Article 6.2 (Habitats Directive) Risk Assessment

The effects of fisheries on Qualifying Interests in Special Areas of Conservation in Irish coastal waters

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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. Such fisheries are subject to appropriate assessment. Fisheries not coming under the scope of Article 6.3, that is, those fisheries not subject to secondary licencing, are subject to risk assessment (RA). 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 into Irish legislation in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). Habitats and Birds (Habitats Directive and Birds Directive) regulations for sea fisheries are laid out in European Union (Birds and Natural Habitats) (Sea Fisheries) regulations 2013 (S.I. 290/2013). Under this legislation Appropriate Assessments (AAs) and risk assessments (RAs) are carried out against the conservation objectives (COs), and more specifically on the version of the COs that are available at the time of the Assessment, for designated ecological features, within the site, as defined by the National Parks and Wildlife Service (NPWS). NPWS are the competent authority for the management of Natura 2000 sites in Ireland. Obviously, aquaculture and fishing operations existed in coastal areas prior to the designation of such areas under the Directives. Ireland is thereby assessing both existing and proposed aquaculture and fishing activities in such sites. This is an incremental process, as agreed with the EU Commission in 2009, and will eventually cover all fishing and aquaculture activities in all Natura 2000 sites.

In Ireland, fisheries other than oyster fisheries, and aquaculture activities are licenced by the Department of Agriculture, Food and Marine (DAFM). Oyster fisheries are licenced by the Department of Communications Energy and Natural Resources (DCENR). The process of identifying existing and proposed activities and submitting these for assessment is, in the case of fisheries projects and plans, outlined in SI 346/2009. Here, the industry or the Minister may bring forward fishing proposals or plans which are subject to appropriate assessment. These so called Fishery Natura Plans (FNPs) may simply be descriptions of existing activities or may also include modifications to activities that mitigate, prior to the assessment, perceived effects to the ecology of a designated feature in the site. In the case of other fisheries, that are not projects or plans, data on activity are collated and subject to a risk assessment against the COs. 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. This process involves consultatioin with industry and other stakeholders, the marine agencies and the competent authority for the management of the sites (NPWS).

2 Acknowledgements

Coastal staff of BIM and SFPA and a number of fishermen provided information on the distribution of inshore fishing activity around the Irish coast.

3 Executive summary

In Ireland, Article 6 (Habitats Directive) assessments of fisheries projects and plans, or so called Fishery Natura Plans (FNPs), that occur within Special Areas of Conservation (SAC) and Special Protection Areas (SPAs), is achieved through sub-Article 6(3) of the Directive which requires that appropriate assessment (AA) of projects and plans is carried out to assess the potential impact of these plans on the sites qualifying interests. Fisheries, not coming under the scope of Article 6.3, which are those fisheries not subject to secondary authorization and therefore not fishery plans as such, are risk assessed using sub-Article 6.2. Identified risks to designated features (habitats and species) can then be mitigated and deterioration of such features can be avoided as envisaged by sub-article 6.2. Likewise, in the case of fisheries projects or plans the response to significant effects findings in the appropriate assessment is, necessarily, to reduce these effects to levels consistent with conservation objectives (COs) for the sites.

This report is a sub-article 6.2 risk assessment of fisheries that operate in SACs and also assesses the risk posed by fisheries outside of SACs to qualifying interests whose distribution is not wholly within the borders of the SACs. A similar assessment of SPA special conservation interests will be published separately.

The geographic scope of the assessment extends from Carnsore Pt. in the south east to Mulroy Bay in the north and includes all waters in between and offshore beyond the 12nm limit. A separate assessment has been published for the Irish Sea. Waters outside of the designated sites are included in the assessment so that the effects of fisheries on species designated by the Directives, and whose distributional range extends well beyond the borders of the designated sites, can be incorporated. The geographic scope of the assessment is, however, also species specific depending on the particular behaviours of the species concerned. The assessment is in a small minotiry of cases limited in that the specific COs for habitats or species for which the sites are designated have not yet been published. To account for this the status of the COs is indicated in tables throughout the document.

Risk posed by fisheries to habitats is categorized based on the potential of the fishery to change the characterizing species of the habitat, whether such change is cumulative and persistent and the proportion of the habitat that is affected. In sedimentary habitats, if the proportion of habitat disturbed is over 15%, the risk is deemed to be significant and to potentially require mitigation. In reef habitats any disturbing impact is seen as potentially significant. In the case of species significant impacts are deemed to occur when there is a risk of population decline or where the distribution or the demographic profile of the species is likely to be impacted. The risk scores are

products of consequence (to the habitat or species) and the likelihood of that consequence occurring. The resulting risk scores are categorized with respect to the likely requirement for mitigation. This methodology follows EC guidance and other published qualitative risk assessment frameworks but adapted to the specific targets and guidance on achieving conservation (management) targets for designated features within the sites.

A diverse range of habitats, habitat features and species are designated in SACs (Habitats Directive) and SPAs (Birds Directive) off the south and west coasts of Ireland. In the marine environment, and excluding coastal habitats, where there is no overlap with fisheries, these include habitats such as large shallow inlet and bays, estuaries, intertidal mud and sand flats, sand banks, reefs and site specific features within these habitats which have been identified through site surveys and which are subject to detailed conservation objectives. Grey Seal, Harbour Seal, Bottle Nose Dolphin, Harbour Porpoise, Twaite shad, Sea lamprey and Salmon are designated in a number of inshore freshwater and marine SACs in Irish waters.

A diverse range of fishing activity occurs on all coasts. There are approximately 1900 inshore (<13m) vessels registered in the Irish fleet. The vast majority of these vessels are engaged in fishing for bivalves and crustaceans using dredges and pots respectively. A small number of vessels fish for mixed demersal fish using bottom trawls. Significant numbers use static bottom set tangle and gill nets for crayfish, turbot, pollack and other species. These vessels also target mackerel and Pollack with hooks and lines using various types of trolling and jigging fishing methods. In addition to inshore vessels, larger (>15m) demersal and pelagic vessels fish in inshore waters using bottom otter trawls, mid-water trawls, set nets, dredges and pots.

Generically, and without summarizing the findings for individual sites, the risk assessment found that

1. Fisheries data is generally insufficient to identify and map the distribution of fishing activity at sufficiently fine resolution relative to the scale and size of habitat features which are the target for conservation. There are exceptions where the distribution of the activity can be assumed to occur where the target species occurs and where the distribution of that specis is relatively fixed and known.
2. Fisheries using bottom trawls or dredges pose a particular risk to maerl, sea grass and biogenic or geogenic reef habitats because these habitats are sensitive to physical disturbance. Dredging is more likely to occur on or close to these habitats, which occur in shallow water, than trawling although maerl can also occur in waters up to 30m deep.
3. Fisheries using bottom trawls or dredges may impact marine communities in sedimentary habitats. The consequence for these communities depends on the intensity and seasonaility of the activity relative to the capacity of the habitat to recover between

fishing seasons. Therefore, fisheries that fish or could fish intensively on such habitats for protracted periods of time need to be, or would need to be, managed to enable habitat recovery and to avoid cumulative effects.

4. Static gears such as pots and associated ground ropes and anchors may have an impact on maerl and seagrass. Effects on maerl may be cumulative if the activity is generally present.
5. Static fishing gears such as pots may have short term seasonal effects on reef communities if the activity is intense and frequent. This may or may not be significant relative to background seasonal variability in such habitats
6. Some fisheries target habitat features which have specific conservation requirements (targets) or which provide structural habitat that supports high biodiversity. These include native oyster habitat and mussel reef. Specific arrangements for managing the effects of fisheries on these features are needed.
7. Some fisheries (cockle, mussel, oyster, clams) target species which are important constituent species of marine habitats and which may also support waterbird species designated under the Birds Directive. Specific arrangements for the management of these fisheries, to protect habitat and bird conservation interests, are needed.
8. Rare species or rare communities occur in some sites. Specific arrangements for managing the effects of fisheries on rare species / communities within SACs are needed
9. Static net fisheries, in particular large mesh tangle nets, have a by-catch of Grey Seals and Harbour Seals.
    a. The highest by-catch is of Grey Seal. Populations of Grey Seal in Ireland are increasing. The by-catch, which is mainly of juveniles seals, limits the productivity of Grey Seal populations.
    b. Harbour Seals are captured in set net fisheries but the catch rate is lower than for Grey Seal even if the lower population size of Harbour Seal is taken into account. Fisheries by-catch may also modulate the rate of population growth of Harbour Seal.
    c. The significance and requirement for mitigation of the impacts of fisheries on seal populations depends on the interpretation of the conservation and management objectives.
10. There is little evidence for fish resource competition between fisheries and seals. Although seals cause significant fish damage and loss of fish in static net fisheries generally seals consume non-commercial species or undersized fish of commercial species. It is unlikely that fisheries cause significant depletion of fish prey for seals. However, habitat quality and prey availability close to haul out sites could be depleted temporarily due to intensive pelagic fisheries occurring close to haul out sites.

11. Static net fisheries have a by-catch of Harbour Porpoise.
    a. Significant set net fishing activity in SACs designated for Harbour Porpoise may reduce the population of Porpoises using the site and require immigration to maintain the number of Porpoise in the sites.
12. Bottlenose dolphins are less susceptible to by-catch than seals or porpoise. Nevertheless, in the case of the Shannon estuary population, which is small and genetically distinct, fishing activity, such as set nets, may pose a risk to the population.
13. Resource competition between dolphin and fisheries is unlikely to be significant
14. Coastal otters may interact with pot and trammel net fisheries. There is a low risk of by-catch of otters in pots.
15. The conservation status of Twaite Shad in Irish rivers is unfavourable; their populations are small and declining. Marine fisheries are known to catch Shad as by-catch although the majority of this by-catch is Allis Shad. By-catch of Twaite Shad in marine commercial fisheries could, in combination with other factors in the freshwater environment, be contributing to the decline in populations of Twaite Shad in Irish rivers.

4 Introduction

This document assesses the potential ecological impacts of fishing activities on Special Areas of Conservation (SACs) in Irish coastal waters from Carnsore Pt in Wexford west to Mizen Head and north to Lough Foyle. A similar assessment has been reported separately for the Irish Sea. The interaction between fisheries and bird species in Special Protection Areas (SPAs) will be published separately. The geographic domain of the assessment extends seaward to outside of the 12nm limit in order to ensure that activities outside the coastal sites that may be relevant to mobile species are included. Offshore designated sites are not included. The fisheries information upon which this assessment is based is from a profile of fishing activity compiled for Irish coasts in the period 2010-2015 using a variety of methods and sources.

5 Structure and layout of the assessment

5.1 Structure

The report is structured as follows

- The scope of the assessment is in **Section 5**. This defines the geographic coverage and list of sites and qualifying interests considered
- Marine Fisheries in Ireland including an overview of the fleet, impinging legislation and data sources on fisheries activity used in the assessment are described in **Section 6.1.** The status of marine fish stocks is summarized in **Section 6.2.** These stocks are a prey resource to a number of marine designated species of mammal and seabird**.**
- A detail profile of all fisheries in each of 5 coastal regions is presented in **Section 7**
- An impact statement identifying the possible types of impacts that fisheries may have on QIs is in **Section 8**
- COs for SACs are listed in **Section 9**
- Screening of SAC QIs against fishing activities is in **Section 10**. This exercise applies a series of filters to the overall QI list and identifies sites, QIs that have no possible interaction with fisheries. These are not considered in the risk assessment proper i.e. they are 'screened or filtered out'. This is done when there is no spatial overlap, either in the site or out with the site, between the habitat or species and any fishery

- Where there is potential interaction between QIs and fisheries the risk that such an interaction poses to the habitat or species is assessed. The risk assessment methodology is in **Section 11**.
- The risk assessment proper is in **Section 12**
    - A site by site approach is presented for each coastal region described in Section 7
    - For widely distributed species, where *ex situ*, spatial overlaps with fisheries occur the geographic scope of the assessment is determined on a species by species basis depending on the range over which the designated populations of the species cover
- References (**Section 13**)

6 Scope of the Assessment

6.1 Definitions

- Conservation objective: defines the aim of achieving Favourable Conservation Status (FCS) or condition for the designated species or habitat. Conservation objectives for each habitat or feature is comprised of
    - Attributes: the property or characteristic of the habitat or species which is subject to conservation
    - Measure: how the attribute is measured
    - Target: the reference point or level for the measure (of the attribute)
- Favourable Conservation Status (FCS)
    - Species: population dynamics data on the species concerned indicates that it is maintaining itself on a long-term basis as a viable component of its natural habitat, its range is not reduced and is unlikely to be reduced and sufficient habitat will continue to be available to maintain its populations on a long term basis (www.npws.ie; site conservation objectives)
    - Habitats: its natural range, and area it covers within that range, are stable or increasing, and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable (www.npws.ie; site conservation objectives)
- SAC: Special Areas of Conservation. These are sites designated under the Habitats Directive (1992) for the protection of listed habitats and species
    - Qualifying interest: the habitats or species for which the site is designated and the conservation objective pertaining to it
- Marine Community type (MCT): A biotope or community that occurs within a qualifying interest habitat eg seagrass (MCT) within a large shallow inlet and bay (QI 1160)

6.2 Geographic scope

This assessment includes all SACs and all marine qualifying interests (QIs; Habitats Directive habitats and annex species) in these sites from Carnsore Pt west to Mizen Hd and north to Lough Foyle (Figure 1) and assesses the interaction of all coastal fisheries activities in this area with each QI.

For presentation purposes the description and display of fisheries activity information and the assessment is presented regionally as follows

- Quigleys Point (in L. Foyle) to Benwee Head (east of Broadhaven Bay N. Mayo)
- Benwee Head to Slyne Head
- Slyne Head to Loop Head
- Loop Head to Reen Point (east of Baltimore)
- Reen Point to Carnsore Point

The SACs are coastal and all are inside the 12nm fisheries jurisdiction derogated to Ireland under the Common Fisheries Policy (CFP). All Irish vessels fish in this zone to some degree. The inshore (<12m) fleet operates almost exclusively in this area. There are also foreign fishing rights in the 6-12nm zone based on historic track record. This includes UK, Belgium, France, Holland and Germany on the south coast and France on the west and north west coasts. Vessels registered in Northern Ireland can fish Republic of Ireland waters up to the coast by reciprocal arrangements defined in the voisinage agreement between Ireland and UK. The activity of all fleets is included in the assessment.

Designated sites which lie completely outside the 12nm fishery limit are excluded from this assessment.

Some species designated in the Habitats Directive are highly mobile, migratory and widely distributed. These designated populations, in coastal SACs, move between designated areas, forage at significant distances from the site in which they are designated and may therefore interact with fisheries distant from the site itself. These *ex situ* interactions are, therefore, also included in the assessment. The scope here, however, is limited to 100km offshore as, although arbitrary, this seems to cover the foraging or scale of offshore movement of the designated species concerned.

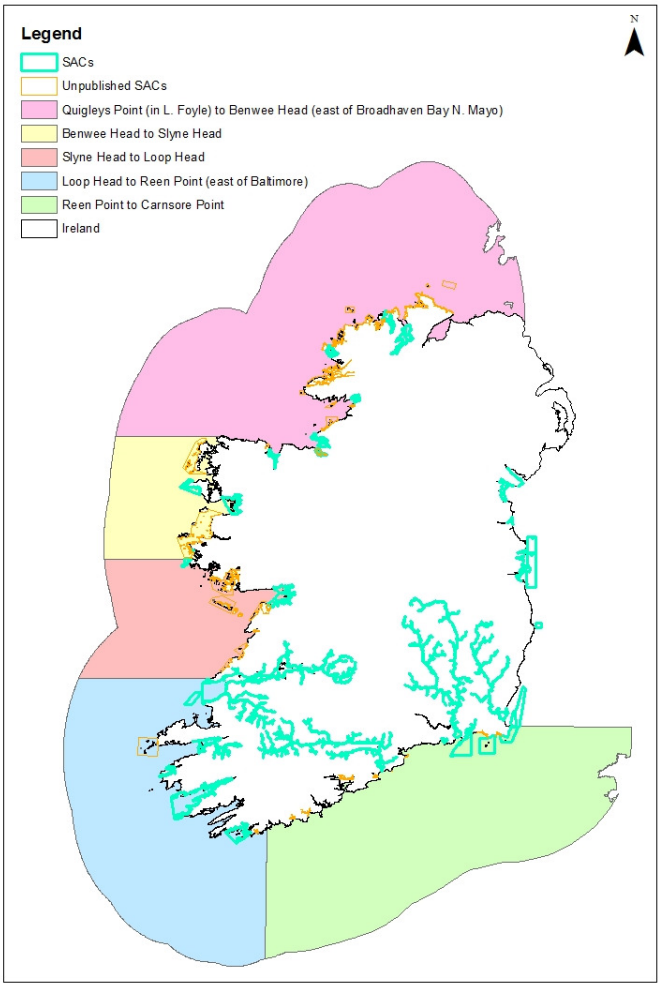

Figure 1. The geographic extent of the assessment, showing SACs with marine features and the regional breakdown and the seaward extent of the assessment.

6.3 Sites included in the assessment and CO status

- See Figures 2 to 7.
- Within the assessment area COs are published[1] for 306 features (marine community types or Annex species) and are pending for 11 features.
- In SACs where COs have not been published the full range of habitat features or marine community types (MCTs) associated with each QI, and their spatial extents, have not been described. It is not, therefore, possible to fully assess the risk of fisheries to these QIs. Nevertheless it is possible to identify if fisheries pose a risk to the QI even if the COs are not

[1] NPWS Geodatabase Ver: April 2015 - http://www.npws.ie/mapsanddata/habitatspeciesdata/

specified for it and to exclude the possibility of risk (screen out) where no overlap with fisheries exists. Where possible this is done. Where the interaction with fisheries cannot be screened out i.e. where there is a spatial overlap of a fishery with a QI and where the COs are not available then the risk assessment simply notes this limitation but also provides a risk score.

- A final iteration of this assessment will be completed when COs for the remaining SACs are published
- Site lists where COs are published or pending are in Table 1. The full list of SACs and their qualifying interests, included in the scope of the assessment, is presented in Annex I.

