1 NO. SITE AT BALLYMACODA BAY CO.CORK

Co-ordinates & Area

Site T05/545A (11.25 Ha)

The area seaward of the high water mark and enclosed by a line drawn from Irish National Grid Reference point

207952, 072296 to Irish National Grid Reference point
208293, 072178 to Irish National Grid Reference point
208197, 071947 to Irish National Grid Reference point
207808, 071950 to the first mentioned point.





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Aqua Culture Sites Ket offer val 1:30,000

Part of Admiralty Chart No 2049-0 Not to be used for Navigation

Sites highlighted in red denotes Application

Agriculture, Food and the Marine

2 9 JAN 20

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Friculture,

Talmhaíochta, Bla agus Mara



Appropriate Assessment Summary Report of Aquaculture in the Ballymacoda (Clonpriest & Pillmore) SAC (Site Code: 00077) and Ballymacoda Bay SPA (Site Code: 004023)

Marine Institute

Version: October 2017

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Annex II: Ballymacoda Bay SPA Assessment of Aquaculture Activities under Article 6 of the Habitats Directive . .

Preface

In Ireland, the implementation of the Habitats Directive in relation to aquaculture and certain fisheries activities that occur within designated sites is achieved through Article 6(3) of the Directive whereby such activities, which are licenced by the Department of Agriculture, Food and the Marine (DAFM) or Department of Communications, Energy and Natural Resources (DCENR), are viewed as plans and projects and are therefore subject to Appropriate Assessment (AA). The Habitats Directive is transposed in Ireland in the European Communities (Birds and Natural Habitats) Regulations 2011. Appropriate assessments are currently carried out against the conservation objectives (COs), and more specifically on the version of the COs that are available at the time of the Assessment, for designated ecological features, within the site, as defined by the National Parks and Wildlife Service (NPWS). NPWS are the competent authority for the management of Natura 2000 sites in Ireland. Obviously, aquaculture and fishing operations existed in coastal areas prior to the designation of such areas under the Directives. Ireland is thereby assessing both existing and proposed aquaculture and fishing activities in such sites. This is an incremental process, as agreed with the EU Commission in 2009, and will eventually cover all fishing and aquaculture activities in all Natura 2000 sites.

In the case of aquaculture, DAFM receives applications to undertake such activity and submits a set of applications, at a defined point in time, for assessment. The aquaculture applications are then subject to AA. If the AA finds that significant effects of such activities cannot be discounted the plans or projects will need to be mitigated further if such activities are to continue. The AA is not explicit on how this mitigation should be achieved but rather the degree of mitigation required. In effect, therefore, the AA is a 'point in time' assessment of aquaculture activities to determine if they are consistent with COs for designated features within a Natura site and thereby compliant with the Directives.

This summary report presents the findings of the reports prepared to consider the interactions between aquaculture activities and the conservation features of both the Ballymacoda (Clonpriest & Pillmore) SAC and the Ballymacoda Bay SPA. The SAC and SPA reports were prepared by RPS and APEM, respectively. Both were reviewed and edited for content by the Marine Institute. This report is structured such that the summary, conclusions and recommendations from the assessment of aquaculture activities on Natura 2000 features for the Ballymacoda (Clonpriest & Pillmore) SAC (Site Code: 00077) and Ballymacoda Bay SPA (Site code 004023) are provided in the first part of this report while the full assessments of aquaculture activities on the SAC and the SPA are provided in Annex 1 and 2, respectively.

Summary SAC Considerations, Conclusions and Recommendations

Ballymacoda (Clonpriest & Pillmore) SAC is located 6km southwest of Youghal town, Co. Cork. The SAC site encompasses the lower tidal area of the Womanagh River and extends to the low tide mark at inner Youghal Bay. The inner estuarine area of the site is well sheltered with sediment types varying from muds to muddy sands while the relatively more exposed outer seaward area is typified by fine rippled sands. Designated marine habitats include Estuaries (1130) and Mudflats and sand flats not covered by seawater at low tide (1140) each of which support soft sedimentary communities and community complexes. The site also contains, and is designated for Salicornia and other annuals colonizing mud and sand (1310) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330). Conservation Objectives for marine habitats and constituent communities within the SAC were identified by NPWS (2015a) and relate primarily to the requirement to maintain habitat distribution, structure and function, as defined by characterizing (dominant) species in these habitats. For designated species the objective is to maintain various attributes of the populations including population size, habitats quality and the distribution of the species.

Activities in the SAC

Within Ballymacoda (Clonpriest & Pillmore) SAC aquaculture focuses on the cultivation of the Pacific oyster *Crassostrea gigas* (*C. gigas*) on trestles in intertidal areas of the bay. The profile of the aquaculture industry in the SAC, used in this assessment, was prepared by BIM and is derived from the list of licence applications received by DAFM and provided to the MI for assessment in March 2016.

The Appropriate Assessment Process

The function of an Appropriate Assessment and Risk Assessment is to determine if the ongoing and proposed aquaculture activities are consistent with the Conservation Objectives for the Natura site or if such activities will lead to deterioration in the attributes of the habitats and species over time and in relation to the scale, frequency and intensity of the activities. NPWS (2015a) provide guidance on interpretation of the Conservation Objectives which are, in effect, management targets for habitats and species in the SAC. This guidance is scaled relative to the anticipated sensitivity of habitats and species to disturbance by the proposed activities. Some activities are deemed to be wholly inconsistent with long term maintenance of certain sensitive habitats while other habitats can tolerate a range of activities. For the practical purpose of management of sedimentary habitats a 15% threshold disturbance is deemed to be non-significant. Disturbance is defined as that which leads to a change in the characterizing species of the habitat (which may also indicate change in structure and function). Such disturbance may be temporary or persistent in the sense that change in characterizing species may recover to pre-disturbed state or may persist and accumulate over time.

The Appropriate Assessment process is divided into a number of stages consisting of a preliminary risk identification, and subsequent assessment (allied with mitigation measures if necessary) which are covered in this report. The first stage of the process is an initial screening wherein activities which cannot have, because they do not spatially overlap with a given habitat or have a clear pathway for interaction, any impact on the conservation features and are therefore excluded from further consideration. The next phase is the Natura Impact Statement where interactions (or risk of) are identified. Further to this, an assessment on the significance of the likely interactions between activities and conservation features is conducted. Mitigation measures (if necessary) will be introduced in situations where the risk of significant disturbance is identified. In situations where there is no obvious mitigation to reduce the risk of significant impact, it is advised that caution should be applied in licencing decisions. Overall the Appropriate Assessment is both the process and the assessment undertaken by the competent authority to effectively validate this Screening Report and/or NIS. It is important to note that the screening process is considered conservative, in that other activities which may overlap with habitats but which may have very benign effects are retained for full assessment. In the case or Risk Assessments consequence and likelihood of the consequence occurring

are scored categorically as separate components of risk. Risk scores are used to indicate the requirement for mitigation.

Data Supports

Distribution of habitats and species population data are provided by NPWS¹. Scientific reports on the potential effects of various activities on habitats and species have been compiled by the MI and provide the evidence base for the findings. The profile of aquaculture activities was provided by BIM. The data supporting the assessment of individual activities vary and provides for varying degrees of confidence in the findings.

Findings

In Ballymacoda (Clonpriest & Pillmore) SAC there is one valid oyster production licence with a further five new applications. The likely interaction of aquaculture activity occurring at licenced sites, application sites and access routes with the conservation features (habitats and species) of the site was considered. An initial screening exercise resulted in a number of habitat features and species being excluded from further consideration. None of the aquaculture activities (existing and/or proposed) overlaps or likely interacts with the following features or species, and therefore the following the Qualifying Interests were excluded from further consideration in the assessment; Estuaries (1130), Salicornia and other annuals colonizing mud and sand (1310) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330).

A full assessment was carried out on the likely interactions between aquaculture operations and the feature Annex 1 habitat Mudflats and sandflats not covered by seawater at low tide (1140). The likely effects of existing and proposed aquaculture activities were considered in light of the sensitivity of the constituent community of the Annex 1 habitat 1140 that was shown to overlap with current and proposed intertidal oyster namely; Sand with polychaetes and bivalves community complex.

In summary, it is concluded, on the basis of spatial overlap and sensitivity analysis, that current and proposed intertidal aquaculture activities, both individually and in-combination, do not pose a risk of significant disturbance to the habitat features of in Ballymacoda (Clonpriest & Pillmore) SAC. However, the risk posed by the introduction of ½-grown oysters from France cannot be discounted.

