Natura Impact Statement of
Extensive Aquaculture operations in
Valentia Harbour/Portmagee Channel SAC, Co. Kerry

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1 Introduction

1.1 Overview of this document

This is a report supporting the Appropriate Assessment of extensive aquaculture operations in Valentia Harbour/Portmagee Channel SAC. It details the Natura Impact Statement and subsequent appropriate assessment and follows from a Screening exercise carried out and reported in Marine Institute (2023a).

This report is to consider if the proposed activities are likely to adversely affect the Qualifying Interests (QIs) of Natura 2000 sites in view of their Conservation Objectives (COs), and any adjacent sites, individually or in combination with existing or planned activities. This is achieved following the assessment process outlined in this document. If there is potential for the activities considered to likely, significantly affect QIs and their conservation features, they are carried forward for a Stage 2 Appropriate Assessment, which considers the impacts on the integrity of the Natura site with respect to the sites conservation objectives, and is considered on a cumulative basis with other activities and other potentially disturbing activities.

1.2 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 in Ireland form part of the Natura 2000 European network of protected sites. 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 and habitats of bird species protected under the Birds Directive, EC 79/409/EEC[4]. The National Parks and Wildlife Service (NPWS) are the competent authority for the management of Natura 2000 sites in Ireland.

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

[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

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 NPWS.

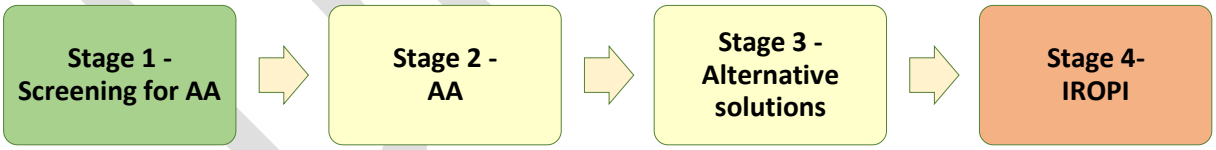
DAFM has responsibility for foreshore licensing functions in respect of activities wholly or primarily for the use, development or support of aquaculture under the 1933 Foreshore Act, as amended. DAFM is also the aquaculture licensing authority under the Fisheries (Amendment) Act (1997)[5] and determines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

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 [6].

The *Guidance on Appropriate Assessment of Plans and Projects in Ireland* document[7] published by the Department of Environment, Heritage and Local Government 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:



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. The triggers for

[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

appropriate assessment screening are based on a '*likelihood*' (read as '*possibility*') of a potential significant effect occurring and not on certainty. This test is based on the precautionary principle[9]. The greatest level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no effect.

1.3.2 Stage 2: Appropriate Assessment

This stage considers whether the plan or project, alone or in combination with other projects or plans, will adversely affect 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 the then determined. If significant 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 and adverse effects on the integrity of the Natura Site cannot be dismissed, then recommendations on mitigation measures or on licensing decisions will be made.

1.4 Structure of Report

This report provides:

1. **Introduction -** an outline of the legislative context and the processes.
2. **Proposed project Background -** providing details of the activity proposed.
3. **Summary of Stage I Appropriate Assessment (Screening)**
4. **Stage II Appropriate Assessment (Natura Impact Statement)** - details the assessment of impacts on relevant Natura sites.
5. **Conclusions** – summary of the findings of the screening and assessment process.

1.5 Data sources

This process and report rely on data and information from a broad and diverse range of 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

[9] OPR - Office of Planning Regulator (2021). Appropriate Assessment Screening for Development Management. March 2021. 43pp Link

- 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
- 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)
- 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 Link
- 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

1.6 Assumptions made for Appropriate Assessment Reports

Certain assumptions are made for this assessment 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.
- All aquaculture applications which were submitted prior to those being considered here, but may still pending decisions (e.g., appealed to Aquaculture Licence Appeals Board- ALAB), 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 will be operational to the maximum extent possible.
- Where multiple species might be proposed to be cultured at a site, the assessment assumes that the species most likely to result in the greatest likely ecological effects on the surrounding environment will be the culture species considered. Furthermore, it will be assessed on the basis that it is cultured throughout the entire area of the proposed site. This ensures that the report considers the highest potential impact in relation to the prospective culture species interaction with the surrounding environment.

Other assumptions may be identified on a case-by-case basis and clearly communicated in the report.

2 Overview of Existing and Proposed Aquaculture Activities in the Valentia Harbour/Portmagee Channel SAC

This document assesses the potential effects of proposed extensive aquaculture activities in combination with existing aquaculture activities on those Qualifying Interests (QIs) of the Valentia Harbour/Portmagee Channel SAC [002262], 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.

The aim of this report is to consider if the proposed aquaculture activities are likely to result in an adverse effect on the integrity 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 effect 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 the proposed and existing extensive aquaculture activities and the Conservation Objectives (COs) of the Valentia Harbour/Portmagee Channel SAC [002262], among others.

Currently within the Valentia Harbour/Portmagee Channel SAC [002262] there are 13 sites at different stages within the licencing process (Table 2-1 and Figure 2-1). There are 2 additional sites (T06- 416A and T06-518A) that lie outside the boundaries of the SAC but are within the Valentia Harbour system (i.e., Ferta River Estuary):

- 5 Licensed sites:
    - 5 intertidal shellfish sites for culture of Pacific oysters (T06-366A, T06-374A, T06-416A, T06-389A and T06-365A)
- 10 Applications sites:
    - 10 sites for intertidal shellfish culture of Pacific oysters (T06-503A, T06-461A, T06-514A, T06-502A, T06-515A, T06-521A, T06-517A, T06-509A, T06-450A, T06-518A)

Table 2-1 Licenced aquaculture and applications for aquaculture activities considered in this report.

Site No.	Status	Activity/Species	Total Area (ha.)	Occurring with Site 002262
T06-366A	Licensed	Pacific Oyster	6.0	Yes
T06-374A	Licensed	Pacific Oyster	7.64	Yes
T06-416A*	Licensed	Pacific Oyster	1.56	No
T06-389A	Licensed	Pacific Oyster	5.59	Yes
T06-365A	Licensed	Pacific Oyster	5.65	Yes
T06-503A	Application	Pacific Oyster	4.55	Yes
T06-461A	Application	Pacific Oyster	9.64	Yes
T06-514A	Application	Pacific Oyster	4.93	Yes
T06-502A	Application	Pacific Oyster	4.77	Yes
T06-515A	Application	Pacific Oyster	1.0	Yes
T06-521A	Application	Pacific Oyster	2.28	Yes
T06-517A	Application	Pacific Oyster	10.37	Yes
T06-509A	Application	Pacific Oyster	12.1	Yes
T06-450A	Application	Pacific Oyster	8.47	Yes
T06-518A*	Application	Pacific Oyster	3.52	No

* *These sites are not within the SAC but within the Valentia River system.*

Existing and proposed aquaculture sites are presented in Figure 2-1.

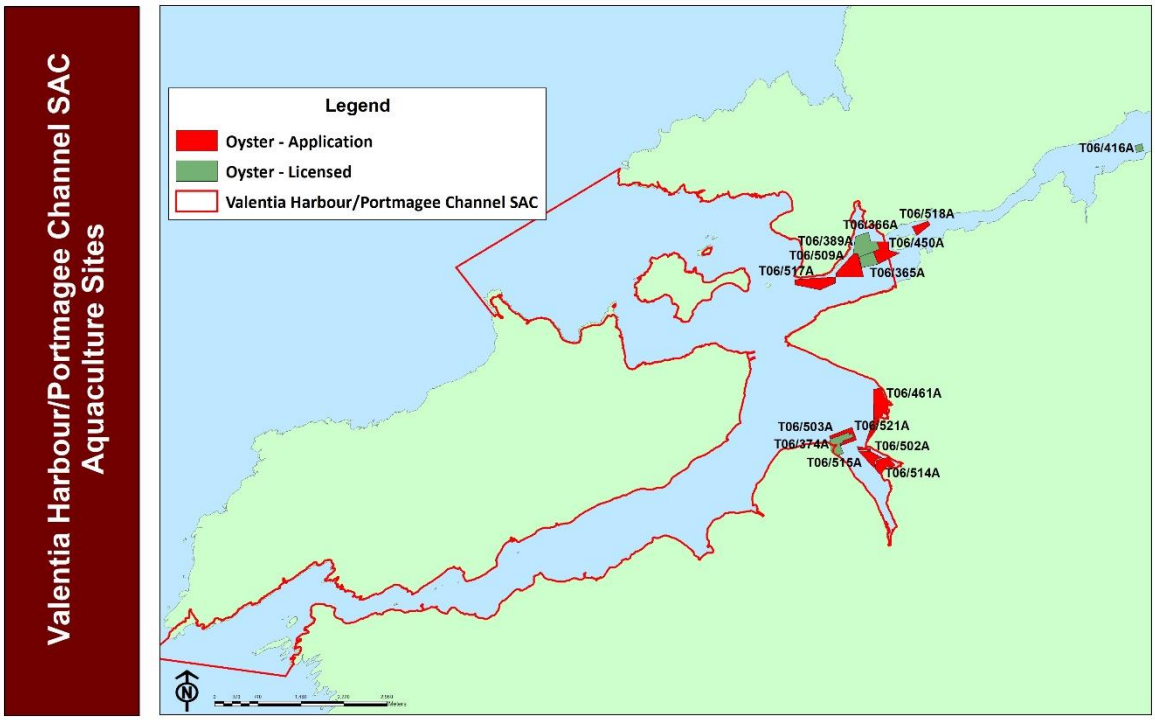


Figure 2-1 Existing and proposed aquaculture sites (Licenced and Applications) in Valentia Harbour/Portmagee Channel SAC (and surrounds).

2.1.1 Extensive Oyster Culture

Oyster farming in Valentia takes place in the intertidal zone using, for the most part, the standard bag and trestle culture method as employed across Europe and the world. Cultivation of the Pacific oyster (*Magallana gigas*) is carried out by growing oysters in mesh bags placed on steel trestles (raised from 0.5m to 1m above the seafloor) to keep them elevated above the seabed. At one licenced site (T06-366A) and three application sites (T06-450A, T06-509A and T06-389), a multi-layered bag system is in current use or proposed, respectively. This system layers bags of oysters (up to 6) on top of each other in a metal frame. The clearance beneath is small, sufficient for a forklift to access.

Oysters are not artificially fed nor do they receive any medicinal treatments. They are filter feeders relying completely on the natural environment for food, and consume phytoplankton when submerged during high tide periods. Water quality conditions are considered important for successful shellfish culture.