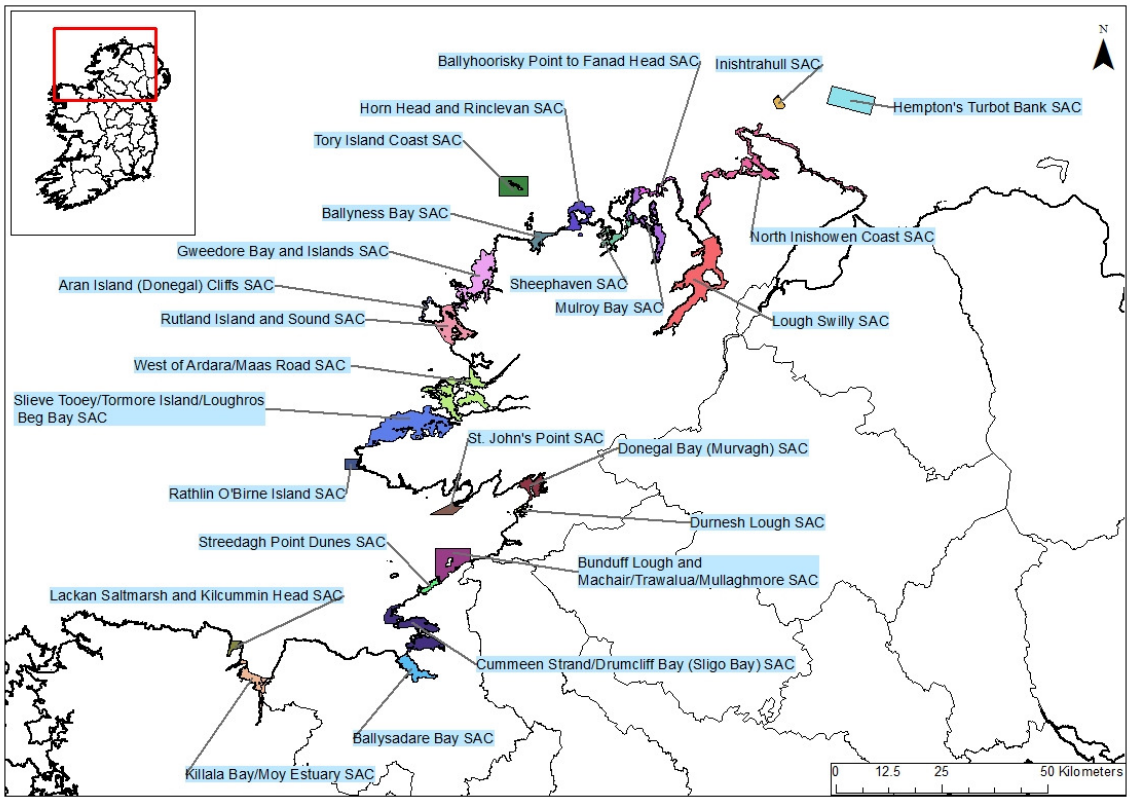

Figure 2. Distribution of SACs between Quigley's Point and Benwee Head included in the assessment

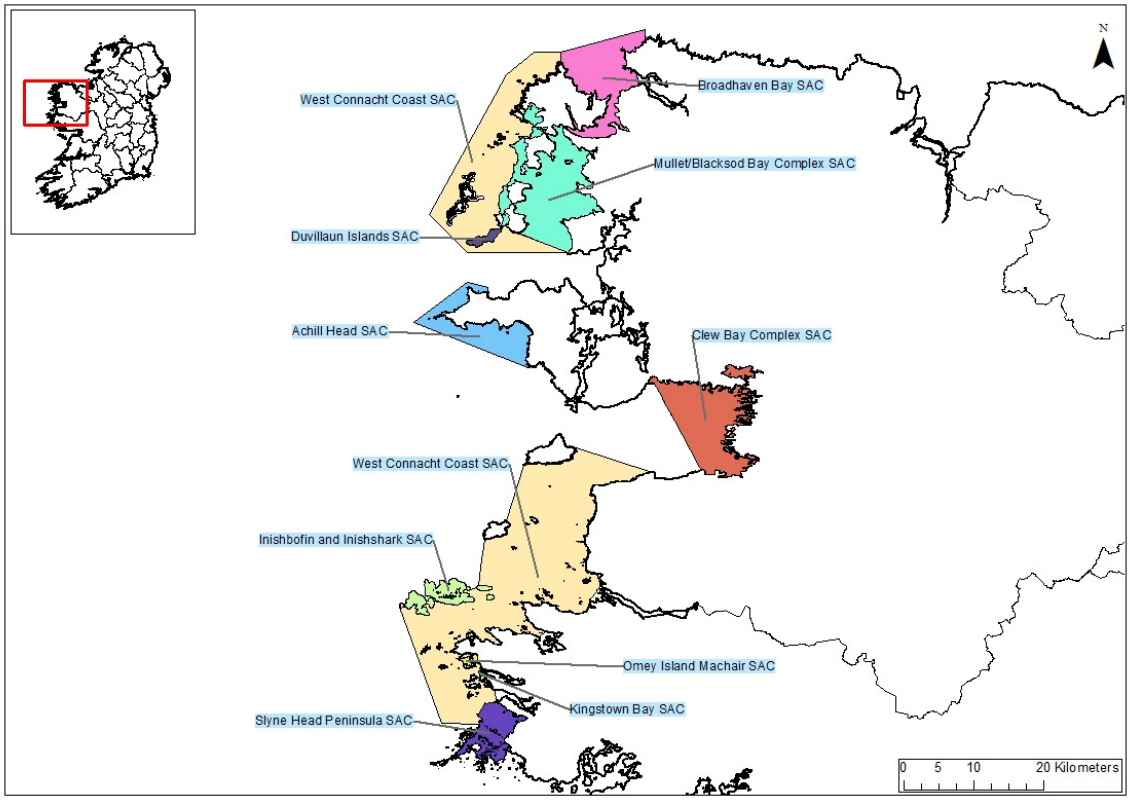

Figure 3. Distribution of SACs between Benwee Head and Slyne Head included in the assessment

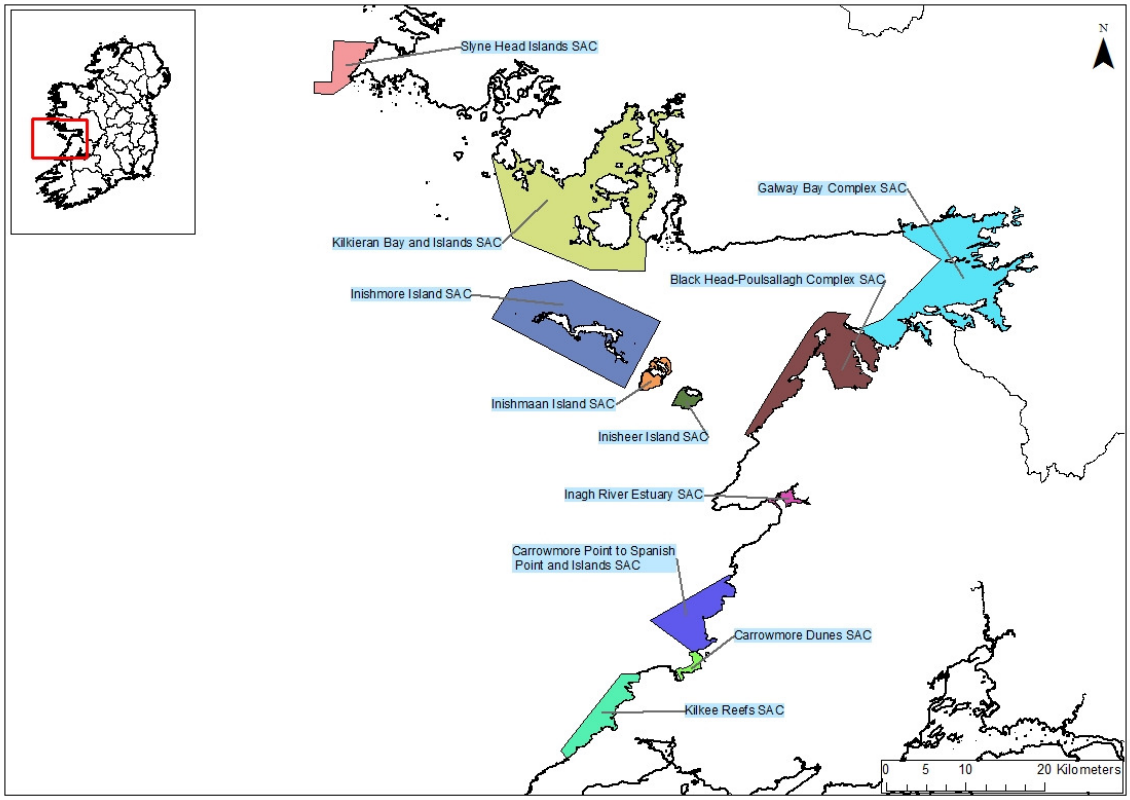

Figure 4. Distribution of SACs between Slyne Head and Loop Head included in the assessment

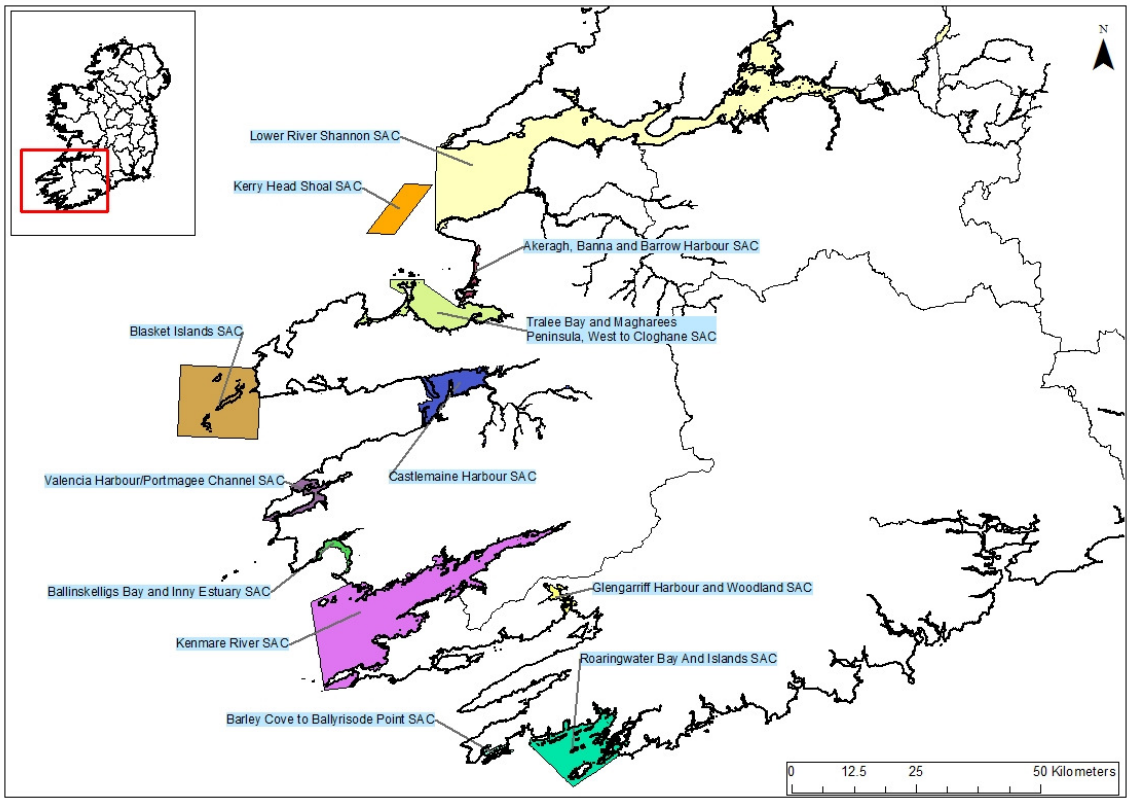

Figure 5.Distribution of SACs between Loop Head to Reen Point included in the assessment

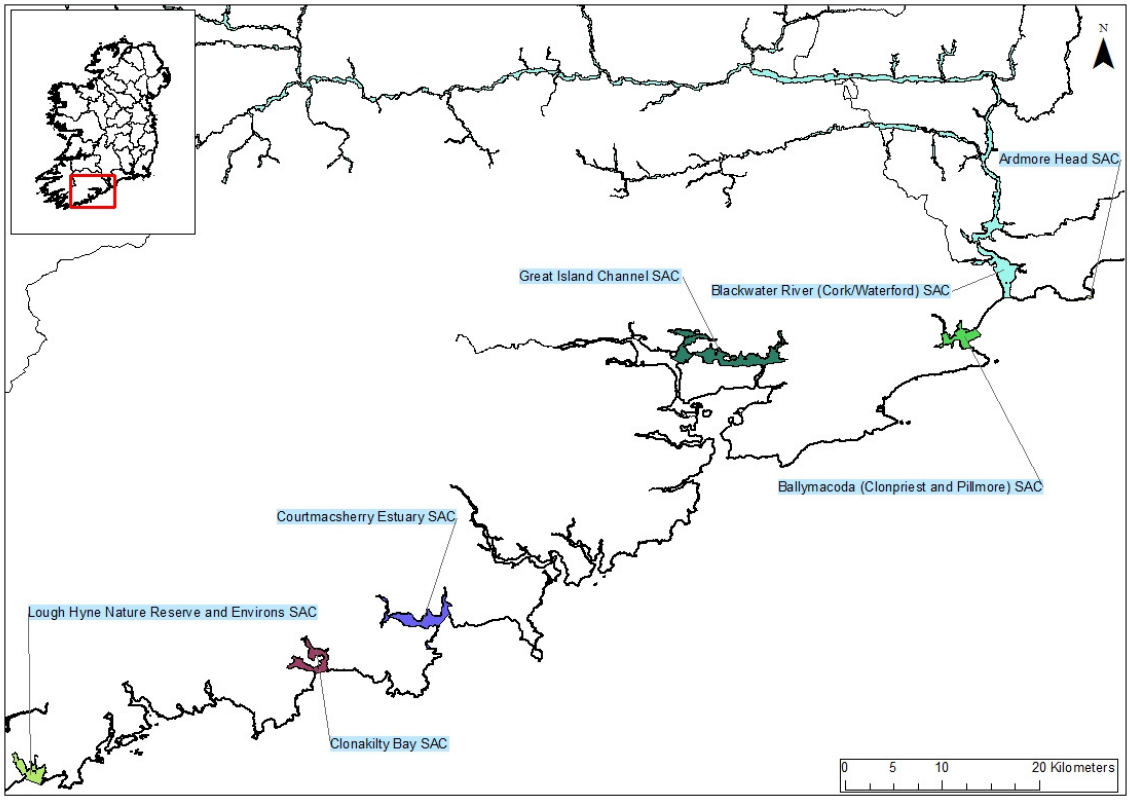

Figure 6. Distribution of SACs in Reen Point to Carnsore Point region (west) included in the assessment

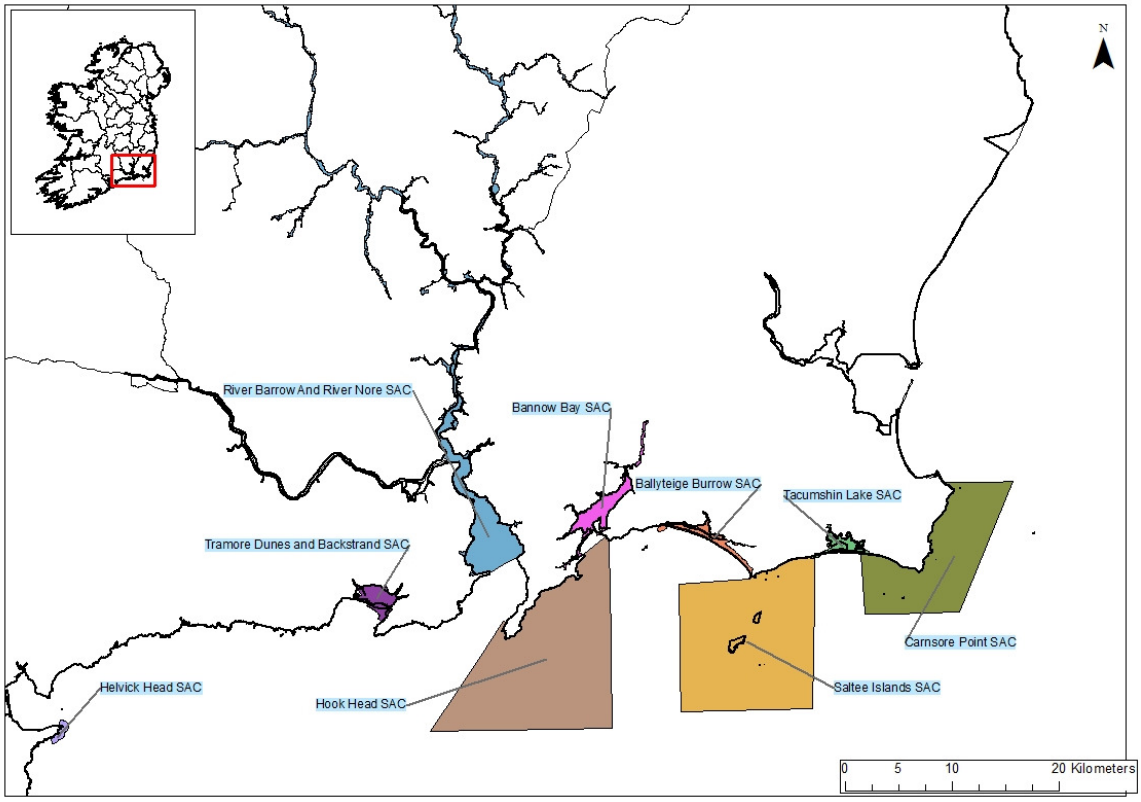

Figure 7. Distribution of SACs in Reen Point to Carnsore Point region (east) included in the assessment. The entire River Barrow and River Nore river system is not shown.

Table 1. List of SACs included in the assessment. The list is divided into 5 geographic regions. The status of the conservation objectives, whether published or pending is indicated. The numbers in the table show the number of QIs in that site or where the COs for habitats are published the number is the sum total of marine community types (MCTs) and Annex species identified across the QIs within the site. Sites are listed alphabetically. The list is disaggregated to QI and MCT level in Annex I by region.

