



Report supporting Appropriate Assessment of
Aquaculture in Ballyness Bay SAC

(Site code: 01090)

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1 PREFACE

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.

The Habitats Directive is transposed in Ireland in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Appropriate assessments (AA) of aquaculture 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.

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 AA. If the AA or the RA 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

Ballyness Bay SAC (Site code: 001090) is a shallow estuarine complex, with extensive areas of sandflats which are exposed at low tide. It is located between Tramore Bay and Inishbofin Bay on the northwest coast of Co. Donegal.

The SAC is designated for the marine habitats Estuaries (1130) and Mudflats and sand flats not covered by seawater at low tide (1140) which support a variety of soft sedimentary communities and community complexes. The site is also designated for a variety of coastal sand dune habitats. Conservation Objectives for marine habitats and constituent communities (within Ballyness Bay SAC) were identified by NPWS (2014a) and relate primarily to the requirement to maintain habitat distribution, structure and function, as defined by characterising (dominant) species.

2.2 ACTIVITIES IN THE SAC

There are currently no licenced aquaculture operations in Ballyness Bay SAC. There are 20 applications for intertidal Pacific oyster production using the bag and trestle method and the culture of clams on the seabed intertidally. 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 August 2018.

2.3 THE APPROPRIATE ASSESSMENT PROCESS

The function of an appropriate 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 (2014a) 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 of overlap between a disturbing activity and a habitat is given in the NPWS guidance (NPWS 2014b). 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.

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 are deemed not to have any impact on the conservation features, because they do not spatially overlap with a given habitat or have a clear pathway for interaction are excluded from further consideration. The next phase is the Natura Impact Statement (NIS) 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 report and/or NIS. It is important to note that the screening process is considered conservative in that activities which may overlap with habitats but which may have very benign effects are retained for full assessment.

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

Aquaculture and Habitats/Species:

In the Ballyness Bay SAC there are 20 new applications for intertidal shellfish culture. The likely interaction between aquaculture activity and 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 habitats and species were excluded from further consideration in the assessment:

- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
-
- Humid dune slacks [2190]
- *Vertigo geyeri* (Geyer's Whorl Snail) [1013].

Furthermore, all proposed aquaculture application sites do not overlap with the Annex I habitat Estuaries [1130] and this habitat was also excluded from further analysis (Table 2.1).

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

Table 2-1 - Community types recorded in Ballyness Bay SAC and the Annex I habitats of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide that overlap with overlap with proposed aquaculture activities

Feature	Community Type	Overlap with intertidal aquaculture activities
Estuaries (1130)	Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	N/A
	Mobile sand community complex	N/A
Mudflats and sandflats not covered by seawater at low tide (1140)	Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	✓
	Mobile sand community complex	✓
Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)	N/A	✓

2.5.1 Habitats

An initial screening exercise resulted in the following habitat features and species being excluded from further consideration by virtue of the fact that no spatial overlap of the culture activities was expected to occur; Embryonic shifting dunes [2110], Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120], Humid dune slacks [2190] and *Vertigo geyeri* (Geyer's Whorl Snail) [1013]. Furthermore, none of the proposed aquaculture applications overlap with the Annex I habitat Estuaries [1130] and this was also excluded from further analysis.

A full assessment was carried out on the likely interactions between proposed culture operations and the feature Annex 1 habitat 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 constituent habitats and species of the Annex 1 habitat 1140. Annex I 1140 constituent communities considered include Coarse sediment to sandy mud with oligochaetes and polychaetes community complex and Mobile sand community complex.

Based upon the scale of spatial overlap of proposed intertidal oyster aquaculture activities (including access route activity) and the relatively high tolerance levels of the habitats and associated species, the general conclusion is that proposed intertidal culture activities are non-disturbing to the Qualifying Interests 1130 and 1140 and their constituent community types.

However, the overlap of access routes with the habitat - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] does appear to present a risk of erosion and habitat degradation.

2.5.2 Species

The likely interactions between the proposed aquaculture activities and the following Annex II Species were assessed; Grey seal *Halichoerus grypus* [1364] and Otter (*Lutra lutra* [1355]). The wider objectives for these species focus upon maintaining the good conservation status of populations. The main aspect of the culture activities that could potentially impact these species relates to disturbance by human movements and activities at the sites. Given the locations and timings of the proposed activities (i.e. daytime) it is concluded that activities would be non-disturbing to otter, but the risk posed to seal species cannot be entirely discounted.

2.5.3 Recommendations

Notwithstanding the conclusions noted above in relation to Annex 1 habitat 1140, it should be noted that the nature of the community type, Mobile sand community complex is such that there are likely to be locations where the sediments are extremely mobile (and soft) thus making them unsuitable for aquaculture operations. It is recommended, prior to making a decision to licence, that these areas be clearly identified with the Bay.

The report highlights risks to coastal habitat [2130] features if the activities proposed are licenced in full. More specifically, the risk arises from the additional traffic likely to occur on existing tracks as a result of the need to access the sites. It is recommended that that the views those with specific engineering expertise be sought in order to identify erosion prevention measures that might be put in place to mitigate the risks identified. Alternatively, the re-routing of access routes to avoid overlap with habitat feature 2130 might be considered?

In relation to interactions between aquaculture operations and seal use of the site, the risk of disturbance cannot be discounted. It is important to note that the site, to date, has had very little aquaculture operations and therefore, the seals will have little opportunity to habituate to the activities. Also of note, where there is no specific barrier to access (e.g. tidal channel), the seals are more likely to be disturbed. Based upon local observations it appears that the seals are faithful to this one identified haul out location. Therefore, careful consideration should be given to licencing the site which shares the sandbank with the observed seal haul out.

3 INTRODUCTION

This document assesses the potential ecological interactions of aquaculture activities within the Ballyness Bay SAC (Site code: 001090) 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 well as aquaculture and fishery profiling information provided on behalf of the operators by Bord Iascaigh Mara. The spatial extent of aquaculture licences is derived from a database managed by the DAFM².

4 CONSERVATION OBJECTIVES FOR BALLYNESS BAY SAC

The appropriate assessment of aquaculture and fisheries in relation to the Conservation Objectives for Ballyness Bay SAC is based on Version 1.0 of the objectives (NPWS 2014a – Version 1 14 May 2014) and supporting documentation (NPWS 2014b - Version 1 April 2014, NPWS 2014c - Version 1 March 2014). The spatial data for conservation features was provided by NPWS³.

4.1 THE SAC EXTENT

Ballyness Bay is situated in north-west Donegal adjacent to the towns of Gortahork and Falcarragh. The underlying geology is mostly pelites, with some smaller areas of limestone and quartzite. This is mostly covered by windblown sand and peat. Ballyness Bay is a large and very shallow estuarine complex, with extensive areas of sandflats which are exposed at low tide. The full extent of the SAC is shown in **Figure 4.1** below.

4.2 QUALIFYING INTERESTS (SAC)

The SAC is designated for the following habitats and species (NPWS 2014a), 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]
- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
- Humid dune slacks [2190]
- *Vertigo geyeri* (Geyer's Whorl Snail) [1013]

² DAFM Aquaculture Database version Aquaculture: May, 2015

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

The spatial extent of the Annex 1 Qualifying Interests Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], Estuaries (1130) and Mudflats and sandflats not covered by seawater at low tide (1140) are illustrated in **Figure 4.2**, **Figure 4.3** and **Figure 4.4**, respectively (from NPWS 2014b).

Constituent communities and community complexes recorded within the Annex 1 marine habitats of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide are listed in NPWS (2014b), presented in **Table 4.1** below and illustrated in **Figure 4.5**.

Table 4-1 - The community types recorded in Ballyness Bay SAC and the Annex I marine habitats in which they occur (NPWS 2014b).

Community Type	Annex I Habitats	
	Estuaries (1130)	Mudflats and sandflats not covered by seawater at low tide (1140)
Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	✓	✓
Mobile sand community complex	✓	✓

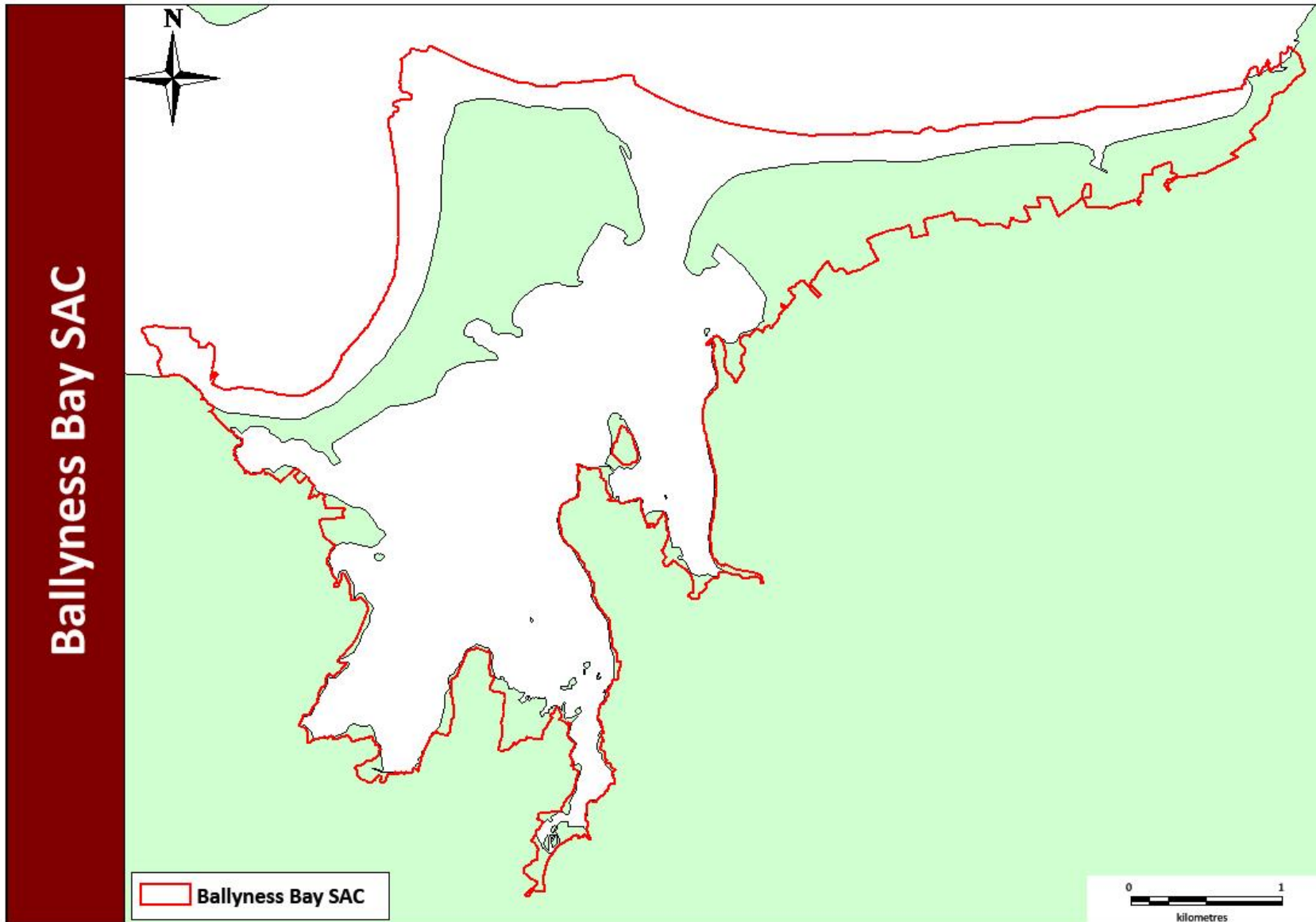


Figure 4-1- The extent of the Ballyness Bay SAC (NPWS 2014b).