¹ NPWS Geodatabase Ver: September 2015 - <u>http://www.npws.ie/mapsanddata/habitatspeciesdata/</u>

Summary SPA Considerations, Conclusions and Recommendations

Introduction

APEM Ltd was commissioned by the Marine Institute to provide ornithological services related to the appropriate assessment of aquaculture on coastal Special Protection Areas (SPAs). This report contains the Appropriate Assessment of aquaculture activities in Ballymacoda Bay, assessed alone as well as 'in combination' with other activities in and around the Bay. The activities being assessed are within the Ballymacoda Bay SPA (Site code 004023) and this SPA is the primary focus of this assessment.

Methodology

The method applied follows the stepwise requirements of Article 6 of the Habitats Directive. The first step is to identify if the activity is related, or not, to the management of the Natura 2000 site for nature conservation purposes. If it is not, then the method moves on to a preliminary screening based on distance of the SPA from the aquaculture activities. The purpose of this is to screen out SPAs that are so distant from the location of the aquaculture activities that detailed consideration of such SPAs is not required. This is followed by consideration of the Special Conservation Interest (SCI) species for each screened in SPA to assess if their habitat requirements and feeding ecology are such that there is no potential for impacts e.g. species that feed and / or nest on terrestrial habitats away from the aquaculture activities. The next, and more detailed, step examines finer scale bird distribution in relation to aquaculture activities and is the application of the approach based on assessing spatial overlap using in particular the National Parks and Wildlife Service (NPWS) Baseline Waterbird Survey (BWS) low tide bird count data. It examines the scale of that spatial overlap and, in relation to conservation objectives of each SCI, identifies a significant negative impact for those species that respond negatively to aquaculture activities and for which there is an overlap between bird distribution at low tide and aquaculture activities of 5% or more of the total SPA population. At this detailed stage the potential for in-combination effects between aquaculture activities and other activities is also assessed.

Outcome of initial screening

Those SPAs that were considered for screening because they were located within 15 km of the aquaculture activities were:

Ballymacoda Bay SPA	(Site code 004023)
Blackwater Estuary SPA	(Site code 004028)
Ballycotton Bay SPA	(Site code 004022)
Helvick Head to Ballyquin SPA	(Site code 004192)

A consideration of the spatial overlap, potential for at a distance effects and SCI species habitat requirements and feeding ecology led the following SPA to be screened in for detailed consideration:

Ballymacoda	Bay SPA	
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(Site code 004023)

Interest features and conservation objectives of the screened in SPA

The SCIs of the Ballymacoda Bay SPA are:

Wigeon	Black-tailed Godwit
Teal	Bar-tailed Godwit
Ringed Plover	Curlew
Golden Plover	Redshank
Grey Plover	Turnstone
Lapwing	Black-headed Gull
Sanderling	Common Gull
Dunlin	Lesser Black-backed Gull

Wetland habitats

The conservation objectives for all of the SCI bird species of the Ballymacoda Bay SPA are expressed in a standard form as:

To maintain the favourable conservation condition of [species name] in Ballymacoda Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing and intensity of use of areas by [species name], other than that occurring from natural patterns of variation

The conservation objective for the SCI 'Wetland habitats' is presented as:

To maintain the favourable conservation condition of the wetland habitat in Ballymacoda Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 602 hectares, other than that occurring from natural patterns of variation

Description of aquaculture activities

The aquaculture activities relate to one method of cultivation only, the bag and trestle method within the intertidal zone. The species of shellfish licenced for cultivation are the Pacific oyster *Crassostrea gigas* and the blue mussel *Mytilus edulis*. Currently only oyster is cultivated. The bag and trestle method uses steel table-like structures in the middle to lower intertidal zone. The trestles are mostly accessed at the time of spring tides (around 3 - 10 days per month) and on average for between 2 and 5 hours on such days, although access depends on tidal and weather conditions. The shellfish are thinned out and graded as they grow. General maintenance work on the trestles and bags includes shaking and turning of bags and hand removal of fouling and seaweed to ensure a flow of water flow through the bags when they are submerged. Access is by vehicle across the intertidal at low tide. Time to harvest, depending on intake size, ranges from 2.5 to 4 years.

The specific activities assessed are a series of renewal licence applications and the new licence applications within Ballymacoda Bay and almost wholly within the SPA. The existing licences that are for renewal occupy 6.12% of the SPA. The applications for new licences are wholly within the SPA and represent 31.85% of the SPA. The renewal and new application licence locations and access routes are all in the outer section of Ballymacoda Bay. In relation to the NPWS BWS count sub-sites the renewal and new applications overlap with only three of those sub-sites: OL571, OL572 and OL573.

Assessment of aquaculture activities

The assessment of spatial overlap for each SCI species, divided by consideration of renewal licence applications alone, new licence applications alone and all licence applications together identified the following potential scale of displacement in relation to the SPA baseline population:

SCI species	Renewal licences	New licences	All licences
Wigeon	3.8%	12.4%	15.1%
Teal	0.1%	1.4%	1.7%
Ringed Plover	1.2%	16.7%	20.3%
Golden Plover	1.0%	3.3%	4.0%
Grey Plover	4.2%	15.8%	19.3%
Lapwing	0.2%	0.8%	0.9%
Sanderling	20.0%	71.8%	87.7%
Dunlin	1.6%	6.6%	8.0%
Black-tailed Godwit	7.4%	21.2%	25.9%
Bar-tailed Godwit	2.0%	26.6%	32.5%
Curlew	1.5%	5.0%	6.1%
Redshank	3.4%	12.2%	14.9%
Turnstone	0.8%	8.0%	9.7%
Black-headed Gull	1.3%	4.7%	5.7%
Common Gull	1.5%	6.1%	7.4%
Lesser Black-backed Gull	0.3%	0.8%	0.9%

The SCI 'wetland habitat' is not subject to a potential adverse impact under any aquaculture licence scenario.

In-combination effects

The assessment of in-combination effects screened in and considered the following activities occurring in and around Ballymacoda Bay:

- Coastal recreation
- Bait digging
- Fisheries and shellfisheries

No in-combination impacts were identified.

Conclusion of the assessment

The assessment that has been undertaken has identified the potential for significant adverse impact on a number of the SCI species of the Ballymacoda Bay SPA, with the potential for that adverse impact varying dependent on whether the renewal applications are considered alone, the new applications are considered alone and the two categories of application are considered together.

The renewal applications alone have the potential to result in significant adverse impact on the following SCI species of the Ballymacoda Bay SPA:

- Sanderling
- Black-tailed Godwit

The new applications alone have the potential to result in significant adverse impact on the following SCI species of the Ballymacoda Bay SPA:

- Wigeon
- Ringed Plover
- Grey Plover
- Sanderling
- Black-tailed Godwit
- Bar-tailed Godwit

The renewal applications and the new applications considered together have the potential to result in significant adverse impact on the following SCI species of the Ballymacoda Bay SPA:

- Wigeon
- Ringed Plover
- Grey Plover
- Sanderling
- Dunlin
- Black-tailed Godwit
- Bar-tailed Godwit
- Common Gull

The following SCI species of the Ballymacoda Bay SPA are not subject to a potential adverse impact under any aquaculture licence scenario:

- Teal
- Golden Plover
- Lapwing
- Curlew
- Redshank
- Turnstone
- Black-headed Gull
- Lesser Black-backed Gull

In addition the SCI 'wetland habitat' is not subject to a potential adverse impact under any aquaculture licence scenario.

Consideration of potential in-combination impacts has been made and the conclusions above remain as stated as no in-combination impacts have been identified.

On the basis of the findings in Annex II under the licencing scenarios presented, it is advised that the licencing of all activities (renewals and applications), would result in what is considered significantly high levels of displacement for 8 shorebird species, and the levels are such that there are no likely clear mitigation measures applicable that would result in acceptable levels of disturbance.

The renewal of existing licences alone, may be feasible on the basis that the two SCI species that might be subject to[®] significant displacement, i.e., Sanderling and Black-tailed Godwit, are considered of 'favourable' conservation status. In addition, monitoring has indicated that mean counts in the SPA, over the last five years, for Sanderling are almost twice the 'baseline population' level and almost 1.5 times the baseline population level for Black-tailed Godwit². Furthermore, as pointed out in Annex II, if the most recent I-WeBS 5-year-mean peak is considered for Sanderling, the percentage displacement as a consequence of the proposed licencing regime would likely decrease to 10%. It is important to note that any positive licencing actions should be conditional on review of monitoring outputs.