	Pending		Published				
Site name	Benwee to Quiqleys Pt	Slyne to Benwee	Benwee to Quiqleys Pt	Loop to Reen Point	Reen point to Carnsore	Slyne to Benwee	Slyne to Loop
Achill Head						10	
Ballymacoda (Clonpriest and Pillmore)					2		
Ballinskelligs Bay				3			
Ballyness Bay			2				
Ballysadare Bay			3				
Ballyteigue Burrow					2		
Bannow Bay					3		
Barley Cove to Ballyrisode Pt				1			
Black Hd Poulsallagh Complex							1
Blackwater River (Cork/Waterford)					15		
Blasket Islands				3			
Broadhaven Bay						3	
Bunduff Lough and Machair/Trawalua/Mullaghmore			3				
Carnsore Pt					4		
Carrowmore Dunes							1
Carrowmore Point to Spanish Point and Islands							1

Castlemaine Harbour SAC				8			
Clew Bay complex						11	
Clonakilty Bay					1		
Courtmacsharry Estuary					2		
Cummeen Strand/Drumcliff Bay (Sligo Bay)			15				
Donegal Bay (Murvagh)			3				
Duvillaun Islands						2	
Galway Bay complex							19
Glengariff Hbr and Woodland				2			
Great Island Channel					2		
Gweedore Bay and Islands			2				
Hempton's Turbot Bank			2				
Hook Head					7		
Horn Head and Rinclevan			1				
Inisboffin and Inishark		1					
Iniskea Islands						1	
Inismaan Island							1
Inismore Island							1
Inisoir Island							1
Kenmare River				18			
Kerry Hd shoal				1			
Kilkee reefs							2
Kilkieran Bay and Islands							5
Killala Bay/Moy Estuary			9				
Kingstown Bay						6	
Lough Hyne Nature reserve and Environs					2		
Loughswilly			7				

Lower River Shannon				28			
Magharee Is				1			
Mullet/Blacksod Bay complex						4	
Mulroy Bay			11				
North Inishowen Coast			2				
Rathlin O'Beirne Island			1				
River Barrow and River Nore					10		
Roaringwater Bay and Islands				14			
Rutland Island and Sound			8				
Saltee Islands					6		
Sheephaven			1				
Slieve Tooey/Tormore Island/Loughros Beg Bay	2						
Slyne Hd Islands						4	
Slyne Hd penninsula						2	
St. Johns Point			2				
Streedagh Point Dunes			1				
Tory Island coast			1				
Tralee Bay and Magharees Peninsula				5			
Tramore Dunes and Backstrand					3		
Valentia Hbr/Portmagee Channel				17			
West Connacht Coast_north		1					
West Connacht Coast_south		1					
West of Ardara/Maas Road	6						

7 Fisheries

7.1 The Irish fishing fleet

- The Department of Agriculture, Food and Marine are the licencing authority for marine fisheries (Fisheries Amendment Act 2003, Sea Fisheries and Maritime jurisdiction Act 2006)
- The total registered capacity of the Irish fishing fleet, as of November 20th 2014, was 63,112 gross tonnes (GTs) and 2,124 vessels (Table 2). The polyvalent general segment is the largest and includes 31,771 GTs and 1,407 vessels. The polyvalent potting segment has 448 registered vessels and 946 GTs. The length distribution of the fleet shows 3 modes between 4-14m and 16-17m and 32-38m (Figure 8).

7.2 Fleet structure

- The Irish fleet is divided into 5 segments. Of these five segments (Aquaculture, Specific, Polyvalent, Beam Trawl and RSW Pelagic) two are broken into sub-segments, namely the Polyvalent and Specific Segments. Aquaculture vessels do not have fishing entitlements. Beam trawl vessels fish mixed demersal fish using beam trawls and RSW Pelagic are large pelagic vessels with refrigerated seawater tanks and target pelagic species. The **Polyvalent Segment** is divided into the following four Sub-segments;

(1) Polyvalent [Potting] Sub-segment;

- vessels of <12 m length overall (LOA) fishing exclusively by means of pots. Such vessels are also <20 GT. Target species are crustaceans and whelk.

(2) Polyvalent [Scallop] Sub-segment;

- vessels ≥10 m LOA with the required scallop (*Pecten maximus*) fishing history. These vessels also retain fishing entitlements for other species excluding those listed in Determination No. 21/2013.

(3) Polyvalent [<18 m LOA] Sub-segment;

- Vessels with fishing entitlements for a broad range of species other than those fisheries which are authorised or subject to secondary licencing as listed in Determination No. 21/2013 (http://agriculture.gov.ie/fisheries/).

(4) Polyvalent [≥18 m LOA] Sub-segment;

- Vessels with fishing entitlements for a broad range of species other than those fisheries which are authorised or subject to secondary licencing as listed in Determination No. 21/2013.

– The **Specific Segment**, which entitles vessels to fish for bivalves only, is divided into the following two Sub-segments;

(1) Specific [Scallop] Sub-segment for vessels ≥10 m LOA with the required scallop (*Pecten maximus*) fishing history;

(2) Specific [General] Sub-segment for all other Specific vessels irrespective of LOA.

Table 2. Capacity (GTs) of Irish fishing fleet segments and sub-segments in November 2014.

		Gross tonnage				
Segment	Vessels	Total	Mean	S.d.	Min	Max
Aquaculture	107	4576	42.8	110.5	0.15	561.0
Beamer	11	1023	93.0	43.7	1.10	161.0
Pelagic	23	22624	983.7	473.2	256.00	1988.0
Polyvalent General	1407	31771	22.6	58.7	0.19	518.0
Polyvalent Potting	448	946	2.1	2.3	0.31	18.3
Specific	128	2172	17.0	32.2	1.39	187.0
Total capacity	**2124**	**63112**				

7.3 Trends in the inshore fleet 2006-2014

– The number of vessels in the inshore fleet, which is mainly a shellfish fleet, increased by 64% between 2006 and 2012. This was predominantly due to regularisation of the potting fleet which were operating outside of the registered fleet prior to 2006 and to registration of existing vessels operating dredges in fishery order and aquaculture licensed areas (Table 3).

– The number of vessels in the polyvalent potting segment declined by on average 6 vessels per year, due to de-registration or transfer from this restricted segment, which limits fishing entitlement (Table 4).

– The number of vessels in the polyvalent general segment increased year on year between 2007 and 2012 by an average of 63 vessels per year. This trend was reversed in 2012-2014 when there was an average reduction of 26 vessels per annum.

- The number of vessels in the specific segment declined by an average of 5 vessels per year from 2009-2014 despite significant increases in fishing activity in some bivalve fisheries.
- The average length and capacity of vessels in the polyvalent and specific segments declined between 2006 and 2014. Polyvalent vessels less than 13m in length were on average 0.7GT smaller in 2014 compared to 2007.
- Polyvalent potting vessels have higher engine capacities in proportion to their gross tonnage than polyvalent general vessels. Aquaculture and specific vessels have lower engine capacities compared to polyvalent or potting vessels.

Table 3. Number of vessels and length and capacity profile of the Irish inshore fleet 2006-2014 (<13m polyvalent, all polyvalent potting, all vessels in bi-valve segment, all aquaculture vessels).

Segment	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aquaculture	16	21	39	73	86	96	104	86	89
Polyvalent General	953	950	994	1131	1198	1257	1269	1233	1216
Polyvalent Potting	80	492	490	481	467	461	460	454	448
Specific	157	117	128	154	150	145	148	137	128
Grand Total	1206	1580	1651	1839	1901	1959	1981	1910	1881
Average length of vessels									
Aquaculture	31.62	30	21.51	14.75	13.33	12.78	12.46	7.14	7.15
Polyvalent General	7.95	7.89	7.82	7.67	7.57	7.63	7.51	7.5	7.52
Polyvalent Potting	7.32	6.74	6.76	6.71	6.67	6.64	6.62	6.62	6.62
Specific	14.7	13.4	13.22	12.09	12.06	11.71	11.58	11.46	11.23
Average Gross Tonnage of vessels									
Aquaculture	212.05	197.86	117.3	64.18	54.12	48.87	45.64	2.71	2.72
Polyvalent General	4.68	4.61	4.38	4.14	3.96	4.3	3.85	3.87	3.91
Polyvalent Potting	2.96	2.28	2.3	2.22	2.16	2.12	2.1	2.11	2.11
Specific	38.62	27.34	25.93	20.54	20.29	18.55	18.25	17.93	16.97
Average kilowattage of vessels									
Aquaculture	468.55	433.79	284.45	166.11	142.51	132.04	126.74	32.48	32.11
Polyvalent General	35.49	36.46	34.22	31.91	30.61	31.88	29.79	29.61	30.17
Polyvalent Potting	44.5	29.6	30.29	29.7	28.93	28.28	28.03	28.06	28.23
Specific	162.81	124.53	114.15	96.99	94.26	90.32	90.28	88.62	85.79
Kilowatts per GT									
Aquaculture	2.21	2.19	2.42	2.59	2.63	2.7	2.78	11.98	11.81
Polyvalent General	7.58	7.91	7.81	7.72	7.74	7.42	7.73	7.65	7.71
Polyvalent Potting	15.03	12.99	13.2	13.39	13.41	13.32	13.35	13.32	13.37
Specific	4.22	4.56	4.4	4.72	4.65	4.87	4.95	4.94	5.06

Table 4. Annual percentage change in numbers of vessels per fleet segment in the inshore fleet 2006-2014

Segment	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
Annual change in number of vessels								
Aquaculture	5	18	34	13	10	8	-18	3
Polyvalent General	-3	44	137	67	59	12	-36	-17
Polyvalent Potting	412	-2	-9	-14	-6	-1	-6	-6
Specific	-40	11	26	-4	-5	3	-11	-9
Annual % change in number of vessels								
Aquaculture	31.25	85.71	87.18	17.81	11.63	8.33	-17.31	3.49
Polyvalent General	-0.31	4.63	13.78	5.92	4.92	0.95	-2.84	-1.38
Polyvalent Potting	515	-0.41	-1.84	-2.91	-1.28	-0.22	-1.3	-1.32
Specific	-25.48	9.4	20.31	-2.6	-3.33	2.07	-7.43	-6.57

7.4 Activity of the fleet

- Not all the registered fleet is active in any given year. The proportion that are active probably increases with vessel size i.e. larger vessels will generally be more active given the capital invested and the economics of owning and maintaining a larger vessel whereas very small vessels (punts, curraghs) may not be used each year, may belong to part-time fishermen and may respond to fishing opportunities seasonally.
- There are no hard data on the proportion of the under 10m fleet that is active in any given year. Although the buyers and sellers legislation (EC 1077/2008) requires sales of fish by all registered vessels to be recorded there are derogations for small quantities of landings per trip that results in incomplete statistics for certain fisheries.
- Fishing activity by inshore vessels is driven by multiple factors including stock status, market conditions, fishing costs, diversity of fishing and other economic opportunities and in any given year by weather conditions which can led to significant loss of potential fishing time.
- Western waters agreement (EC 1415/2004) restricts the annual effort of the brown crab and spider crab fisheries in ICES VI and VII
- Total Allowable Catch (TAC) and Quota constraints limits the activity of demersal and pelagic trawlers in particular

7.5 Types of fisheries

- There are 3 main categories of fisheries operating in Irish coastal waters
  - Demersal fisheries
    - Mainly using bottom otter trawl and various modifications of this basic trawl type to fish for mixed species demersal fish (gadoids, hake, monkfish) and *Nephrops* in fine sedimentary habitats
    - Bottom set net fisheries typically targeting cod, hake, turbot and pollack
  - Pelagic fisheries
    - Mainly using mid-water pelagic trawls and seine nets to target single species pelagic fish (mackerel, horse mackerel, blue whiting, boarfish, sprat, herring)
    - Also hook and line fishing for mackerel and pollack
  - Shellfish fisheries
    - Mainly using pots and dredges to target crustaceans (lobster, crab, shrimp) and molluscs (whelk, scallop, cockle, mussel, oyster)
    - Lobster are typically targeted on reef or edge of reef habitat. Shrimp and crab fisheries occur on mixed habitats including sedimentary habitat and reef. Mollusc fisheries occur on sedimentary habitats but some species such as oyster are, potentially, structural reef forming species to a degree (Tully and Clarke 2012).
    - Bottom set nets for crayfish
    - Crustaceans and molluscs are the primary target species for the inshore (<12m) fleet. Larger vessels fish for crab and scallop offshore.

7.6 Fishing capacity and licences

7.6.1 Vessel capacity transfer rules

The following rules apply to the transfer of capacity within segments

- Polyvalent capacity is privately transferable within its segment. Where an applicant for a polyvalent fishing licence has evidence of holding such capacity (a capacity assignment note) and has an approved fishing vessel then a fishing licence will be issued to such an applicant. This applies to over 18m and under 18m sub-segments.
- Excluding the fisheries listed in Determination No. 21 the polyvalent capacity is not coupled to any given quota or entitlement. The capacity assignment note simply enables the vessel owner to complete the registration of a vessel and to fish for species other than those in Determination No. 21 but are governed by TAC & Quota and any other harvest control rules that might generally apply.

- In the case of fisheries listed in Determination No. 21 the authorisation to fish such stock is effectively coupled with the capacity if the capacity is transferred i.e. this transfer is essentially a transfer of track record in the particular fishery. Such entitlement is, however, also governed by TAC & Quota and any other policies or harvest control rules that might apply to those stocks.
- Polyvalent potting capacity is not transferable within its segment other than to first degree relatives of the person to which the capacity is assigned.
- Polyvalent general capacity that is not attached to a registered vessel for a period of more than 2 years expires.
- When polyvalent potting capacity is no longer attached to a registered vessel then the capacity reverts to the licencing authority. This capacity is not re-issued. In 2013 6% of this capacity was transferred to first degree relatives

7.6.2 Primary and secondary fishing licences

- Although the fleet segments largely determine the licencing entitlements a number of fisheries also require secondary authorization or permit in addition to the primary fishing licences associated with the particular segment. These stocks are listed in Determination 21 of 2013 (www.sfpa.ie) and include herring, mackerel, horse mackerel, cod, albacore tuna, scallop (for vessels over 10m in length), boarfish, various deep water species, seed mussel, all vessels using nets in waters deeper than 200m, blue whiting, all vessels involved in trans-shipment of fish, all stocks in NEAFC area, vessels over 10m in length fishing with trawls, seines, entangling nets or longlines fishing in ICES Vb, VIa and VIIa.
  - In fisheries subject to either primary or secondary licencing, and particularly for fisheries managed by TAC, fisheries management notices are used to manage the allocation of quota and to close fisheries when the TAC is taken (http://www.sfpa.ie/Sea-FisheriesConservation/Legislation/FisheriesManagementNotices.aspx). Such notices are also used to further refine the conditions under which vessels can operate in given fisheries. These could include fishing operations in relation to vessel size or geographic area of fishing
  - To fish for oysters fishermen must have a registered sea fishing vessel and a primary fishing licence from DAFM and are also required to obtain a dredge licence from IFI prior to fishing. In effect many of these fisheries are managed partly by IFI and partly by the oyster co-ops where management authority has been devolved to the co-op through either an Aquaculture licence or Fishery Order issued to a co-operative. The fishing season and other regulations may be written into the fishery order but additional measures may also be introduced by the co-ops. IFI issue dredge licences to members of co-ops

who wish to fish the Aquaculture licence Area or the Fishery Order Area. In other cases, such as part of the inner Galway Bay beds or L. Swilly the oyster fisheries are public and as such any member of the public with a dredge licence from IFI may fish these areas.

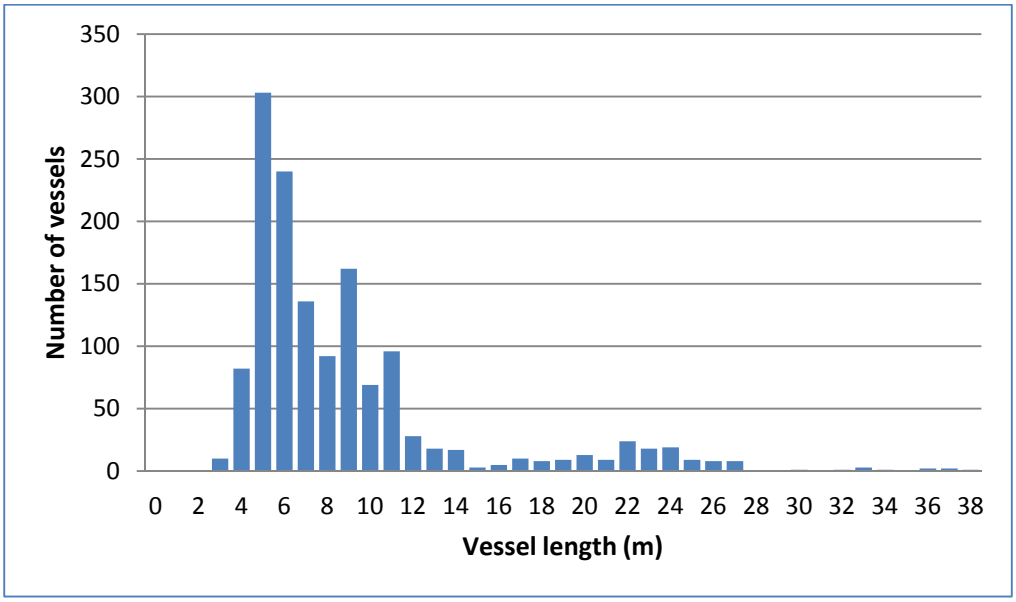

Figure 8. Size distribution of the Irish fishing fleet in November 2014.

7.7 Additional legislation impinging on shellfish fisheries

- The majority of shellfish (other than velvet crab and shrimp) are regulated by minimum landing sizes (various national legislation and EC 850/1998). The purpose of these size limits is to protect stocks from recruitment and growth overfishing
- Lobster are also subject to a maximum landing size of 127mm. Since Jan 1st 2015 it is prohibited to land lobsters over this size.
- Shrimp fishing operates only between August and mid March
- The annual total effort, expressed in kilowatt days per annum, of brown crab, spider crab and scallop fisheries is limited under western waters regulations (EC 1415/2004)
- There are geographic restrictions on netting for crayfish (SI 233/2006)
- There are various closed seasons for oyster fisheries operated by oyster co-ops and which may be written into the Fishery Order area.
- Razor clam fisheries in the Irish Sea are regulated by weekly vessel quotas and additional measures including a requirement to report vessel and restrictions on fishing hours.

7.7.1 Shellfish classification and production areas

- Bivalve shellfish can only be fished for market from classified production areas in accordance with requirement of Annex II of EC 854/2004. The production areas are

classified for each bivalves species according to the microbiological status of the area. The list of production areas and species for which they are classified are described in (http://www.sfpa.ie/SeafoodSafety/Shellfish/ClassifiedAreas.aspx). Areas are routinely monitored under an agreed code of practice (www.sfpa.ie). Resulting classification categories A, B or C indicate both the microbiological loading that can be expected in shellfish harvested from such areas and post-harvest processing prototcols that should be followed prior to placing shellfish products on the market.

- In addition fisheries in these production areas may be closed for periods of time according to the levels of biotoxins in species being fished. Bioxins are monitored under an agreed code of practice (www.sfpa.ie)
- During collation of data on distribution of bivalve resources for this report a number of potential fisheries for bivalves were identified which are not currently in classified production areas or where the potential target species is not on the list of classified species within the production area. This information was mainly derived from fishermens knowledge and to a lesser extent from survey data held by the Marine Institute. These potential fisheries (pending the classification of such areas) are included in the analysis of risk to qualifying interests in SACs.

7.8 The status of fish stocks

- A number of species listed in Annex II and Annex IV of the Habitats Directive prey on fish species that are commercially exploited. These species therefore compete to varying degrees with commercial fisheries for food and the standing stock biomass of commercially exploited fish species may be important in maintaining populations of designated species. There are some clear examples;
  - Predation of sandeel and juvenile sprat and herring by a number of mammals
  - Predation of commercially exploited gadoids and clupeids by seals and small cetaceans. Although not wholly dependent on such species habitat quality and use could be dependent on availability of these species in the foraging range of seals
- B_{MSY} is the biomass at which maximum sustainable yield is achieved in the long term. F_{MSY} is the fishing rate that will eventually result in B_{MSY}. $B_{trigger}$ is the biomass level below which a management response (or a harvest control rule) is invoked.. B_{lim} is the biomass limit at which recruitment failure is probable.
- The proportion of pelagic and demersal stocks (n= 59) that were assessed as sustainably fished in 2013, under the above criteria, was 34% (20 stocks). Fishing mortality levels were unsustainable in 24% (14 stocks). Fishing mortality was unknown, F_{MSY} was undefined or not available in 42% of stocks.