Currently Valentia Harbour is used for the production of half-grown oysters which are harvested at this size and finished in other bays both in Ireland and in France, with some sites having the option to produce full grown oysters. The production cycle begins in Valentia when triploid G6 seed is introduced from the hatchery, which may be from Ireland, France, UK, or Gurnsey. Production takes 18-24 months on site. Upon receipt from the hatchery, seed is placed in the mesh plastic bags with mesh size and stocking density appropriate to the seed grade. As the oysters grow stocking densities are reduced. Bag sizes used on site are 2mm to 9mm. Grading takes place annually between October and April. Grading and harvesting activities entails actually removing the bags from the inter-tidal zone to a land based site. They are collected by hand, loaded onto trailers and transported by tractor.

Maintenance activities on-site include shaking and turning of bags, which are shaken and turned on site. Tractor movements in this instance are for the transport of staff to and from site.

Harvesting occurs between September and June and involves hand placing of the bags on tractor and trailer to be brought ashore.

2.1.2 Access Routes

There are a number of access routes for the operators in the area to the applied licensed sites. For the sites in the northern portion of the SAC, frequency of site access is every day by tractor along the margin of upper shore and land from Ballycarbery Castle to the site. These habitats are typically hard packed sand. Other oyster culture sites have direct access from land with little or no access along the shore outside of licenced areas. Access to sites the Derreen River is along the shore or directly from land. It is proposed that, two sites (T06-461A, T06-521A) will be accessed by boat only from a launch point near the mouth of the Derreen River.

Calculation of area of the access routes 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 3.07ha (

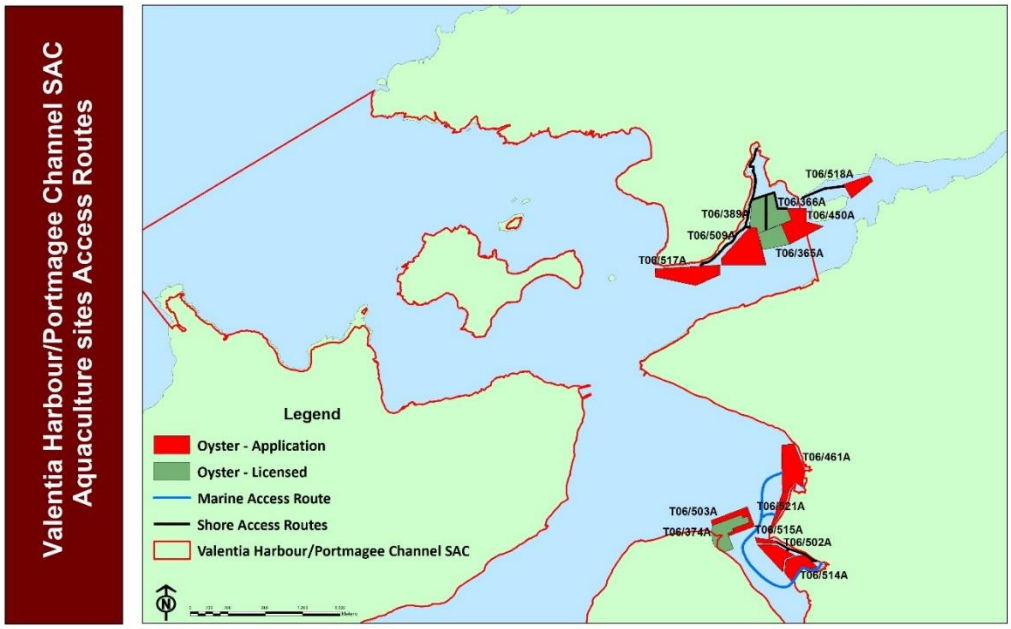


Figure 2-2).

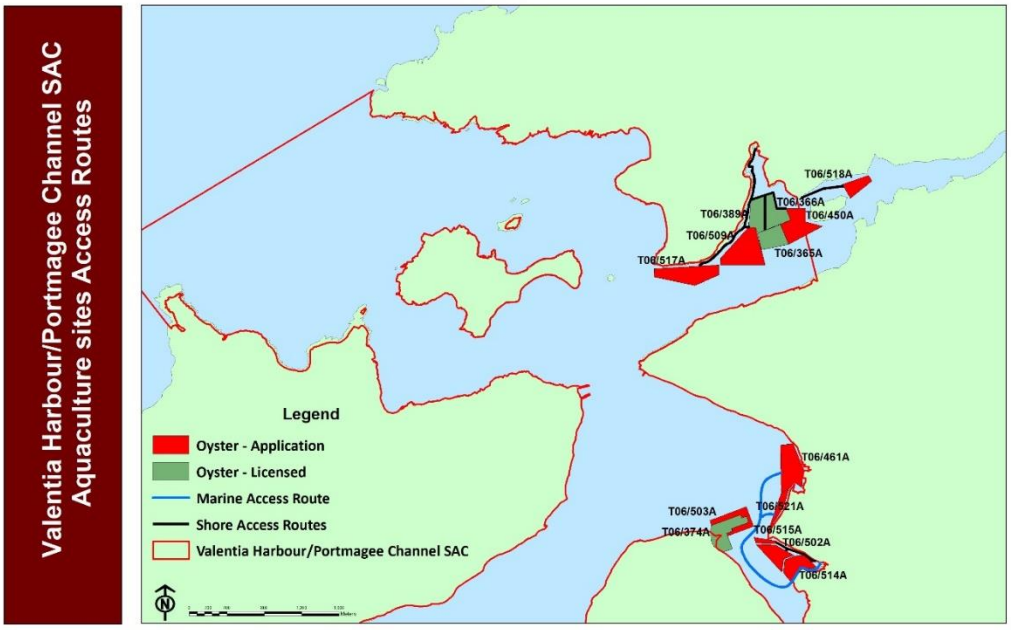


Figure 2-2 Existing and proposed access routes to the existing and proposed shellfish culture sites within the Valentia Harbour/Portmagee Channel SAC.

3 Appropriate Assessment - Screening Summary

The Stage 1 AA Screening has been undertaken by the Marine Institute and is detailed in the *Report supporting Appropriate Assessment Screening of Extensive Aquaculture in Valentia Harbour/Portmagee Channel SAC (Site Code: 2262)*, dated September 2023. This report documented the Stage 1 screening process of the Appropriate Assessment of the proposed activities as specified under the Habitat Directive (European Community (EC) Directive 92/43/EEC).

The proposed aquaculture activities are found within the Valentia Harbour/Portmagee Channel SAC and are also considered adjacent to 2 SACs (within 15km) and 13 SPAs (within 50km).

Based on the location, nature and zone of impact of potential effects, and the best scientific information available, this screening assessment has identified QIs or associated conservation features in the Natura sites that the proposed activities will spatially overlap with for which likely significant effects cannot be discounted.

On the basis that likely significant effects (i.e. spatial overlap, see Table 3-1) of the proposed activity on the European sites cannot be ruled out, it was recommended the following QIs (Figure 3-1) be brought forward for Stage 2 Appropriate Assessment:

- Annex I Habitat 1140 - Mudflats and sandflats not covered by seawater at low tide
- Annex I Habitat 1160 - Large shallow inlets and bays
- Annex I Habitat 1170 – Reefs

It was also concluded that no animal (e.g., bird, mammal or fish) species are likely to interact with the existing and proposed intertidal cultures, such that significant effects could not be discounted.

Finally, the risk of naturalisation posed by the culture of the Non-native species, the Pacific oyster (*Magallana gigas*) should be considered further in a full AA.

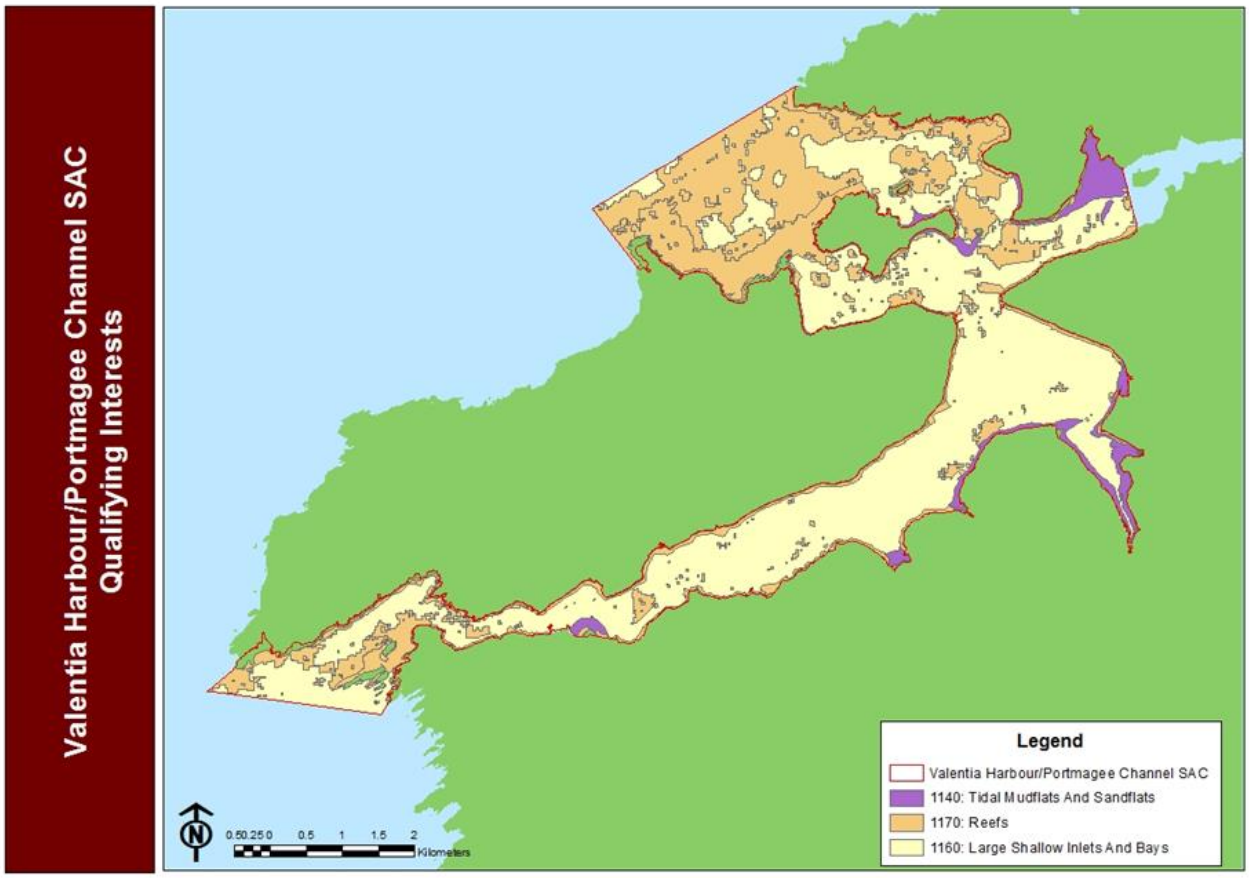
Table 3-1 Spatial extent of aquaculture activities overlapping with the qualifying interests (QI) 1140-Mudflats and sandflats not covered by seawater at low tide, 1160-Large shallow inlets and bays and 1170-Reefs in Valentia Harbour/Portmagee Channel SAC, presented according to culture species, license status and tidal zone location.