² The Irish Wetland Bird Survey (I-WeBS) - www.birdwatch.ie

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Annex I

Report supporting Appropriate Assessment of Aquaculture in Ballymacoda (Clonpriest & Pillmore) SAC (Site Code: 00077)

Marine Institute

Rinville

Oranmore, Co. Galway

Version: October 2017

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1 PREFACE

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In Ireland, the implementation of Article 6 of the Habitats Directive in relation to aquaculture and fishing projects and plans that occur within designated sites is achieved through sub-Article 6(3) of the Directive. Fisheries not coming under the scope of Article 6.3, i.e. those fisheries not subject to secondary licencing are subject to Risk Assessment. Identified risks to designated features can then be mitigated and deterioration of such features can be avoided as envisaged by sub-article 6.2.

Fisheries, other than oyster fisheries, and aquaculture activities are licenced by the Department of Agriculture, Food and the Marine (DAFM). Oyster fisheries (in fishery order areas) are licenced by Inland Fisheries Ireland under the auspices of the Department of Climate Action and Environment (DCCEA). The Habitats Directive is transposed in Ireland in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Appropriate Assessments of aquaculture and Risk Assessment of fishing activities are carried out against the Conservation Objectives and more specifically on the version of the Conservation Objectives that are available at the time of the Assessment, for designated ecological features, within the site, as defined by the National Parks and Wildlife Service (NPWS). NPWS are the competent authority for the management of Natura 2000 sites in Ireland. Obviously, aquaculture and fishing operations existed in coastal areas prior to the designation of such areas under the Directives. Ireland is thereby assessing both existing and proposed aquaculture and fishing activities in such sites. This is an incremental process, as agreed with the EU Commission in 2009, and will eventually cover all fishing and aquaculture activities in all Natura 2000 sites.

The process of identifying existing and proposed activities and submitting these for assessment is, in the case of fisheries projects and plans, outlined in S.I. 290 of 2013. Fisheries projects or plans are taken to mean those fisheries that are subject to annual secondary licencing or authorization. Here, the industry or the Minister may bring forward fishing proposals or plans which become subject to assessment. These Fishery Natura Plans (FNPs) may simply be descriptions of existing activities or may also include modifications to activities that mitigate, prior to the assessment, perceived effects to the ecology of a designated feature in the site. In the case of other fisheries, that are not projects or plans, data on activity are collated and subject to a Risk Assessment against the Conservation Objectives. Oyster fisheries, managed by DCENR, do not come under the remit of S.I. 290 of 2013 but are defined as projects or plans as they are authorized annually and are therefore should be subject to Appropriate Assessment.

In the case of aquaculture, DAFM receives applications to undertake such activity and submits a set of applications, at a defined point in time, for assessment. The FNPs and aquaculture applications are then subject to Appropriate Assessment. If the Appropriate Assessment or the Risk Assessment process finds that the possibility of significant effects cannot be discounted or that there is a likelihood of negative consequence for designated features then such activities will need to be mitigated further if they are to continue. The assessments are not explicit on how this mitigation should be achieved but rather indicate whether mitigation is required or not and what results should be achieved.

2 EXECUTIVE SUMMARY

2.1 THE SAC

Ballymacoda (Clonpriest & Pillmore) SAC is located 6km southwest of Youghal town, Co. Cork. The SAC site encompasses the lower tidal area of the Womanagh River and extends to the low tide mark at inner Youghal Bay. The inner estuarine area of the site is well sheltered with sediment types varying from muds to muddy sands while the relatively more exposed outer seaward area is typified by fine rippled sands. Designated marine habitats include Estuaries (1130) and Mudflats and sand flats not covered by seawater at low tide (1140) each of which support soft sedimentary communities and community complexes. The site also contains, and is designated for Salicornia and other annuals colonizing mud and sand (1310) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330). Conservation Objectives for marine habitats and constituent communities within the SAC were identified by NPWS (2015a) and relate primarily to the requirement to maintain habitat distribution, structure and function, as defined by characterizing (dominant) species in these habitats. For designated species the objective is to maintain various attributes of the populations including population size, habitats quality and the distribution of the species.

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2.3 THE APPROPRIATE ASSESSMENT PROCESS

The function of an Appropriate Assessment and Risk Assessment is to determine if the ongoing and proposed aquaculture activities are consistent with the Conservation Objectives for the Natura site or if such activities will lead to deterioration in the attributes of the habitats and species over time and in relation to the scale, frequency and intensity of the activities. NPWS (2015a) provide guidance on interpretation of the Conservation Objectives which are, in effect, management targets for habitats and species in the SAC. This guidance is scaled relative to the anticipated sensitivity of habitats and species to disturbance by the proposed activities. Some activities are deemed to be wholly inconsistent with long term maintenance of certain sensitive habitats while other habitats a 15% threshold of overlap between a disturbing activity and a habitat is given in the NPWS guidance. Below this threshold disturbance is deemed to be non-significant. Disturbance is defined as that which leads to a change in the characterizing species of the habitat (which may also indicate change in structure and function). Such disturbance may be temporary or persistent in the sense that change in characterizing species may recover to pre-disturbed state or may persist and accumulate over time.

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pathway for interaction, any impact on the conservation features and are therefore excluded from further consideration. The next phase is the Natura Impact Statement where interactions (or risk of) are identified. Further to this, an assessment on the significance of the likely interactions between activities and conservation features is conducted. Mitigation measures (if necessary) will be introduced in situations where the risk of significant disturbance is identified. In situations where there is no obvious mitigation to reduce the risk of significant impact, it is advised that caution should be applied in licencing decisions. Overall the Appropriate Assessment is both the process and the assessment undertaken by the competent authority to effectively validate this Screening Report and/or NIS. It is important to note that the screening process is considered conservative, in that other activities which may overlap with habitats but which may have very benign effects are retained for full assessment. In the case or Risk Assessments consequence and likelihood of the consequence occurring are scored categorically as separate components of risk. Risk scores are used to indicate the requirement for mitigation.

2.4 DATA SUPPORTS

Distribution of habitats and species population data are provided by NPWS¹. Scientific reports on the potential effects of various activities on habitats and species have been compiled by the MI and provide the evidence base for the findings. The profile of aquaculture activities was provided by BIM. The data supporting the assessment of individual activities vary and provides for varying degrees of confidence in the findings.

2.5 FINDINGS

2.5.1 Aquaculture and Habitats/Species:

In Ballymacoda (Clonpriest & Pillmore) SAC there is one valid oyster production licence with a further five new applications. The likely interaction of aquaculture activity occurring at licenced sites, application sites and access routes with the conservation features (habitats and species) of the site was considered. An initial screening exercise resulted in a number of habitat features and species being excluded from further consideration. None of the aquaculture activities (existing and/or proposed) overlaps or likely interacts with the following features or species, and therefore the following the Qualifying Interests were excluded from further consideration in the assessment; Estuaries (1130), Salicornia and other annuals colonizing mud and sand (1310) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330).

A full assessment was carried out on the likely interactions between aquaculture operations and the feature Annex 1 habitat Mudflats and sandflats not covered by seawater at low tide (1140). The likely effects of existing and proposed aquaculture activities were considered in light of the sensitivity of the constituent community of the Annex 1 habitat 1140 that was shown to overlap with current and proposed intertidal oyster namely; Sand with polychaetes and bivalves community complex.

In summary, it is concluded, on the basis of spatial overlap and sensitivity analysis, that current and proposed intertidal aquaculture activities, both individually and in-combination, do not pose a risk of significant disturbance to the habitat features of in Ballymacoda (Clonpriest & Pillmore) SAC. However, the risk posed by the introduction of ½-grown oysters from France cannot be discounted.

¹ NPWS Geodatabase Ver: September 2015 - <u>http://www.npws.ie/mapsanddata/habitatspeciesdata/</u>



3 INTRODUCTION

This document assesses the potential ecological interactions of aquaculture activities within the Ballymacoda (Clonpriest & Pillmore) SAC (Site code: 000077) on the Conservation Objectives of the site. The information upon which this assessment is based is a list of applications and extant licences for aquaculture activities administered by the Department of Agriculture Food and Marine (DAFM) and forwarded to the Marine Institute as of May 2015; as well as aquaculture profiling information provided on behalf of the operators by Bord Iascaigh Mara (April 2016). The spatial extent of aquaculture licences is derived from a database managed by the DAFM² and shared with the Marine Institute.