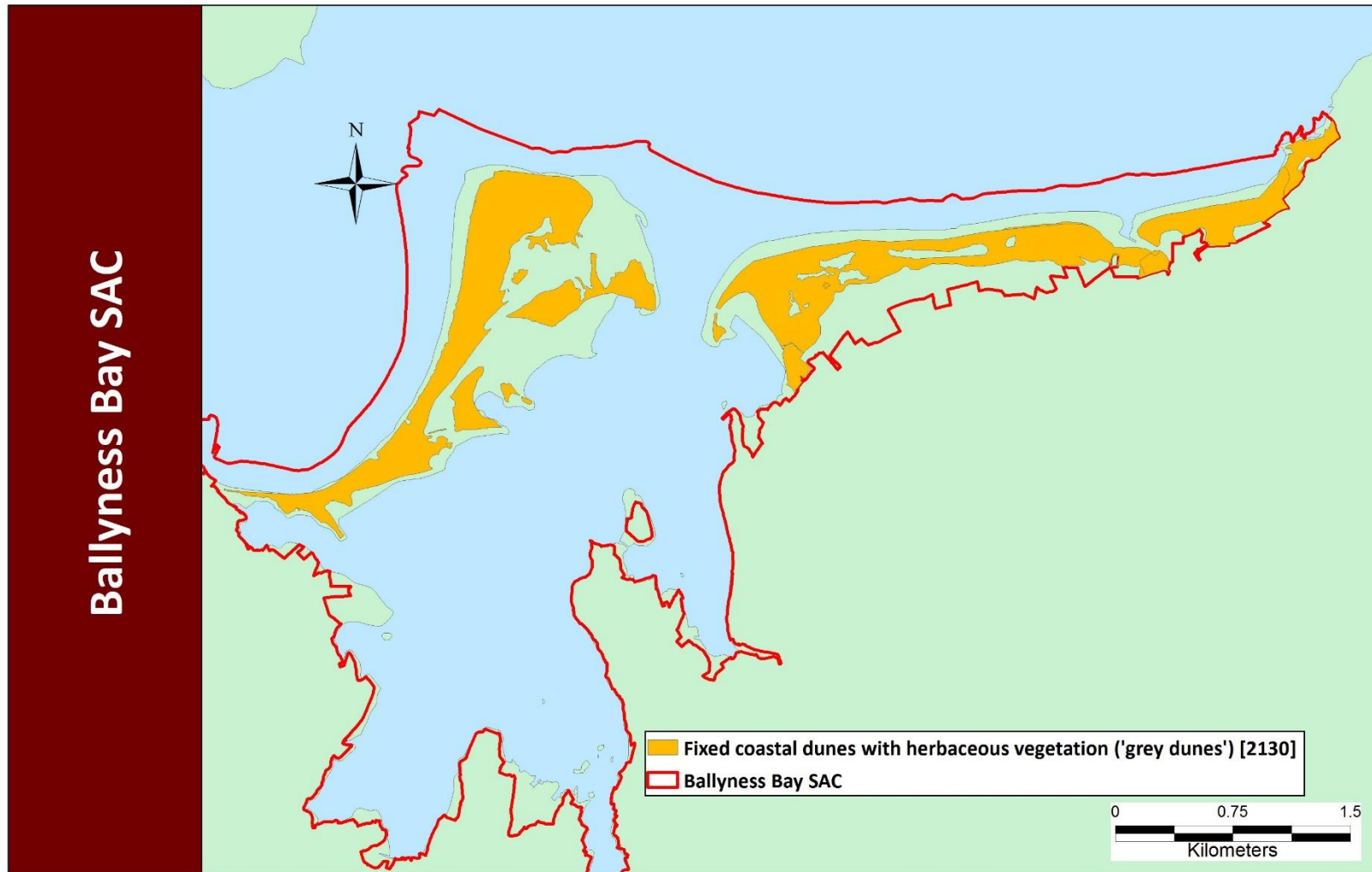


Figure 4-2: The extent of the coastal Annex I Qualifying Interest of (2130) Fixed coastal dunes with herbaceous vegetation (grey dunes) within the Ballyness Bay SAC (NPWS 2014b).

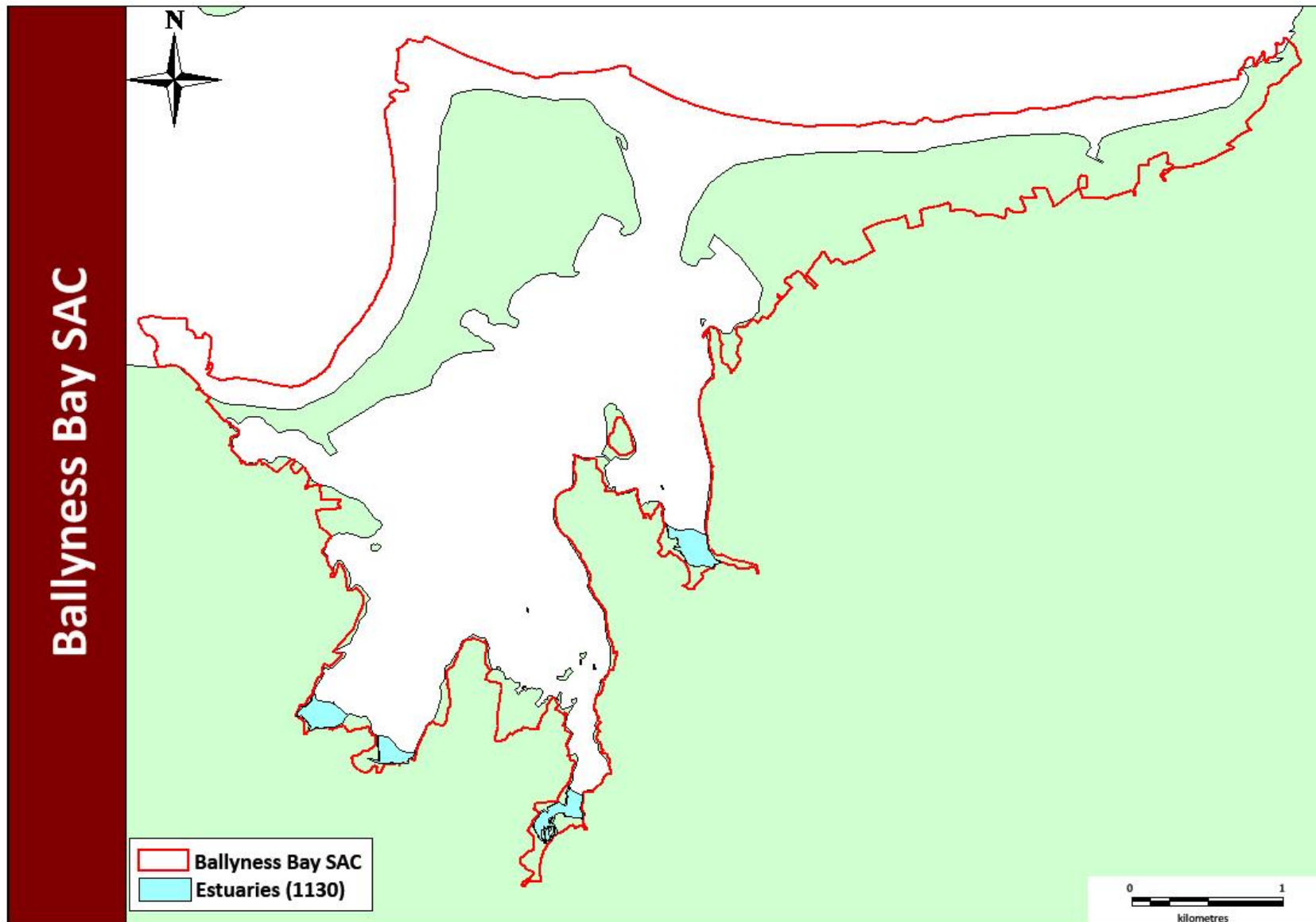


Figure 4-3 - The extent of the marine Annex I Qualifying Interest of (1130) Estuaries within the Ballyness Bay SAC (NPWS 2014b).

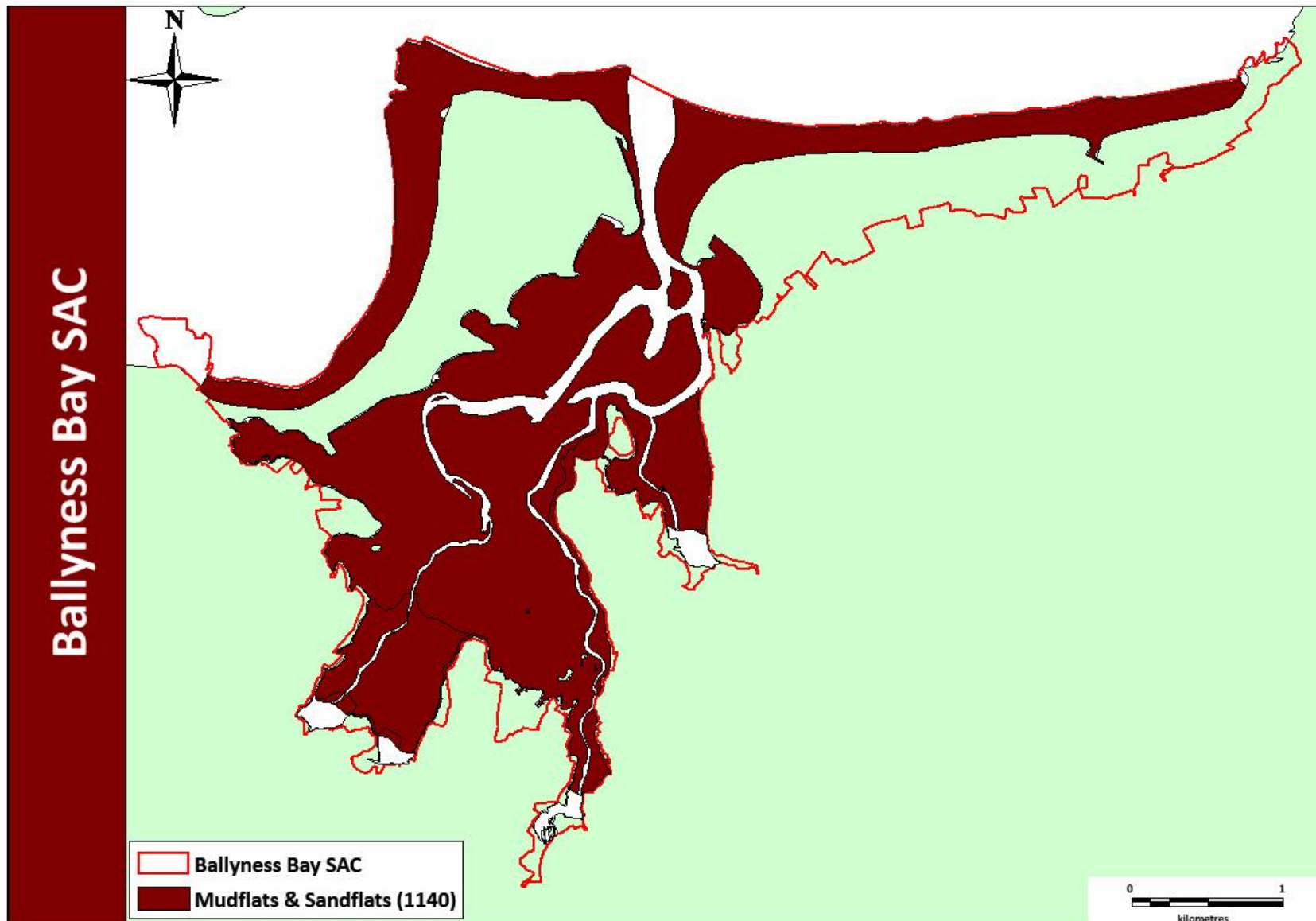


Figure 4-4 - The extent of the marine Annex I Qualifying Interest of (1140) Mudflats and sandflats not covered by seawater at low tide within the Ballyness Bay SAC (NPWS 2014b).