- Reference points (Fishing mortality or Biomass) have not been identified for shellfish stocks.
- The status of the main stocks of shellfish, demersal fish and pelagic is briefly described below and in Table 5 and Table 6.

7.8.1 Molluscs

- Scallop stocks in the Celtic Sea are thought to be in a strong position.
  - Catch rates have been improving in recent years and are higher than at any time in the past 10 years.
  - The annual fishing footprint of the fishery has declined and is more concentrated in the eastern Celtic Sea than prior to 2006 (when some fo the fleet was decommissioned)
  - Total mortality rates, derived from pseudo-cohort analysis, are stable
- The status of smaller scallop stocks on the south west, west and north west coasts is generally unknown. Some are depleted.
- Cockle stocks on the south and west coasts are largely unexploited.
- Many razor clam stocks on the south and west coasts are unexploited. However, others have been overexploited in the past. There is very little current fishing activity on the west coast. The main razor clam fisheries are in the Irish Sea where fishing effort has increased recently mainly due to dramatically improved market prices.
- Surf clam stocks in the Waterford estuary seem to be sustainably fished. The status of other surf clam stocks in Galway Bay and Clifden is unknown.
- Generally all native oyster stocks are depleted although to varying degrees. Recruitment is irregular and stock biomass is low in all areas except Tralee Bay
- The main whelk fishery occurs in the Irish Sea. Effort has increased in recent years due to increased market price and product development.

7.8.2 Crustaceans

- Lobster is fished on all coasts. Egg production per recruit is below what is regarded as a safe level (equivalent to a limit reference point). Spawning potential is not sufficiently protected by the minimum landing size (MLS) but additional recent legislation prohibiting the landing of lobsters over 127mm when combined with v-notching increases egg production to above a recognized limit reference point. Catch rates and recruitment (undersized lobster catch rates) are stable or declining depending on area. Effort is increasing. Landings data are unreliable.
- Crab spawning potential is protected by the MLS. Crab mature at a size smaller than the MLS. High grading and live discarding further reduces fishing mortality and protects spawning potential. However, grading and discard rates differ regionally. Catch rates are

stable or declining and may be uneconomic early in the first quarter of the year when crab quality is low and catch rates are low. Offshore effort has declined but inshore effort may still be increasing. Landings data are unreliable.

- Shrimp are mainly caught off the south west and west coasts (Cork, Kerry, Galway, Mayo). Recruitment is variable annually in this short lived species. Stock status (as shown by landings and catch rates) vary annually but in some regions seems to have generally declined with a succession of poor years. Landings data may be unreliable.
- Crayfish stocks are heavily depleted relative to their status in the 1960s and 1970s. Targeted pot fisheries for crayfish are no longer viable and landings are now taken with tangle nets, which were introduced in the early 1970s, and a by-catch is taken in the lobster/crab fishery especially in the south west. Tangle nets were introduced in the early 1970s. The high minimum size protects spawning potential per recruit. Discard mortality may be significant. Landings data may be unreliable.

7.8.3 Herring

- Stock status of herring in the Celtic Sea is good. Fishing mortality (0.23) is below F_{MSY} and Biomass is above $B_{trigger}$ and is highest since the 1960s. TAC in 2013 was 17200 tonnes.
- Stock status of herring north-west of Ireland is poor. F in 2010 and 2011 was above F_{MSY}. There is reduced reproductive capacity and SSB is below B_{lim}.

7.8.4 Sprat

- There is no TAC for sprat in Irish waters.
- Sprat and herring may occur together in catches
- There is no stock assessment and reference points have not been identified. Catches are 3500 per annum. Landings data may be unreliable
- Sprat may be an important forage fish for a number designated species

7.8.5 Hake

- Fishing mortality on Hake has been appropriate (close to F_{MSY}) in 2011 and 2012. SBB has increased since 1998 and is estimated to be at a record high in 2013. Recruitment in 2012 was very strong. Landings and TAC have increased. Approximately 16% of the catch is discarded

7.8.6 Cod

- In the Celtic sea fishing mortality is at F_{MSY}. SSB has increased from below B_{lim} to well above MSY $B_{trigger}$ since 2010. Recruitment is episodic with very strong recruitment in some years. Approximately 11% of the catch is discarded

- On the Malin shelf and west of Scotland F on Cod is above F_{MSY} and SSB is extremely low and well below B_{lim}. Recruitment is extremely low. Most of the catch (71%) is discarded.

7.8.7 Haddock

- Fishing mortality is above F_{MSY}. SSB has increased slowly since the early 1990s and spiked in 2011 as the 2009 cohort matured. Recruitment was very low in 2012. An estimated 36% of the catch was discarded
- On the Malin shelf and west of Scotland F on Haddock has been declining since 1999 and fell below F_{MSY} (proxy) in 2009. The stock is characterized by episodic strong recruitment the last of which was in 2009. SSB is still increasing as a result of this recruitment. Discarding rates are low.

7.8.8 Whiting

- In the Celtic Sea fishing mortality is less than F_{MSY} and spawning biomass has been increasing since 2008 and is well above MSY $B_{trigger}$. Fishing mortality has been fluctuating but generally declining since the early 1990s. Discards are known to be high but have not been quantified
- On the Malin shelf and west of Scotland fishing mortality on Whiting has declined over the past 10 years and is thought to be at sustainable levels. SSB remains very low however and well below Blim. Approximately 70% of the catch is discarded.

7.8.9 Plaice

- In the Celtic Sea fishing mortality on plaice is unknown. Indicators show that the stock size is increasing. Discards are also increasing
- Off the south west coast of Ireland SSB has increased in recent years and F has declined although it probably remains above F_{MSY}. SSB and recruitment remains much lower than during the 1990s.
- The status of plaice off the west coast of Ireland is unknown.

7.8.10 Megrim

- Indicators for the Celtic Sea stock show that biomass has been increasing in recent years while recruitment is stable. Effort in the fishery has reduced although the exploitation rate is unknown.
- On the Malin shelf and west of Scotland fishing mortality on megrim is low and well below F_{MSY} and SSB is well above MSY $B_{trigger}$. 15% of the catch is discarded.

7.8.11 Sole

- In the Celtic Sea F on sole has recently increased and is above F_{MSY}in 2012. SSB is above MSY $B_{trigger}$ but is lower than in the 1970s.
- Off the south west coast of Ireland fishing mortality has declined over the past 10 years and SSB has increased.
- Off the west of Ireland status of sole is unknown.

7.8.12 Angler fish

- Long term biomass is stable or increasing as shown by biomass and abundance indicators. There is no quantitative assessment.

7.8.13 Mackerel and horse mackerel

- The SSB index from the mackerel egg survey shows a doubling of SSB since 2004 and a 30% increase from 2010-2013 (preliminary estimate). Various different approaches to assessment are currently being developed.
- Western horse mackerel SSB has been in decline since the mid 1980s with a small recovery in 2003-2010. F has increased since 2007 and is currently above F_{MSY}. Recruitment has been low from 2004 onwards.

Table 5. Status, ICES advice and 2013 total allowable catch for pelagic and demersal stocks in the Celtic Sea (and neighbouring ICES areas as indicated for each stock. Source: The Stock Book, MI, 2013. (See Table 7 for description of symbols)

Species	Stock area	International Landings	International Discards	ICES Stock Status 2012		ICES/ICCAT Catch Advice	ICES/ICCAT Landings Advice (Tonnes) for 2014
				F ~MSY	SSB ~ Btrig		
Cod	VIIe-k	7,692	952			6,848	6,848
Haddock	VIIb-k	18,501	10,191			5,281	3,602
Whiting	VIIe-k	9,976	?			NA	<15,562 + 5,106 for
Pollock	VII	4,432	?				<4,150
Saithe	VII, VIII, IX, X,	1,447	?	NA	NA		No ICES advice
Plaice	VIIfg	443	947			1,608	519
Plaice	VIIbc	29	?				<30
Plaice	VIIhjk	200	60				135
Sole	VIIfg	1,096	?				920
Sole	VIIbc	45	?				<30
Sole	VIIhjk	233	?			252	
Megrim	VIIb-k & VIIIabde	12,080	2,902				<12,000
Anglerfish	VII & VIII	36,383	?				37,450
Hake	II, III, IV, VI, VII,	75,200	14,600				81,846
Sprat	VI and VII (excl. VIId and VIIe)	4,500	na				<3,500 t,
Herring	VIIaS VIIg,j	12,004	na			MSY: 35,942	
Herring	VIaS VIIbc	3,791	na			1 t or Rebuilding pl	0 t or Rebuilding plan

Table 6 Status, MI advice and 2013 total allowable catch for pelagic and demersal stocks in ICES Area VI (Malin Shelf and west of Scotland) source: The Stock Book, MI, 2013. (See Table 7 for description of symbols).

Species	Stock area	International Landings	International Discards	ICES Stock Status 2012		ICES/ICCAT Catch Advice (Tonnes) for 2014	ICES/ICCAT Landings Advice (Tonnes) for 2014
				F ~MSY	SSB ~ Btrig		
Cod	VIa	473	1,158			0	0
Cod	VIb	32	?			<70	<70
Haddock	VIa	5,100	529			6,432	3,988
Haddock	VIb	710	16			1,620	980
Whiting	VIa	313	728			0	low. poss. catch & TCMs
Anglerfish	VI, IIa, IIIa, IVa	4,142	64			10,231	Decrease catches by 20%
Megrim	VIa and IV	3,047	457			7,000	5,950
Megrim	VIb	224	?			NA	207
Plaice	Vb(EU waters), VI, XII, XIV	54	?	NA	NA	NA	No ICES Advice
Sole	Vb(EU), VI, XII, XIV	14	Low	NA	NA	NA	No ICES Advice

Table 7. Traffic light symbols indicating stock status in relation to reference points (source: The Stock Book, MI, 2013)

Status relative to reference points	Qualitative evaluation	
		Desirable situation e.g. F is below the relevant reference point or SSB is above the relevant reference point
		Status lies between the precautionary (pa) and limit (lim) reference points
		Undesirable situation e.g. F is above the relevant reference point or SSB is below the relevant reference point
		Status of the stock is either unknown because there is no quantitative assessment, or undefined when there is an analytical assessment but reference points are not defined, or not available when input data (e.g. catch statistics or survey indices) is unavailable in a specific year and assessments can therefore not be performed
		Absolute level unknown, but increasing
		Absolute level unknown, but unchanged
		Absolute level unknown, but decreasing

7.9 Data on fisheries for risk assessment

- A number of categories of data were obtained, or were available, to describe the distribution and intensity of fishing activity in Irish coastal waters
  - All vessels >15m, and from September 2013 all vessels over 12m, report vessel position usually every 2 hours using vessel monitoring systems (VMS). There are approximately 80 vessels between 12-15m. By coupling these data with logbook information the gear used by the vessel can be determined. The main issue with these data is distinguishing VMS points that represent fishing activity as opposed to vessel steaming for instance. This is done using vessel speed filters given that towing speeds for different gears are approximately known. Obviously similar vessel speeds can also occur during steaming and in particular as the vessel approaches or departs from port. There may typically therefore be clusters of VMS points close to ports that do not represent fishing activity. These clusters may occur in Natura sites and in fact are likely to where there is a significant port close to or in the site. In this assessment the VMS points close to port are excluded from assessment where there is clear rationale (knowledge that such a fishery cannot and does not occur in these areas) to do so.

- Vessels between 12-15m in length are also required to report GPS position. This requirement was implemented during 2014 and the data for 2014 are included in this report.
- Vessels fishing for razor clams and irrespective of vessel size are since mid 2015 required to report GPS position while fishing. None of these data are included in this report
- Vessels between 10-15m report logbook data which gives information on landings mainly and gives an indication of the effort in days at sea. The majority of these vessels are between 10-12m. There is no indication of fishing location (other than ICES statistical rectangle) in these data.
- From 2015, vessels fishing for bivalves, irrespective of vessel size, are required to carry on board a 'Shellfish gatherers logbook'. These data are not available for this report.
- Vessels under 10m do not carry EU logbooks. In the case of vessels not fishing bivalves the only record of their activity is in sales note data (as required under Buyers and Sellers regulation) which indicates the number of boats selling fish and the quantity of each species. However, these data may not identify the number of commercially active vessels, where they fish or what fishing gears they use
- In the case of all vessels under 15m information on fishing distribution and additional information on seasonality and amount of gear used has been collated using the following methods;
    - expert knowledge held in Bord Iascaigh Mhara (BIM), Sea Fisheries Protection Authority (SFPA) and Marine Institute (MI) together with limited consultation with industry has been used to identify the distribution of fishing activity, its frequency and where possible the intensity of the activity
    - in some areas more detailed questionnaire data at individual vessel level was available. In this case the distribution of fishing activity and the level of activity of each vessel is mapped and described
    - for some bivalve stocks Marine Institute survey data describes the distribution of commercial quantities of fish and therefore defines where fishing for such species occurs. Additional information on annual fishing activity in these areas was compiled from expert sources
    - In some fisheries private vessel diary data on fishing positions for vessels was available.

8 Fisheries: fishing effort and spatial extent

8.1 Description of fisheries Quigleys Point to Benwee Head

8.1.1 Crustacean and mollusc trap fisheries

Trap fisheries for brown crab, velvet crab, lobster and whelk occur on all coasts of north Mayo and Donegal (see Figure 9 and maps in Section 8.2).

8.1.1.1 Brown crab

The brown crab fishery extends from the coast offshore to the 200m depth contour both off the north Mayo coast and the north west Donegal coast. There are approximately 50 vessels and 50000 pots in the Donegal fishery and 66 active vessels and 47000 pots in the north and northwest Mayo (Erris) fishery. The offshore crab fleet in Donegal is an over 18m vivier fleet while the offshore fleet working out of Mayo is mainly <12m in length. Crab is targeted offshore and a mix of lobster and crab are caught in coastal waters. The fishery occurs throughout the year but a lot of gear may be brought ashore during the period Dec-Feb. In the Mayo fleet up to 5 vessels fish all year, 7 vessels fish for 8 months and 16 vessels fish for 6 months. Landings into Mayo may be in the region of 2500-3000 tonnes per annum. Landings into Malin Head were previously 1800 tonnes but have declined recently due to a reduction in the number of vessels participating in the fishery. Effort and landings in the offshore vivier (>18m) have also declined as this fleet now spends a proportion of the year fishing in the southern north Sea. Effort hours (VMS) by this fleet in the area declined from 5714hrs in 2006 to 2238hrs in 2014.

8.1.1.2 Lobster

Lobster fishing occurs on all coasts from Erris into Donegal Bay to Inver Bay and on the Donegal coastline north to Malin. Over 200 vessels are actively involved in the fishery off Donegal the majority of which are <10m in length. Approximately 57 vessels fish between Erris Head and Sligo. The latter vessels use on average 350 pots each and fish for over 100 days per year between Mar and Nov. This fishery occurs throughout the year but activity increases during spring and peaks in summer. There is an intensive v-notching programme in the area with up to 3.7 tonnes of lobster v-notched and released per annum in recent years.

8.1.1.3 Shrimp

Shrimp fishing occurs mainly in Dungloe Bay in west Donegal, where approximately 10 vessels fish for shrimp from Sept to February, and in Inver Bay in Donegal Bay where up to 20 vessels <6m in length fish mainly between Sept and Dec.

8.1.1.4 Whelk

A trap fishery for whelk has developed off the Inishowen peninsula in recent years. Up to 10 vessels may participate in this seasonal fishery in spring and summer depending on the relative market strength for whelk, lobster and crab.

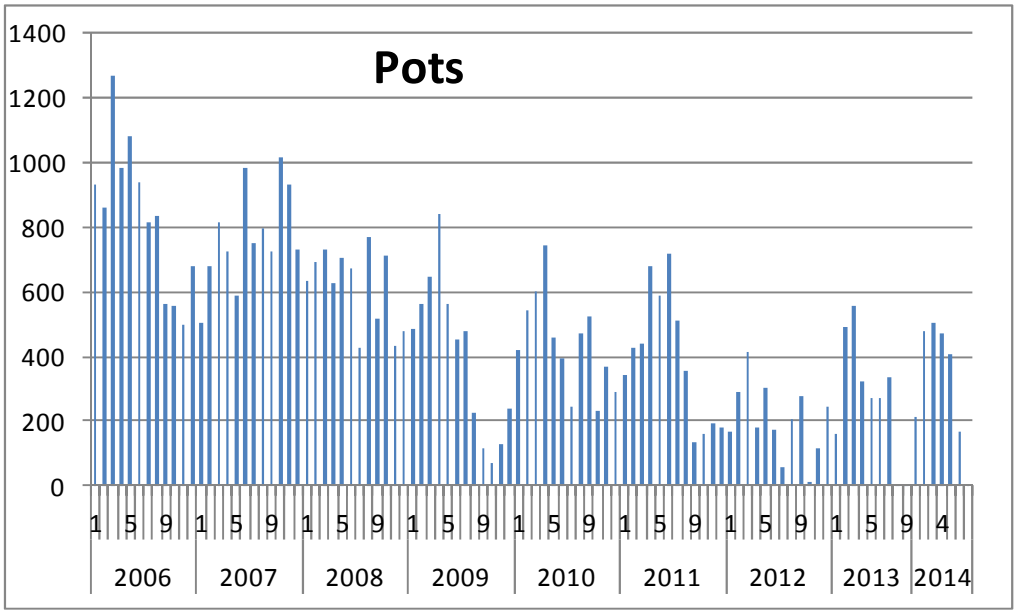

Figure 9. VMS hrs of activity by potters >15m in the Quigleys Point to Benwee region by month during the period 2006-2014.

8.1.2 Benthic dredge fisheries

See Figure 10 and maps in Section 8.2.

8.1.2.1 Scallop

A scallop fishery occurs off the north east coast of Inishowen. This is an expanding fishery but is currently fished only by Scottish and Northern Irish vessels. The Irish scallop fleet >10m is capacity limited and is active mainly in the Celtic and Irish Seas. This limits or wholly restricts scallop fishing opportunities in the Donegal fishery.

8.1.2.2 Oyster

Dredge fisheries for oyster occur in Lough Foyle and Lough Swilly. The Lough Foyle fishery, managed by the Loughs Agency, operates from late Sept to March. Participation in the fishery has varied from 30 in September to less than 5 at the end of the season. Between 100 and 150 tonnes of oysters are landed. The minimum size is 80mm compared to 76-78mm in other fisheries. Catch per unit effort varies from 25-30kgs.hr^{-1} in Sept to approximately 5kgs.hr^{-1} in March. Dredging for mussels also occur in Foyle and Swilly but in Aquaculture sites. This activity is reported in the VMS data if vessels are >15m.