4 CONSERVATION OBJECTIVES FOR BALLYMACODA (CLONPRIEST & PILLMORE) SAC

The Appropriate Assessment of aquaculture in relation to the Conservation Objectives for Ballymacoda (Clonpriest & Pillmore) SAC is based on Version 1.0 of the objectives (NPWS 2015a - Version 19 Feb 2015) and supporting documentation (NPWS 2014 - Version 1 Jan 2014; NPWS 2015b - Version 1 Feb 2015). The spatial data for conservation features was provided by NPWS³.

4.1 THE SAC EXTENT

Ballymacoda (Clonpriest & Pillmore) SAC is located near the eastern boundary of Co. Cork, 6km southwest of Youghal town. The site comprises the estuary of the Womanagh River, a substantial river which drains a large agricultural catchment. Part of the tidal section of the river is included within the site and the boundary extends to the low tide mark on the seaward side. The inner part of the estuary is well sheltered by a stabilised sandy peninsula (Ring peninsula). Sediment types vary from muds to muddy sands in the inner part to fine rippled sands in the outer exposed part. The spatial extent of Ballymacoda (Clonpriest & Pillmore) SAC is illustrated in Figure 4.1 below.

4.2 QUALIFYING INTERESTS (SAC)

The SAC is designated for the following habitats and species (NPWS 2015a), as listed in Annex I and Annex II of the Habitats Directive:

- Estuaries (1130)
- Mudflats and sandflats not covered by seawater at low tide (1140)
- Salicornia and other annuals colonizing mud and sand (1310)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

The spatial extent of the Qualifying Interest Annex 1 marine habitat Estuaries (1130) and Mudflats and sandflats not covered by seawater at low tide (1140) are illustrated in Figure 4.2 and Figure 4.3

² DAFM Aquaculture Database version Aquaculture: May, 2015

³ NPWS Geodatabase Ver: September 2015 - <u>http://www.npws.ie/mapsanddata/habitatspeciesdata/</u>

respectively (from NPWS (2015b). Constituent communities and community complexes recorded within the Annex 1 habitats of Estuaries (1130) and Mudflats and sandflats not covered by seawater at low tide (1140) are listed in NPWS (2015a), and presented here in Table 4.1 and Figure 4.4 below.

Annex I Habitats **Community Type** Mudflats and sandflats not covered Estuaries (1130) by seawater at low tide (1140) Sandy mud with Hediste 1 1 diversicolor Tubificoides and benedii community Sand with polychaetes and 1 1 bivalves community complex

Table 4.1 – Marine community types recorded at Ballymacoda (Clonpriest & Pillmore) SAC and the Annex I habitats in which they occur (NPWS 2015b).



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Figure 4.2 - The spatial extent of the marine Annex I Qualifying Interest of 1130 Estuaries within the Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2015b).



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Figure 4.3 - The spatial extent of the marine Annex I Qualifying Interest of 1140 Mudflats and sandflats not covered by seawater at low tide within the Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2015b).



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Figure 4.4 - Marine community types recorded within the marine Annex I Qualifying Interest of Estuaries (1130) and Mudflats and sandflats not covered by seawater at low tide (1140) within the Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2015b).

4.3 CONSERVATION OBJECTIVES FOR BALLYMACODA - CLONPREIST AND PILLMORE SAC

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The Conservation Objectives for the Qualifying Interests were identified in NPWS (2015a). The natural condition of the designated features should be preserved with respect to their area, distribution, extent and community distribution. Habitat availability should be maintained for designated species and human disturbance should not adversely affect such species. The features, objectives and targets of each of the Qualifying Interests within the SAC are listed in Table 4.2 below.

Table 4.2 - Conservation Objectives and targets for marine habitats and species in Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2014, 2015a, 2015b). Annex I and II features listed in **bold**.

Feature (Community Type)	Objective	Target(s)
Estuaries (1130)	Maintain favourable conservation condition	160ha: Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species
(Sandy mud with <i>Hediste</i> diversicolor and Tubificoides benedii community)	Maintain favourable conservation condition	96ha; Likely area derived from intertidal and subtidal surveys undertaken in 2011.
(Sand with polychaetes and bivalves community complex)	Maintain favourable conservation condition	6ha; Likely area derived from intertidal and subtidal surveys undertaken in 2011.
Mudflats and sandflats not covered by seawater at low tide (1140)	Maintain favourable conservation condition	301.72ha: Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species
(Sandy mud with Hediste diversicolor and Tubificoides benedii community)	Maintain favourable conservation condition	90.94ha; Likely area derived from intertidal and subtidal surveys undertaken in 2011.
(Sand with polychaetes and bivalves community complex)	Maintain favourable conservation condition	210.77ha; Likely area derived from intertidal and subtidal surveys undertaken in 2011.
Salicornia and other annuals colonizing mud and sand (1310)	Restore favourable conservation condition	Estimated area of 1.57ha (n.b. further unsurveyed areas maybe present within the site); Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)	Restore favourable conservation condition	Four sub-sites giving a total estimated area of 28.36ha (n.b. further unsurveyed areas maybe

Feature (Community Type)	Objective	Target(s)
		present within the site); Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and managing levels of negative species.

4.4 SCREENING OF ADJACENT SAC OR FOR EX-SITU EFFECTS ARDMORE HEAD SAC AND GREAT ISLAND CHANNEL SAC

The Ardmore Head SAC (002123) and Great Island Channel SAC (001058) are located to the east and west of Ballymacoda (Clonpriest & Pillmore) SAC respectively (Figure 4.5). The characteristic features of these SACs are identified in Table 4.3 where a preliminary screening is carried out on the likely interaction with aquaculture activities based primarily upon the likelihood of spatial overlap. As it was deemed that there are no ex-situ effects and no effects on features in adjacent SACs both Ardmore Head SAC (002123) and Great Island Channel SAC (001058) sites were screened out.

Table 4.3 - Qualifying Interest of SAC sites adjacent to the Ballymacoda (Clonpriest & Pillmore) SAC with initial screening assessment on likely interactions with aquaculture activities.

Natura site (Site code)	Qualifying features (habitat/species code)	Aquaculture initial screening
Ardmore Head SAC (002123) Great Island Channel	European dry heaths (4030)	No spatial overlap or likely interactions with aquaculture activities within Ballymacoda (Clonpriest & Pillmore) SAC – excluded from further analysis.
(001058)	Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)	No spatial overlap or likely interactions with aquaculture activities within Ballymacoda (Clonpriest & Pillmore) SAC – excluded from further analysis.
Great Island Channel SAC (001058)	Mudflats and sandflats not covered by seawater at low tide (1140)	No spatial overlap or likely interactions with aquaculture activities within Ballymacoda (Clonpriest & Pillmore) SAC – excluded from further analysis.
	Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)	No spatial overlap or likely interactions with aquaculture activities within Ballymacoda (Clonpriest & Pillmore) SAC – excluded from further analysis.



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Figure 4.5 - SACs adjacent to the Ballymacoda (Clonpriest & Pillmore) SAC

5 DETAILS OF THE PROPOSED PLANS AND PROJECTS

5.1 DESCRIPTION OF AQUACULTURE ACTIVITIES

Aquaculture activities within the SAC occur within the Qualifying Interest of Mudflats and sandflats not covered by seawater at low tide (1140) Youghal Bay (Figure 5.1), focussing on the cultivation of the Pacific oyster *C. gigas*. Descriptions of spatial extents of existing and proposed aquaculture activities within the Qualifying Interest were calculated using coordinates of activity areas in a GIS. The spatial extent of the cultivation activities (current and proposed) overlapping the habitat features is presented in Table 5.1 (data provided by DAFM). In 2015 there was 1 existing licence for oyster production and a further 5 new applications that are found within the boundary of teh SAC. A further three sites (2 licenced and 1 application) are located on the seaward edge of the SAC (Figure 5.1).

5.1.1 Intertidal Oyster Cultivation

Currently only *Crassostrea gigas* oysters (triploids and diploids from hatchery and naturally settled sources in France) are farmed within Ballymacoda (Clonpriest & Pillmore) SAC. Cultivation is a form of intensive culture with oyster seed cultivated using the bag and trestle method within the intertidal zone, either to half-grown or fully-grown size. The bag and trestle method uses steel table-like structures on the middle to lower intertidal zone, arrayed in double rows with wide gaps between the paired rows to allow for access. Trestles used are made from steel and typically between 3 in length, are approximately 1 metre in width and stand between 0.5 and 0.7 metre in height.