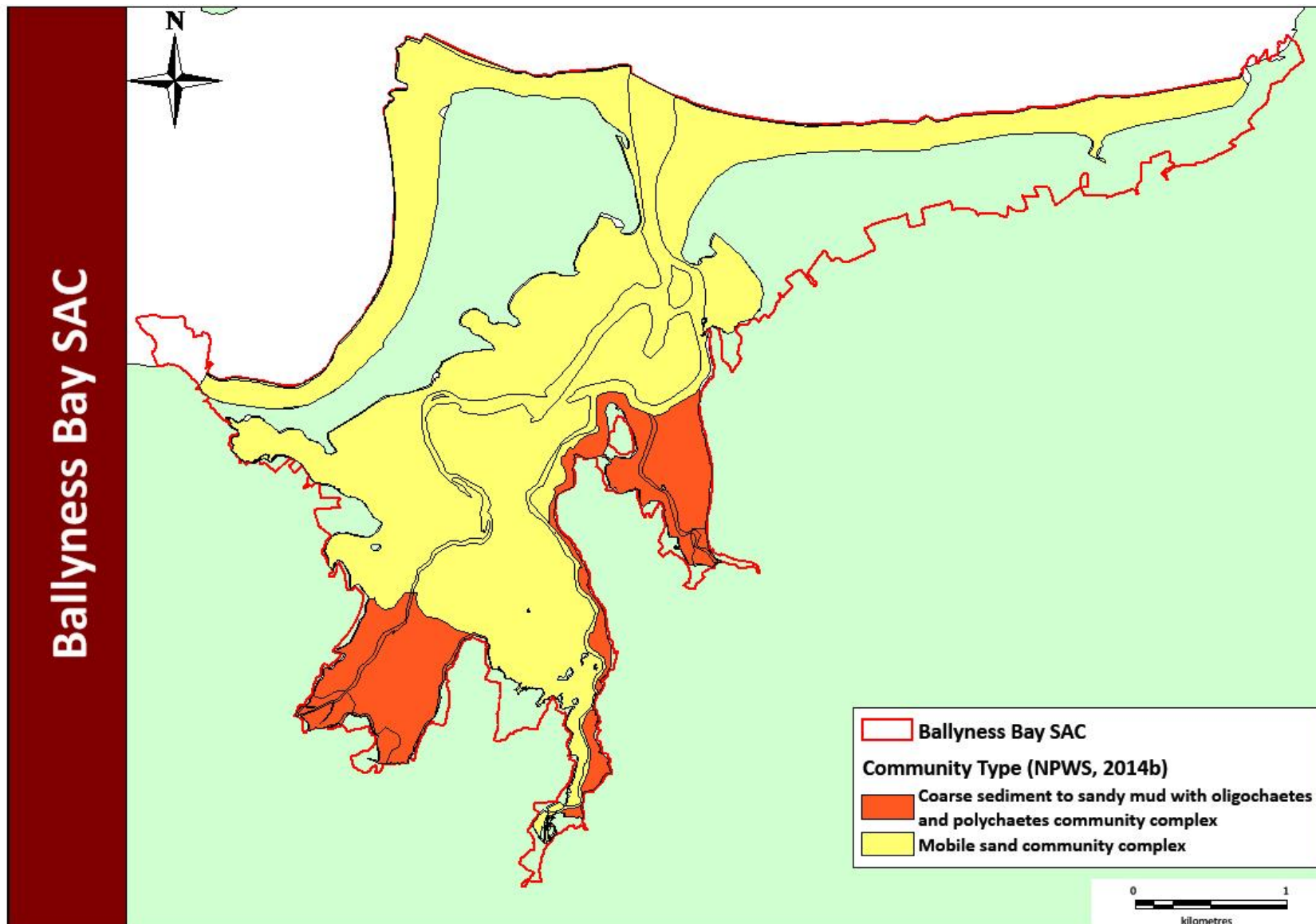


Figure 4-5 - Principal benthic communities recorded within the marine Annex I Qualifying Interests of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide within the Ballyness Bay SAC (NPWS 2014b).

4.3 CONSERVATION OBJECTIVES FOR BALLYNESS BAY SAC

The Conservation Objectives for the Qualifying Interests for the SAC were prepared by NPWS (NPWS 2014a). The natural condition of the designated features should be preserved with respect to their area, distribution, and 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 in Ballyness Bay SAC (NPWS 2014a, 2014b). Annex I features listed in **bold**.

Feature (Community Type)	Objective	Target(s)
Estuaries (1130)	Maintain favourable conservation condition	15.96ha: 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
(Coarse sediment to sandy mud with oligochaetes and polychaetes community complex)	Maintain favourable conservation condition	12ha; Likely area derived from Intertidal Surveys undertaken in 2006 and 2011. Along with a subtidal survey undertaken in 2011.
(Mobile sand community complex)	Maintain favourable conservation condition	3ha; Likely area derived from Intertidal Surveys undertaken in 2006 and 2011. Along with a subtidal survey undertaken in 2011.
Mudflats and sandflats not covered by seawater at low tide (1140)	Maintain favourable conservation condition	691.81ha: 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
(Coarse sediment to sandy mud with oligochaetes and polychaetes community complex)	Maintain favourable conservation condition	120ha; Likely area derived from Intertidal Surveys undertaken in 2006 and 2011. Along with a subtidal survey undertaken in 2011.
(Mobile sand community complex)	Maintain favourable conservation condition	570ha; Likely area derived from Intertidal Surveys undertaken in 2006 and 2011. Along with a subtidal survey undertaken in 2011.
Embryonic shifting dunes (2110)	Maintain favourable conservation condition	7.07ha; Targets are identified that focus on a wide range of attributes with the ultimate goal of maintaining function and diversity of favourable species and

Feature (Community Type)	Objective	Target(s)
		managing levels of negative species
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) (2120)	Maintain favourable conservation condition	23.13ha; 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
Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)	Restore favourable conservation condition	187.99ha; 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
Humid dune slacks (2190)	Maintain favourable conservation condition	13.87ha; 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
<i>Vertigo geyeri</i> (Geyer's Whorl Snail) (1013)	Maintain favourable conservation condition	Targets include: No decline in numbers. There is one known site for this species in this SAC, Adult or sub-adult snails are present in at least two of the four samples taken from optimal or suboptimal habitat on the transect, At least two samples on the transect should have more than 20 individuals, 17m of habitat along the first 45m of the transect is classed as optimal and at least 34m is classed as optimal or sub-optimal habitat, Soils, at time of sampling, are saturated (optimal wetness) for at least 24m of the first 45m of the transect and 0.4-0.5ha of the site optimal and sub-optimal habitat mosaic.

4.4 SCREENING OF ADJACENT NATURA SITES FOR EX-SITU EFFECTS

In addition to the Ballyness Bay SAC there are four other SAC sites proximate to the proposed activities (**Figure 4.6**) including Horn Head and Rinclevan SAC (000147), Gweedore Bay and Islands SAC (001141) and the Tory Island Coast SAC (002259). In addition, there are 7 SPA sites in the vicinity of Ballyness Bay SAC (**Figure 4.7**). The characteristic features of all of these sites 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.

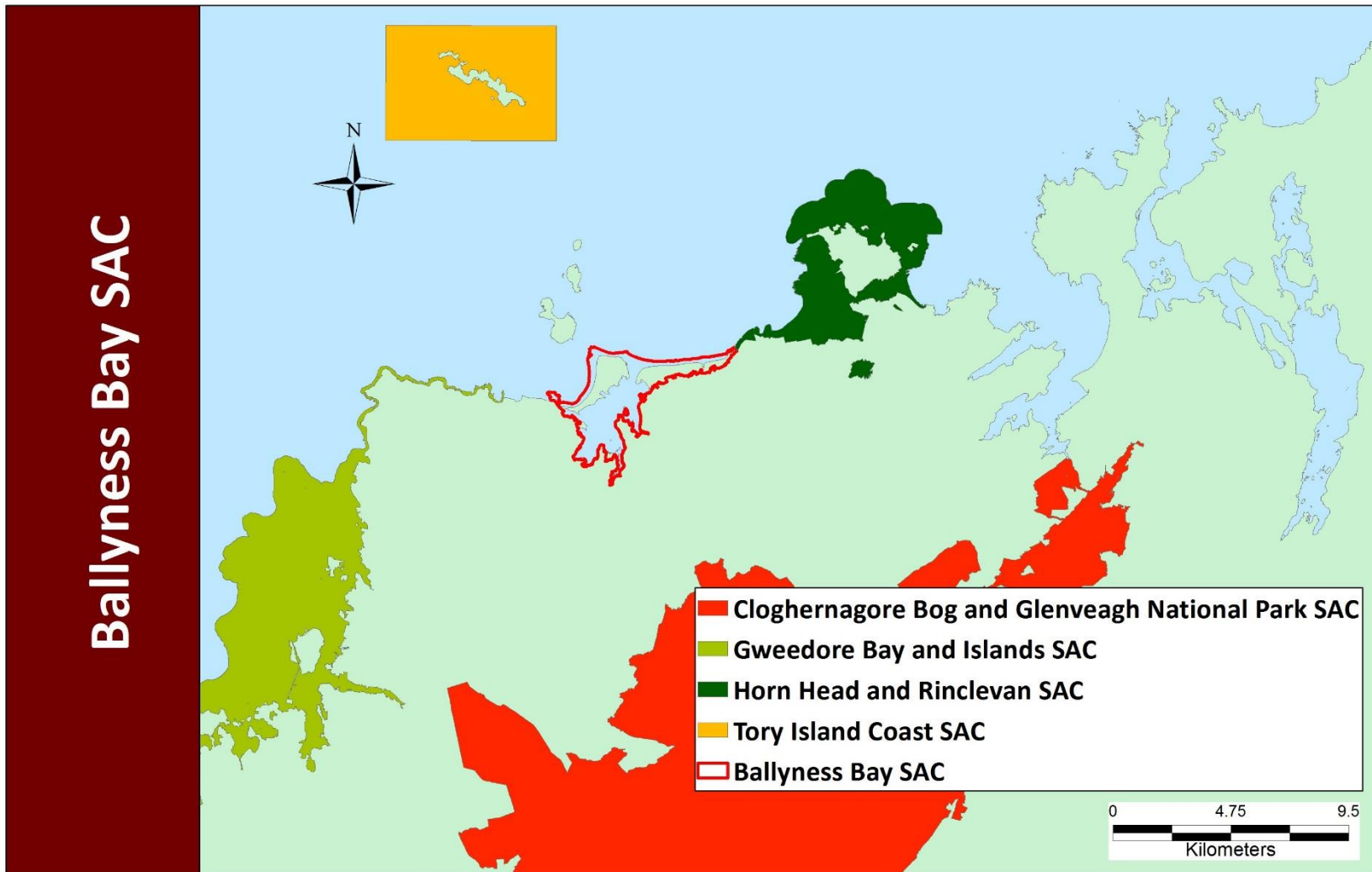


Figure 4-6 – SACs adjacent to the Ballyness Bay SAC (001090)