Site ID	Species	Status	Location	1140 - Mudflats and sandflats not covered by seawater at low tide - 123 ha		1160 - Large shallow inlets and Bays - 2629 ha		1170 – Reefs - 953 ha	
				Area (ha)	% QI	Area (ha)	% QI	Area (ha)	% QI
T06-366A	Oyster	Licensed	Intertidal	6.00	4.88	6.00	0.23		
T06-374A	Oyster	Licensed	Intertidal	4.58	3.72	7.64	0.29		
T06-416A*	Oyster	Licensed	Intertidal	0	0	0	0	0	0
T06-389A	Oyster	Licensed	Intertidal	5.59	4.54	5.59	0.21		
T06-365A	Oyster	Licensed	Intertidal	2.63	2.14	5.65	0.21		
T06-503A	Oyster	Application	Intertidal	0.46	0.37	4.55	0.17	0.11	0.01
T06-461A	Oyster	Application	Intertidal	3.48	2.83	9.64	0.37	0.38	0.04
T06-514A	Oyster	Application	Intertidal	4.89	3.98	4.93	0.19		0.00

Site ID	Species	Status	Location	1140 - Mudflats and sandflats not covered by seawater at low tide - 123 ha		1160 - Large shallow inlets and Bays - 2629 ha		1170 – Reefs - 953 ha	
T06-502A	Oyster	Application	Intertidal	0.74	0.60	4.77	0.18		0.00
T06-515A	Oyster	Application	Intertidal	0.73	0.59	1.00	0.04	0.14	0.01
T06-521A	Oyster	Application	Intertidal	0.96	0.78	2.28	0.09	0.41	0.04
T06-517A	Oyster	Application	Intertidal	0.30	0.24	10.40	0.40	2.13	0.22
T06-509A	Oyster	Application	Intertidal	4.29	3.49	12.10	0.46	0.22	0.02
T06-450A	Oyster	Application	Intertidal	4.43	3.60	6.60	0.25	0.34	0.04
T06-518A*	Oyster	Application	Intertidal	0	0	0	0	0	0
Access Routes				2.64	2.15	3.07	0.12	0.43	0.05

* *These sites are not within the SAC.*

Figure 3-1 The extent of Valentia Harbour/Portmagee Channel SAC (site code 002262) with constituent qualifying interests (QI).



4 Appropriate Assessment - Natura Impact Statement

This NIS has been prepared as it was not possible at the Screening for AA stage to rule out, as a matter of scientific certainty, that the proposed projects will not have a likely significant effect on Natura sites. It will examine and analyse, in light of the best scientific knowledge, how the proposed operations could impact on the Qualifying Features of Natura sites and whether the predicted impacts would adversely affect the integrity of protected sites.

The potential ecological effects of activities on the CO for the site relate to the physical and biological effects of structures and human activities on designated species, intertidal and sub-tidal habitats and invertebrate communities, and biotopes within those broad habitat types. The overall effect on the conservation status will depend on the spatial and temporal extent of activities during the lifetime of the proposed plan and the nature of each of these activities in conjunction with the sensitivity of the receiving environment.

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

- Annex I Habitat 1140 - Mudflats and sandflats not covered by seawater at low tide
- Annex I Habitat 1160 - Large shallow inlets and bays
- Annex I Habitat 1170 – Reefs

4.1 Impact statement of proposed activities

Within the Valentia Harbour/Portmagee Channel SAC, the species cultured are:

- Pacific oyster, (*Magallana gigas*) confined to intertidal areas.

The potential impacts of these culture practices are communicated below and are derived from published primary literature and review documents that have specifically focused upon the environmental interactions of mariculture and pressures deriving from these activities (e.g. Black 2001; McKindsey et al. 2007; NRC 2010; O'Beirn et al 2012; Cranford et al 2012; Wilding 2012; Wilding and Nickell 2013; ABPMer 2013a-h; Gallardi 2014; Forde et al., 2015; O'Carroll et al., 2016; Callier et al., 2017).

Filter feeding organisms, for the most part, feed at the lowest trophic level, usually relying primarily on ingestion of phytoplankton. The process is extractive in that it does not rely on the input of feedstuffs in order to produce growth. Suspension feeding bivalves such as oysters and mussels can modify their filtration to account for increasing loads of suspended matter in the water and can increase the production of faeces and pseudofaeces (non-ingested material) which result in the transfer of both organic and inorganic particles to the seafloor. This process is a component of benthic-pelagic coupling. The degree of deposition and accumulation of biologically derived material on the seafloor is a function of a number of factors discussed below.

Suspended culture, may result in faecal and pseudo-faecal material falling to the seabed. In addition, the loss of culture species to the seabed is also a possibility. The degree to which the material disperses away from the location of the culture system (longlines or trestles) depends on the density of culture stock above the seafloor, the depth of water, and the current regime in the vicinity. Cumulative

impacts on the seabed, especially in areas where dispersion of pseudofaeces is low, may occur over time. A number of features of the site and culture practices will govern the speed at which pseudofaeces are assimilated or dispersed by the site. These relate to:

- Hydrography - will govern how quickly the wastes disperse from the culture location and the density at which they will accumulate on the seafloor.
- Turbidity in the water - the higher the turbidity the greater the production of faeces and pseudo-faeces by the filter feeding animal and the greater the risk of accumulation on the seafloor.
- Density of culture - suspended mussel culture is considered a dense culture method with high densities of culture organisms over a small area. The greater the density of organisms the greater the risk of accumulations of material. The density of culture organisms is a function of:
    - Clearance between bottom of culture systems and seafloor. The culture systems located very close to the seabed will result in greater impact as a result of accumulation of organic matter, impeded water flow likely resulting in hypoxia and impact on biota.
    - the husbandry practices - appropriate maintenance will ensure optimum densities in the culture bags in order to maximise growth rates.
    - Thinning practices such that loss of culture animals to the seafloor is negated.

Pacific oyster is typically cultured in the intertidal zone using a combination of plastic mesh bags and trestles. Their specific location in the intertidal is dependent upon the level of exposure of the site, the stage of culture and the accessibility of the site. Any habitat impact from oyster trestle culture is typically localised to areas directly beneath the culture systems. The physical presence of the trestles and bags may reduce water flow and allowing suspended material (silt, clay as well as faeces and pseudo-faeces) to fall out of suspension to the seafloor. The build-up of material will typically occur directly beneath the trestle structures and can result in accumulation of fine, organically rich sediments. These sediments may result in the development of infaunal communities distinct from the surrounding areas. Whether material accumulates beneath oyster trestles is dictated by a number of factors, including:

- Hydrography – low current speeds (or small tidal range) may result in material being deposited directly beneath the trestles. Under normal circumstances, i.e. where trestles are held 0.5-1m above the seafloor and where tidal height is high resulting in large volumes of water moving through the culture area an acceleration of water flow can occur beneath the trestles and bags, resulting in a scouring effect or erosion and little to no accumulation of material. However, culture systems that are located very close to the seabed will result in impeded water flow and thus, greater impact as a result of accumulation of organic matter all of which will likely result in hypoxia and impact on biota. Structures held close together will also likely impede water flow through the site. Any hindrance in water flow can also impact oyster production levels as well as benthic communities.
- Turbidity of water – oysters have very plastic response to increasing suspended matter in the water column with a consequent increase in faecal or pseudo-faecal production. As euryhaline species, oysters can be cultured in estuarine areas (given their tolerance to a wide salinity ranges) and as a consequence can be exposed to elevated levels of suspended matter. If

currents in the vicinity are generally low, elevated suspended matter can result in an increase build-up of material beneath culture structures.

- Density of culture – the density of oysters in a bag and consequently the density of bags on a trestle will increase the likelihood of accumulation on the seafloor. In addition, if the trestles are located in close proximity a greater dampening effect can be realised with resultant accumulations. Close proximity may also result in impact on shellfish performance due to competitive interactions for food.
- Exposure of sites - the degree to which the aquaculture sites are exposed to prevailing weather conditions will also dictate the level of accumulated organic material in the area. As fronts move through culture areas increased wave action will re-suspend and disperse material away from the trestles, this is particularly relevant in intertidal areas.
- Other husbandry related aspects that may impact on habitats are, periodic thinning which may result in the loss of culture animals to the seafloor.

The trestles and bags used for intertidal shellfish culture, if held relatively close to the seabed may limit light penetration to the sea bed and may therefore present a risk to production of photosynthesising species (Jernakoff 2001; Eyres 2005). This is likely important for biogenic habitats e.g. Maërl and seagrasses, which need sun light for production.

Activities associated with the culture of intertidal shellfish include the travel to and from the culture sites and within the culture sites using tractors and trailers as well as the activities of workers within the site boundaries. Physical disturbance associated with compaction of sediments as a result of persistent vehicular traffic, to and from oyster trestle culture sites, have resulted in biological impact (Forde et al 2015).

One aspect to consider in relation to the culture of shellfish is the potential risk of non-native species arriving into an area among consignments of seed or stock sourced from outside of the area under consideration or as a consequence of the stock itself reproducing. When the seed is sourced locally (e.g. mussel culture) the risk is likely zero. When seed is sourced at a small size from hatcheries in Ireland the risk is also small. When seed is sourced from hatcheries outside of Ireland (this represents the majority of cases particularly for oyster culture operations) the risk is also considered small, especially if the nursery phase has been short. When ½-grown stock (oysters and mussels) is introduced from another area (e.g. France, UK) the risk of introducing non-native species (hitchhikers) is considered greater given that the stock will have been grown in the wild (open water) for a prolonged period (i.e. ½-grown stock). Furthermore, the culture of a non-native species (e.g. the Pacific Oyster - *Magallana gigas*) may also present a risk of establishment of this species in the SAC. Recruitment of *M. gigas* has been documented in a number of Bays in Ireland and appears to have become naturalised (i.e. establishment of a breeding population) in two locations (Kochmann et al 2012; 2013) and may compete with the native species for space and food. To date, no settlement of Pacific oysters has been reported in Valentia Harbour/Portmagee Channel SAC (F.O'Beirn, Marine Institute - personal observation).