Oyster dredgers fishing L. Foyle may also fish L. Swilly. In recent years the fishery in L. Swilly has been a mixed native and Pacific oyster fishery as the Pacific oyster has naturalized in the Lough. A management plan for this fishery was subject to Appropriate Assessment in 2012.

8.1.2.3 Cockle and razor clams

Cockle beds may exist in intertidal mud and sand flats in Killala Bay, Ballysadare Bay, Sligo Harbour, Drumcliffe Bay, Donegal Harbour, Gweebara, Loughrous More and Loughrous Beg, Gweebarra and Trawenagh in south west Donegal. Killala Bay was surveyed in 2011 and the Donegal beds were surveyed in the mid 1980s. Some areas hold commercial quantities of cockles. However, in this list, only Drumcliffe Bay is a classified production area for cockles (www.sfpa.ie, Nov 19th 2013). Harvesting is thereby prohibited from all other areas. Harvesting of cockles in Drumcliffe Bay is by hand gathering and not by dredging.

Razor clam stocks may occur in Rutland Channel and Gweedore Bay. These stocks do not have a microbiological classification and are not fished

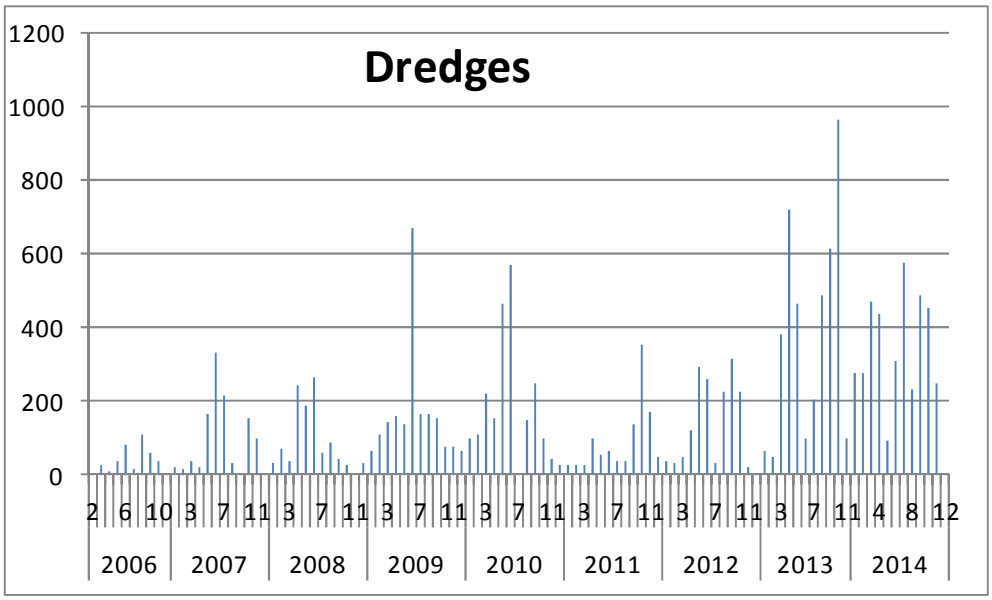

Figure 10. VMS hrs of activity by dredgers >15m in the Quigleys Point to Benwee region by month during the period 2006-2012.

8.1.3 Set net fisheries

See Figure 11 and maps in Section 8.2.

8.1.3.1 Gill net

Bottom set gill net (125mm mesh) fisheries for Pollack occurs along the north Mayo coast from Erris to inner Donegal Bay. This is an episodic fishery depending on market demand and fish abundance. Up to 4 vessels may be involved using a total of 600m of net for about 40 days between Apr and Nov.

VMS data for vessels over 15m indicate gill netting activity in offshore waters west of Mayo.

8.1.3.2 Tangle net

Tangle netting for crayfish occurs around the Aranmore Is area. Current effort is unknown. The fishery occurs mainly during late summer and Autumn. In 2007 1-2 tonnes were landed into Burtonport by approximately 5 vessels.

8.1.3.3 Trammel nets

Trammel nets may be used to catch bait by a sub-set of the lobster fleet in the area

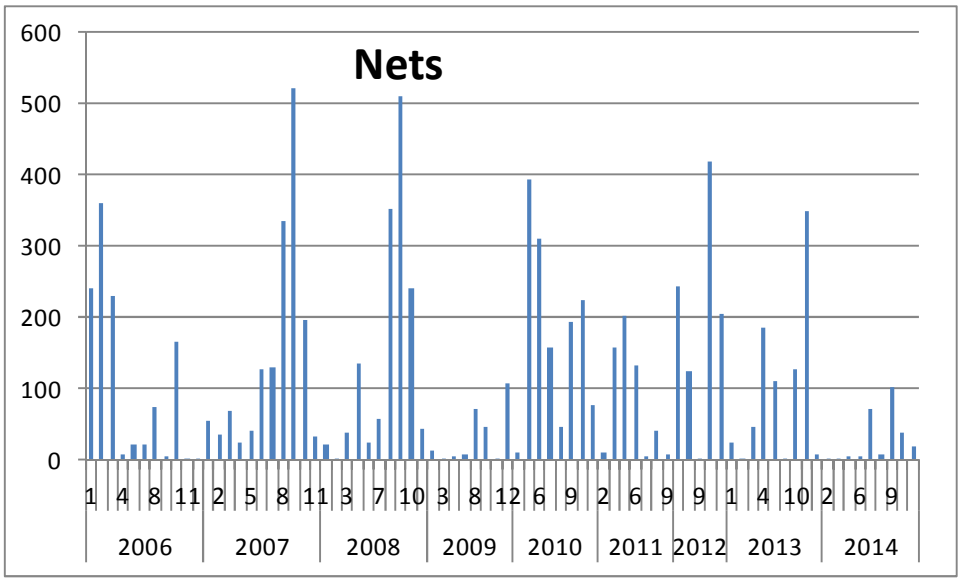

Figure 11. VMS hrs of activity by netters >15m in the Quigleys Point to Benwee region (offshore waters) by month during the period 2006-2014.

8.1.4 Bottom trawl fisheries

See Figure 12 and maps in Section 8.2.

8.1.4.1 Queen scallop

A queen scallop fishery occurs from Inishowen west to Rathlin. This is a bottom trawl fishery rather than a dredge fishery. As a result it comes under restrictions on fishing with trawls outlined in EC 227/2013 where trawling activities that could result in capture of cod, haddock or whiting. Up to 20 vessels participated in the fishery in 2013 but only 2 Irish registered vessels fished in 2014.

8.1.4.2 Mixed demersal

Fishing for demersal fish using bottom trawls is restricted by EC 227/2013. No targeted fishing for cod, haddock or whiting is allowed. There are derogations for small mesh nets (<55mm) targeting small pelagic fish. Also, in some areas, where *Nephrops* is the target, a sorting or square mesh panel grid should be used and the mesh must be at least 80mm.

Demersal trawling for mixed demersal fish in the period 2006 to 2009 was common in the Cape ground (north east of Inishowen), in outer Donegal Bay and in offshore areas of the Malin Shelf.

VMS effort by bottom trawlers has declined from 14831hrs in 2006 to 8494hrs in 2012 and increased to 13521hrs in 2014.

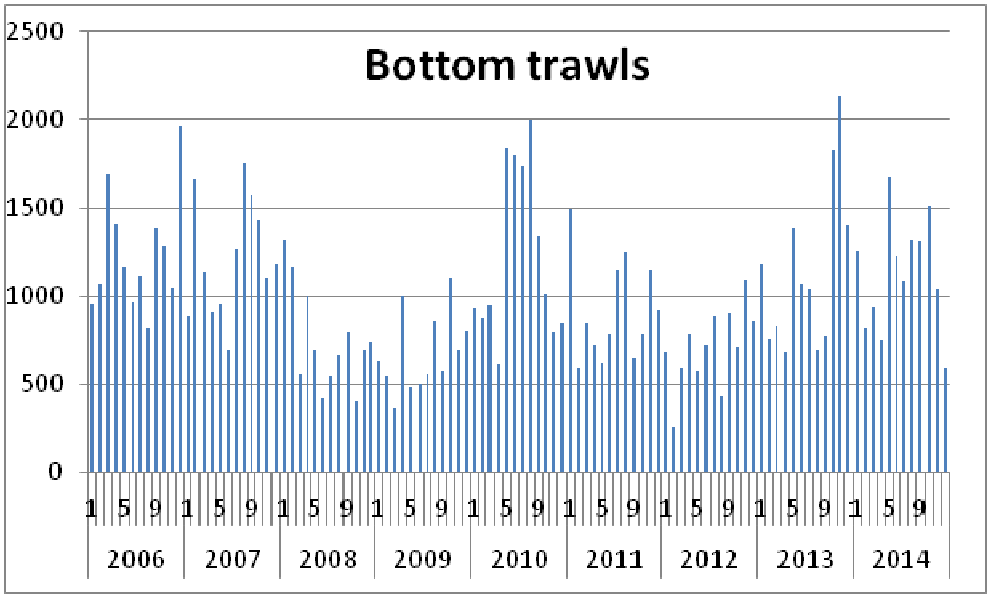

Figure 12. VMS hrs of activity by bottom trawlers >15m in the Quigleys Point to Benwee region by month during the period 2006-2014

8.1.5 Pelagic fisheries

See Figure 13 and maps in Section 8.2

Mid-water trawling for herring, sprat, mackerel and horse mackerel occurs in coastal and offshore waters in the area. Fishing for sprat occurs mainly in inner Donegal Bay and Inver Bay. Horse mackerel is caught off the north Mayo coast and off the south coast of Donegal. Herring is fished off the south west coast of Donegal and in deeper waters off north-west Donegal Fishing for sprat and horse mackerel occurs in autumn and winter. Herring are fished from Oct to Mar. There is practically no mid-water fishing effort in summer months.

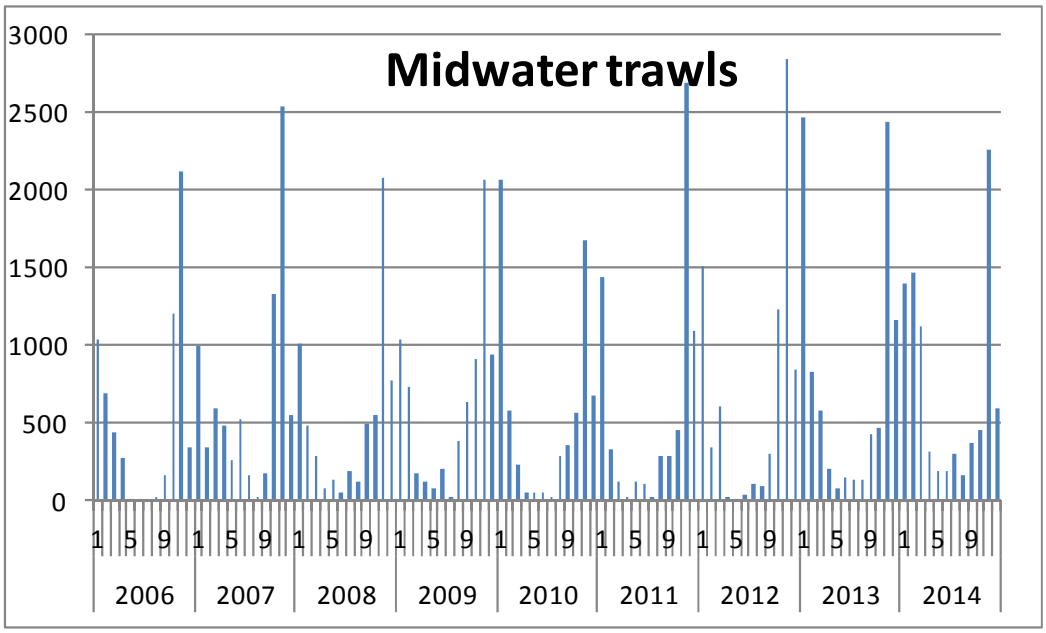

Figure 13. VMS hrs of activity by mid-water trawlers >15m in the Quigleys Point to Benwee region by month during the period 2006-2014

8.1.6 Hook and Line fishing

See Figure 14 and maps in Section 8.2.

Line fishing by vessels <12m in length may occur on all coasts from north Mayo to north Donegal (Figure 34). These vessels target pollack and mackerel in summer and autumn. Ten vessels are each rigged with two automated jigging machines with 60 hooks per machine. These vessels fish for approximately 60 days per year. A further 10 vessels are rigged with hand gurdies who occasionally fish for bait and for up to 60 days per year. This hook and line fishery varies year on year depending on availability of fish.

Vessels over 15m fish with hooks and lines offshore. This activity has declined from 9798hrs in 2007 to 1365 in 2012 (Figure 14)

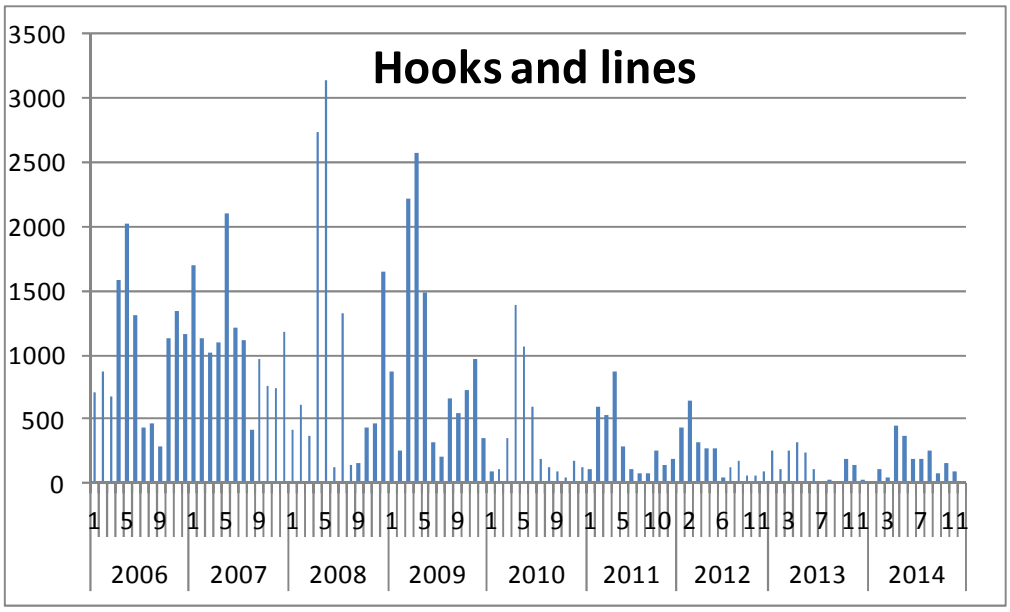

Figure 14. VMS hrs of activity by vessels >15m fishing hooks and lines in the Quigleys Point to Benwee region by month during the period 2006-2014.

8.1.7 Seine netting

See Figure 15.

A limited amount of seine netting for pelagic fish is indicated in the VMS data for vessels over 15m. This is reported mainly in offshore areas and off the south Donegal coast. It declined to near zero levels in 2011 and 2012 (Figure 15).

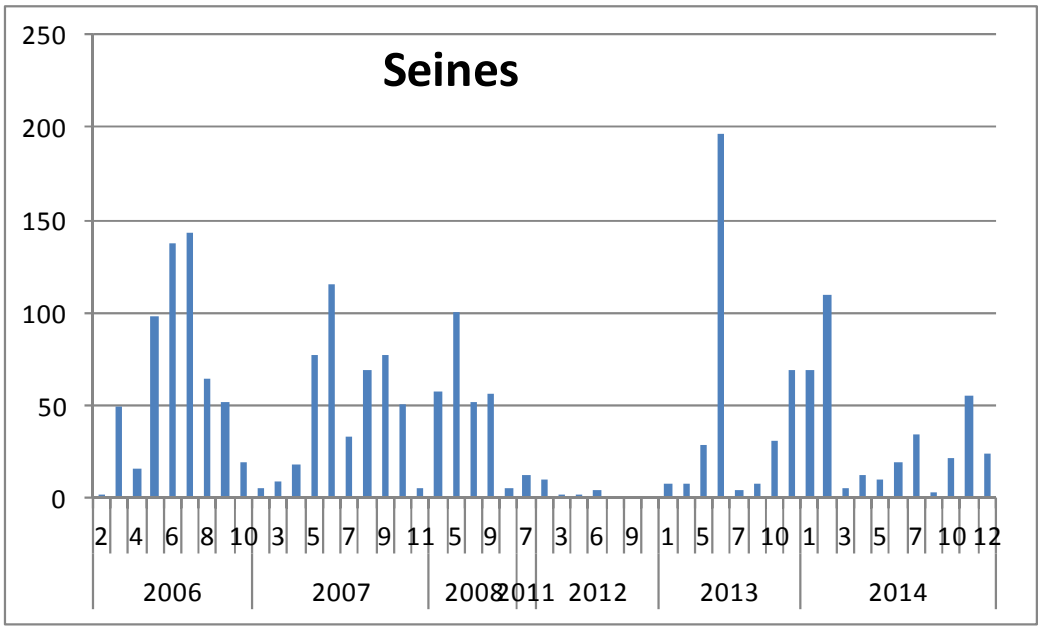

Figure 15. VMS hrs of activity by vessels >15m fishing seine nets in the Quigleys Point to Benwee region by month during the period 2006-2014