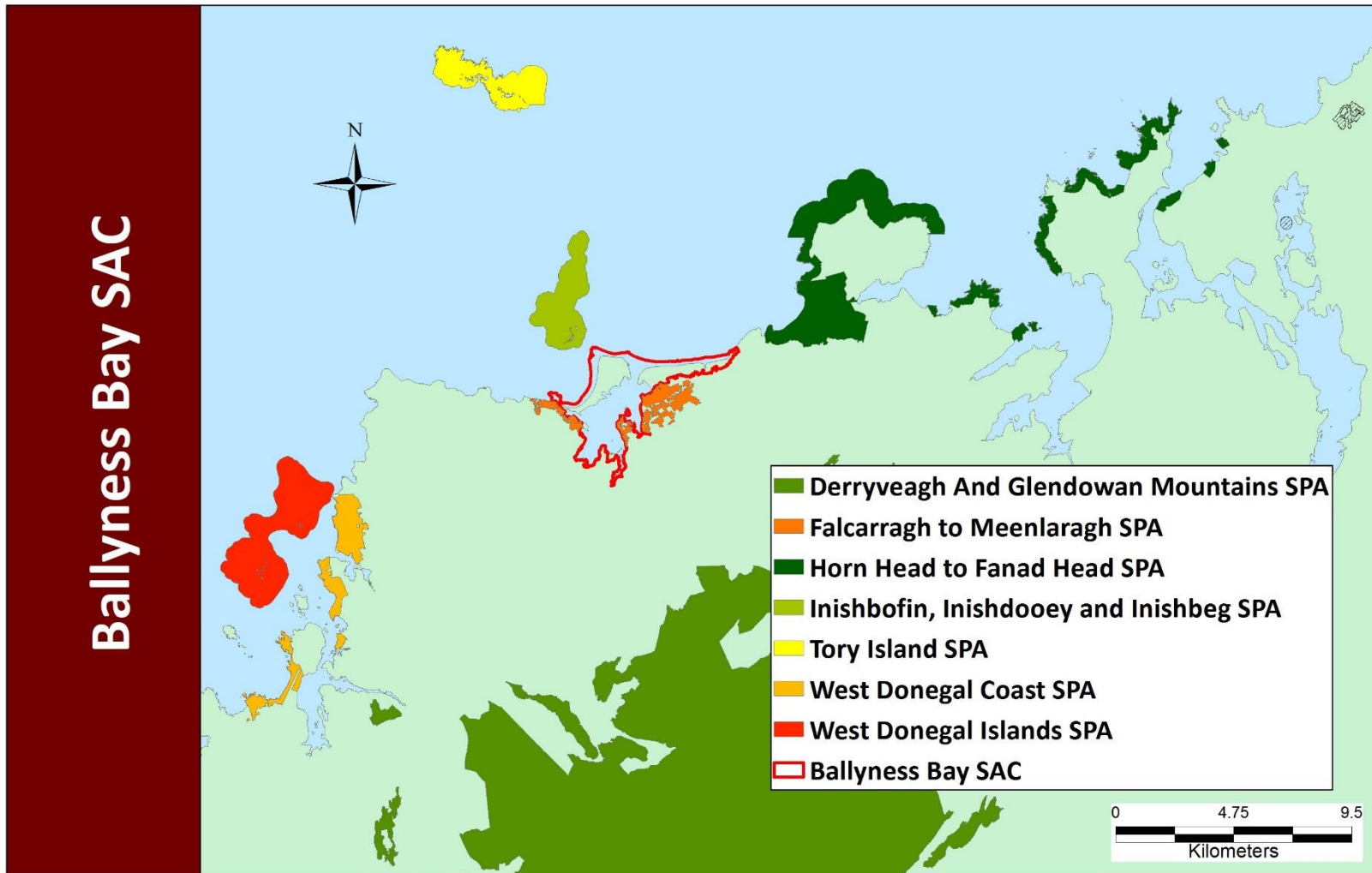


Figure 4-7 – SPAs adjacent to Ballyness Bay SAC (001090)

Table 4-3 - Natura sites adjacent to (in the vicinity of) the Ballyness Bay SAC and Qualifying Features with initial screening assessment on likely interactions with aquaculture activities.

Natura site (Site code)	Qualifying features (habitat/species code)	Aquaculture initial screening	
Horn Head and Rinclevan SAC (IE000147)	Embryonic shifting dunes [2110]	No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.	
	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]		
	Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]		
	Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170]		
	Humid dune slacks [2190]		
	Machairs (* in Ireland) [21A0]		
	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]		
	<i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]		
	<i>Halichoerus grypus</i> (Grey Seal) [1364]		Horn Head and Rinclevan is adjacent to the Ballyness Bay SAC. Grey seal may migrate into the Ballyness Bay SAC and could interact with aquaculture activities – carry forward to Section 8.5.
	<i>Petalophyllum ralfsii</i> (Petalwort) [1395]		No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.
<i>Najas flexilis</i> (Slender Naiad) [1833]			
Gweedore Bay & Islands SAC (001141)	Coastal Lagoons (1150)*	No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.	
	Reefs (1170)		
	Perennial vegetation of stony banks [1220]		
	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]		
	Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]		
	Embryonic shifting dunes [2110]		

Natura site (Site code)	Qualifying features (habitat/species code)	Aquaculture initial screening
	<p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p> <p>Decalcified fixed dunes with <i>Empetrum nigrum</i> [2140]</p> <p>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150]</p> <p>Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170]</p> <p>Humid dune slacks [2190]</p> <p>Machairs (* in Ireland) [21A0]</p> <p>Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]</p> <p>European dry heaths [4030]</p> <p>Alpine and Boreal heaths [4060]</p> <p><i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130]</p> <p><i>Euphydrys aurinia</i> (Marsh Fritillary) [1065]</p> <p><i>Petalophyllum ralfsii</i> (Petalwort) [1395]</p> <p><i>Najas flexilis</i> (Slender Naiad) [1833]</p>	<p>No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.</p>
	<p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Gweedore Bay & Islands SAC at its shortest distance is c. 3km from the Ballyness Bay SAC. Otter may migrate into the Ballyness Bay SAC and could interact with aquaculture activities – carry forward to Section 8.4.</p>

Natura site (Site code)	Qualifying features (habitat/species code)	Aquaculture initial screening
Tory Island Coast SAC (I02259).	Coastal lagoons [1150]	No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.
	Reefs [1170]	
	Perennial vegetation of stony banks [1220]	
	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	
	Submerged or partially submerged sea caves [8330]	
Cloghernagore Bog and Glenveagh National Park SAC (O2047)	Oligotrophic waters containing very few minerals of sandy plains (<u>Littorelletalia uniflorae</u>) [3110]	No spatial overlap or likely interaction with aquaculture activities within the Ballyness Bay SAC – excluded from further analysis.
	Water courses of plain to montane levels with the <u>Ranunculion fluitantis</u> and <u>Callitricho-Batrachion</u> vegetation [3260]	
	Northern Atlantic wet heaths with <u>Erica tetralix</u> [4010]	
	European dry heaths [4030]	
	Alpine and Boreal heaths [4060]	
	<u>Molinia</u> meadows on calcareous, peaty or clayey-silt-laden soils (<u>Molinion caeruleae</u>) [6410]	
	Blanket bogs (* if active bog) [7130]	
	Depressions on peat substrates of the <u>Rhynchosporion</u> [7150]	
	Old sessile oak woods with <u>Ilex</u> and <u>Blechnum</u> in the British Isles [91A0]	
	<u>Margaritifera margaritifera</u> (Freshwater Pearl Mussel) [1029]	
	<u>Salmo salar</u> (Salmon) [1106]	
	<u>Lutra lutra</u> (Otter) [1355]	
	<u>Trichomanes speciosum</u> (Killarney Fern) [1421]	

Horn Head to Fanad Head SPA (04194)	Fulmar (<i>Fulmarus glacialis</i>) [A009] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Shag (<i>Phalacrocorax aristotelis</i>) [A018] Barnacle Goose (<i>Branta leucopsis</i>) [A045] Peregrine (<i>Falco peregrinus</i>) [A103] Kittiwake (<i>Rissa tridactyla</i>) [A188] Guillemot (<i>Uria aalge</i>) [A199] Razorbill (<i>Alca torda</i>) [A200] Chough (<i>Pyrrhocorax pyrrhocorax</i>) [A346] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis
Falcarragh to Meenlaragh SPA (04149)	Corncrake (<i>Crex crex</i>) [A122]	No spatial overlap of Corncrake habitat or likely interactions with aquaculture activities in Ballyness Bay SAC – excluded from further analysis
Inishbofin, Inishdooley and Inishbeg SPA (04083)	Barnacle Goose (<i>Branta leucopsis</i>) [A045] Corncrake (<i>Crex crex</i>) [A122] Common Gull (<i>Larus canus</i>) [A182] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] Arctic Tern (<i>Sterna paradisaea</i>) [A194]	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis
Derryveagh and Glendowan Mountains SPA (004039)	Red-throated Diver (<u><i>Gavia stellata</i></u>) [A001] Merlin (<u><i>Falco columbarius</i></u>) [A098] Peregrine (<u><i>Falco peregrinus</i></u>) [A103] Golden Plover (<u><i>Pluvialis apricaria</i></u>) [A140] Dunlin (<u><i>Calidris alpina schinzii</i></u>) [A466]	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis
Tory Island SPA (4073)	Fulmar (<u><i>Fulmarus glacialis</i></u>) [A009] Corncrake (<u><i>Crex crex</i></u>) [A122] Razorbill (<u><i>Alca torda</i></u>) [A200] Puffin (<u><i>Fratercula arctica</i></u>) [A204]	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis

West Donegal SPA (004150)	<p>Fulmar (<u>Fulmarus glacialis</u>) Cormorant (<u>Phalacrocorax carbo</u>)</p> <p>Shag (<u>Phalacrocorax aristotelis</u>)</p> <p>Peregrine (<u>Falco peregrinus</u>)</p> <p>Herring Gull (<u>Larus argentatus</u>)</p> <p>Kittiwake (<u>Rissa tridactyla</u>)</p> <p>Razorbill (<u>Alca torda</u>)</p> <p>Chough (<u>Pyrrhocorax pyrrhocorax</u>)</p>	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis
West Donegal Coast SPA (4150)	<p>Fulmar (<u>Fulmarus glacialis</u>) [A009]</p> <p>Cormorant (<u>Phalacrocorax carbo</u>) [A017]</p> <p>Shag (<u>Phalacrocorax aristotelis</u>) [A018]</p> <p>Peregrine (<u>Falco peregrinus</u>) [A103]</p> <p>Herring Gull (<u>Larus argentatus</u>) [A184]</p> <p>Kittiwake (<u>Rissa tridactyla</u>) [A188]</p> <p>Razorbill (<u>Alca torda</u>) [A200]</p> <p>Chough (<u>Pyrrhocorax pyrrhocorax</u>) [A346]</p>	No spatial overlap or likely detrimental interactions of conservation features with aquaculture activities in Ballyness Bay SAC – excluded from further analysis

5 DETAILS OF THE PROPOSED PLANS AND PROJECTS

5.1 DESCRIPTION OF AQUACULTURE ACTIVITIES

There are no aquaculture activities in Ballyness Bay SAC. There are currently 14 applications for Pacific oyster production using the bag and trestle method only with an additional 5 applications to culture oysters (on trestles) in addition to clams under netting on the seabed in the intertidal zone. There is a single application to culture clams (only). This assessment focuses on the proposed aquaculture activities which occur within the Qualifying Interests of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide for which the Ballyness Bay SAC is designated. Descriptions of spatial extents of proposed intertidal aquaculture activities (provided below) within the Qualifying Interest were calculated using coordinates of activity areas in a GIS (**Figure 5.1**). The spatial extent of the proposed cultivation activities overlapping the Qualifying Interests of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide are presented in **Table 5.1** and **Table 5.2**, while **Table 7.1** and **Table 7.2** presents spatial overlap on constituent communities of the Qualifying Interests of 1130 and 1140.

There is currently no aquaculture activity in Ballyness Bay SAC. There were two operators in 1990's that held licenses for oyster farming, but these operations are now ceased and licenses no longer valid.

5.1.1 Intertidal Clam Culture

Clam farming

It is proposed to culture the Manila Clam (*Ruditapes philippinarum*) on-bottom at six sites in intertidal areas. The seed is usually obtained in spring, April. Seed likely to be sourced from hatcheries in France or Lissadell hatchery Co. Sligo at size 8mm – 12mm and grown in trays and bags for one year after which time they are sown on intertidal ground under mesh. The netting is buried in the ground down around 10 cm and is kept in place with rope that is stapled around the edges with steel hooks. The netting is usually changed once in the cycle when mesh size is also increased. They reach harvestable market size around 3 years. They are sold onto the local and regional retail marketplace and into France.

Harvesting is carried out by tractors with modified dredges (to which sieves are attached).