5 Appropriate Assessment - Overview of Habitat Impact Assessment Method

The significance of adverse effects is determined on the basis of scientific studies on likely impacts of proposed activities on conservation features allied with Conservation Objective guidance for constituent community types of 1140, 1160 and 1170 and Annex II species in NPWS guidance documents. The guidance is scaled relative to the anticipated sensitivity of habitats and species to disturbance by activities. Some activities are deemed to be wholly inconsistent with long term maintenance of certain habitats while other habitats can tolerate a range of activities. For the practical purpose of management of seabed habitats other than sensitive habitats, (e.g. Maërl-dominated communities), a 15% threshold of overlap between disturbing activities and both the QI and community types is established in the NPWS guidance (NPWS. 2012c). Below this threshold, disturbance is deemed to be non-significant.

Disturbance, in this instance, is defined as that which leads to a change in the characterising species of the habitat or marine community type. In the case of shellfish culture the changes are most likely as a result of organic enrichment from faeces and/or compaction as a result of transport vehicles across intertidal habitats. Such disturbance may be temporary or permanent, in the sense that change in characterising species may recover to a pre-disturbed state or may persist. The degree of change is likely a function of the sensitivity of the receiving environment to organic loading, which in turn may be influenced by hydrodynamic conditions in addition to the density of the organisms in culture at the site. The rationale adopted to apply this threshold is that, while there may be persistent disturbance as a result of an activity (e.g. organic loading) which may result in a response/change to the structure of the marine community type, it is expected, however, that (some level of) function will be retained. Function is considered the process whereby the animals living on and in the seafloor, by virtue of their activities, influence benthic dynamics (reflective of) related to system health (Bolam et al 2002; Solam et al 2004). Such activities or traits are considered in relation to, among others, the organisms feeding type (e.g., scavenger, filter, deposit feeders), mobility, body size, ability to bioturbate (i.e. introduce oxygen into the sediment). All such traits can result in the removal or conversion of organic matter to biomass (i.e. secondary production). However, by virtue of the fact that the composite species may change, the result is considered a disturbance. The confidence around the measure of spatial overlap is considered high because much published literature and monitoring outputs identifies that the effect of shellfish and finfish culture is, for the most part, confined to the footprint of the activity in question (cage or longline).

No activity is likely to be allowed or result in the total exclusion or extirpation of a marine community type within the SAC. In addition, habitats and species that are key contributors to biodiversity and which are sensitive to disturbance should be afforded a high degree of protection i.e. thresholds for impact on these habitats is low and any significant anthropogenic disturbance should be avoided. In Valentia Harbour/Portmagee Channel SAC there are four such community types found within the feature Large shallow inlets and Bays (1160). These sensitive habitats include:

1. *Zostera*-dominated community
2. Maërl-dominated community / Zostera-dominated community
3. Maërl-dominated community
4. *Edwardsia delapiae* associated community

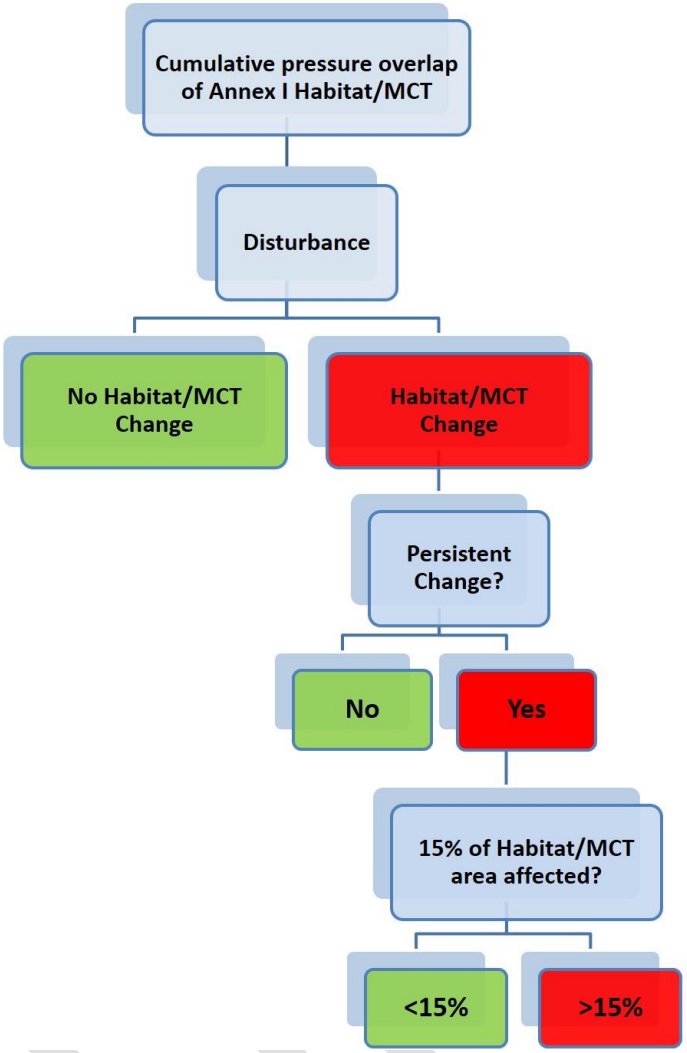
5.1.1 Determining Significance

A schematic outlining the determination of significant effects on marine habitats and marine community types is presented in **Figure 5-1**. For the Annex I habitats and their constituent community types, potential effects are identified in relation to, first and foremost, spatial overlap. Subsequent disturbance and the persistence of disturbance are considered as follows:

1. The degree to which the activity will disturb the Annex I habitat – as indicated above, disturbance is meant as a change in the characterising species, as listed in the Conservation Objective guidance of the constituent marine community types. The likelihood of change depends on the sensitivity of the characterising species to the activities in question. Sensitivity results from a combination of intolerance to the activity and/ or recoverability from the effects of the activity.
2. The persistence of the disturbance in relation to the intolerance of the community - If the activities are persistent (high frequency, high intensity) and the receiving community has a high intolerance to the activity (i.e., the characterising species of the communities are sensitive and consequently impacted) then such communities could be said to be persistently disturbed.
3. It is expected that in spite of the potential change in characterising species that certain functions are retained by the benthic communities, such that effects deriving from the aquaculture activities are alleviated.
4. In the event that disturbance is greater than 15% of the defined area of Habitat QI or Marine Community Type, it is deemed to be significant.

For the assessment, the 15% threshold detailed in Point 4 above applies to the habitats or constituent community types that are overlapped by likely disturbing aquaculture activities considered in-combination with all other likely disturbing activities (e.g. fisheries, dredging).

Figure 5-1: Schematic outlining the determination of likely significant effects on habitats and marine community types (MCT) (following NPWS 2012b). MCT- Marine Community Type.



5.1.2 Sensitivity and Assessment Rationale

This assessment used a number of sources of information in assessing the sensitivity of the characterising species of the community types recorded within the QIs 1140, 1160 and 1170.

One source of information is a series of reviews commissioned by the Marine Institute which identify habitat and species sensitivity to a range of pressures that are likely to result from aquaculture and fishery activities (ABPMer, 2013a – h). These reviews draw from the broader literature, including the MarLIN Sensitivity Assessment (Marlin.ac.uk) and the AMBI Sensitivity Scale (Borja et al., 2000; 2009) and other primary literature. Subsequent literature and reports have also provided more recent sources of information on likely interactions including, MarESA (Tyler-Walters et al 2018; 2022).

It must be noted that the NPWS have acknowledged that given the wide range of community types that can be found in marine environments, the application of conservation targets to these would be difficult. On this basis, they have proposed broad community complexes as management units. These

complexes (for the most part) are very broad in their description and do not have clear surrogates which might have been considered in targeted studies and thus reported in the scientific literature. On this basis, the confidence assigned to likely interactions of the community types with anthropogenic activities are, by necessity, relatively low, with the exception of community types dominated by sensitive taxa, e.g. maërl and *Zostera sp*. Directed research investigating the effect of aquaculture on the benthic environment does provide a greater degree of confidence in conclusions; for example, the output of Forde et al. (2015) and O'Carroll et al (2016) has provided greater confidence in terms of assessing likely interactions between intertidal oyster culture and marine habitats. Similarly, Wilding et al (2013) and Wilding et al (2012) provide greater confidence in benthic assessments for mussel and finfish farming.

Furthermore, the sensitivity of a species to a given pressure is the product of the intolerance (the susceptibility of the species to damage, or death, from an external factor) of the species to the particular pressure and the time taken for its subsequent recovery (recoverability is the ability to return to a state close to that which existed before the activity or event caused change). Life history and biological traits are important determinants of sensitivity of species to pressures from aquaculture.

In the case of species, habitats, and communities the separate components of sensitivity (intolerance, recoverability) are relevant to the persistence of the pressure:

- For persistent pressures (i.e. activities that occur frequently and throughout the year) recovery capacity may be of little relevance except for species/ habitats that may have extremely rapid (days/weeks) recovery capacity or whose populations can reproduce and recruit in balance with population damage caused by aquaculture. In all but these cases, and if sensitivity is moderate or high, then the species/ habitats may be negatively affected and will exist in a modified state. Such interactions between aquaculture and species/ habitat/ community represent persistent disturbance.
- In the case of episodic pressures (i.e. activities that are seasonal or discrete in time) both the intolerance and recovery components of sensitivity are relevant. If sensitivity is high but recoverability is also high relative to the frequency of application of the pressure, then the species/ habitat/ community will be in favourable conservation status (FCS) for at least a proportion of time.

The sensitivities of the community types (or surrogates) found within the Valentia Harbour/Portmagee Channel SAC to pressures similar to those caused by aquaculture (e.g. smothering, organic enrichment and physical disturbance) are identified Table 5-1. The sensitivities of species which are characteristic (as listed in the Conservation Objective supporting document) of benthic communities to pressures similar to those caused by aquaculture (e.g. smothering, organic enrichment and physical disturbance) are identified, where available, from the literature (ABPMer, 2013a – h; Tyler-Walters et al 2018; 2022). The following guidelines broadly underpin the analysis and conclusions of the species and habitat sensitivity assessment:

- Sensitivity of certain taxonomic groups such as emergent sessile epifauna to physical pressures is expected to be generally high or moderate because of their form and structure (Roberts et al., 2010). Sensitivity is also expected to be high for species with large bodies and with fragile shells/ structures, but low for those with smaller body size. Body size (Bergman and van Santbrink, 2000) and fragility are regarded as indicative of a

high intolerance to physical abrasion caused by fishing gears (i.e. dredges). However, even species with a high intolerance may not be sensitive to the disturbance if their recovery is rapid once the pressure has ceased.