8.2 Maps of fishing activity Quigley Pt to Benwee Hd

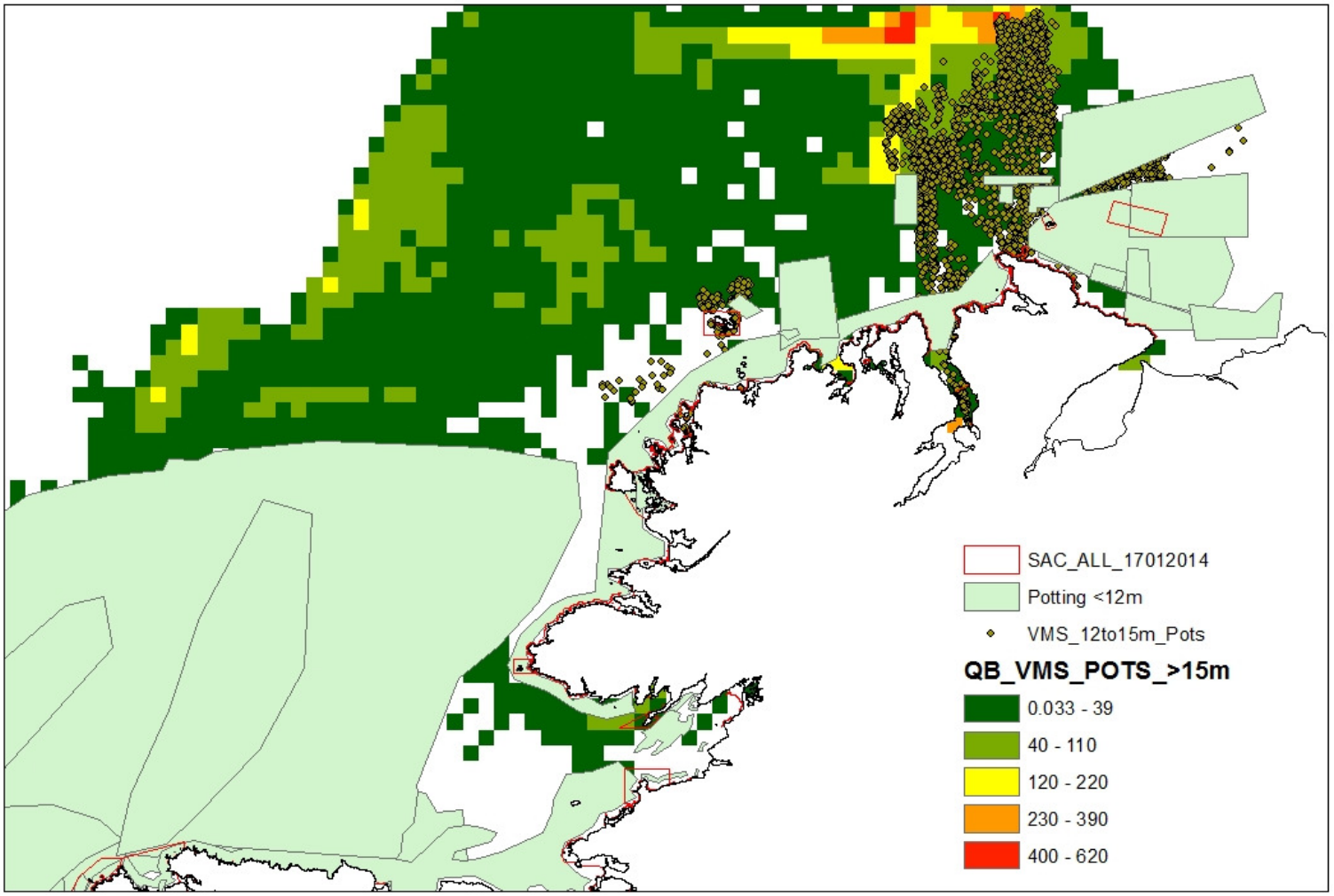

Figure 16. Distribution and intensity of fishing with pots in the area Benwee Head to Lough Foyle

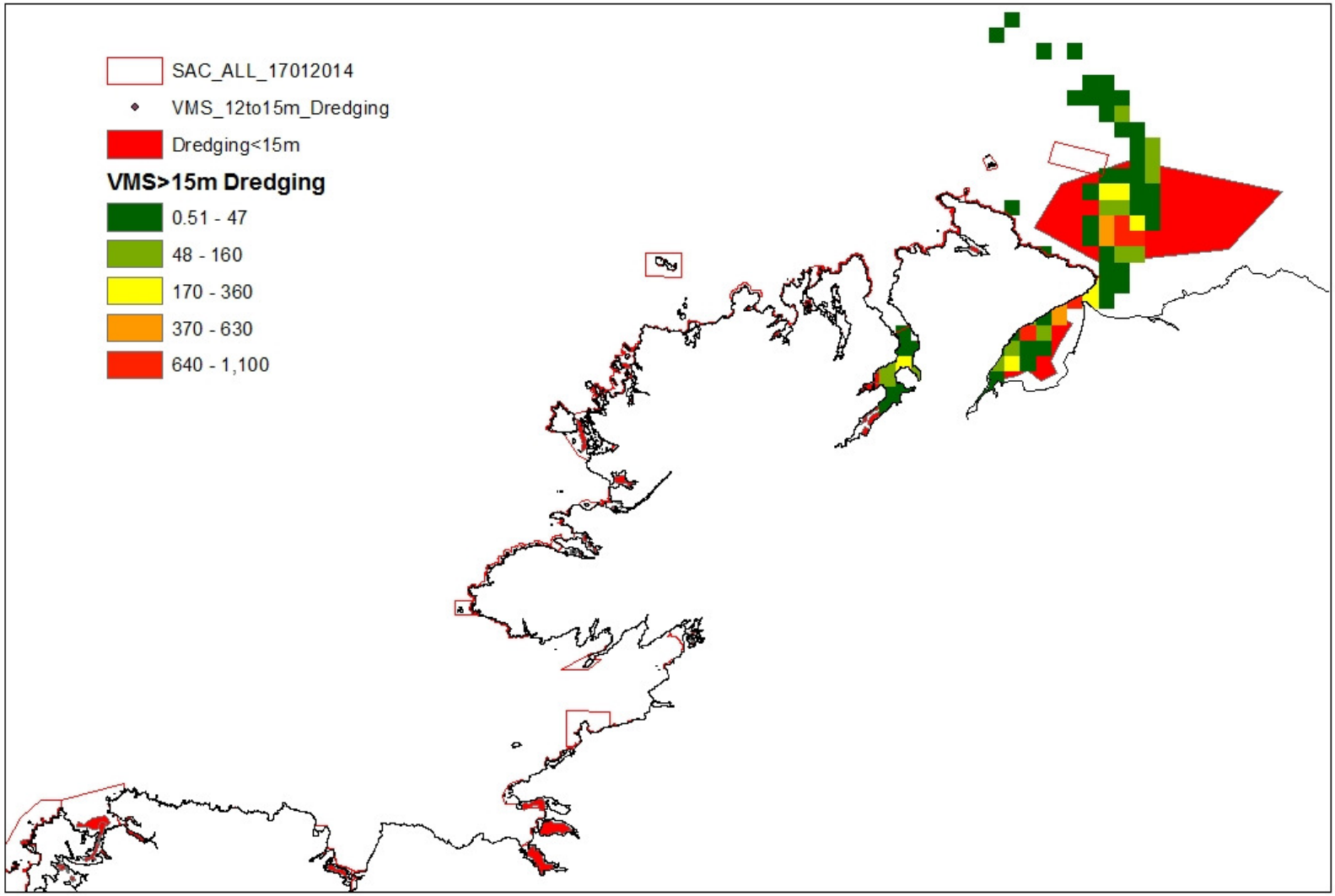

Figure 17. Distribution and intensity of fishing with dredges in the area Benwee Head to Lough Foyle

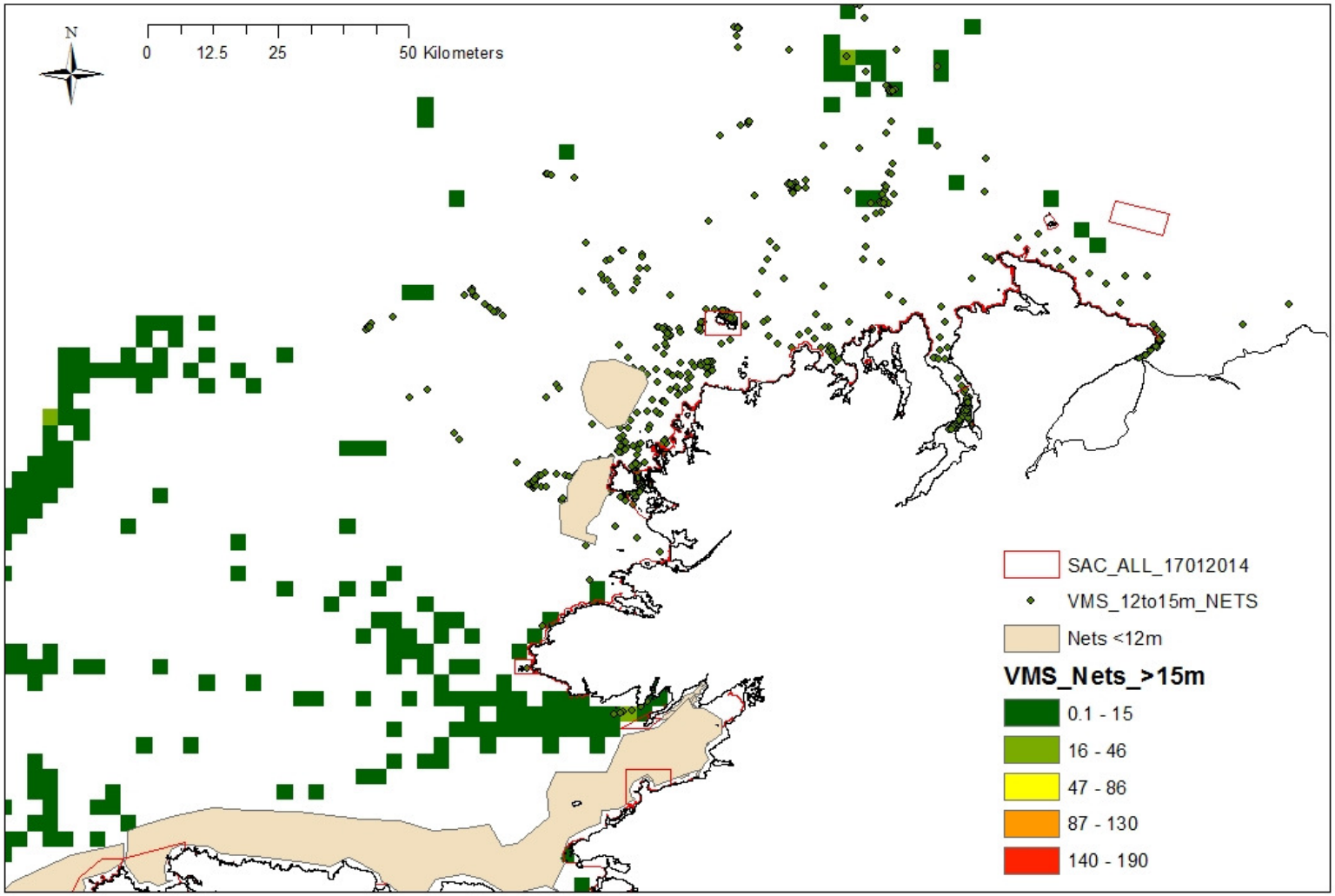

Figure 18. Distribution and intensity of fishing with set nets in the area Benwee Head to Lough Foyle

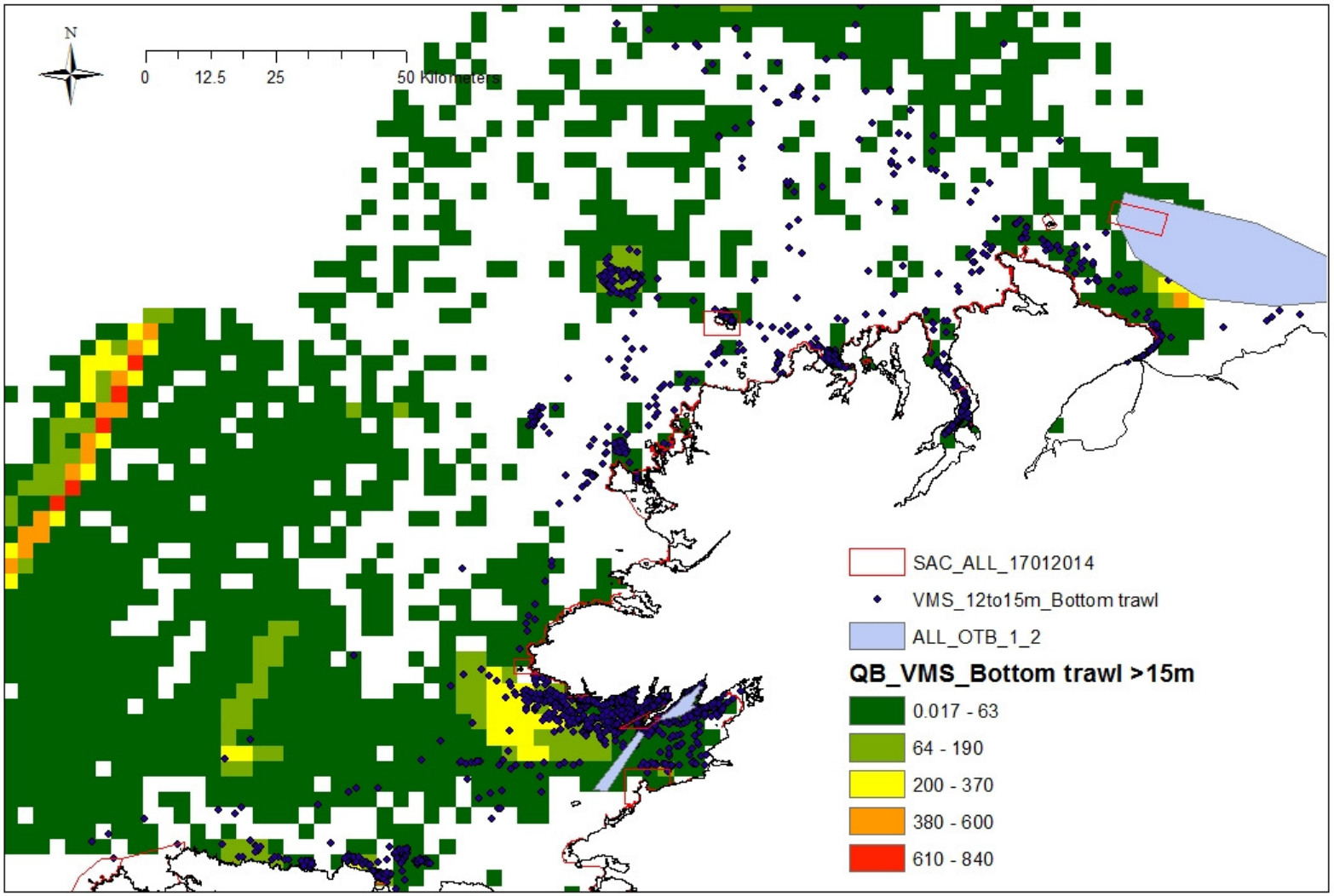

Figure 19. Distribution and intensity of fishing with bottom trawls in the area Benwee Head to Lough Foyle.

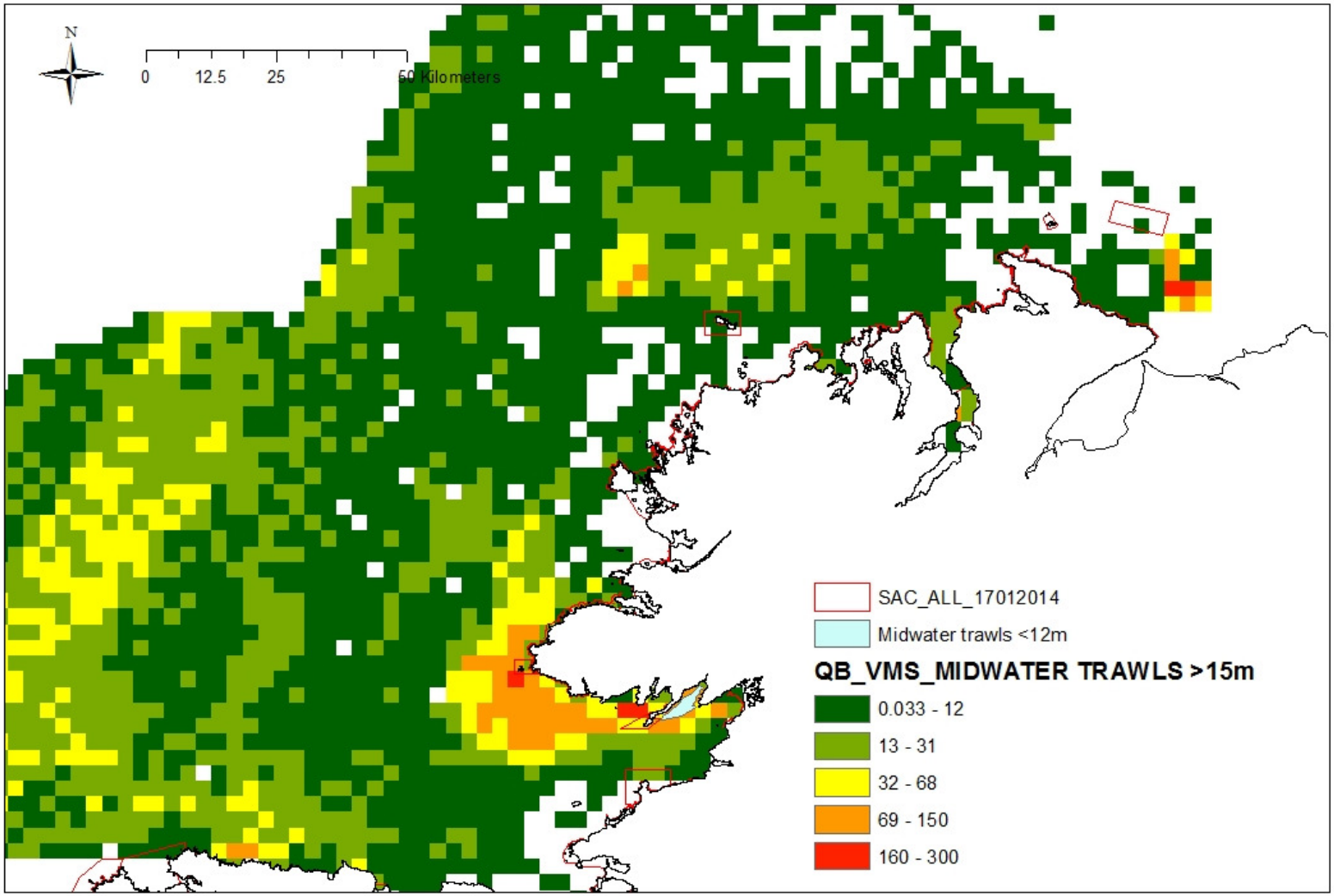

Figure 20. Distribution and intensity of fishing with mid-water trawls in the area Benwee Head to Lough Foyle