5.1.2 Intertidal Oyster Cultivation

Proposed Activity

All applicants will use bag and trestle as the method of cultivation and all have identified that they will grow triploid seed in the bay which will sourced from one of the following:

1. Grain Ocean
2. Satmar
3. Guernsey Hatchery and
4. France Nissan

The overlap of proposed intertidal cultivation activities with the Qualifying Interests of 1130 and 1140 is presented in **Table 5.1** below. **Table 7.1** presents spatial overlap on constituent communities of the Qualifying Interests of 1130 and 1140.

5.1.3 Access Routes

There are a number of access routes for the operators in the area to the applied licensed sites. One is from Magheraroarty Pier to the west and one from Ballyness Pier to the east (via tractor and boat), see **Figure 5.1**. There will be tractors and trailers in use, for all applicants. For sites in the centre of the bay access will be from a public road near Ranaghmore Island. It should be noted that for sites on the western side of the bay access will be achieved from Magheraroarty Pier along established sand track that runs through Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130), with a number of points of access to the intertidal sites.

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, gives a total spatial overlap of 6.81ha. (**Figure 5.1**).

The spatial overlap of access routes on Qualifying Interests 1130 and 1140 and 2130 is presented in **Table 5.2** (while **Table 7.2** presents spatial overlap on constituent communities of Qualifying Interests of 1130 and 1140).

Table 5-1 - Spatial extent (ha) of intertidal aquaculture areas overlapping with the Qualifying Interest of Estuaries [1130] and Mudflats and sandflats not covered by seawater at low tide [1140] in the Ballyness Bay SAC (Site Code 001090). Spatial extent of licenced areas presented according to Qualifying Interest and license status.

Licence Status	Culture Species	Qualifying Interest 1130 (15.87 ha)	Qualifying Interest 1140 (688.5 ha)
		% Overlap (Overlap ha)	% Overlap (Overlap ha)
Application	Oyster	-	4.80% (33.26ha)
Application	Clam and Oyster	-	1.18% (8.1ha)
Application	Clam	-	1.3% (9ha)
Total		-	7.28% (50.36ha)

Table 5-2 - Spatial extent (ha) of intertidal access routes overlapping with the Qualifying Interest of Estuaries [1130] and Mudflats, sandflats not covered by seawater at low tide [1140] and Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] in the Ballyness Bay SAC (Site Code 001090).

Licence Status	Culture Species	Qualifying Interest 1130 (15.87 ha)	Qualifying Interest 1140 (688.5 ha)	Qualifying Interest 2130 (187.99ha)
		% Overlap (Overlap ha)	% Overlap (Overlap ha)	% Overlap (Overlap ha)
Site Access Routes		-	0.69% (4.76ha)	0.90% (1.7ha)

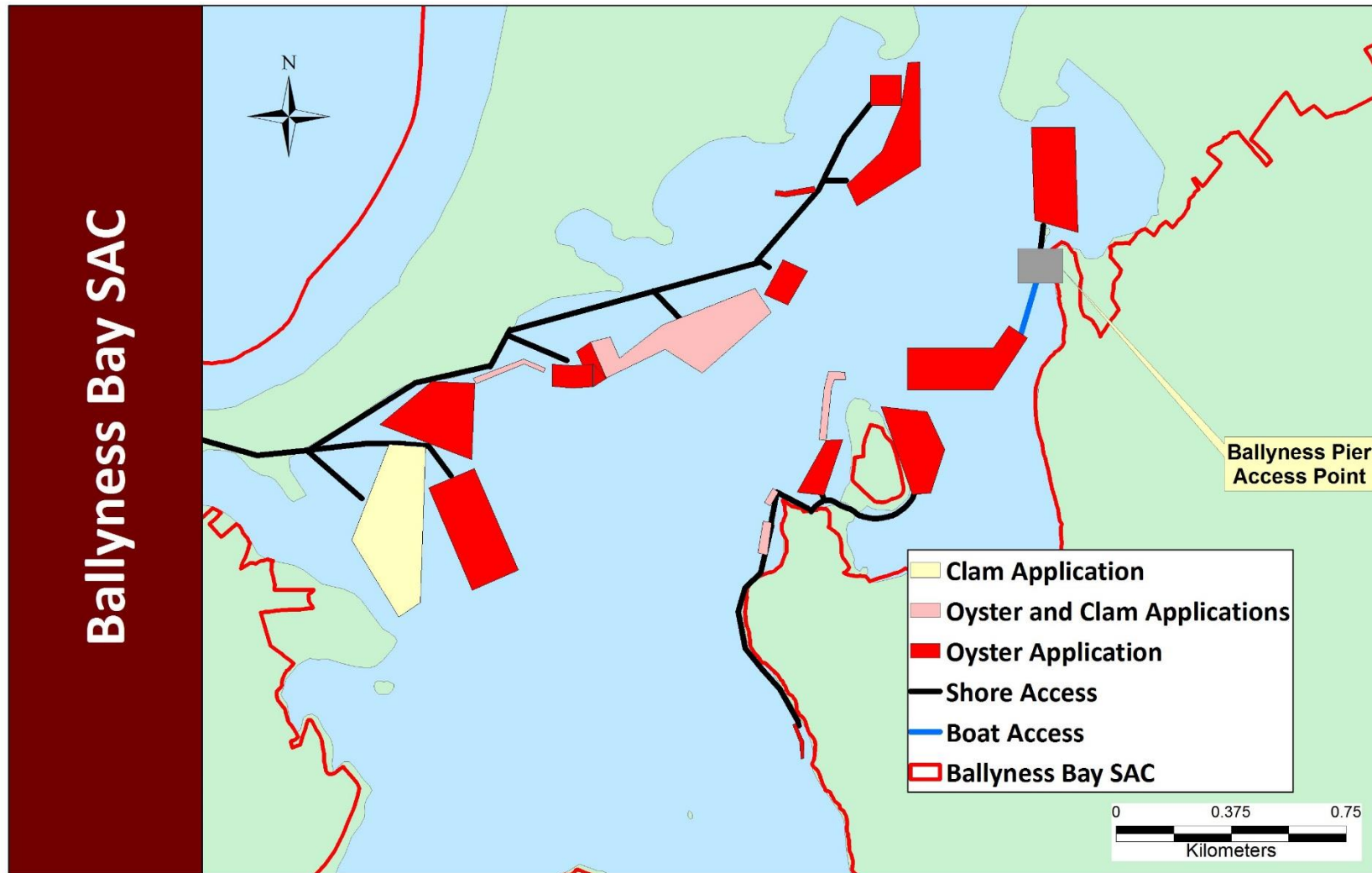


Figure 5-1: Aquaculture sites and proposed access routes in the Ballyness Bay SAC Bay (NPWS, 2014a).

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 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 fishing and 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. Bottom cultivation and harvesting of shellfish can, like fishing, alter the surrounding environment, both physically and biologically, not only due to the presence of the culture organisms (e.g. increased deposition, disease, shading, fouling, alien species) but also due to the activities associated with the culture mechanisms (e.g. structures resulting in current alteration, dredging, sediment compaction), the extraction of commercial and natural populations and the physical effects of dredging.

Aquaculture activities within the SAC will focus on the intertidal (bags and trestle) cultivation of the Pacific oyster, *C. gigas* and on-bottom culture of the Manila clam (*Ruditapes philippinarum*) Details of the potential biological and physical effects of this aquaculture activities on the habitat features, their sources and the mechanism by which the impact may occur are discussed below and 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).

6.1 BIOLOGICAL EFFECTS OF AQUACULTURE – ALL CULTURE METHODS:

Oysters, being suspension feeding bivalve molluscs, feed at the lowest trophic level feeding largely as herbivores, relying primarily on ingestion of phytoplankton. Therefore, the culture process does not rely on the input of feedstuffs into the aquatic environment. Suspension feeding bivalves filter suspended matter from the water column and the resulting faeces and pseudofaeces (non-ingested material) are then deposited onto the seafloor, this is known as biodeposition and is a component of a greater process called benthic-pelagic coupling. This deposition can accumulate on the seafloor beneath aquaculture installations (suspended and intertidal culture) and can alter the local sedimentary habitat type in terms of organic content and particle grain size which has, in certain circumstances been shown to alter the infaunal community therein.

Moderate enrichment due to deposition can lead to increased diversity due to increased food availability; however further enrichment can lead to a change in sediment biogeochemistry (e.g. oxygen levels decrease and sulphide levels increase) which can result in a reduction in species richness and abundance resulting in a community dominated by specialist species. In extreme cases of protracted organic enrichment anoxic conditions may occur where no fauna survives and the sediment may become blanketed by a bacterial mat. Changes to the sedimentary habitat due to deposition are indicated by a decrease in oxygen levels, increased sulphide reduction, decrease in REDOX depth and particle size changes.

Several factors can affect the rate of deposition onto the seafloor; these include structure and culture density, site hydrography and site history. Oysters and clams have a “plastic response” to increased levels of suspended matter in the water column and can modify their filtration rate accordingly and thus increase the production of pseudofaeces which results in an increase in transfer of particles to

the seafloor. The degree to which the material disperses away from the footprint of the culture system (e.g. Longlines, BST Longlines, floats, trestles & bags etc.) is governed by the density of oysters/clams on the system, the depth of water and the water currents in the vicinity. It is likely that some overlap in effect will be realised. The duration and extent to which culture has been conducted on site may lead to cumulative impacts on the seabed, especially in areas where assimilation or dispersion of faeces/pseudofaeces is not rapid. A number of features of the site and culture practices will govern the speed at which faeces/pseudofaeces are assimilated or dispersed by the site. These relate to:

- Hydrography (residence time, tidal range, residual flow) govern how quickly the wastes disperse from the culture location and the density at which they will accumulate on the seafloor i.e. the greater the tidal range and residual flow then the greater the rate of dispersion and therefore the risk of accumulation is reduced.
- Turbidity in the water-the higher the water turbidity the greater the production of pseudo-faeces/faeces by the suspension feeding animal ("plastic response") and therefore greater the risk of accumulation on the seafloor.
- Density of structures-high density of culture structures (e.g. Longlines, floats, trestles & bags etc.) can result in the slowing of water currents/impediment of water flow (baffling effect), slow it down and cause localised deposition of material on the seafloor.
- Density of culture-the greater the density organisms the greater the risk of accumulations of material, suspended culture is considered a dense culture method with high densities of culture organisms over a small area. The density of culture organisms is a function of:
 - depth of the site (shallow sites have shorter droppers and hence fewer culture organisms),
 - husbandry practices – proper maintenance will result in optimum densities on the lines as well as ensuring a reduced risk of drop-off of culture animals to the seafloor as well as ensuring a sufficient distance among the longlines to reduce the risk of cumulative impacts in depositional areas.

Seston filtration-All culture methods

Suspension feeding bivalves such as oysters have a large filtration capacity and in confined areas, have been shown to alter the phytoplankton and zooplankton community abundance and structure and therefore potentially impact on the production of an area. This method of feeding may reduce water turbidity hence increasing light penetration, which may increase phytoplankton production and therefore food availability. This increase in light penetration can have positive effects on light sensitive species such as maerl, seagrass and macroalgae.

Shading Suspended culture

The structures associated with suspended culture (e.g. trestles & bags etc.) can prevent light penetration to the seabed and therefore potentially impact on light sensitive species such as maerl, seagrass and macroalgae.

Fouling/Habitat creation-All culture methods

The structures associated with aquaculture, and the culture organisms themselves provide increased habitat for fouling species to colonise and therefore increase diversity; results in increased secondary production and increased nekton production.

Introduction of Non-native species- All culture methods

Movement and introduction of bivalve shellfish can be a vector for the introduction and spread of non-native/alien species. In some instances the introduced species may proliferate rapidly and compete with and in some cases replace the 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.

Another means is the unintentional introduction of non-native species/diseases which are associated with the imported target culture species, and their subsequent spread and establishment. These associated species are referred to as "hitch-hikers" and include animals and plants and/or parasites and diseases that potentially could cause outbreaks within the culture species or spread to other local species.

The introduction and establishment of non-native species can result in loss of native biodiversity due to increased competition for food and habitat and also predation and/or disease.