- Recoverability of species depends on biological traits (Tillin et al., 2006) such as reproductive capacity, recruitment rates and generation times. Species with high reproductive capacity, short generation times, and high mobility or dispersal capacity may maintain their populations even when faced with persistent pressures; but such environments may become dominated by these (r-selected) species. Slow recovery is correlated with slow growth rates, low fecundity, low and/or irregular recruitment, limited dispersal capacity and long generation times. Recoverability, as listed by MarLIN, assumes that the impacting factor has been removed or stopped and the habitat returned to a state capable of supporting the species or community in question. The recovery process is complex and therefore the recovery of one species does not signify that the associated biomass and functioning of the full ecosystem has recovered (Anand and Desrocher, 2004; cited in Hall et al., 2008).

	Pressure Type																			
Community Type (EUNIS Code)	Surface Disturbance	Shallow Disturbance	Deep Disturbance	Trampling-Access by foot	Trampling-Access by vehicle	Siltation (addition of fine sediments, pseudofaeces, fish food)	Smothering (addition of materials biological or non-biological to the surface)	Changes to sediment composition- increased coarseness	Prevention of light reaching seabed/features	Changes to sediment composition- increased fine sediment proportion	Changes to water flow	Increase in turbidity/suspended sediment	Decrease in turbidity/suspended sediment	Organic enrichment-water column	Organic enrichment of sediments-sedimentation	Increased removal of primary production-phytoplankton	Decrease in oxygen levels- sediment	Decrease in oxygen levels-water column	Introduction of non-native species	Introduction of hydrocarbons
Mixed sediment with *Chaetozone gibber* community complex (A2.42)	NS (*)	L (*)	L (*)	NS (*)	L (*)	L-M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	L (*)	L (*)	H (*)	L (*)
Mixed sediment with *Chaetozone gibber* community complex (A5.44)	NS (*)	L (*)	L (*)	NE	NE	L-M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	H (*)	L (*)
Intertidal sand with nematodes and polychaetes community complex (A2.23)	NS (*)	L (*)	L (*)	NS (*)	L-NS (*)	L-M (*)	L-M (*)	L-M (*)	NS (*)	M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	L-NS (*)	L-NS (*)	NS (***)	L (*)
Medium to fine sand with *Nephtys cirrosa* and *Spiophanes bombyx* community complex (A2.23)	NS (*)	L (*)	L (*)	NS (*)	L-NS (*)	L-M (*)	L-M (*)	L-M (*)	NS (*)	M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	L-NS (*)	L-NS (*)	NS (***)	L (*)
Fucus-dominated intertidal reef community complex (A1.21)	NS (*)	NA	NA	NS (*)	NE	NS (*)	M-VH (*)	NA	NS (*)	NA	NS (*)	NS (*)	NS (*)	NS (*)	NE	NS (*)	NE	NS (*)	NS (*)	NS (*)
Laminaria-dominated community (A3.22)	NS (*)	NA	NA	NE	NE	NS (*)	M-VH (*)	NA	NS (*)	NA	NS (*)	NS (*)	NS (*)	NS (*)	NE	NS (*)	NE	NS (*)	NS (*)	NS (*)
Sandy mud to mixed sediment with Melinna palmata community complex (A5.33)	NS (*)	L (*)	L (*)	NE	NE	L (*)	L-M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	L (*)	NS (*)	L (*)	L (*)	H (*)	L (*)

Table 5-1 Matrix showing the characterising habitats sensitivity scores x pressure categories for habitats in Valentia Harbour/Portmagee Channel SAC (ABPMer 2013a-h). Table 5-2 provides the code for the various categorisation of sensitivity and confidence

Table 5-2 Codes of sensitivity and confidence applying to species and pressure interactions presented in Table 5-1.

Species x Pressure Interaction Codes for Table 5-1	
NA	Not Assessed
Nev	No Evidence
NE	Not Exposed
NS	Not Sensitive
L	Low
M	Medium
H	High
VH	Very High
*	Low confidence
**	Medium confidence
***	High Confidence

6 Assessment

Aquaculture pressures on a given habitat are related to its vulnerability (spatial overlap or exposure of the habitat to the equipment/culture organism combined with the sensitivity of the habitat) to the pressures induced by culture activities. To this end, the location and orientation of structures, 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 habitats and species. The significance of the possible effects of the proposed activities on habitats, as outlined in the Natura Impact statement (Section 4) and habitat impact assessment method (Section 5), is determined here in the assessment. The significance of effects is determined on the basis of Conservation Objective guidance for constituent habitats and species (NPWS 2012b, c).

Within the Valentia Harbour/Portmagee Channel SAC the qualifying interests carried further, from the screening exercise, (Marine Institute, 2023) in this assessment are:

- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1160 Large shallow inlets and bays
- 1170 Reefs

6.1 1140-Mudflats and sandflats not covered by seawater at low tide

The qualifying interest, Mudflats and Sandflats not Covered by Seawater at Low Tide (1140) has a number of attributes (with associated targets) relating to the following broad habitat features as well as its constituent community types (NPWS 2012b,c);

1. **Habitat Area** – it is unlikely that the activities proposed will reduce the overall extent of permanent habitat within the feature Mudflats and Sandflats not Covered by Seawater at Low Tide. The habitat area is likely to remain stable.

2. **Community Distribution** – (conserve a range of community types in a natural condition).

The constituent communities identified in the Annex 1 feature (Figure 3-1), Mudflats and Sandflats not covered by seawater at low tide (1140) are:

1. Intertidal sand with nematodes and polychaetes community complex
2. Medium to fine sand with *Nephtys cirrosa* and *Spiophanes bombyx* community complex

Aquaculture activities do not overlap the intertidal representation of the community type, **Medium to fine sand with *Nephtys cirrosa* and *Spiophanes bombyx* community complex**. On the basis that effects from intertidal oyster culture are highly localised, it unlikely that the existing or proposed aquaculture activities will impact on this community type (however, see Section 6.4 re: non-native species below).

Intertidal sand with nematodes and polychaetes community complex is overlapped by extensive (shellfish) operations (Table 6-1). This community type will be exposed to differing ranges of pressures from intertidal oyster aquaculture activities. This activity may alter the current regime, cause surface disturbance and shading, introduce non-native species, and organic enrichment (Section 4).

Table 5-1 lists the marine community types (or surrogates) found within this SAC (including Intertidal sand with nematodes and polychaetes community complex) and provides an estimate of sensitivity to a range of pressures. The risk scores in Table 5-1 are derived from a range of sources identified above. The pressures are listed as those likely to result from the primary aquaculture activities carried out in the Valentia Harbour/Portmagee Channel SAC.

Tables 2-1 and 6-1 provide an estimate of spatial overlap of aquaculture activities over marine habitat 1140 and its constituent community types, respectively. On the basis of targeted research (Forde et al., 2015) intertidal oyster culture on traditional trestles is considered non-disturbing to sedimentary habitats similar to those intertidal community types identified in this SAC.

However, those activities proposed for some sites include the culture of oysters on or very close to the seabed. These systems are multi-layered systems with high density of oysters above and little clearance below. In the absence of evidence to the contrary, it is likely that this system of culture will result in disturbance to the habitat 1140 and the relevant Marine Community Type (Intertidal sand with nematodes and polychaetes community complex). The sites where this likely disturbing are found is licenced site: T06-366 and application sites: T06-450A and T06-509A. This represent a likely disturbance of 4.88% for T06-366A, 3.49% for T06-509A and 3.60% for T06-450A for Habitat QI 1140 and 5.41% for T06-366A, 3.85% for T06-509A and 3.97% for T06-450A for the MCT - Intertidal sand with nematodes and polychaetes community complex.

Identified access routes are considered disturbing as a result of the compaction of sediments by vehicles on the shore. The likely extent of access route disturbance on this community type (and habitat 1140) is 2.64ha. This represents a likely disturbance of 2.15% and 2.38% over Habitat 1140 and community type Intertidal sand with nematodes and polychaetes community complex, respectively.

The total combined disturbance resulting from existing and proposed oyster culture over the QI Mudflats and Sandflats not covered by seawater at low tide (1140) is 14.12%.

The total combined disturbance resulting from existing and proposed oyster culture over the Marine Community Type - Intertidal sand with nematodes and polychaetes community complex is 15.61%.

Table 6-1 Habitat utilisation i.e. spatial overlap in hectares and percentage of Aquaculture activity over relevant Marine Community Types (MCT) within the qualifying interest 1140 - Mudflat and sandflats not covered by seawater at low tide of Valentia Harbour/Portmagee Channel SAC. (Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS– supporting docs marine and coastal).

1140 - Mudflats and sandflats not covered by seawater at low tide (123 ha)						
Site ID	**Species**	**Status**	**Location**	**Area**	**Intertidal sand with nematodes and polychaetes community complex - 111ha**	
					Ha	**% MCT**
T06-366A	**Oyster**	**Licensed**	**Intertidal**	**6.00**	**6.00**	**5.41**
T06-374A	**Oyster**	**Licensed**	**Intertidal**	**7.64**	**4.59**	**4.14**
T06-416A*	**Oyster**	**Licensed**	**Intertidal**	**0**	**0**	**0**
T06-389A	**Oyster**	**Licensed**	**Intertidal**	**5.59**	**5.59**	**5.04**
T06-365A	**Oyster**	**Licensed**	**Intertidal**	**5.65**	**2.62**	**2.36**
T06-503A	**Oyster**	**Application**	**Intertidal**	**4.55**	**0.45**	**0.41**
T06-461A	**Oyster**	**Application**	**Intertidal**	**9.64**	**3.50**	**3.15**
T06-514A	**Oyster**	**Application**	**Intertidal**	**4.93**	**4.87**	**4.39**
T06-502A	**Oyster**	**Application**	**Intertidal**	**4.77**	**0.74**	**0.67**
T06-515A	**Oyster**	**Application**	**Intertidal**	**1.00**	**0.73**	**0.66**
T06-521A	**Oyster**	**Application**	**Intertidal**	**2.28**	**0.97**	**0.87**
T06-517A	**Oyster**	**Application**	**Intertidal**	**10.40**	**0.29**	**0.26**
T06-509A	**Oyster**	**Application**	**Intertidal**	**12.10**	**4.27**	**3.85**
T06-450A	**Oyster**	**Application**	**Intertidal**	**6.60**	**4.41**	**3.97**
T06-518A*	**Oyster**	**Application**	**Intertidal**	**0**	**0**	**0**
Access Routes				**2.64**	**2.64**	**2.38**

***** *These sites are not within the SAC but within the Valentia River system*.

6.2 1160 - Large shallow inlets and bays

The qualifying interest, Large shallow inlets and bays (1160) has a number of attributes (with associated targets) relating to the following broad habitat features as well as its constituent community types within the Valentia Harbour/Portmagee Chanel SAC (NPWS, 2012 b, c).

