Natura 2000 site.

3.7 Screening of Potential Effects of Introduction of Non-native Species on Slyne Head Peninsula SAC (site code: 002074) and adjacent Natura sites

The establishment of non-native species as a wild population in an area can be a potential risk associated with aquaculture and can occur due to the moving of stock (seed, juvenile or adults) into aquaculture sites. This may occur if the culture organism[s] become established as a wild, non-native population, or, if non-native species 'hitch-hike' along with the cultured organisms and then become established as a wild population. The primary risk of the proposed activities to the QIs of Slyne Head Peninsula SAC (site code: 002074) is the potential introduction and establishment of the culture organism *Magallana gigas* as a wild, non-native, population.

The environmental conditions in Slyne Head Peninsula SAC (site code: 002074) may be suitable for the settlement and subsequent establishment of *M. gigas*. Their larvae require residency times within a waterbody, to have time to settle (low rates of water circulation and replenishment), on the order of 20 days.

Out of an abundance of caution and because the proposed activities may interact directly with marine habitats within the Slyne Head Peninsula SAC (site code: 002074), the potential for the establishment of wild populations of *M. gigas* cannot be discounted. As a result, the likely significant effect resulting from the culture of the Pacific

[9] Wexford SPA AA report (2016)

oyster, *Magallana gigas*, on the QIs of the SAC cannot be discounted. This risk factor, therefore, should be carried forward for further consideration in a full AA.

3.8 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 extensive aquaculture operation acts in-combination with other (non-aquaculture) 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 extensive shellfish culture activities have been reviewed. Those activities reviewed are:

- DHLGH Foreshore Licencing (https://www.gov.ie/en/foreshore-notices/ - Accessed: 27/07/2023),
- Galway County Council planning (Map Viewer[10] Accessed: 27/07/2023)
- EPA pressures maps (www. https://gis.epa.ie/EPAMaps/Water: Accessed: 27/07/2023)
- Inshore Fishing Maps (Ireland's Marine Atlas - http://atlas.marine.ie/#?c=53.9108:-15.9082:6: Accessed: 27/07/2027)

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 might now be included. It should be noted that in-combination effects on QI between inshore fishing and aquaculture operations will be addressed in the full assessment report. The result of this scan has meant that screening conclusions identified above (and summarised below) are considered valid and the process can progress to the full AA stage.

[10] https://galwaycoco.maps.arcgis.com/apps/webappviewer/index.html?id=3570e45b0e354cf0b740ecbc7505adb2

4 Summary findings of AA Screening of proposed extensive aquaculture activities in Slyne Head Peninsula SAC (Site Code: 002074).

In Slyne Head Peninsula SAC (site code: 002074), extensive oyster culture in the intertidal zone is the only aquaculture activity proposed. Based upon this and the information provided in the aquaculture profiling, the likely interaction between the culture methodologies employed and conservation features (habitats) of the site and other sites and QIs where interactions might occur were considered.

An initial screening exercise resulted in a number of habitat features being excluded from further consideration by virtue of the fact that no spatial overlap or likely interactions (S-P-R) of the culture activities was expected to occur. Table 4-1 presents a summary of the screening outcome for each of the sites representing licenced extensive aquaculture or extensive aquaculture applications. The table identifies the proposed site that has a likely significant effect on QI for a relevant Natura Site (SAC/SPA) that cannot be excluded at this stage of the assessment.

Table 4-1 Summary table of AA screening conclusions by extensive aquaculture sites.

(N– No significant effect, P – Likely significant effect cannot be excluded)

Site No.	Status	Activity/Species	Habitat (QI)	Species (QI)	Non-native species
T09-522A	Application	Pacific Oyster	P	N	P
T09-417A	Licensed	Pacific Oyster	P	N	P
T09-417B	Licensed	Pacific Oyster	P	N	P
T09-417C	Licensed	Pacific Oyster	P	N	P
T09-517A	Licensed	Pacific Oyster	P	N	P

Those Habitat QIs carried forward for additional consideration are:

- Annex I Habitat 1160 - Large shallow inlets and bays
- Annex I Habitat 1170 – Reefs

No Qualifying Interest species are considered likely to interact with the proposed extensive aquaculture in the intertidal zone, such that significant effects could not be discounted.

The risk of naturalisation posed by the culture of the non-native species, the Pacific oyster (*Magallana gigas*), cannot be discounted and should be considered further in a full AA.

There are no likely non-aquaculture activities in the area that may act in-combination with the proposed aquaculture activity such that QIs screened out, may now screen in on foot of synergistic effects.

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