Disease risk-All culture methods

Due to the nature of the culture methods the risk of transmission of disease from cultured to wild stocks is high, e.g. the introduction of the parasitic protozoan *Bonamia ostreae*, which has caused the mass mortality within Irish native Oyster Beds. This risk can be limited by compiling a bio security plan, screening all introduced stock prior to transferring to on growing site and also good animal husbandry. Disease risk associated with movement of shellfish is governed by Fish Health legislation on the movement of shellfish stocks into and out of culture areas and will not be considered further in this assessment.

Nutrient Exchange - All culture methods

By their suspension feeding nature, removing particulate matter from the water column and releasing nutrients in solid and dissolved forms, bivalves influence benthic-pelagic coupling of organic matter and nutrients. Intensive bivalve culture can cause changes in ammonium and dissolved inorganic nitrogen resulting in increased primary production. The removal of nitrogen from the system is caused by both removal via harvest or denitrification at sediment surface.

6.2 PHYSICAL EFFECTS OF AQUACULTURE

Current alteration-Suspended culture

The structures used in aquaculture (e.g. Longlines, floats, trestles & bags etc.) can alter the hydrodynamics of an area i.e. increase/decrease water flow, this is known as the “Baffling effect”. An increase in water flow will result in scouring of the seafloor leading to an increase in coarse sediment while a decrease in current flow will result in an increase in the amount of fine particles being deposited. Both result in a change in the sedimentary habitat structure and therefore can lead to change in the composition of the benthic infaunal community.

Surface disturbance-All culture methods

All aquaculture activities physically alter the receiving habitat, but the level of this disturbance depends on the culture method employed. The culture of bivalves on the seabed (on-bottom) in an contained (clams under netting) or uncontained fashion involves the dredging of the seafloor at various stages in the culture process i.e. the collection of seed mussels and relaying of spat, routine maintenance, removal of predators (“mopping”), stock movements and finally harvesting. The frequency of dredging activity depends on site management and how often stock is moved to new on-growing areas to maximise growth and minimise predation prior to harvest. This dredging activity physically disturbs the seafloor and the organisms therein, and has been demonstrated to cause habitat and community changes.

The intertidal culture of bivalves (e.g. Longlines, Bags & trestles) does not require dredging and therefore is less damaging (physically) to the seafloor than the bottom culture method. However, the intertidal (and coastal) habitat can be affected by ancillary activities on-site i.e. servicing, vehicles on shore; human traffic and boat access lanes, causing an increased risk of sediment compaction resulting in sediment changes and associated community (infaunal and epifaunal) changes. Such activities can result in shallow and/or deep physical disturbance causing burrows to collapse, deeply burrowed organisms to die due to smothering and/or preventing siphon connection to the sediment surface or by directly crushing the animal. The travel of large vehicles over dune habitat can also result in erosion compaction and damage.

Shading-Suspended culture

The structure associated with suspended culture (e.g. netting, Longlines, floats, trestles & bags etc.) have the potential to prevent light penetration to the seabed and therefore potentially impact on light sensitive species such as maerl, seagrass and macroalgae.

Table 6-1 - Potential indicative environmental pressures of proposed aquaculture activities within the Qualifying Interests of Estuaries [1130] and Mudflats and sandflats not covered by seawater at low tide [1140] of the Ballyness Bay SAC.

Activity	Pressure category	Pressure	Potential effects	Equipment / Gear	Duration (days)	Time of year	Factors constraining the activity
Intertidal Oyster Culture and Clams	Physical	Current alteration	Structures may alter the current regime and resulting increased deposition of fines or scouring.	Netting, Trestles and bags and service equipment	365	All year	At low tide only
		Surface disturbance	Ancillary activities at sites, e.g. harvesting, 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 (<i>C. gigas</i>) 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				

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 process is a filter, which may lead to exclusion of certain activities or Qualifying Interests from further assessment, thereby simplifying the process. Screening is a conservative filter that minimises the risk of false negatives.

In this report, 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 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. Conversely, 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 not deemed necessary.

Table 5.1 and **Table 5.2** highlights the spatial overlap between proposed intertidal aquaculture activities, and the habitat features of (1130) Estuaries and (1140) Mudflats and sandflats not covered by seawater at low tide and Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], while **Table 7.1** and **Table 7.2** presents spatial overlap on constituent community types of the habitat features of 1130 and 1140.

7.1 AQUACULTURE ACTIVITY SCREENING

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

- Estuaries [1130]
- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Humid dune slacks [2190]
- *Vertigo geyeri* (Geyer's Whorl Snail) [1013]

Overlap between an access route and coastal habitat designated as Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] occurs from Magheraroarty Pier. The access route follows an established track through the dunes system at Magheraroarty (Figure 5-1). The risk of additional heavy vehicular traffic on a bare sand route could lead to increased erosion of dune habitat. Therefore, the interaction between aquaculture activities and Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] is carried forward for further consideration in this assessment.

When overlap was confirmed it was quantified in a GIS application and presented on the basis of coverage of specific activity representing different pressure types (e.g. intertidal oyster cultivation) and licence status (all are applications) intersecting with designated conservation features and/or sub-features (community types) (see **Table 7.1** and **Table 7.2**).

Table 7.1 below provides estimates of overlap of aquaculture activities and specific marine community types (identified from Conservation Objectives (i.e. NPWS, 2014a) within the broad habitat features of (1140) Mudflats and sandflats not covered by seawater at low tide.

Table 7-1 - Habitat utilisation i.e. spatial overlap in percentage and hectares (given in parentheses) of intertidal oyster and clam cultivation activity and access routes over community types within the Qualifying Interest 1140 (i.e. Mudflats and sandflats not covered by seawater at low tide) in the Ballyness Bay SAC. Spatial data based on licence database provided by DAFM. Habitat data provided in NPWS 2014b.

Licence Status	Culture Species	Qualifying Interest 1140 (688.5 ha)	
		Community Type	
		Coarse sediment to sandy mud with oligochaetes and polychaetes community complex (120.9ha)	Mobile sand community complex (567.6ha)
		Overlap % (Overlap ha)	Overlap % (Overlap ha)
Application	Oyster	3.77% (4.56ha)	5.1% (28.7ha)
Application	Clam	-	1.6% (9ha)
Application	Oyster and Clam	0.28% (0.35ha)	1.37% (7.75ha)
Site Access Routes		1.2% (1.43ha)	0.59% (3.33ha)
Total		5.25% (6.34ha)	8.66% (48.78ha)

8 ASSESSMENT OF AQUACULTURE ACTIVITIES

8.1 DETERMINING SIGNIFICANCE

The function of an appropriate 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 (2014c) 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 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.

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 4.4** and NPWS 2014a, 2014b, 2014c).

Within the Ballyness Bay SAC the qualifying habitats/species considered subject to potential disturbance and, therefore, carried further in this assessment are:

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

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; Table 5.1, 5.2** and **Section 7; Table 7.1, 7.2**). Subsequent disturbance and the persistence of disturbance are considered as follows:

1. 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 2014b) 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.
3. 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. This threshold does not apply to the sensitive habitat *Zostera* where any spatial overlap of activities should generally be avoided.

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

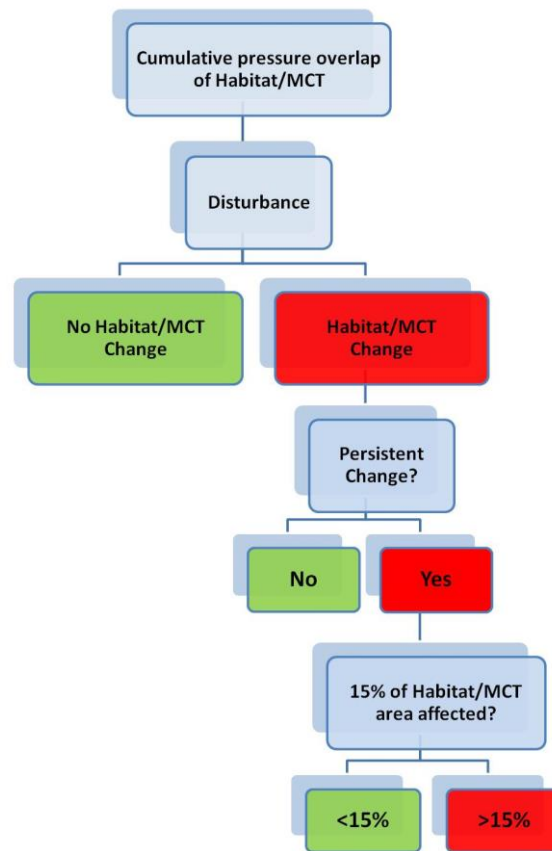


Figure 8-1 - Determination of significant effects on community distribution, structure and function for sedimentary habitats (following NPWS 2014b).

In relation to the designated species *Halichoerus grypus* (Grey Seal) [1364] and *Lutra lutra* (Otter) [1355]; the capacity of the species population to maintain themselves in the face of anthropogenic induced disturbance or mortality at the site will need to be taken into account in relation to the Conservation Objectives for the species on a case-by-case basis.

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 Ballyness Bay 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 2014b). On this basis, NPWS 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 recent studies has provided greater confidence in terms of assessing likely interactions between intertidal oyster culture and marine habitats (Forde et al 2015; O'Carroll et al 2016). 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 2014a).
- 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 Ballyness Bay 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). 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, deposit and suspension 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 BALLYNESS BAY 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 are all important considerations when considering risk of disturbance of intertidal aquaculture to habitats and species.

NPWS (2014a) provide lists of species characteristic of benthic communities occurring within Annex I features that are defined in the Conservation Objectives.

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

- Coarse sediment to sandy mud with oligochaetes and polychaetes community complex
- Mobile sand community complex

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

1. **Habitat Area** - it is unlikely that the activities proposed will reduce the overall extent of permanent habitat within the feature (1140) 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)** - this attribute considered interactions with the community types listed above. **Table 8.1** below indicates the community types, found within the Qualifying Interests of 1140 that are considered further as part of the assessment (i.e. community types which overlap with current and existing aquaculture activities).

Table 8-1 - Community types recorded in Ballyness Bay SAC and the Annex I habitats of (1140) Mudflats and sandflats not covered by seawater at low tide that overlap with overlap with current and existing aquaculture activities

Feature	Community Type	Overlap with intertidal oyster cultivation activities*	Overlap with intertidal clam cultivation*
Mudflats and sandflats not covered by seawater at low tide (1140)	Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	✓	✓
	Mobile sand community complex	✓	✓

* Includes access routes

For community types listed under 1130 **Table 8.2** lists the habitats and **Table 8.3** lists the constituent taxa and both 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) and intertidal clam cultivation within the SAC.

The likely interactions between (existing and proposed) intertidal oyster cultivation and intertidal clam cultivation aquaculture activities and the broad habitat feature of 1130 and 1140 and their constituent community types are described in **Table 8.5** together with broad conclusions and justifications on whether the activities in isolation and/or cumulatively are 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.

Intertidal oyster cultivation

The spatial overlap of proposed oyster cultivation sites and the constituent community types Coarse sediment to sandy mud with oligochaetes and polychaetes community complex and Mobile sand community complex identified for the Qualifying Feature habitats of 1140, ranges from 4.05% and 6.47%, respectively (**Table 7.1**). Published literature (Forde *et al.*, 2015; O’Carroll *et al.*, 2016) suggests that the presence of bags on trestles is considered non-disturbing to the community type, Coarse sediment to sandy mud with oligochaetes and polychaetes community complex. The sensitivity of the community type Mobile sand community complex, is unknown given the wide variation in species composition and sedimentary characteristics that comprise this community type (NPWS 2014b). While some characteristics of this community type match those described and investigated in Forde *et al* (2015) and O’Carroll *et al* (2016) others are quite different. In particular, areas where there are very ‘soft’ mobile sands with impoverished communities would appear to be sensitive to the placement of trestles and even foot traffic among the trestle rows. On this basis, it is assumed that intertidal shellfish culture has the potential to disturb this community type.