1. **Habitat Area** – it is unlikely that the activities proposed will reduce the overall extent of permanent habitat within the feature Large shallow inlets and bays. The habitat area is likely to remain stable.

2. **Community Distribution** – (conserve a range of community types in a natural condition).

The constituent communities identified in the Annex 1 feature (Figure 3-1), Large shallow inlets and bays (1160) are:

1. Maërl-dominated community
2. *Zostera*-dominated community
3. (Maërl-dominated community/ *Zostera*-dominated community)[10]
4. *Edwardsia delapiae* associated community
5. Intertidal sand with nematodes and polychaetes community complex; and
6. Medium to fine sand with *Nephtys cirrosa* and *Spiophanes bombyx* community complex
7. Coarse sediment with *Pisione remota* community complex;
8. Sandy mud to mixed sediment with *Melinna palmata* community complex;
9. Mixed sediment with *Chaetozone gibber* community complex;
10. *Fucus*-dominated intertidal reef community complex;
11. *Laminaria*-dominated community;
12. Echinoderm dominated reef community complex

On the basis of spatial analysis, it is considered given the localised nature of potential impacts of intertidal shellfish culture activities, that those MCT not subject to spatial overlap are unlikely to result in any significant effect from intertidal shellfish culture activities (however, see Section 6.4 re: non-native species below). To this end, the following 7 MCT are excluded from further consideration, these are:

1. Coarse sediment with *Pisione remota* community complex
2. Echinoderm-dominated reef community complex
3. *Edwardsia delapiae* associated community*
4. Maerl-dominated community*
5. Maerl-dominated community / *Zostera*-dominated community*
6. Medium to fine sand with *Nephtys cirrosa* and *Spiophanes bombyx* community complex
7. *Zostera*-dominated community*

The following community types are overlapped by existing and proposed extensive (shellfish) operations (Table 6-2). These community type will be exposed to differing ranges of pressures from intertidal oyster aquaculture activities. This activity may alter the current regime, cause surface disturbance and shading, introduce non-native species, and organic enrichment (Section 4).

1. Intertidal sand with nematodes and polychaetes community complex; and

[10] The community type "Maërl-dominated community/ *Zostera*-dominated community" presented in Marine Community type maps (Figure 3-1) are not specifically included in conservation objectives (NPWS 2012b).

2. Sandy mud to mixed sediment with *Melinna palmata* community complex;
3. Mixed sediment with *Chaetozone gibber* community complex;
4. *Fucus*-dominated intertidal reef community complex;
5. *Laminaria*-dominated community;

Table 5-1 lists the marine community types (or surrogates) found within this SAC and provides an estimate of sensitivity to a range of pressures. The risk scores in Table 5-1 are derived from a range of sources identified above. The pressures are listed as those likely to result from the primary aquaculture activities carried out in the Valentia Harbour/Portmagee Channel SAC.

Identified access routes are considered disturbing as a result of the compaction of sediments by vehicles on the shore. The likely extent of access route disturbance on this community type (and habitat 1140) is 2.64ha. This represents a likely disturbance of 0.12%, 2.38%, 0.34% over Habitat 1160, community types Intertidal sand with nematodes and polychaetes community complex and *Fucus*-dominated intertidal reef community complex, respectively.

Tables 2-1 and 6-2 provide an estimate of spatial overlap of aquaculture activities over marine habitat 1160 and its constituent community types, respectively. On the basis of targeted research (Forde et al., 2015), intertidal oyster culture using traditional trestle systems is considered non-disturbing to the one intertidal sedimentary community types for which there is overlap identified in this SAC. This community type is Intertidal sand with nematodes and polychaetes community complex.

However, activities carried out or proposed for some sites include the culture of oysters on or very close to the seabed. These systems are multi-layered systems with a high density of oysters above and little clearance below. In the absence of evidence to the contrary, it is likely that this system of culture will result in disturbance to the habitat 1160 and the relevant Marine Community Type (Intertidal sand with nematodes and polychaetes community complex). The sites where this likely disturbing are found is licenced site: T06-366 and application sites: T06-450A and T06-509A. This represents a likely disturbance of 0.23% for T06-366A, 0.16% for T06-509A and 0.17% for T06-450A for Habitat QI 1140 and 5.41% for T06-366A, 3.85% for T06-509A and 3.97% for T06-450A for the MCT - Intertidal sand with nematodes and polychaetes community complex.

In addition, a number of sedimentary community types over which intertidal oyster bag and trestle culture are proposed within the SAC are considered likely to be disturbed by the shellfish culture activities. This is on the basis of no evidence to the contrary from, say, targeted studies. Furthermore, a number of MCT (e.g. reef communities) are considered wholly unsuited for such activities, given the uneven, heterogenous and sometimes subtidal nature of the MCT. On this basis, the proposed activities are considered likely disturbing.

Those Marine Community Types within QI 1160 considered subject to disturbance from existing and proposed shellfish culture activities, in addition to access route disturbance (with likely disturbance percentage) as described above are:

1. **Intertidal sand with nematodes and polychaetes community complex (15.61%)**
2. **Sandy mud to mixed sediment with *Melinna palmata* community complex (5.37%)**
3. **Mixed sediment with *Chaetozone gibber* community complex (2.54%)**
4. ***Fucus*-dominated intertidal reef community complex (0.79%)**
5. ***Laminaria*-dominated community (0.52%)**

The total combined disturbance resulting from existing and proposed oyster culture over the QI Large shallow inlets and Bays (1160) in Valentia Harbour/Portmagee Channel SAC is 2.24%.

Table 6-2 Habitat utilisation i.e. spatial overlap in hectares and percentage of Aquaculture activity over relevant Marine Community Types (MCT) within the qualifying interest 1160 – Large Shallow Inlet and Bays of Valentia Harbour/Portmagee Channel SAC. (Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS– supporting docs marine and coastal).

				Large Shallow Inlet and Bay – 1160 (2629 ha)									
Site ID	**Species**	**Status**	**Area (Ha)**	***Fucus*-dominated intertidal reef community complex - 127ha**		**Intertidal sand with nematodes and polychaetes community complex - 111ha**		***Laminaria*-dominated community - 451ha**		**Mixed sediment with *Chaetozone gibber* community complex - 715ha**		**Sandy mud to mixed sediment with *Melinna palmata* community complex - 359ha**	
T06-366A	**Oyster**	**Licensed**	**6.00**			**6.00**	**5.41**						
T06-374A	**Oyster**	**Licensed**	**7.64**			**4.59**	**4.14**			**2.18**	**0.30**		
T06-416A*	**Oyster**	**Licensed**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
T06-389A	**Oyster**	**Licensed**	**5.59**			**5.59**	**5.04**						
T06-365A	**Oyster**	**Licensed**	**5.65**			**2.62**	**2.36**					**3.03**	**0.84**
T06-503A	**Oyster**	**Application**	**4.55**	**0.11**	**0.09**	**0.45**	**0.41**			**3.99**	**0.59**		
T06-461A	**Oyster**	**Application**	**9.64**	**0.16**	**0.13**	**3.50**	**3.15**	**0.21**	**0.05**	**5.74**	**0.80**		
T06-514A	**Oyster**	**Application**	**4.93**			**4.87**	**4.39**			**0.06**	**<0.01**		
T06-502A	**Oyster**	**Application**	**4.77**			**0.74**	**0.67**			**4.03**	**0.56**		
T06-515A	**Oyster**	**Application**	**1.00**	**0.13**	**0.10**	**0.73**	**0.66**			**0.13**	**0.02**		
T06-521A	**Oyster**	**Application**	**2.28**	**0.17**	**0.13**	**0.97**	**0.87**	**0.25**	**0.06**	**0.89**	**0.12**		
T06-517A	**Oyster**	**Application**	**10.40**	**0.86**	**0.68**	**0.29**	**0.26**	**1.28**	**0.28**	**1.10**	**0.15**	**6.82**	**1.90**
T06-509A	**Oyster**	**Application**	**12.10**			**4.27**	**3.85**	**0.23**	**0.05**			**7.61**	**2.12**
T06-450A	**Oyster**	**Application**	**6.60**			**4.41**	**3.97**	**0.34**	**0.08**			**1.82**	**0.51**
T06-518A*	**Oyster**	**Application**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Access Routes				**0.43**	**0.34**	**2.64**	**2.38**						

6.3 1170 – Reefs

The qualifying interest, Reef (1170) has a number of attributes (with associated targets) relating to the following broad habitat features as well as its constituent community types (NPWS 2012b,c);

1. **Habitat Area** – it is unlikely that the activities proposed will reduce the overall extent of permanent habitat within the feature Reefs. The habitat area is likely to remain stable (however, see point below re: removal of substrate).
2. **Community Distribution** – (conserve a range of community types in a natural condition). The constituent communities identified in the Annex 1 feature (Figure 3-1), Reefs (1170) are:
    - *Fucus*-dominated intertidal reef community complex
    - *Laminaria*-dominated community

Tables 2-1 and 6-1 provide an estimate of spatial overlap of proposed extensive (shellfish) aquaculture activities over marine habitat 1170 and its constituent community types, respectively. This QI and community types will be exposed to differing ranges of pressures from intertidal oyster aquaculture activities. This activity may alter the current regime, cause surface disturbance (due to transport), shading, as well as organic enrichment (Section 4).

In addition, the community types are considered largely unsuited for bag and trestle culture, given the subtidal nature (in parts) as well as the presence of a mosaic of predominantly bedrock, cobble and boulders. It is likely that any structures would result in shading on the dominant macro-algae species. In addition, movement of substrate (e.g., boulder, cobble) might be considered necessary in order to locate trestles. This would be considered a highly disturbing activity. On this basis, the proposed activities are considered likely disturbing.