In general, In Ireland oyster farms are positioned between mean Low Water Spring and mean Low Water Neap, allowing on average between 2 and 5 hours exposure depending on location, tidal and weather conditions. The trestles hold typically hold six HDPE mesh bags approximately 1m by 0.5m by 10cm, using rubber and wire clips to close the mesh bags and to fasten them to the trestles. Typically the production cycle begins when G4 to G8 (6 – 10mm, respectively) oyster seed is brought to the service site either in spring or late summer of each year. Oyster bags vary in mesh size (4mm, 6mm, 9mm and 14 mm) depending on oyster stock grade. For example 6mm seed is put into 4mm mesh bags at a ratio of 1000 to 1500 seed per bag. Oysters are thinned out and graded as the oysters grow. As the oysters grow, they will be taken to the handling / sorting facility twice per year for grading and re-packing, and returned to the trestles. In the final stage they will be 'hardened' in the upper intertidal area, before removal, grading, bagging and delivery. Time to harvest, depending on intake size, ranges from 2.5 to 4 years, where they will have reached 60 or 80 to the kilo. At reaching market size oysters are in bags of about 120.

There is one producer farming in the bay. The farm located on the intertidal is accessed during spring tides (at low tide) using tractors. Preparatory work is conducted in the service areas in the intervening periods, including grading and packing, preparation of bags and trestles and general maintenance work which includes shaking and turning of bags, and hand removal of fouling and seaweed to ensure maintenance of water flow through the bags when submerged.

The overlap of the single exisiting licenced site is extremely small at 0.025ha (Table 5.1) and is likely a mapping artefact.

5.1.1.1 Proposed Oyster Cultivation Activity

There are a total of five new applications for production in the SAC all of which have indicated their source of seed will be from hatcheries currently used by the existing farm within the bay (see Figure 5.1 and Table 5.1). All new applicants are to use bag and trestles as the method of cultivating their oysters.

Table 5.1 – Spatial extent of aquaculture activity (i.e. spatial overlap in hectares and percentage) within the Qualifying Interest of 1140 (Mudflats and sandflats not covered by seawater at low tide) in Ballymacoda (Clonpriest & Pillmore) SAC. Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS 2015b.

Status	1140 Mudflats and sandflats not c (301.71	overed by seawater at low tide 7ha)
	Area overlap ha	% overlap
Licensed	0.025	0.008
Application	95.679	31.711
Totals	95.70	31.719

5.1.1.2 Access Routes

There is currently one main access route used by tractors and trailers in the Ballymacoda (Clonpriest & Pillmore) SAC (Figure 5.1). This existing access route which extends from the upper shore at Ring to the production area overlaps with 0.23% of the Qualifying Interest of 1140 Mudflats and sandflats not covered by seawater at low tide (Table 5.2).

New applications are located in the inner bay and to the north of the bay. Proposed access routes for the new applications overlaps with less than 1% of the Qualifying Interest of 1140 Mudflats and sandflats not covered by seawater at low tide (Figure 5.1 and Table 5.2).

Table 5.2 - Spatial extent of aquaculture access routes (existing and proposed) overlapping with the Qualifying Interest 1140 Mudflats and sandflats not covered by seawater at low tide in Ballymacoda (Clonpriest & Pillmore) SAC. Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS 2015b.

Status	1140 Mudflats and sandflats not covered by seawater at low tide (301.717ha)									
	Area overlap ha	% overlap								
Existing Access Routes	0.694	0.230								
Proposed Access Routes	2.776	0.920								
Totals	3.470	1.150								



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Figure 5.1 - Aquaculture sites (licenced and applications) and access routes (existing and proposed) relative to the marine community types recorded within the marine Annex (Qualifying Interest 1140 Mudflats and sandflats not covered by seawater at low tide of Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2015b).

6 NATURA IMPACT STATEMENT FOR THE PROPOSED ACTIVITIES

The potential ecological effects of activities on the Conservation Objectives for the site relate to the physical and biological effects of fishing gears, aquaculture cultivation structures and activities and human activities on designated species, intertidal 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 aquaculture activities during the lifetime of the proposed plans and projects and the nature of each of these activities in conjunction with the sensitivity of the receiving environment.

6.1 AQUACULTURE

Within the Qualifying Interest of the Ballymacoda (Clonpriest & Pillmore) SAC the species cultured is the Pacific oyster *C. gigas* in bags & trestles in the intertidal area.

Details of the potential biological and physical effects of these aquaculture activities on the habitat features, their sources and the mechanism by which the impact may occur are summarised in Table 6.1 below. The impact summaries identified in the table are derived from published primary literature and review documents that have specifically focused upon the environmental interactions of mariculture (e.g. Black 2001; McKindsey et al 2007; NRC 2010; O'Beirn et al 2012; Cranford et al 2012; ABPMer 2013a-h).

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.

One other aspect to consider in relation to the culture of shellfish is the potential risk of alien species arriving into an area among consignments of seed or stock sourced from outside of the area under consideration. 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 alien 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).

Oysters grown in other bays in Ireland and 'finished' in Ballymacoda (Clonpriest & Pillmore) SAC, would not appear to present a risk of introduction of non-native species assuming best practice is applied (e.g. <u>http://invasivespeciesireland.com/cops/aquaculture/</u>).

Furthermore, the culture of a non-native species (e.g. the Pacific Oyster – C. gigas) may also presents a risk of establishment of this species in the SAC. Recruitment of C. 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.

Intertidal shellfish culture: Oysters are 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. Similar to suspended culture above, 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. If tidal height is high and large volumes of water moved through the culture area an acceleration of water flow can occur beneath the trestles and bags, resulting in a scouring effect or erosion and no accumulation of material.
- Turbidity of water as with suspended mussel culture, oysters have very plastic response to
 increasing suspended matter in the water column with a consequent increase in faecal or
 pseudo-faecal production. Oysters can be cultured in estuarine areas (given their polyhaline
 tolerance) 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 increased
 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 resuspend and disperse material away from the trestles.

Shading may be an issue as a consequence of the structures associated with intertidal oyster culture. The trestles and bags are held relatively close to the seabed and as a consequence may shade sensitive species (e.g. seagrasses) found underneath.

Physical disturbance caused by compaction of sediment from foot traffic and vehicular traffic. 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.

Other considerations: Due to the nature of the (high density) of shellfish culture methods the risk of transmission of disease within cultured stock is high. However, given that *C. gigas* does not appear to occur in the wild the risk of disease transmission to 'wild' stock is considered low. The risk of disease transmission from cultured oysters to other species is unknown.

Table 6.1 - Potential indicative environmental pressures of aquaculture activities within the Qualifying Interest of 1140 Mudflats and sandflats not covered by seawater at low tide within the Ballymacoda (Clonpriest & Pillmore) SAC.

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Activity	Pressure category	Pressure	Potential effects	Equipment / Gear	Duration (days)	Time of year	Factors constraining the activity
Intertidal Oyster Culture	Physical	Current alteration	Structures may alter the current regime and resulting increased deposition of fines or scouring.	Trestles and bags and service equipment	365	All year	At low tide only
		Surface disturbance	Ancillary activities at sites, e.g. servicing, transport increase the risk of sediment compaction resulting in sediment changes and associated community changes.				
		Shading	Prevention of light penetration to seabed potentially impacting light sensitive species				
	Biological	Non-native species introduction	Potential for non-native species (C. gigos) to reproduce and proliferate in SAC. Potential for alien species to be included with culture stock (hitch- hikers).				
		Disease risk	In event of epizootic the ability to manage disease in uncontained subtidal oyster populations is compromised.				
		Organic enrichment	Faecal and pseudofaecal deposition on seabed potentially altering community composition				
	Physical	Current alteration	Structures may alter the current regime and resulting increased deposition of fines or scouring.				

7 SCREENING OF AQUACULTURE ACTIVITIES

A screening assessment is an initial evaluation of the possible impacts that activities may have on the Qualifying Interests. The screening, is a filter, which may lead to exclusion of certain activities or Qualifying Interests from Appropriate Assessment proper, thereby simplifying the assessments, if this can be justified unambiguously using limited and clear cut criteria. Screening is a conservative filter that minimises the risk of false negatives.

In this assessment screening of the Qualifying Interests against the proposed activities is based primarily on spatial overlap i.e. if the Qualifying Interests overlap spatially with the proposed activities then significant impacts due to these activities on the Conservation Objectives for the Qualifying Interests is not discounted (not screened out) except where there is absolute and clear rationale for doing so. Where there is relevant spatial overlap full assessment is warranted. Likewise if there is no spatial overlap and no obvious interaction is likely to occur, then the possibility of significant impact is discounted and further assessment of possible effects is deemed not to be necessary. Table 5.1 and Table 5.2 presents the spatial overlap of aquaculture activities with the Qualifying Interest of 1140 (Mudflats and sandflats not covered by seawater at low tide) within the Ballymacoda (Clonpriest & Pillmore) SAC.