Clam Cultivation

Clam culture will overlap only one marine community type found Clam culture may result in more chronic and long-term changes in community composition which were considered during the assessment process. High density clam culture may result in exclusion of native fauna and build-up of sedimentary material as a consequence of the netting. In addition, the harvest method employed using modified dredges attached to tractors is considered highly disturbing to all sedimentary marine community types.

Access Routes

The access routes used in intertidal areas, presumably by virtue of persistent compaction of the sedimentary habitats, are considered disturbing (De-Grave *et al.*, 1998; Forde *et al.*, 2015; O'Carroll *et al.*, 2016). The access routes proposed for aquaculture sites will travel over both community types found in the Qualifying Interest (1140) Mudflats and sandflats not covered by seawater at low tide (see **Figure 4.4** and **Table 7.2**). For the Qualifying Interests 1140 the spatial overlap of the access routes with the constituent community type of Mobile sand community complex is 0.59% and for Coarse sediment to sandy mud with oligochaetes and polychaetes community complex is 1.2%.

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 (*Crassostrea 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 risk of Pacific oysters naturalising in Ballyness Bay **cannot be discounted**.

While there is minimal risk associated with the introduction of hitchhiker species with hatchery reared oyster seed. A risk of alien species introductions presents if '½-grown' or 'wild' seed originating from another jurisdiction (e.g. Britain, France) is introduced to the sites. However, it is noted that hatchery seed will only be used in the bay so the risk posed by the transfers of other sources of stock can be discounted.

In relation to the Manila clam (*Ruditapes philippinarum*), this species has been in culture in Ireland since 1984 and, to the best of our knowledge, no recruitment in the wild has been recorded. The operations are totally reliant on hatchery seed and are fully contained at all stages of the production cycle and given the short residence times calculated for the SAC, the risk of naturalisation of this species is considered low, but should be kept under surveillance.

For **(2130) Fixed coastal dunes with herbaceous vegetation (grey dunes)** there are a number of attributes (with associated targets) relating to this feature that would likely interact with the pressures deriving from the use of the habitat as a means to access the sites proposed for aquaculture purposes (Table 5.2 and Figure 8-2). While it is acknowledged that the access routes proposed will follow (for the most part) existing paths (currently subject to vehicular and pedestrian traffic), the licencing of aquaculture activity at this site could lead to additional risk of erosion and degradation of this dune habitat [2130]. The risk of damage from vehicular traffic to dune habitat (2130) in Ballyness Bay therefore, **cannot be discounted**.

Figure 8-2 Access route overlap with Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130].

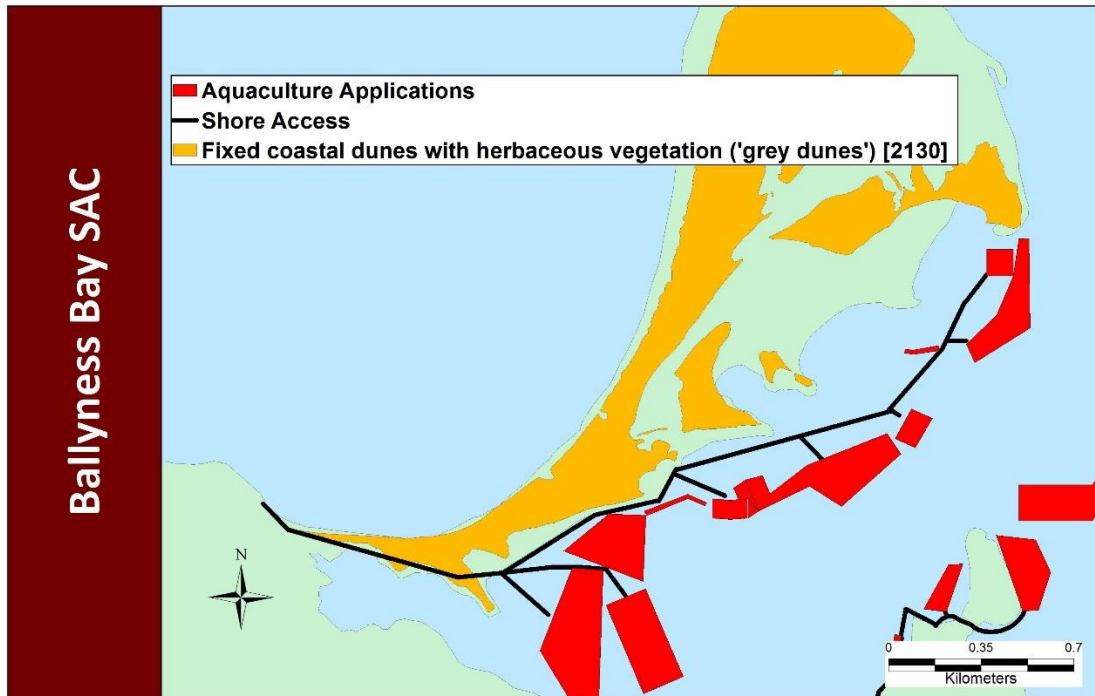


Table 8-2 - Matrix showing the characterising habitats sensitivity scores x pressure categories for habitats (or surrogates) in Ballyness Bay SAC (ABPMer 2013a-h) (**Table 8.4** provides the code for the various categorisation of sensitivity and confidence.)

Community Type (Surrogate [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- phytoplankton	Decrease in oxygen levels- sediment	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
Coarse sediment to sandy mud with oligochaetes and polychaetes community complex (Polychaete / amphipod dominated sand shores [A2.23]/ Polychaete/bivalve-dominated muddy sand shores [A2.24])	NS **/ NS ***	L **	L **/ L ***	NS **	L- NS **/ L **	L-M *	L-M *	L-M *	L-M *	M */ NS *	L-M *	NS */ NS	NS *	NS *	NS *	L- NS */ L *	L- NS */ L *	NS *** /H ***	NS *	NS *	NS *	NS *	L *	NS *
Mobile sand community complex (Polychaete / amphipod dominated sand shores [A2.23]/ Infralittoral Fine Sand [A5.23])	NS *	L *	L *	NS */ NE	L- NS */ NE	L-M *	L-M *	L-M *	L-M *	M *	L-M *	NS *	NS *	NS *	NS *	L- NS */ L- NS ***	L- NS */ L- NS ***	NS ***	NS *	NS *	NS *	NS *	L *	NS *

Table 8-3 - Matrix showing the characterising species sensitivity scores x pressure categories for species in Ballyness Bay SAC (ABPMer 2013a-h) (**Table 8.4** provides the code for the various categorisation of sensitivity and confidence.)

Community Type (Surrogate [EUNIS code])	Species (Characterizing species Identified from NPWS 2014b)	Surface Disturbance	Shallow Disturbance	Deep Disturbance	Trampling – access by foot	Trampling – access by vehicle	Extraction	Sitiation (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- 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	
Coarse sediment to sandy mud with oligochaetes and polychaetes community complex (Polychaete / amphipod dominated sand shores [A2.23]/ Polychaete/bivalve-dominated muddy sand shores [A2.24])	<i>Tubificoides benedii</i>	NS *	NS *	L **	L *	L *	M *	NS *	L *	NS *	NS *	NS ***	NS *	NS *	NS ***	NS ***	NS *	NS ***	NS ***	NS *	NS *	NS *	NS **	NEv	NEv	NS **	
	<i>Pygospio elegans</i>	L *	L **	M ***	L *	L *	L-M *	L ***	L-M ***	L-M *	NS **	L-M *	NS *	NS *	NS *	NS ***	NS *	L **	L **	M *	NS *	NS *	NS *	NEv	NEv	NS *	
	<i>Hediste diversicolor</i>	NS *	L-M **	L-H **	NS *	L *	L-H *	NS ***	L-M *	M-H *	NS *	NS *	NS *	NS *	NS **	NS **	NS *	NS **	NS **	L-M *	L-M *	NS *	NS *	M-H **	M-H **	NS *	
	Nematode indet.	NS ** *	NS ***	NS ***	NS ***	NS *	L *	NS *	NS ***	NS ***	NS ***	NS *	NS *	NS *	NS *	NS ***	NS *	NS *	L ***	L ***	NS ***	NS *	L *	NS ***	NEv	L ***	NS *
	<i>Capitella</i> sp.	L *	L **	L **	L ***	L *	L *	L *	NS *	NS *	NS ***	NS *	NS *	NS *	NS *	NS ***	NS ***	NS *	L ***	L ***	NS *	NS *	NS *	NS **	L ***	NS ***	NS *
Mobile sand community complex (Polychaete /	<i>Angulus tenuis</i>	NS *	L *	L ***	NS *	L *	M *	NS *	H *	M-H *	NS *	L-M *	L *	NS *	NS *	NEv	L-NS *	NEv	NEv	M *	NS *	NS *	NS *	NEv	NEv	NS *	

Prevention of light reaching seabed/features	NS *
Introduction of hydrocarbons	NS ***
Introduction of medicines	NEv
Introduction of antifoulants	NS *
Removal of Non-target species	NS *
Removal of Target Species	NS *
Introduction of non-native species	M *
Decrease in oxygen levels-water column	L *
Decrease in oxygen levels- sediment	L *
Increased removal of primary production- phytoplankton	NS *
Organic enrichment of sediments-sedimentation	NS ***
Organic enrichment-water column	NS *
Decrease in turbidity/suspended sediment	NS *
Increase in turbidity/suspended sediment	NS *
Changes to water flow	NS *
Changes to sediment composition- Increased fine sediment proportion	NS *
Changes to sediment composition- Increased coarseness	NS *
Smothering (addition of materials biological or non-biological to the surface)	L-M ***
Siltation (addition of fine sediments, pseudofaeces, fish food)	L-M ***
Extraction	L-M *
Trampling – access by vehicle	NS *
Trampling – access by foot	NS *
Deep Disturbance	NS *
Shallow Disturbance	NS ***
Surface Disturbance	NS *
Species (characterizing species identified from NPWS 2014b)	Scolelepis squamata
Community Type (Surrogate [EUNIS code])	amphipod dominated sand shores [A2.23]/ Infralittoral Fine Sand [A5.23]

Table 8-4 - 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
M	Medium
H	High
VH	Very High
*	Low confidence
**	Medium confidence
***	High Confidence

Table 8-5 - Interactions between proposed aquaculture activities and constituent communities of the habitat features of (1140) Mudflats and sandflats not covered by seawater at low tide with a broad conclusion on the interactions.

Licence Status	Culture Species	Qualifying Interest 1140 (688.5 ha)	
		Coarse sediment to sandy mud with oligochaetes and polychaetes community complex (120.9ha)	Mobile sand community complex (567.6ha)
Application	Oyster Sites	Disturbing: No Justification: The spatial overlap with the community type is low at 3.77%. Published literature (Forde <i>et al.</i> , 2015) suggests that activities occurring at trestle culture sites are not disturbing.	Disturbing: No Justification: The spatial overlap with the community type is low at 5.1%. Published literature (Forde <i>et al.</i> , 2015) suggests that activities occurring at trestle culture sites are not disturbing.
Application	Oyster and Clam Sites	Disturbing: Yes Justification: Compaction by vehicles and harvest methods using dredges can lead to change in community composition. The spatial overlap with the community type is 0.28%.	Disturbing: Yes Justification: Compaction by vehicles and harvest methods using dredges can lead to change in community composition. The spatial overlap with the community type is 1.37%.
Application	Clam	N/A	Disturbing: Yes Justification: disturbance by site preparation and harvesting techniques can lead to change in community composition The spatial overlap with the community type is 1.6%.
Access Routes		Disturbing: Yes Justification: Compaction by vehicles can lead to change in community composition The spatial overlap with the community type is 1.2%.	Disturbing: Yes Justification: Compaction by vehicles can lead to change in community composition The spatial overlap with the community type is 0.59%.
Cumulative Impact of Proposed Aquaculture Activity		Disturbing: No Justification: The overall spatial overlap of likely disturbing activity with the community type is 1.48%. This value is below the spatial overlap threshold (15%) for significant adverse impacts of on this community type.	Disturbing: No Justification: The overall spatial overlap of likely disturbing activity with the community type is 3.56%. This value is below the spatial overlap threshold (15%) for significant adverse impacts of on this community type.