Those Marine Community Types considered subject to disturbance from existing and proposed shellfish culture activities in QI 1170, in addition to access route disturbance (with likely disturbance percentage) as described above are:

1. ***Fucus*-dominated intertidal reef community complex (0.79%)**
2. ***Laminaria*-dominated community (0.52%)**

The total combined likely disturbance resulting from existing and proposed oyster culture over the QI Reefs (1170) in Valentia Harbour/Portmagee Channel SAC is 0.43%.

Table 6-3 Habitat utilisation i.e. spatial overlap in hectares and percentage of Aquaculture activity over relevant Marine Community Types (MCT) within the qualifying interest 1170 – Reefs of Valentia Harbour/Portmagee Channel SAC. (Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS– supporting docs marine and coastal).

		Reefs -1170 (953 ha)					
Site ID	**Species**	**Status**	**Area (Ha)**	***Fucus*-dominated intertidal reef community complex - 127ha**		***Laminaria*-dominated community - 451ha**	
T06-366A	**Oyster**	**Licensed**	**6.00**				
T06-374A	**Oyster**	**Licensed**	**7.64**				
T06-416A*	**Oyster**	**Licensed**	**-**	**-**	**-**	**-**	**-**
T06-389A	**Oyster**	**Licensed**	**5.59**				
T06-365A	**Oyster**	**Licensed**	**5.65**				
T06-503A	**Oyster**	**Application**	**4.55**	**0.11**	**0.09**		
T06-461A	**Oyster**	**Application**	**9.64**	**0.16**	**0.13**	**0.21**	**0.05**
T06-514A	**Oyster**	**Application**	**4.93**				
T06-502A	**Oyster**	**Application**	**4.77**				
T06-515A	**Oyster**	**Application**	**1.00**	**0.13**	**0.10**		
T06-521A	**Oyster**	**Application**	**2.28**	**0.17**	**0.13**	**0.25**	**0.06**
T06-517A	**Oyster**	**Application**	**10.40**	**0.86**		**1.28**	**0.28**
T06-509A	**Oyster**	**Application**	**12.10**			**0.23**	**0.05**
T06-450A	**Oyster**	**Application**	**6.60**			**0.34**	**0.08**
T06-518A*	**Oyster**	**Application**	**-**	**-**	**-**	**-**	**-**
Access Routes				**0.43**	**0.34**		

6.4 Introduction of non-native species

As already outlined oyster culture may present a risk in terms of the introduction of non-native species as the Pacific oyster (*Magallana gigas*) itself is a non-native species. Recruitment of *M. gigas* has been documented in a number of Bays in Ireland and appears to have become naturalised (i.e. establishment of a breeding population) in two locations (Kochmann et al., 2012; 2013) and may compete with the native species for space and food. In addition to having large number of oysters in culture, Kochmann et al., (2013) identified short residence times and large intertidal areas as factors likely contributing to the successful recruitment of oysters in Irish bays. Furthermore, increased recruitment of *M gigas* has been recorded in other bays in Ireland in more recent years (Marine Institute). The residence time in Valentia Harbour is unknown. Consequently, there is a risk of Pacific oysters naturalising in Valentia Harbour. However, it is noted that the majority of sites will source their seed directly from hatcheries and that it will be 100% triploid. Triploid oysters have a considerably lower reproductive potential that diploid oysters and therefore, the risk of establishment of this non-native species will be reduced.

While the risk of introduction of hitchhiker species with hatchery reared oyster seed is considered minimal, the risk posed by the introduction of '½-grown' or 'wild' seed originating from another jurisdiction (e.g. Britain, France) cannot be discounted.

7 In-combination effects of aquaculture, fisheries and other activities

The risk posed by extensive aquaculture operations are identified in Section 6 above. There are potentially a number of other disturbing activities that are carried out within the Valentia Harbour/Portmagee Channel SAC that may act in combination with the proposed shellfish culture operations.

7.1 In-combination effects with Inshore fishing

Inshore fishing occurs in Valentia Harbour. Information and Figure 7-1 are derived from Inshore Fishing Maps (Ireland's Marine Atlas - http://atlas.marine.ie/#?c=53.9108:-15.9082:6: Accessed: 27/07/2027).

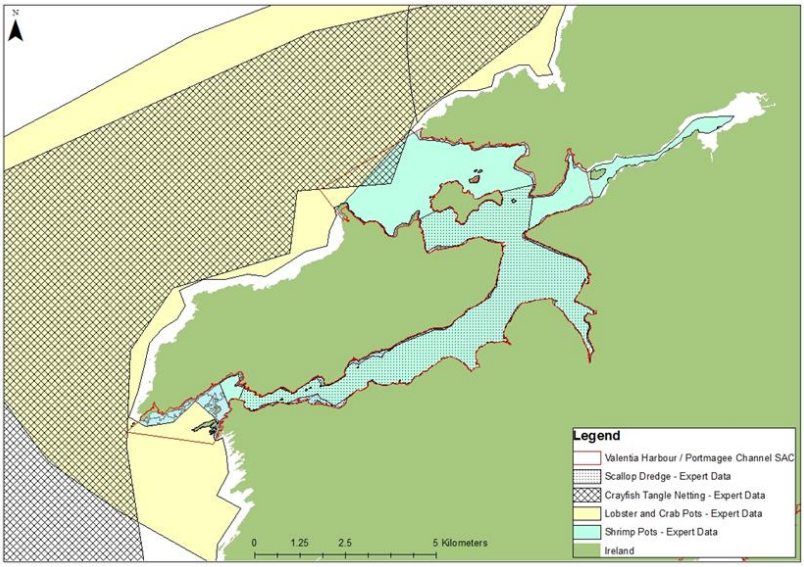


Figure 7-1 Fishing activity by vessels under 15m in the vicinity of Valencia Harbour / Portmagee Channel SAC.

Pot fisheries for shrimp occurs in Valentia from Portmagee to Knightstown from August to March. Fourteen vessels fish approximately, 6,000 shrimp pots in the area. A smaller amount of lobster and crab fishing occurs in the Valencia-Portmagee Channel and west of Portmagee and north of Knightstown. An unknown proportion of these vessels may use trammel nets to collect bait. Lobster fishing is more common between March and October. Periwinkles may be fished on rocky seaweed covered shores in the area. Some bottom trawling activity occurs west of Portmagee but this is predominantly outside the SAC. At the current time there is no known scallop dredging in the SAC. (No new application for 'scallop culture' has been received by DAFM).

Specific fishery details and assessment:

Shrimp fisheries.

The overlap of the shrimp fishery on mud and sand flats is considered spurious, given the intertidal nature of the habitat and is a function of the low resolution of the fishing information. The shrimp fishery overlaps with 82% of large shallow inlet and bay and 73% on reefs. The fishery overlaps with sedimentary habitats, sensitive Maërl and *Zostera* communities and with various reef communities.

Risks to sedimentary habitats from shrimp pot fisheries is considered low. Shrimp pots and associated ropes and anchors may impact Maërl and Seagrass. Although fishing with pots is unlikely to pose significant risk to the *Edwardsia* community. However, given this community is endemic to Valencia, a higher level of precaution with respect to impacts is therefore, appropriate.

Lobster and crab fisheries

Lobster and crab fisheries do not occur to any extent within the Valencia-Portmagee Channel but in reef areas north east of Valencia Island and west of Portmagee. The fishery overlaps with 8% of large shallow inlet and bay and 12.3% of reef mainly on coarse sand and echinoderm dominated reef marine communities and on *Laminaria* reef. Lobster pots and associated ropes and anchors could degrade epifauna of reef depending on the sensitivity of associated fauna and on the intensity of the activity.

In addition, Trammel netting for bait may be associated with lobster and crab fishing. These nets may capture seabirds from nearby SPAs. Nets and anchors may impact epifauna of reef. The level of trammel netting is unknown although it is considered unlikely to occur at levels which would cause any impacts to reef habitat in this location.

Tangle netting for crayfish

Tangle netting for crayfish occurs mainly west of Portmagee on reef habitat. This activity is unlikely to pose a risk to reef habitat in this area.

Aquaculture and fisheries in-combination effects:

Shellfish aquaculture does not overlap with any of the identified sensitive biogenic community types and therefore, there are no likely in-combination with fisheries activities overlapping these MCT.

Both intertidal aquaculture and pot fishing for lobster are considered disturbing to reef habitat. Putative coverage of combined activities is 12.7% of QI Reef (1170) and 8.5% of *Laminaria*-dominated community within QI 1160, which could be considered disturbed. It would be important that any licenced activity be managed such that disturbance is minimised, as much as possible.

7.2 In-combination effects with other activities

Another activity leading to potential impacts on conservation features relate to harvest of seaweed on intertidal reef communities. There is little known concerning the level of harvest from these intertidal reef communities. The impact is likely two-fold, direct impact upon the reefs by removal of a constituent species and impact upon substrates as a consequence of travel across the shore to the harvest sites. The likely overlap between these activities and intertidal shellfish culture is considered small as the (reef) habitat is not considered suitable for shellfish culture. Seaweed harvesting requires a foreshore licence administered by the Department of Environment, Community and Local Government. At the time of this report there are no known foreshore applications for the removal of seaweed from intertidal areas in Valentia Harbour. In addition, on the basis of an examination of the Department of Housing, Local Government and Heritage foreshore database (https://www.gov.ie/en/foreshore-notices/ - Accessed: 27/07/2023) identified no existing or proposed activities on the foreshore or adjacent to the foreshore that may interact with the likely effects resulting from the proposed shellfish culture activities resulting in in-combination effects. Similarly, a review of other licencing body databases identified no existing or potential activities likely to interact with the proposed aquaculture activities e.g., Kerry County Council planning (Map Viewer Accessed: 27/07/2023) and EPA pressures maps (www. https://gis.epa.ie/EPAMaps/Water: Accessed: 27/07/2023).