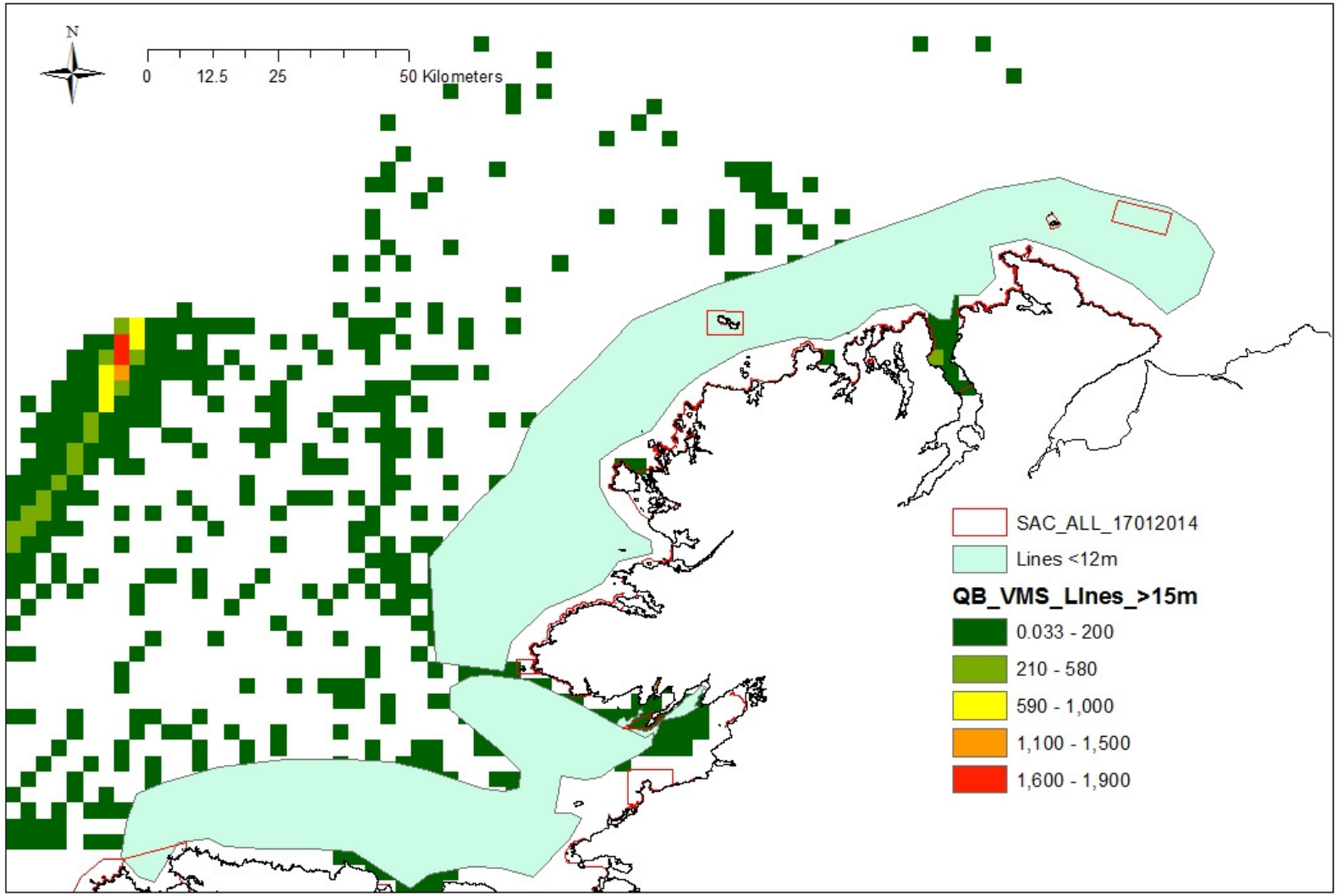

Figure 21. Distribution and intensity of fishing with hooks and lines in the area Benwee Head to Lough Foyle

8.3 Description of fisheries Benwee Head to Slyne Head

8.3.1 Crustacean and mollusc trap fisheries

See Figure 22 and maps in Section 8.4 .

8.3.1.1 Crab

The crab fishery is a continuation of that described for the area Quigleys Pt to Benwee head above. The fishery off Mayo extends up to 80km offshore although the vessels are <12m in length. One vivier vessel operates in the area. Further south the crab fishery is coastal and occurs around the Islands of Inisbofin and Inisturk. Up to 6 vessels fish crab in inshore and offshore areas west of Inisturk. Here the fishery is offshore in spring and moves inshore in summer and autumn. These vessels use approximately 2900 pots in total.

8.3.1.2 Lobster

The lobster fishery, using soft-eye creels as in the crab fishery, occurs in coastal waters from Erris to Slyne. Vessels range in size from 6-12m with the larger vessels tending to target crab rather than lobster. The fishery occurs mainly from Mar to Oct. Ten vessels fish from the coast out to 3nm from Killary to Roonagh Quay (Clew Bay south) using 5900 pots. A further 8 vessels fish around Inisturk and use 3200 pots. Fifteen vessels fish at Inisbofin with 3750 pots. A total of 47 vessels fish coastal waters between Killary south to Slyne Head using approximately 11000 pots.

In Clew Bay a total of 16 fishermen use soft eye creels to fish for lobster and brown crab and velvet crab. Seven of these fishermen also use top entrance pots for spider crab. Pot numbers per vessel varies from 250-600. The gear is fished throughout the year with higher levels of activity in the period Apr-Sept. A total of 2800 may be fished in the Bay in mid summer.

8.3.1.3 Shrimp

A shrimp fishery occurs in Blacksod Bay. This fishery is fished by 4 vessels using 1200 pots between Oct and Feb for about 30 days per year. One vessel fishes for shrimp in upper Broadhaven Bay using approximately 300 pots between Oct and Feb. In Clew Bay 15 vessels fish for shrimp and use a total of, approximately, 4300 shrimp pots. Most vessels in this fishery grade and discard live juvenile shrimp. Shrimp are fished at Killary, Ballinakill, Cleggan, Clifden Bay, Mannin Bay by 2,6,1,3 and 4 vessels respectively using 2800 pots collectively.The fishery operates from Aug to Feb.

8.3.1.4 Whelk

Two vessels fished for whelk In Clew Bay in 2013 using 400 pots each. Two vessels fished whelk north side of Achill using 300 pots each

8.3.1.5 Prawns

A small scale pot fishery for prawns occurs in the middle area of Clew Bay in mud and sandy mud substrates. Three fishermen are involved on a seasonal basis. The fishery occurs in May and again from October to December. Pot numbers vary from 300 in May to 1150 in October-December. Prawns are landed and sold live. The catch is high graded on the vessel whereby a significant proportion of small prawns are returned alive to the sea. One vessel fishes for prawns in Killary using pots.

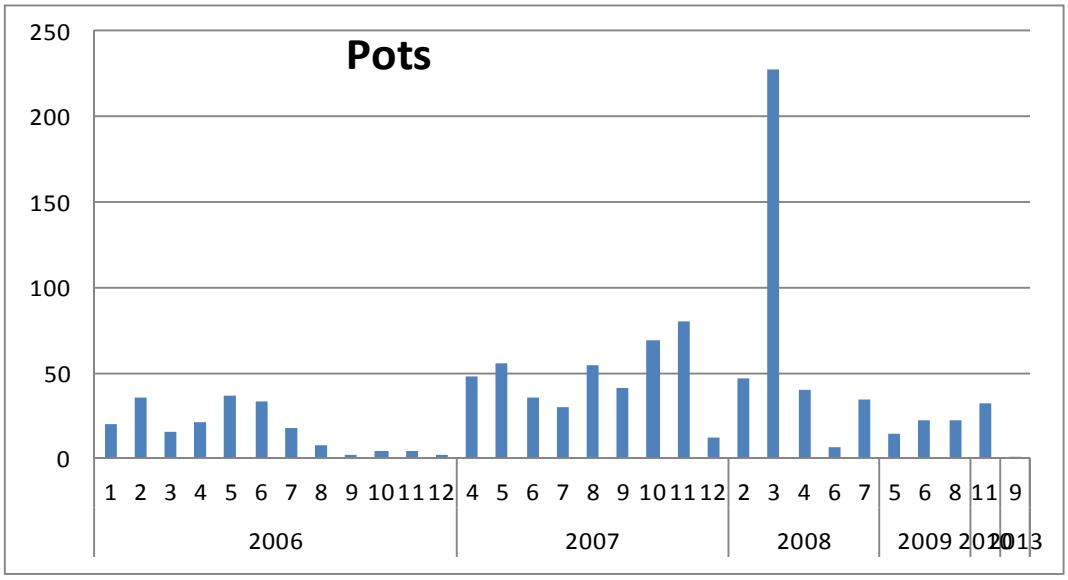

Figure 22. VMS hrs of activity by vessels >15m using pots in the Benwee Head to Slyne Head region by month during the period 2006-2014

8.3.2 Benthic dredge fisheries

See Figure 28.

8.3.2.1 Scallop

Scallop dredging occurs in Blacksod Bay, between Inisbofin and Clifden and in small areas west of Killary Harbour. These fisheries are sporadic and may not be fished every year. In Clew Bay the fishery is regular. Here, scallop occurs in shallow cobble and gravel substrates at 10-20m depth surrounding islands in the inner Bay and in deeper water. The fishery may be restricted and closed periodically due to high levels of biotoxins in the flesh of scallops which

prohibits their sale onto the market. Scallop in these areas are fished by vessels operating single dredges or 3-4 dredges on a single beam.

8.3.2.2 Oyster

Oyster fisheries occur in Clew Bay and Blacksod Bay and Achill. These fisheries have declined in recent years and stock biomass is low. The spatial extent of the Clew Bay fishery is not definitely known but recent survey data indicates the probable distribution of areas which have commercial, albeit low densities, of oysters. Oysters are fished from vessels under 10m in length using blade or fixed toothed dredges. One dredge, measuring approximately 1.2m in width, is used by each vessel. Licences to fish for oyster are issued annually by IFI. Six licences were issued in 2013 for the Ballinakill area which includes the south side of Clew Bay. An additional 49 licences were issued in the Bangor district which includes north side of Clew Bay and Achill.

8.3.2.3 Cockle

Cockle beds occur in a number of intertidal areas including the north shore of Clew Bay and in north Achill sound. The Clew Bay beds were surveyed in 2010. These fisheries are not currently open as the areas are not classified (microbiological) production areas for cockle.

8.3.2.4 Razor clam

Razor clam beds may exist in a number of areas including outside Killary, south of Inisbofin, Clifden Bay and west of Streamstown Bay, east of the Iniskeas, and east of Edye Rk. None of these beds have been surveyed and have not been fished recently and they are not in classified production areas.

8.3.2.5 Surf clam

A number of surf clam beds may occur or do occur in inner Broadhaven Bay, between the Iniskea Is and Achill and in Clifden Bay. None of these beds have been surveyed, there are no current fisheries other than in Clifden Bay.

There is no VMS activity reported by dredgers in the Benwee Hd to Slyne Hd area.

8.3.3 Set net fisheries

See Figure 23.

8.3.3.1 Tangle nets

Tangle netting is common in the area west and south of the Mullet Peninsula, west of Iniskeas Is and north and west of Achill and east into Clew Bay. Up to 12 vessels may operate in this fishery between Apr and Nov and use up to 3.6km of 7.5 inch tangle nets. Three fishermen fish with tangle nets in Clew Bay. The tangle net fishery also occurs west of Killary, around Inisbofin and Inisturk and south to Slyne Hd. The number of vessels involved in not known. Long gear soak time of over 5 days is common in this fishery.

Tangle netting for turbot also occurs west of the Mullet Peninsula and west of Achill. Only 1 vessel using 2.4km of 10-12inch net is involved.

8.3.3.2 Gill nets

Set gill nets are used to target mainly Pollack. In Clew Bay 5 vessels, fishing from Jan to Sept, use approximately 7.6km of gill net. This fishery may also occur west of Mayo and Galway.

8.3.3.3 Drift nets

Drift netting for mackerel is carried out by 1 vessel in Clew Bay for approximately 10 days per month during May to Sept. A number of fishermen in 6m vessels also set drift nets for herring in autumn in inner Clew Bay. Catches are generally low and amount to 3-4 boxes per vessel for the season.

8.3.3.4 Trammel nets

A sub-set of the lobster fleet may fish for bait with trammel nets. The number of vessels involved is not known.

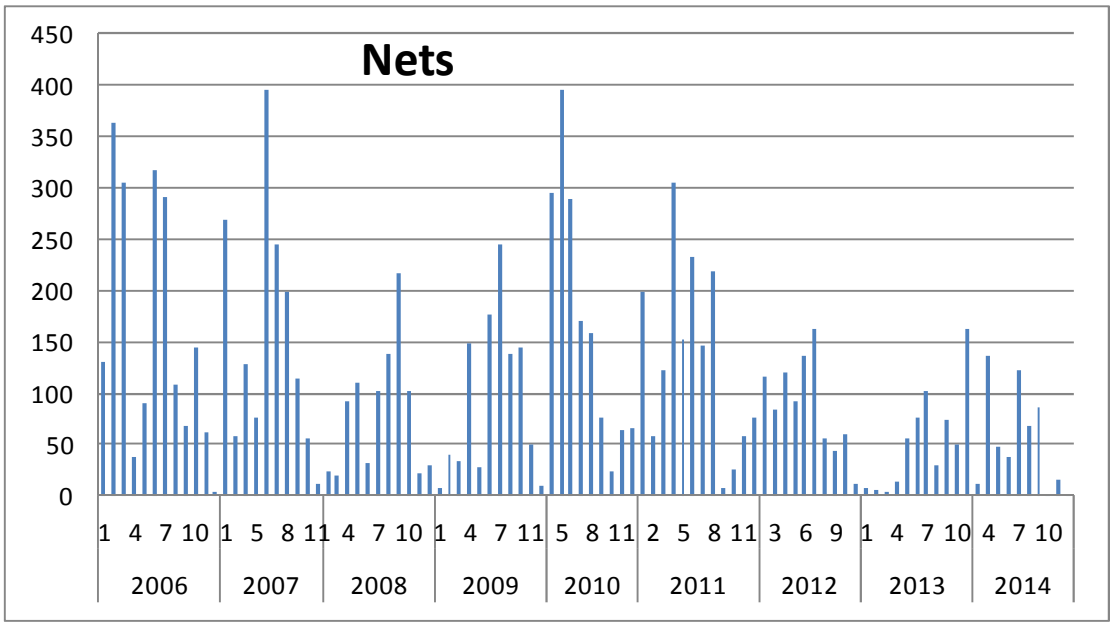

Figure 23. VMS hrs of activity by vessels >15m using set nets in the Benwee Head to Slyne Head region by month during the period 2006-2014

8.3.4 Bottom trawl fisheries

Bottom trawling by vessels >15m is not intensive in the area. Patches of higher intensity activity occurs north and north west of Clare Island and in Broadhaven Bay. Trawling by vessels under 15m is also common in outer Clew Bay and west of Killary (Figure 24). One vessel occasionally trawls for prawns in Killary Harbour.

This fishery targets mixed demersal fish. Three vessels <15m may fish the area east of Inisbofin during the summer.

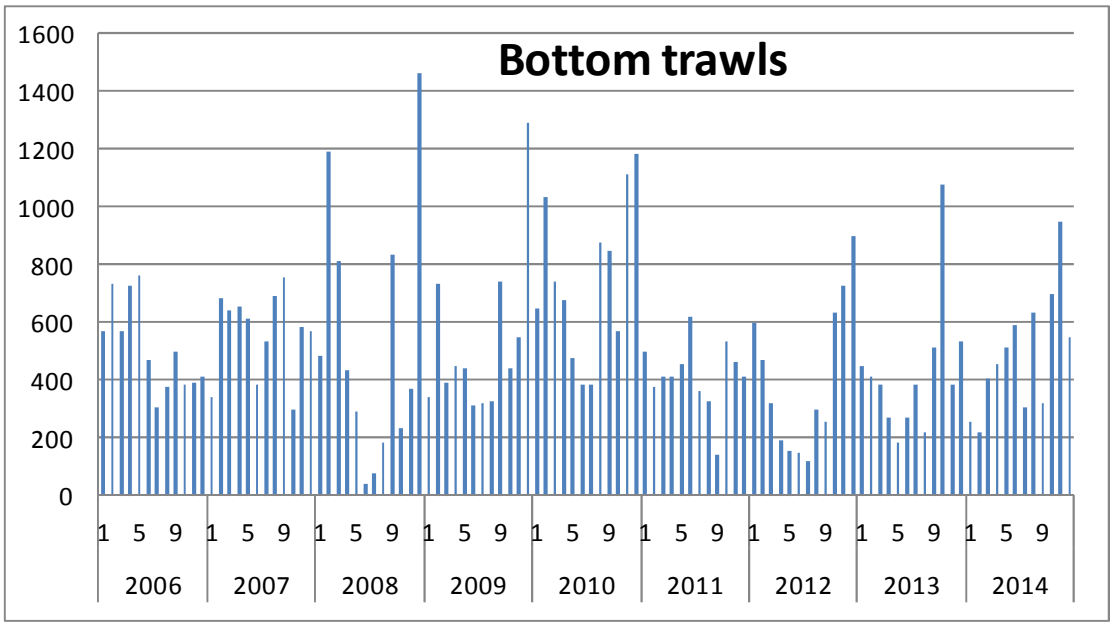

Figure 24. VMS hrs of activity by bottom trawlers >15m in the Benwee Head to Slyne Head region by month during the period 2006-2014.

8.3.5 Pelagic fisheries

Mid-water trawling for pelagic fish occurs mainly in offshore waters in the Benwee Head to Slyne Head region. The main fishery is for horse mackerel and mackerel. This fishery occurs in autumn and winter. Smaller scale pelagic trawling for sprat may sporadically occur inshore during winter (Figure 25).

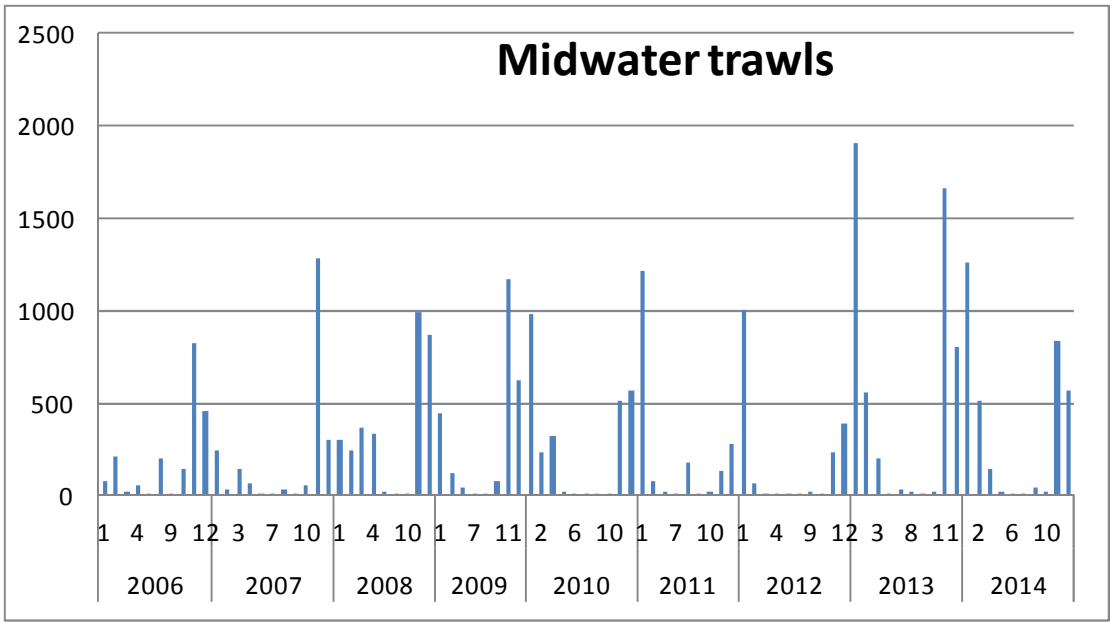

Figure 25. VMS hrs of activity by midwater trawlers >15m in the Benwee Head to Slyne Head region by month during the period 2006-2014

8.3.6 Hook and Line fishing

Hook and line fishing by vessels over 15m in length is reported in Broadhaven, Blacksod and in offshore waters to the west. Some of these data may reflect vessels sheltering from poor weather in Blacksod and Broadhaven and may not represent fishing activity (Figure 26).