7.1 AQUACULTURE ACTIVITY SCREENING

Where the overlap between aquaculture activity and a feature is zero and there is no likely interaction it is screened out and not considered further. Therefore, the following habitats are excluded from further consideration in this assessment:

- Estuaries (1130)
- Salicornia and other annuals colonizing mud and sand (1310)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

Furthermore, of the two community types (see Table 4.1) listed under the habitat features (1140), one (i.e. Sandy mud with *Hediste diversicolor* and *Tubificoides benedii* community) had no spatial overlap with any aquaculture activities. On this basis, this community type was excluded from further analysis of aquaculture interaction.

When overlap was observed it was quantified in a GIS application and presented on the basis of coverage of specific activity (representing different pressure types i.e. activity occurring at trestles and access routes), licence status (licenced or application) intersecting with designated conservation features and/or sub-features (community types). Table 7.1 below provides an overview of the overlap of aquaculture activities and the specific marine community type of Sand with polychaetes and bivalves community complex within the broad habitat feature of 1140 (Mudflats and sandflats not covered by seawater at low tide). It is important to note that the spatial overlap of a licenced culture site and the qualifying interests of the site is likely a mapping artefact Tables 5.1 and 7.1), but for completeness sake, it is carried forward in the assessment.

Given the spatial overlap a full assessment (see Section 8) was carried out on the likely interactions of aquaculture activities at licensed and application aquaculture sites and access routes with the

community types of Sand with polychaetes and bivalves community complex community complex and (see Table 7.1 and Table 7.2).

Table 7.1 – Spatial extent of aquaculture activity (i.e. spatial overlap in hectares and percentage) within constituent community type of Sand with polychaetes and bivalves community complex within the Qualifying Interest of 1140 (Mudflats and sandflats not covered by seawater at low tide) in Ballymacoda (Clonpriest & Pillmore) SAC. Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS 2015b.

Status	Sand with polychaetes and bi (210.77	valves community complex 3ha)
	Area overlap ha	% overlap
Licensed	0.025	0.012
Application	95.679	45.394
Cumulative	95.704	45.406

Table 7.2 - Spatial extent of aquaculture access routes activity (i.e. spatial overlap in hectares and percentage) within constituent community type of Sand with polychaetes and bivalves community complex within the Qualifying Interest of 1140 (Mudflats and sandflats not covered by seawater at low tide) in Ballymacoda (Clonpriest & Pillmore) SAC. Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS 2015b. Spatial data provided by DAFM Habitat data provided in NPWS 2015b.

Status	Sand with polychaetes and bivalves community complex (210.773ha)									
	Area overlap ha	% overlap								
Existing Access Routes	0.694	0.329								
Proposed Access Routes	2.776	1.317								
Totals	3.470	1.646								

8 ASSESSMENT OF AQUACULTURE ACTIVITIES

8.1 DETERMINING SIGNIFICANCE

The significance of the possible effects of the proposed activities on habitats, as outlined in the Natura Impact Statement (Section 6) and subsequent screening exercise (Section 7), is determined here in the assessment. The significance of effects is determined on the basis of Conservation Objective guidance for constituent habitats and species (Figures 4.2, 4.3, 4.4 and NPWS 2014, 2015a, 2015b).

Within the Ballymacoda (Clonpriest & Pillmore) SAC the Qualifying Interest 1140 (Mudflats and sandflats not covered by seawater at low tide) was considered subject to potential disturbance and therefore, carried further in this assessment.

For broad habitats and community types (Figures 4.2, 4.3, 4.4) significance of impact is determined in relation to, first and foremost, spatial overlap (see Section 5; Tables 5.1, 5.2 and Section 7; Tables 7.1, 7.2). Subsequent disturbance and the persistence of disturbance are considered as follows:

- The degree to which the activity will disturb the Qualifying Interest. By disturb is meant change in the characterising species, as listed in the Conservation Objective guidance (NPWS 2015b) for constituent communities. 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 (see Section 8.2 below).
- 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.
- The area of communities or proportion of populations disturbed. In the case of community disturbance (continuous or ongoing) of more than 15% of the community area it is deemed to be significant.

Effects will be deemed to be significant when cumulatively they lead to long-term change (persistent disturbance) in an impacted area greater than 15% of the area of the broad habitat/features or constituent communities, whichever is larger.



Figure 8.1 - Determination of significant effects on community distribution, structure and function for sedimentary habitats (following NPWS 2015b).

8.2 SENSITIVITY AND ASSESSMENT RATIONALE

This assessment used a number of sources of information in assessing the sensitivity of the characterising species of each community recorded within the benthic habitats of the Ballymacoda (Clonpriest & Pillmore) SAC. 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 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) and other primary literature. It must be noted that 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 (NPWS 2015b). 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. Mearl and Zostera. Other literature cited in the assessment does provide a greater degree of confidence in the conclusions. For example, the output of a recent study has provided greater confidence in terms of assessing likely interactions between intertidal oyster culture and marine habitats (Forde et al 2015). 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, communities and habitats of conservation interest, the separate components of sensitivity (intolerance, recoverability) are relevant in relation 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. They become significantly disturbing if more than 15% of the community is thus exposed (NPWS 2015b).
- 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 for at least a
 proportion of time.

The sensitivities of the community types (or surrogates) found within the Ballymacoda (Clonpriest & Pillmore) SAC to pressures similar to those caused by aquaculture (e.g. smothering, organic enrichment and physical disturbance) are identified in Table 8.1. 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, in Table 8.2. 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 high for those 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.
- Sensitivity of certain taxonomic groups to increased sedimentation is expected to be low for species which live within the sediment and deposit feeders; and high for those sensitive to clogging of respiratory or feeding apparatus by silt or fine material.
- 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, 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).

8.3 ASSESSMENT OF THE EFFECTS OF AQUACULTURE PRODUCTION ON THE CONSERVATION OBJECTIVES FOR HABITAT FEATURES IN THE BALLYMACODA (CLONPRIEST & PILLMORE) SAC.

Aquaculture pressures on a given habitat are related to 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 associated with the culture organism, the density of culture organisms, the duration of the culture activity and the type of activity are all important considerations when considering risk of disturbance to habitats and species.

NPWS (2015a) provide lists of species characteristic of benthic communities that are defined in the Conservation Objectives. The species defined are typical of fine sedimentary habitats as well as where relevant, intertidal habitats (tolerant of desiccation and physical stress). For the most part, these intertidal communities are typically impoverished with low numbers of species and overall abundances.

The constituent communities identified in the broad Annex 1 feature of 1140 Mudflats and sandflats not covered by seawater at low tide are:

- Sandy mud with Hediste diversicolor and Tubificoides benedii community (No overlap with aquaculture)
- Sand with polychaetes and bivalves community complex

For Mudflats and sandflats not covered by seawater at low tide (1140) there are a number of attributes (with associated targets) relating to the following broad habitat features as well as constituent community types;

- 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 (1140). The habitat area is likely to remain stable.
- 2. Community Distribution (conserve a range of community types in a natural condition) this attribute considered interactions with the two community types listed above. Of the two communities, one had overlap with aquaculture activities (i.e. Sand with polychaetes and bivalves community complex). This community type is typical muddy sand to sandy habitat type that occurs in the intertidal, and so can be exposed to a range of physical and hydrodynamic pressures. Table 8.1 and Table 8.2 respectively list the constituent community (or surrogates) habitats and species typically characterising Sand with polychaetes and bivalves community complex. Both Table 8.1 and Table 8.2 provide a commentary of sensitivity to a range of pressures. The risk scores are derived from a range of sources identified above. The pressures are listed as those likely to result from intertidal oyster culture (bags and trestle) within the SAC.

Table 8.4 below identifies the likely interactions between the relevant aquaculture activities and the broad habitat feature of 1140 Mudflats and sandflats not covered by seawater at low tide and constituent community type (i.e. Sand with polychaetes and bivalves community complex). Table 8.4 also provides broad conclusions and justifications on whether the activity is considered disturbing to the feature in question. It must be noted that the sequence of distinguishing disturbance is as highlighted above, whereby activities with spatial overlap on habitat features are assessed further for their ability to cause persistence disturbance on the habitat. If persistent disturbance is likely then the spatial extent of the overlap is considered further. If the proportion of the overlap exceeds a threshold of 15% disturbance of the habitat then any further licencing should be informed by interdepartmental review and consultation (NPWS 2015a).