8.4 ASSESSMENT OF THE EFFECTS OF AQUACULTURE PRODUCTION ON THE CONSERVATION OBJECTIVES FOR OTTER *LUTRA LUTRA* IN THE GWEEDORE AND ISLANDS SAC.

Gweedore Bay and Islands SAC, which is c. 1.7km west of Ballyness Bay SAC, is designated for the otter (*Lutra lutra*); Conservation Objectives for the species within the SAC have been defined by NPWS and primarily relate to population size and distribution (NPWS, 2015a). It is acknowledged in this assessment that the favourable conservation status of the otter has been achieved (NPWS 2015a) in the Gweedore Bay and Islands SAC given current absence of aquaculture production within the Ballyness Bay SAC.

As the proposed aquaculture production activities within the Ballyness Bay SAC do not spatially overlap with otter territory in the Gweedore Bay and Islands SAC, individuals may migrate into the Ballyness Bay SAC and as a result experience disturbances from the proposed aquaculture activities in the bay.

The risk of negative interactions between aquaculture operations and aquatic mammal species is a function of:

1. The location and type of structures used in the culture operations- is there a risk of entanglement or physical harm to the animals from the structures?
2. The schedule of operations on the site – is the frequency such that they can cause disturbance to the animals?

Shellfish Culture: Shellfish culture operations are likely to be carried out in daylight hours. The interaction with the otter is likely to be minimal given that otter foraging is primarily crepuscular. It is unlikely that these culture types pose a risk to otter populations from the Gweedore Bay and Islands SAC.

Impacts from intertidal oyster and clam cultivation can be discounted on the basis that the proposed activities will not lead to any modification of the following attributes for otter:

- Extent of habitat (terrestrial, marine and/or freshwater habitat).
- The activity involves net input rather than extraction of fish biomass so that no negative impact on the essential food base (fish biomass) is expected
- The number of couching sites and holts or, therefore, the distribution, will not be directly affected by aquaculture and fisheries activities.
- Shellfish production activities are unlikely to pose any risk to otter populations through entrapment or direct physical injury.
- The oyster culture structures are raised from the seabed (0.5m -1m) and are oriented in rows, thus allowing free movement through and within the site.
- Disturbance associated with vessel and foot traffic at aquaculture cultivation sites could potentially affect the distribution of otters at the site. However, the level of disturbance

is likely to be very low given the likely encounter rates will be low dictated primarily by tidal state and in daylight hours.

On the basis of location and timing of activities, the proposed levels of licenced shellfish culture are considered **non-disturbing** to otter conservation features in the Gweedore Bay and Islands SAC.

8.5 ASSESSMENT OF THE EFFECTS OF AQUACULTURE PRODUCTION ON THE CONSERVATION OBJECTIVES FOR GREY SEAL *HALICHOERUS GRYPUS* IN THE HORN HEAD AND RINCLEEVAN SAC.

The Horn Head and Rinclevan SAC is designated for the grey seal (*Halichoerus grypus*); Conservation Objectives for the species within the SAC sites have been defined by NPWS and primarily relate to the requirement to maintain various attributes of the populations including population size and the distribution of the species (NPWS 2014d). It is acknowledged in this assessment that the favourable conservation status of the grey seal has been achieved (NPWS 2014d) given current absence of aquaculture production within the Ballyness Bay SAC.

The proposed aquaculture activities must be considered in light of the following attributes and measures for the grey seal:

- Access to suitable habitat – number of artificial barriers
- Disturbance – frequency and level of impact
- Harbour seal Sites:
 - . Breeding sites
 - . Moulting sites
 - . Resting sites

Restriction to suitable habitats and levels of disturbance are important pressures that must be considered to ensure the maintenance of favourable conservation status of the grey seal and implies that the seals must be able to move freely within the site and to access locations considered important to the maintenance of a healthy population. They are categorised according to various life history stages (important to the maintenance of the population) during the year. Specifically they are breeding, moulting and resting sites. It is important that the access to these sites is not restricted and that disturbance, when at these sites, is kept to a minimum. Activities at culture sites and during movement to and from culture sites may result in disturbance events such that the seals may note an activity (head turn), move towards the water or actually flush into the water. While such disturbance events might have been documented, the impact of these disturbances at the population level has not been studied more broadly (National Research Council, 2010).

All of the proposed aquaculture production activities within Ballyness Bay SAC are >10km from the documented breeding, moulting and resting sites of the grey seal in the Horn Head and Rinclevan SAC and therefore, are unlikely to impact on the attributes relating to the site. Notwithstanding, local observations have identified a specific haul-out within Ballyness Bay. In particular, seals have been observed on a large sand bank in the centre of the Bay (Figure 8-2). Given that there are currently no aquaculture operations in Ballyness Bay, it is not certain that the introduction of significant levels of aquaculture operations will not impact on the site use by these Annex II species, in particular at those

locations proximate to the this haul-out location. Therefore, the risk posed by the proposed aquaculture activities in Ballyness Bay to seal conservation features cannot be discounted.

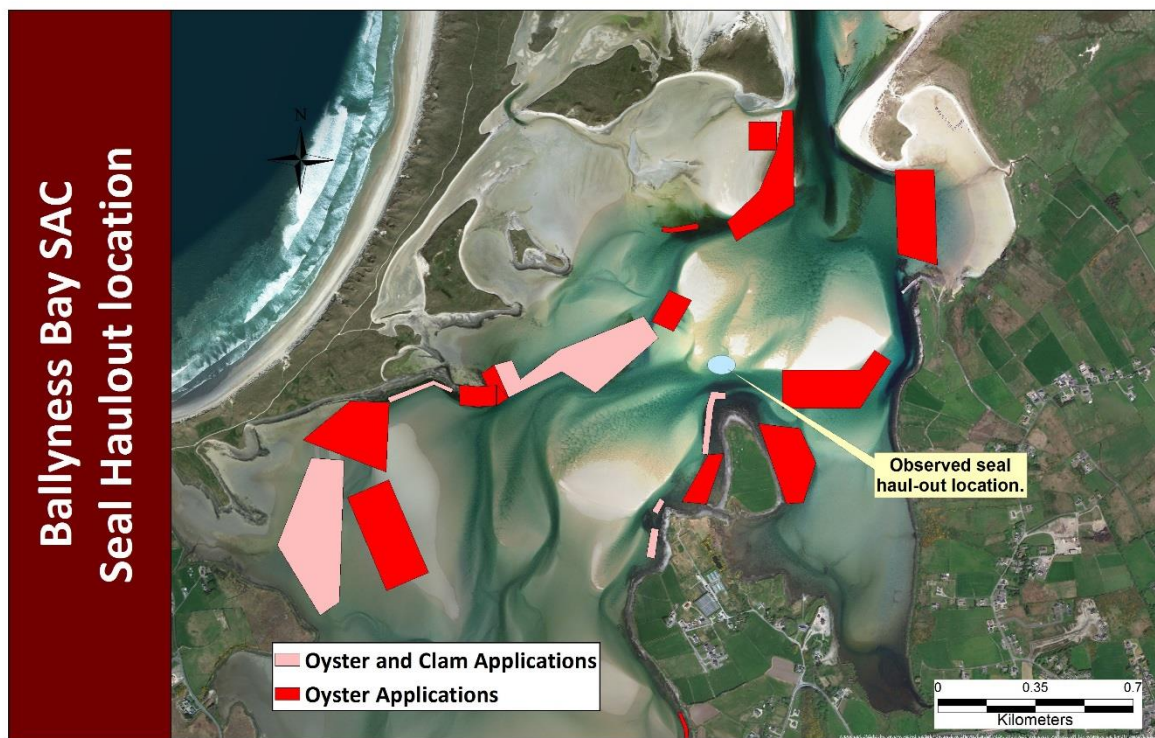


Figure 8-3 Location of observed seal haul-out in Ballyness Bay.

9 IN-COMBINATION EFFECTS OF AQUACULTURE, FISHERIES AND OTHER ACTIVITIES

9.1 FISHERIES

There are no fishing activities within Ballyness Bay SAC and therefore there are no likely in-combination effects.

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 Ballyness Bay SAC. Primary among these are point source discharges from domestic sewage outfalls distributed along the bay and municipal urban waste water treatment plants. The pressure derived from these point sources may impact upon levels of dissolved nutrients, suspended solids and some elemental components e.g. aluminium in the case of water treatment facilities.

9.2.1 Conclusion

Pressures resulting from aquaculture activities are primarily disturbance to sediments as a consequence of compaction of sediment along access routes and preparation of sites and harvest of clam sites. It was, therefore, concluded that given the pressure resulting from point discharge location such as the urban waste-water treatment 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.**

10 SAC AQUACULTURE CONCLUDING STATEMENT

10.1 ASSESSMENT REPORT CONCLUDING STATEMENT

Proposed aquaculture activities occurring in the Ballyness Bay SAC focus on the cultivation of oysters (using bags and trestles) and clams using trays and netting, in the intertidal zone. Based upon this and the information provided in the aquaculture profiling report (**Section 5**), the likely interaction between these culture methodologies and conservation features (habitats and species) of the SAC were considered.

10.1.1 Habitats

An initial screening exercise resulted in the following habitat features and species being excluded from further consideration by virtue of the fact that no spatial overlap of the culture activities was expected to occur; Embryonic shifting dunes [2110], Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120], Humid dune slacks [2190] and *Vertigo geyeri* (Geyer's Whorl Snail) [1013]. Furthermore, none of the proposed aquaculture applications overlap with the Annex I habitat Estuaries [1130] and this was also excluded from further analysis.

A full assessment was carried out on the likely interactions between proposed culture operations and the feature Annex 1 habitat 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 constituent habitats and species of the Annex 1 habitat 1140. Annex I 1140 constituent communities considered include Coarse sediment to sandy mud with oligochaetes and polychaetes community complex and Mobile sand community complex.

Based upon the scale of spatial overlap of proposed intertidal aquaculture activities (including access route activity) and the relatively high tolerance levels of the habitats and associated species, the general conclusion is that proposed intertidal culture activities are non-disturbing to the Qualifying Interests 1130 and 1140 and their constituent community types.

However, the overlap of access routes with the habitat - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] does appear to present a risk of erosion and habitat degradation.

10.1.2 Species

The likely interactions between the proposed aquaculture activities and the following Annex II Species were assessed; Grey seal *Halichoerus grypus* [1364] and Otter (*Lutra lutra* [1355]). The wider objectives for these species focus upon maintaining the good conservation status of populations. The main aspect of the culture activities that could potentially impact the designated species disturbance caused to otter and seal by movements and activities at the sites. Given the locations and timings of the proposed activities (i.e. daytime) it is concluded that activities would be non-disturbing to otter but the risk posed to seal species cannot be entirely discounted.

10.1.3 Recommendations

Notwithstanding the conclusions noted above in relation to Annex 1 habitat 1140, it should be noted that the nature of the community type, Mobile sand community complex is such that there are likely to be locations where the sediments are extremely mobile (and soft) thus making them unsuitable for

aquaculture operations. It is recommended, prior to making a decision to licence, that these areas be clearly identified with the Bay.

The report highlights risks to coastal habitat [2130] features if the activities proposed are licenced in full. More specifically, the risk arises from the additional traffic likely to occur on existing tracks as a result of the need to access the sites. It is recommended that those with specific engineering expertise be sought in order to identify erosion prevention measures that might be put in place to mitigate the risks identified. Alternatively, the re-routing of access routes to avoid overlap with habitat feature 2130 might be considered?

In relation to interactions between aquaculture operations and seal use of the site, the risk of disturbance cannot be discounted. It is important to note that the site, to date, has had very little aquaculture operations and therefore, the seals will have little opportunity to habituate to the activities. Also of note, where there is no specific barrier to access (e.g. tidal channel), the seals are more likely to be disturbed. Based upon local observations it appears that the seals are faithful to this one identified haul out location. Therefore, careful consideration should be given to licencing the site which shares the sandbank with the observed seal haul out.

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