The Shellfish Water Characterisation Study prepared by the relevant Government Department for Valentia Harbour[11] was consulted in order to identify any pressures that might result in additive or synergistic pressures to those identified as originating from aquaculture activities. There are a number of activities which are terrestrial in origin that might result in impacts on the conservation features of the Valentia Harbour/Portmagee Channel SAC. Primary among these are point source discharges from municipal and industrial units (Shellfish Pollution Reduction Programme, DHPLG). There are three urban waste water treatment plants in the general vicinity of the SAC. These are found in Cahersiveen,

[11]Shellfish Pollution Reduction Programme - Characterisation Report No. 3 – Valentia Harbour Shellfish Area County Kerry.https://assets.gov.ie/129146/6d57df93-5997-4863-b044-197855a21385.pdf

Knightstown and Portmagee. The pressure derived from these facilities is a discharge that may impact upon levels of dissolved nutrients, suspended solids and some elemental components e.g. aluminium in the case of water treatment facilities. It should be noted that the pressures resulting from fisheries and aquaculture activities are primarily morphological in nature. It was, therefore, concluded that given the pressure resulting from say, a point discharge location (e.g. urban waste-water treatment plant or combined sewer overflow) would likely impact on physico-chemical parameters in the water column, any in-combination effects with aquaculture or fisheries activities are considered to be minimal or negligible. In addition, the most recent Water Framework Directive water quality monitoring data from Valentia Harbour is classified as High for general conditions (nutrients, etc..) and High for biological conditions (EPA).

No other activities resulting in morphological pressures were identified or could be quantified.

8 Aquaculture Appropriate Assessment Summary Mitigation (and Recommendations) and Conclusion.

8.1 Summary of Assessment

In Valentia Harbour/Portmagee Channel SAC intertidal oyster culture is the only aquaculture activity currently being carried out or proposed. Based upon this and the information provided in the aquaculture profiling (Section 2), the likely interaction between the culture methodologies employed and conservation features (habitats) of the site were considered.

An initial screening exercise was carried out to consider likely interactions between the aquaculture activities and the conservation features of the Valentia Harbour/Portmagee Channel SAC and a number of other Natura 2000 sites (i.e., 2 SACs within 15km and 13 SPAs within 50km). The screening exercise resulted in three habitat Qualifying Interests (1140, 1160 and 1170) of the SAC being carried forward for full assessment. No qualifying interests from other Natura sites were considered to have likely significant effects resulting from extensive aquaculture operations alone or in-combination with other pressures and therefore, were screened out from further consideration.

It is important to note the spatial extent of conservation features (i.e. Annex I – habitats and Marine Community Types) are based upon mapping provided by NPWS and presented in the relevant conservation objective documentation (NPWS 2012b,c). The extent of aquaculture sites is derived from mapping derived from DAFM database. The appropriate assessment is carried out using mapping derived from these sources only.

A full assessment was carried out on the likely interactions between aquaculture operations (as proposed) and the features of the Annex 1 habitats 1140 (Mudflats and sandflats not covered by seawater at low tide), 1160 (Large Shallow Inlets and Bay) and 1170 (Reefs). In addition, the likely effects of the aquaculture activities (Species, structures, transport routes) were considered in light of the sensitivity of the marine community types found within these Annex 1 habitats.

The total combined disturbance resulting from existing and proposed oyster culture over the QI Mudflats and Sandflats not covered by seawater at low tide (1140) is 14.12%.

The total combined disturbance resulting from existing and proposed oyster culture over the Marine Community Type - Intertidal sand with nematodes and polychaetes community complex is 15.61%. This is due primarily to the proposed use of a particular multi-layered culture system at two sites **(T09-509A and T09-450A**). These systems are multi-layered systems with high density of oysters above and little clearance below and as such the impact on the sedimentary community (and QI 1140) is likely to be such that disturbance cannot be dismissed.

The total combined disturbance resulting from existing and proposed oyster culture over the QI Large shallow inlets and Bays (1160) in Valentia Harbour/Portmagee Channel SAC is 2.24%.

Those Marine Community Types within QI 1160 considered subject to disturbance from existing and proposed shellfish culture activities, in addition to access route disturbance (with likely disturbance percentage) as described above are:

1. Intertidal sand with nematodes and polychaetes community complex (15.61%)
2. Sandy mud to mixed sediment with *Melinna palmata* community complex (5.37%)

3. Mixed sediment with *Chaetozone gibber* community complex (2.54%)
4. *Fucus*-dominated intertidal reef community complex (0.79%)
5. *Laminaria*-dominated community (0.52%)

With the exception of MCT, Intertidal sand with nematodes and polychaetes community complex, the other MCT are subject to overlap from all proposed aquaculture operations. The other two sedimentary habitats, Sandy mud to mixed sediment with *Melinna palmata* community complex and Mixed sediment with *Chaetozone gibber* community complex are likely subject to disturbance from **all of the proposed sites**. These community types are considered primarily subtidal and therefore, not likely considered suitable for the proposed oyster culture methods. The overlap with reef community types is discussed below.

The total combined likely disturbance resulting from existing and proposed oyster culture over the QI Reefs (1170) in Valentia Harbour/Portmagee Channel SAC is 0.43%.

In addition, the combined disturbance with fishery activity (lobster/crab potting) over reef habitat is 12.7% of QI Reef (1170) and 8.5% of *Laminaria*-dominated community within QI 1160.

Those Marine Community Types, within QI 1170, considered subject to disturbance from existing and proposed shellfish culture activities, in addition to access route disturbance (with likely disturbance percentage) as described above are:

1. *Fucus*-dominated intertidal reef community complex (0.79%)
2. *Laminaria*-dominated community (0.52%)

Oyster culture using bags and trestles is wholly incompatible with any reef habitat (1170) or constituent community types. The substrate which for both MCT are mosaics of predominantly bedrock, cobble and boulders cannot easily facilitate the placement of trestles and access. In addition, the MCT *Laminaria*-dominated community is primarily subtidal.

The risk of potential recruitment of the culture organism, *Magallana gigas,* in Valentia Harbour/Portmagee Channel SAC was identified. However, it is noted that the majority of sites will source their seed directly from hatcheries and that it will be 100% triploid. Triploid oysters have a considerably lower reproductive potential that diploid oysters and therefore, the risk of establishment of this non-native species will be reduced. This assessment is based upon the seed source being triploid from hatcheries and, as such, does not present a major risk to conservation features from recruitment of non-native oysters (i.e. *Magallana gigas*) and other hitchhiker species. If the source or type of seed were to change this would require a separate assessment.

In-combination effects between proposed aquaculture activities occurs with pot fisheries for lobster and crab. There are no other activities identified that may act in combination with extensive aquaculture operations and result in disturbance to qualifying interests in the Valentia Harbour/Portmagee Channel SAC.

8.2 Mitigation Measures and Recommendations

As noted above all of the proposed shellfish culture activities will likely result in some disturbance on QIs of the Valentia Harbour/Portmagee Channel SAC. It is likely that some the potential disturbance can be mitigated and these actions are summarised below and present for each of the applications in Table 8-1.

In summary, it is recommended that for those proposed aquaculture sites with reef habitat (and reef MCT) overlap, that the site boundaries be redrawn to remove any of these habitats and relevant MCT. This is on the basis that the practicality of carrying out shellfish culture without modifying the sites considerably in reef habitats is questioned. Any such modification would likely result in greater harm to the feature. In addition, the in-combination effects with potentially disturbing fishing activities (potting for lobster/crab) result in relatively high coverage of disturbance of reef habitats (and MCT) such that it is approaching the 15% threshold requiring action.

The use of multi-layered system at two sites presents an unknown risk to intertidal sedimentary communities. It is possible that the high density of culture organism above and poor clearance below will result in considerable build-up of organic matter and potential hypoxic or anoxic conditions in the sediments. Such conditions could lead to collapse of communities in the footprint of the culture system. As mitigation, it is recommended that traditional bag and trestle systems be used at the sites. This will result in lower densities and above and greater clearance below. Such systems in similar habitat types have shown no impact on structure and function based upon published research (Forde et al 2015).

Finally, the exclusive use of hatchery sourced triploid oysters will mitigate the risks of recruitment (and potentially naturalisation) of the non-native culture species, the Pacific Oyster (*Magallana gigas*). It should be noted that the use of triploid stock is specifically identified in a number of applications (T06-503A, T06-514A, T06-502A, T06-515A) as seed source. It is recommended that all other applicants use triploid seed as well.

For some sites the full implementation of the mitigation measures may present operational difficulties that may call into question the viability of using the site for oyster production and therefore, facilitate a positive recommendation in relation to licencing.

Table 8-1 Oyster application sites in Valentia Harbour/Portmagee Channel SAC and recommended mitigation measures to facilitate licencing. (MCT = Marine Community Type)

Site ID	***Area (Ha)***	***Disturbance effect***	***Mitigation measure(s)***
T06-503A	**4.55**	- Overlap with reef MCT and subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use of hatchery sourced triploid seed identified in application
T06-461A	**9.64**	- Overlap with reef MCT and subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - exclusive use of hatchery sourced triploid seed
T06-514A	**4.93**	- Overlap with subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use of hatchery sourced triploid seed identified in application
T06-502A	**4.77**	- Overlap subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use of hatchery sourced triploid seed identified in application

Site ID	*Area (Ha)*	*Disturbance effect*	*Mitigation measure(s)*
T06-515A	**1.00**	- Overlap with reef MCT and subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use of hatchery sourced triploid seed identified in application
T06-521A	**2.28**	- Overlap with reef MCT and subtidal MCT - Non-native species recruitment	- Redraw boundaries of sites to remove all reef and subtidal habitats - Exclusive use of hatchery sourced triploid seed
T06-517A	**10.40**	- Overlap with reef MCT and subtidal MCT - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Exclusive use of hatchery sourced triploid seed
T06-509A	**12.10**	- Overlap with reef MCT and subtidal MCT - Multi-layered culture system - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use traditional bag and trestle system - Exclusive use of hatchery sourced triploid seed
T06-450A	**6.60**	- Overlap with reef MCT and subtidal MCT - Multi-layered culture system - Non-native species recruitment	- Redraw boundaries of site to remove all reef and subtidal MCT overlap - Use traditional bag and trestle system - Exclusive use of hatchery sourced triploid seed
T06-518A*	**-**	- Non-native species recruitment	- Exclusive use of triploid hatchery sourced seed

** This site is not within the SAC but within the Valentia River system.*

8.3 Conclusion

In summary, assuming the mitigation measures are implemented, the general conclusions relating to the interaction between current and proposed aquaculture activities with QIs is that consideration can be given to licencing (new applications) in the Annex 1 habitats – 1140 (Mudflats and sandflats not covered by seawater at low tide) and 1160 (Large Shallow Inlets and Bays).

It is recommended that there be strict adherence to the access routes identified and that density of culture structures within the sites be maintained at normal levels.

The potential impacts have been assessed and it has been objectively concluded following best available information, objective criteria, best scientific knowledge and expert judgement as well as the application of appropriate mitigation measures, that the proposed extensive aquaculture sites will not pose a risk of adversely affecting (either directly or indirectly) the integrity of Natura sites, either alone or in-combination with other plans and projects.

9 References

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