On the basis of targeted research (Forde et al 2015) and the fact that activities occurring at intertidal oyster culture trestles is considered non-disturbing to intertidal sedimentary habitats, further assessment (i.e. spatial analysis) is not required.

While Forde et al (2015) reported activities occurring at access routes might negatively impact intertidal community types, at Ballymacoda (Clonpriest & Pillmore) SAC existing and proposed access routes activity (individually or combined) do not extend beyond 15% of the community type (Table 7.2 and Table 8.5).

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 (*C. gigas*) itself is a non-native species. Recruitment of *C. 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. The residence time is Ballymacoda (Clonpriest & Pillmore) SAC is likely short given the large intertidal component of the SAC in addition to significant drainage from the Womanagh River. On this basis, the risk of successful establishment of the pacific oyster in Ballymacoda (Clonpriest and Pilmore) SAC is considered low.

Given that the aquaculture profile identifies, as a practice, the introduction to the SAC of ½ grown oysters from France for ongrowing, the risk of introduction of alien species as 'hitchhikers' cannot be discounted.

8.3.1 Conclusion Summary

In summary, based upon the spatial overlap and sensitivity analysis, it is concluded that existing and proposed aquaculture activities at trestle sites and at access routes, individually and in-combination, do not pose a risk of significant disturbance to the conservation of the habitat feature of Mudflats and sandflats not covered by seawater at low tide (1140) or the constituent community types (Table 8.5). In the absence of any management plan or monitoring programme, the risk of introduction of alien species as 'hitchhikers' with ½ grown oysters from France cannot be discounted.

Table B.1 - Matrix showing the characterising habitats sensitivity scores x pressure categories for habitats (or surrogates) in Ballymacoda (Clonpriest & Pillmore) SAC (ABPMer 2013a-h) (Table 8.3 provides the code for the various categorisation of sensitivity and confidence.)

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Community Type (EUNIS code)	Surface Disturbance	Shallow Disturbance	Deep Disturbance	Trampling – access by foot	Trampling – access by vehicle	Extraction	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	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- phytopiankton	Decrease in oxygen levels-sediment	Decrease in oxygen levels-water column	Introduction of non-native species	Removal of Target Species	Removal of Non-target species	Introduction of antifoulants	Introduction of medicines	Introduction of hydrocarbons	Prevention of light reaching seabod/features
Muddy sand to coarse sediment with Pygospio elegans community complex (A2.23 – Polychaete/amphipod- dominated fine sand shore)	NS (*)	L (*)	L (*)	NS (*)	L-NS (*)	L-M (*)	L-M (*)	L-M (*)	L-M (*)	м (*)	L-M (*)	NS (*)	N5 (*)	NS (*)	NS (*)	NS (")	L-NS (*)	L-NS (*)	NS (***)	NS (*)	NS (*)	NS (*)	NS (*)	L (?)	NS (*)
Sand with Angulus tenuis and Scalaplas (Scalaplas) armiger community complex (A2.24 – Polychaete/bivalve dominated fine sand shores)	NS (** *)	L (*)	د (*)	N5 (*)	L (*)	L-M (*)	L-M (*)	L-M (*)	L-M (*)	N5 (*)	L-M (*)	N5 (*)	N5 (*)	N5 (*)	NS (*)	N5 (*)	L (*)	L (*)	н. (***	N5 (*)	NS (*)	NS (*)	NS (*)	L (*)	NS (*)

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Table 8.2 - Matrix showing the characterising species sensitivity scores x pressure categories for taxa (or surrogates) in Ballymacoda (Clonpriest & Pilln	nore)
SAC (ABPMer 2013a-h) (Table 8.3 provides the code for the various categorisation of sensitivity and confidence.)	

Species	Surface Disturbance	Shallow Disturbance	Deep Disturbance	Trampling – access by foot	Trampling – access by vehicle	Extraction	Siltation (addition of fine sediments, pseudofaeces, fish food)	mothering (addition of materials biological or non biological to the surface)	Changes to sediment composition-increased coarseness	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	Removal of Target Species	Removal of Non-target species	Introduction of antifoulants	Introduction of medicines	Introduction of hydrocarbons	Prevention of light reaching seabed/features
Angulus tenuis	NS (*)	L(*)	,	N5 (*)	L (*)	M (*)	NS (*)	н (*)	м-н (*)	NS (*)	L-M (*)	Ľ.	NS (*)	N5 (*)	Nev	L-NS (*)	NEv	NEv	M (*)	NS (*)	N5 (*)	NS (*)	NEv	NEv	NS (*)
Arenicola marina	N5 (*)	NS (***	L-M (***	NS (***	NS (***	L-M (*)	NS (*)	L-M (*)	L-M	L-M (***		NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (***	NS (***	M (*)	L-M (*)	N5 (*)	NS (***	L (**)		NS (*)
Capitella sp.	L (*)	L (**)	(**)	I	L(*)	L(*)	L (*)	N5 (*)	NS (*)	NS (***	N5 (*)	NS (*)	NS (*)	NS (***	NS (***	N5 (*)	,	(****	NS (*)	NS (*)	N5 (*)	NS (***	(***	NS (***	NS (*)
Cerastaderma edule	L (*)	L-M (*)	L-M (***	L-M (***	L-M (*)	L-H (*)	(L-M (*)	L-H (*)	NS (*)	L (*)	NS (*)	N5 (*)	NS (*)	NS (**)	L-NS (*)	L-M (*)	L-M (*)	M (*)	M (*)	NS (*)	NS (*)	NEV	L-M (*)	NS (*)
Corophium volutator	(***)	((****	L(*)	L(*)	L (*)	L.	(****	M (*)	N5 (*)	NS (*)	NS (*)	N5 (*)	NS (***	NS (***	NS (*)	((****	Nev	N5 (*)	NS (*)	NA	NEv	(****	NS (*)
Hediste diversicolor	NS (*)	L-M (**)	L-H (**)	NS (*)	L(*)	L-H (*)	NS (***	L-M (*)	м-н (*)	NS (*)	N5 (*)	NS (*)	NS (*)	NS (**)	NS (**)	N5 (*)	NS (**)	N5 (**)	L-M (*)	L-M (*)	NS (*)	N5 (*)	M-H (**)	M-H (**)	NS (*)
Lanice conchilego	NS (*)	NS-L (***	NS-L (***	NS (*)	NS-L (*)	м-н (*)	NS (*)	м-н (*)	NS (*)	NS (***	NS (*)	NS (*)	NS (*)	NS (*)	N5 (*)	NS (*)	M (*)	M (*)	м-н (*)	NS (*)	NS (*)	NS (*)	NEv	(••••	NS (*)
Nemtoda	NS (***	N5 (***	N5 (***)	NS (***)	NS (*)	٤(*)	NS (*)	N5 (***)	NS (***	N5 (***)	NS (*)	N5 (*)	NS (*)	NS (*)	NS (***)	NS (*)	(***)	(****)	N5 (***)	NS (*)	N5 (*)	N5 (***)	Nev	(***)	NS (*)

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Species	Surface Disturbance	Shallow Disturbance	Deep Disturbance	Trampling – access by foot	Trampling – access by vehicle	Extraction	Siltation (addition of fine sediments, pseudolaeces fish food)	Smothering (addition of materials biological or nor biological to the surface)	Changes to sediment composition- increased coarseness	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	Removal of Target Species	Removal of Non-target species	Introduction of antifoulants	Introduction of medicines	Introduction of hydrocarbons	Prevention of light reaching seabed/features
Pygaspia elegans	L (*)	L (**)	M (***	L (*)	L (*)	L-M (*)	(****	L-M (***	L-M (*)	N5 (**)	L-M (*)	N5 (*)	NS (*)	NS (*)	NS (***	NS (*)	L (**)	L (**)	M (*)	N5 (*)	N5 (*)	N5 (*)	NEv	NEv	NS (*)
Scoloplas (Scoloplas) armiger	NS (*)	L (*)	L-M (*)	NS (*)	L (*)	н (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (***	N5 (***	NS (*)	M (****	(***)	M (*)	M (**)	N5 (*)	NS (*)	NEv	NEv	N5 (*)
Scolelepis (Scaloplas) squamata	NS (*)	NS (***	NS (*)	NS (*)	NS (*)	L-M (*)	L-M (***	L-M (***	NS (*)	NS (*)	NS (*)			NS (*)	NS (***	NS (*)	L(*)	L(*)		NS (*)	N5 (*)	Nev	Nev		NS (*)
Scrobicularia plana	NS (*)	NS (**)	M-H (*)	NS (**)	L (**)	M-H (*)	NS-L (*)	M-H (*)	M-H (*)	NS (*)	NS (*)	L(*)	NS (*)	M (*)	M (*)	NS (*)	NS (*)	NS (*)	M (*)	NS (*)	NS (*)	NS (*)	NA	L (*)	NS (*)
Spia sp.	L (*)	(()	r (•)	L (*)	L-M (*)	NS (*)	M (*)	L-M (*)	L-M (*)	NS (*)	NS (*)	NS (*)	NS (*)	NS (***	NS (*)	NEv	NEv	VH (*)	NS (*)	NS (*)	NS (*)	NEv	NS (***)	NS (*)
Tubificoides sp.	NS (*)	NS (*)	(**)	r (.)	r (•)	M (*)	NS (*)	L (*)	N5 (*)	NS (*)	NS (***	N5 (*)	NS (*)	(**** (****	N5 (***)	N5 (*)	NS (***	NS (***	NS (*)	N5 (*)	NS (*)	NS (**)	Nev	Nev	NS (**)

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Table 8.3 - Codes of sensitivity and confidence applying to species and pressure interactions presented in Tables 8.1 and 8.2.

Pressure interaction	codes for Table 8.1 and 8.2
NA	Not Assessed
Nev	No Evidence
NE	Not Exposed
NS	Not Sensitive
L	Low
М	Medium
Н	High
VH	Very High
*	Low confidence
**	Medium confidence
***	High Confidence

Table 8.4 - Interactions between the relevant aquaculture activities and the constituent community of Sand with polychaetes and bivalves community complex within of the habitat feature 1140 Mudflats and sandflats not covered by seawater at low tide within the Ballymacoda (Clonpriest & Pillmore) SAC with broad conclusions on interactions.

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A	ctivity	Mudflats and sandflats not covered by seawater at low tide (1140); 301.72ha
Culture Type	Status	Sand with polychaetes and bivalves community complex; 210.77ha
Oysters	Application	Disturbing: No Justification: The activity overlaps 0.025ha or 0.012% of this community type. Published literature (Forde et al 2015) suggests that activities occurring at trestle culture sites are not disturbing. The risk associated with the introduction of ½ grown oysters from France cannot be discounted.
Oysters	Licensed	Disturbing: No Justification: The activity overlaps 95.679ha or 45.394% of this community type. Published literature (Forde et al 2015) suggests that activities occurring at trestle culture sites are not disturbing. The risk associated with the introduction of ½ grown oysters from France cannot be discounted.
Cumulative In Proposed	npact Licensed and d Aquaculture	Disturbing: No Justification: The activity overlaps 95.704ha or 45.406% of this community type. Published literature (Forde et al 2015) suggests that activities occurring at trestle culture sites are not disturbing. The risk associated with the introduction of ½ grown oysters from France cannot be discounted.

Table 8.5 - Interactions between aquaculture access routes the and constituent community of Sand with polychaetes and bivalves community complex of the habitat feature 1140 Mudflats and sandflats not covered by seawater at low tide within the Ballymacoda (Clonpriest & Pillmore) SAC with a broad conclusion on the interactions.

Activity	Mudflats and sandflats not covered by seawater at low tide (1140); 301.72ha
	Sand with polychaetes and bivalves community complex; 210.77ha
Existing Access Routes	Disturbing: No Justification: The spatial overlap with the community type is low at 0.329%. This value is below the spatial overlap threshold (15%) for significant adverse impacts of on this community type.
Proposed Access Routes	Disturbing: No Justification: The spatial overlap with the community type is low at 0.1.317%. This value is below the spatial overlap threshold (15%) for significant adverse impacts of on this community type.
Cumulative Impact Licensed and Proposed Aquaculture	Disturbing: No Justification: The spatial overlap with the community type is low at 1.646%. This value is below the spatial overlap threshold (15%) for significant adverse impacts of on this community type.

9 IN-COMBINATION EFFECTS OF AQUACULTURE AND OTHER ACTIVITIES

9.1 FISHERIES PRESSURES

Soft sediment communities, particularly suspension feeders and crustaceans, are sensitive to fishing pressure from dredging but this depends on intensity of the fishing pressure. Recovery time is prolonged (measured in years) compared to coarser substrates due to the fact that such habitats are mediated by a combination of biological, chemical and physical processes compared to very coarse substrates which are dominated by physical processes (ABPMer 2013e).

Fisheries data indicate suitable cockle habitat co-occurring with the constituent marine community types within the marine Annex I Qualifying Interest of Mudflats and sandflats not covered by seawater at low tide 1140 (i.e. Sandy mud with *Hediste diversicolor* and *Tubificoides benedii* community and, Sand with polychaetes and bivalves community complex) (see Figure 9.1).

In spite of the overlap with constituent community types identified above, it is important to note that the fishery data are based upon general accounts and the areas were selected on the basis of suitable cockle habitat and have not had cockle fishing occurring at the site. Furthermore, there are no known applications for a fishery, a Classified Production Area, or proposed fishery plans for the area. In particular, the high intertidal nature of some of the fishery areas identified suggests that hydraulic dredging would be impractical. On this basis, there are **not likely to be any in-combination** effects of wild fishery and aquaculture activities on the qualifying interests of the Ballymacoda (Clonpriest and Pillmore) SAC. Furthermore, the two activities can be considered antagonistic.

Areas outside of the SAC boundary support extensive pot fishing for crustaceans (lobster and crab) and, dredge fishing for molluscs (mussels, surf clams and razor clams (Marine Institute, 2015). These fisheries do not overlap with designated habitats (and associated community types) of the SAC, consequently, it is deemed unlikely that these fisheries would impact on features of the SAC.

9.2 POLLUTION PRESSURES

There are a number of activities which are terrestrial in origin that might result in impacts on the conservation features of the Ballymacoda (Clonpriest & Pillmore) SAC. Primary among these are point source discharges from domestic sewage outfalls distributed along the harbour. The pressure derived from these point sources may impact upon levels of dissolved nutrients and suspended solids.

Pressures resulting from aquaculture activities are primarily localised compaction of sediment along access routes. It was, therefore, concluded that given the pressure resulting from point discharge location and/or combined sewer outfalls would likely impact on physico-chemical parameters in the water column, any in-combination effects with aquaculture activities are considered to be **minimal or negligible**.



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Figure 5.1 – Likely suitable cockle habitat relative to principal benthic communities recorded within the marine Annex I Qualifying Interest 1140 Mudflats and sandflats not covered by seawater at low tide of Ballymacoda (Clonpriest & Pillmore) SAC (NPWS 2015b).

10 SAC AQUACULTURE APPROPRIATE ASSESSMENT CONCLUDING STATEMENT AND RECOMMENDATIONS

10.1 AQUACULTURE

In the Ballymacoda (Clonpriest & Pillmore) SAC oyster culture (using bags and trestles) is the only type of aquaculture activity currently occurring. Based upon this and the information provided in the aquaculture profiling carried out (Section 5), the likely interaction between this culture methodology and conservation features of the site was considered.

10.1.1 Habitats

An initial screening exercise resulted in the following features being excluded from further consideration by virtue of the fact that no spatial overlap of the culture activities was expected to occur; Estuaries (1130), Salicornia and other annuals colonizing mud and sand (1310) and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330).

A full assessment was carried out on the likely interactions between existing and proposed culture operations and the Annex 1 Qualifying Interest habitat of 1140 Mudflats and sandflats not covered by seawater at low tide. The likely effects of the aquaculture activities (species, structures, access routes) were considered in light of the sensitivity of one (of two) constituent habitats and species of the Annex 1 habitat, namely, Sand with polychaetes and bivalves community complex.

Based upon the scale of spatial overlap of current and proposed aquaculture activities and the relatively high tolerance levels of the habitats and associated species, the general conclusion is that current activities are non-disturbing to the Qualifying Interest habitat of 1140 Mudflats and sandflats not covered by seawater at low tide and its constituent communities.

The movement of stock in and out of the Ballymacoda (Clonpriest & Pillmore) SAC should adhere to relevant fish health legislation and follow best practice guidelines (e.g. http://invasivespeciesireland.com/cops/aquaculture/). If management actions associated with these guidelines are not applied to the practices currently carried out and proposed for Ballymacoda Bay, then the risk of introduction of alien taxa with ½ grown oysters from France cannot be discounted.

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