Vessels under 12m in length fish with hooks and lines in Clew Bay and in Broadhaven Bay. This fishery may occur sporadically in inshore waters throughout the area.

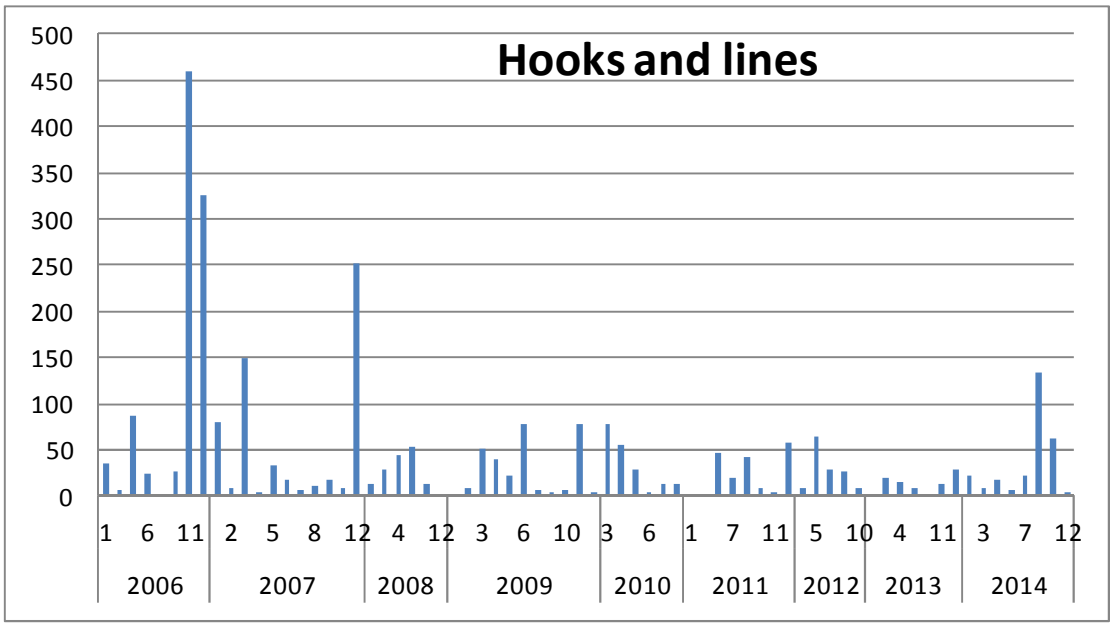

Figure 26. VMS hrs of activity by vessels >15m using lines in the Benwee Head to Slyne Head region by month during the period 2006-2014.

8.4 Maps of fishing activity Benwee Hd to Slyne Hd

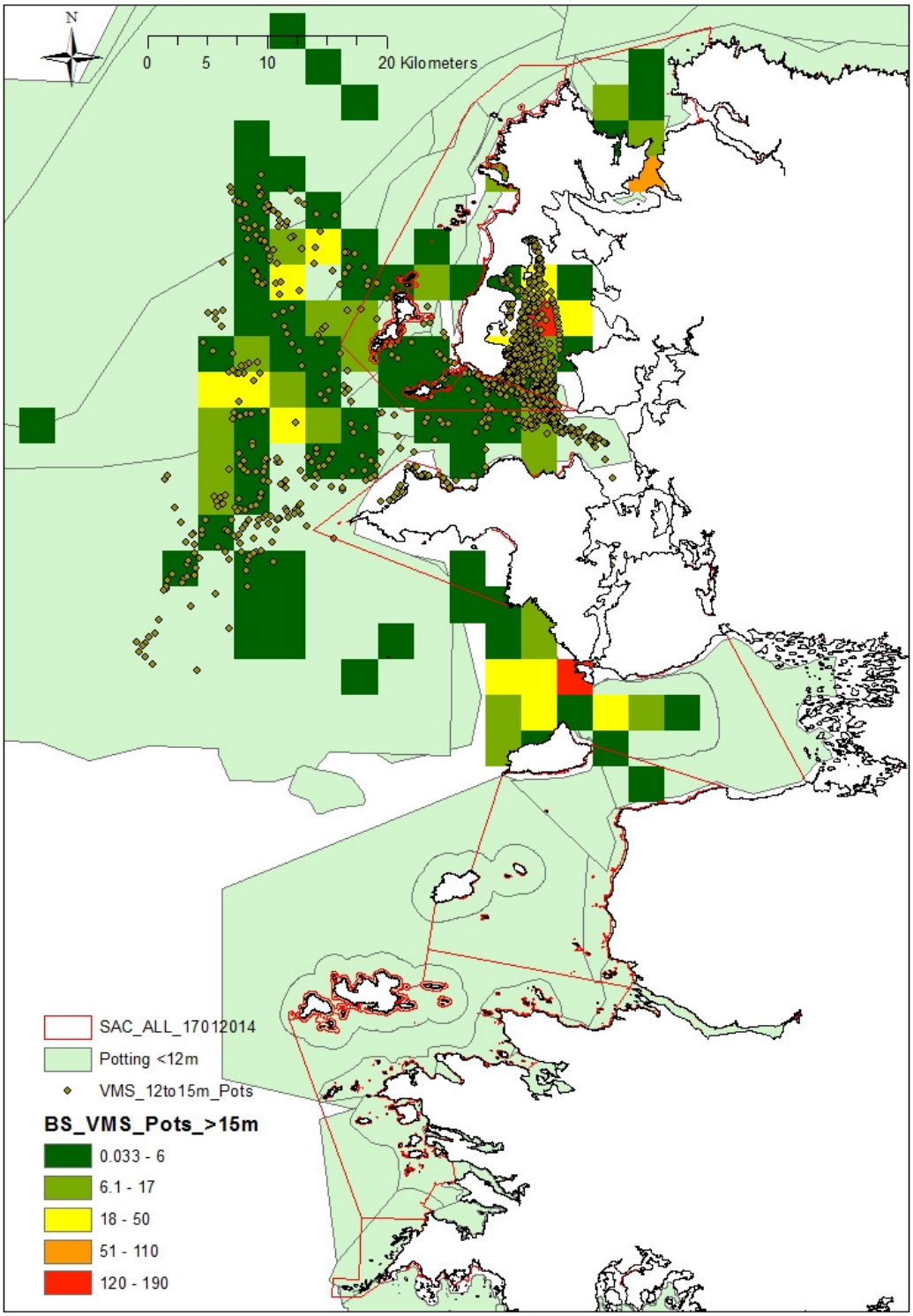

Figure 27. Distribution and intensity of fishing with pots in the area Benwee Head to Slyne Head.

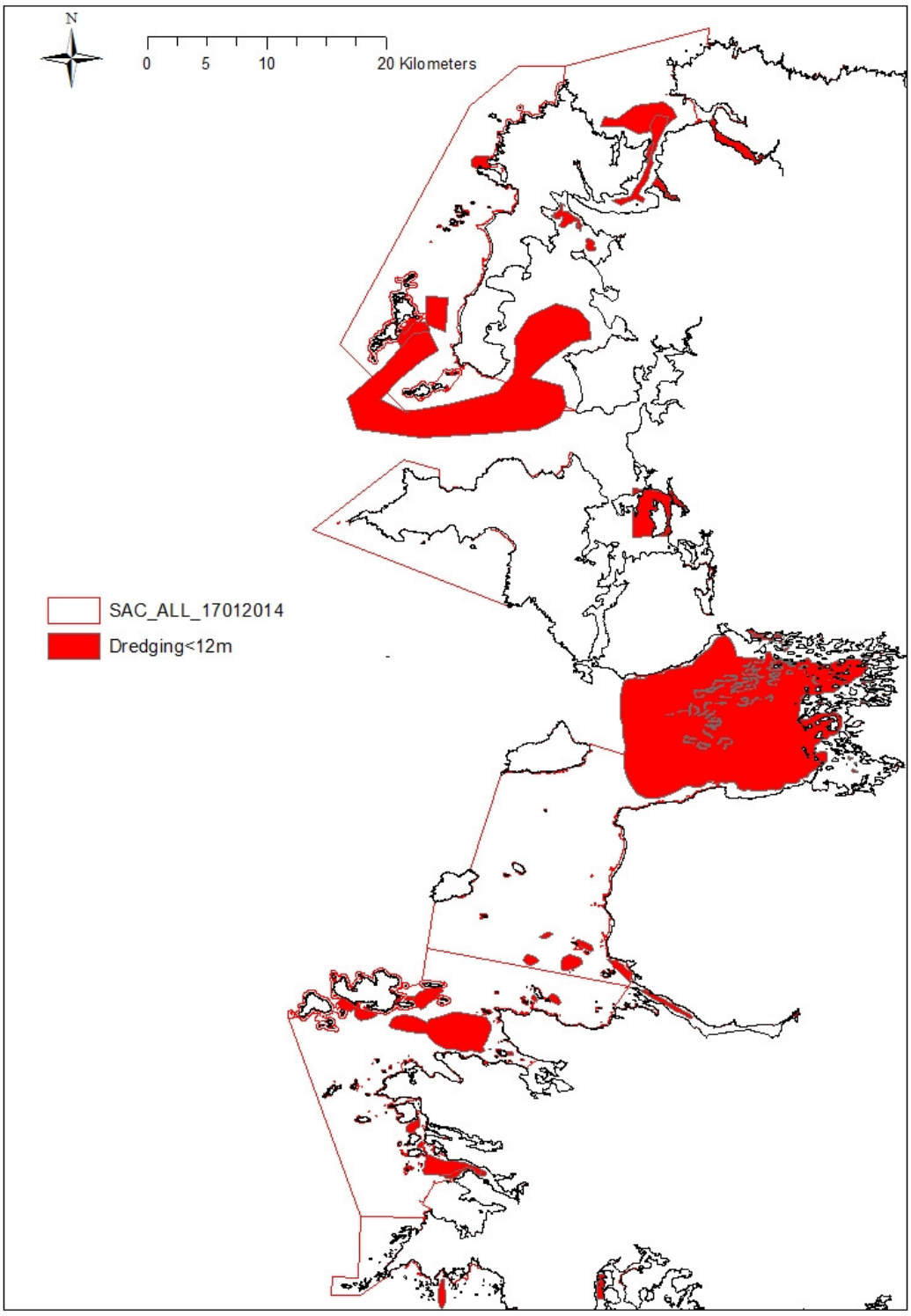

Figure 28. Distribution and intensity of fishing with dredges in the area Benwee Head to Slyne Head

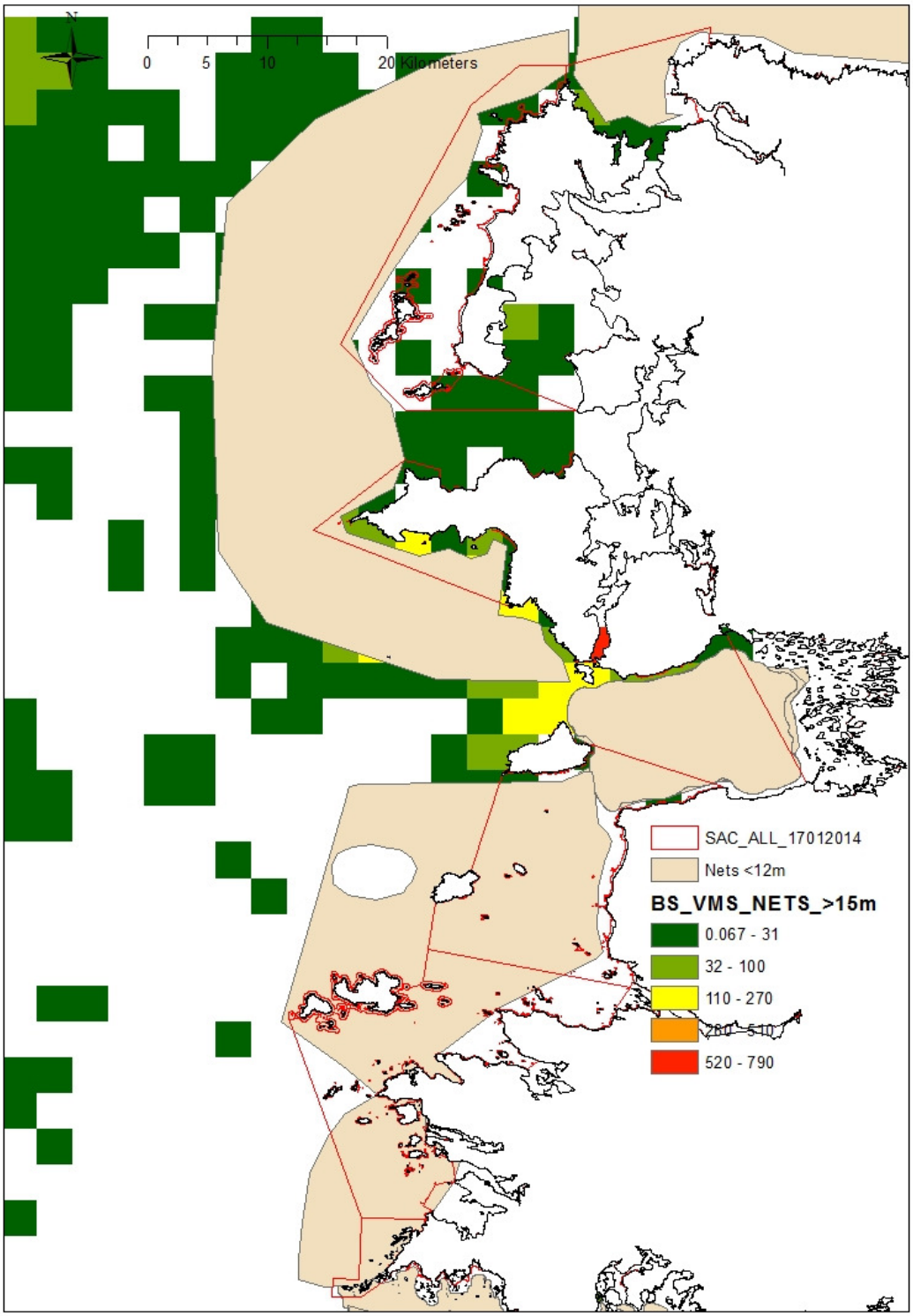

Figure 29. Distribution and intensity of fishing with set nets in the area Benwee Head to Slyne Head

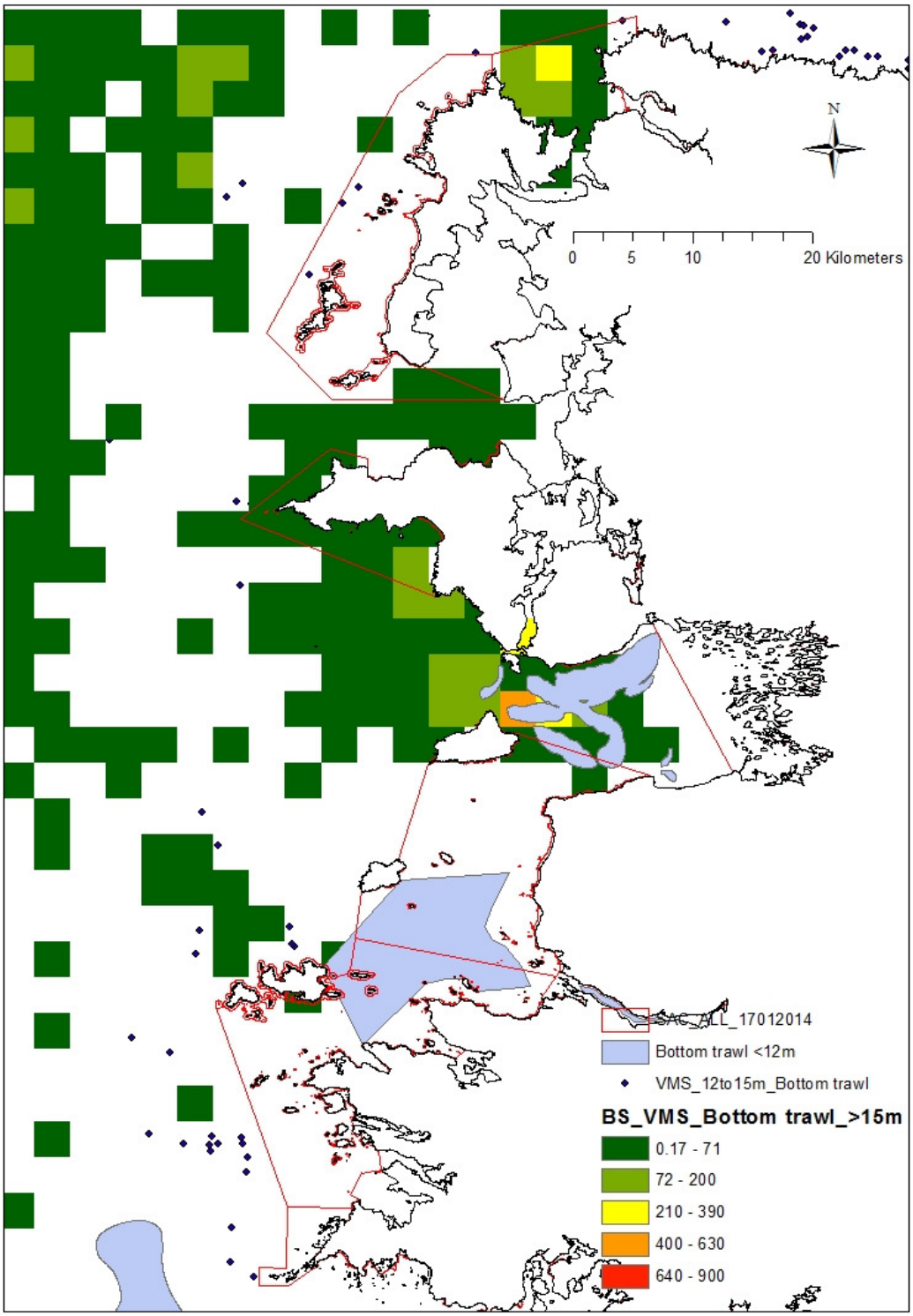

Figure 30. Distribution and intensity of fishing with bottom otter trawls in the area Benwee Head to Slyne Head

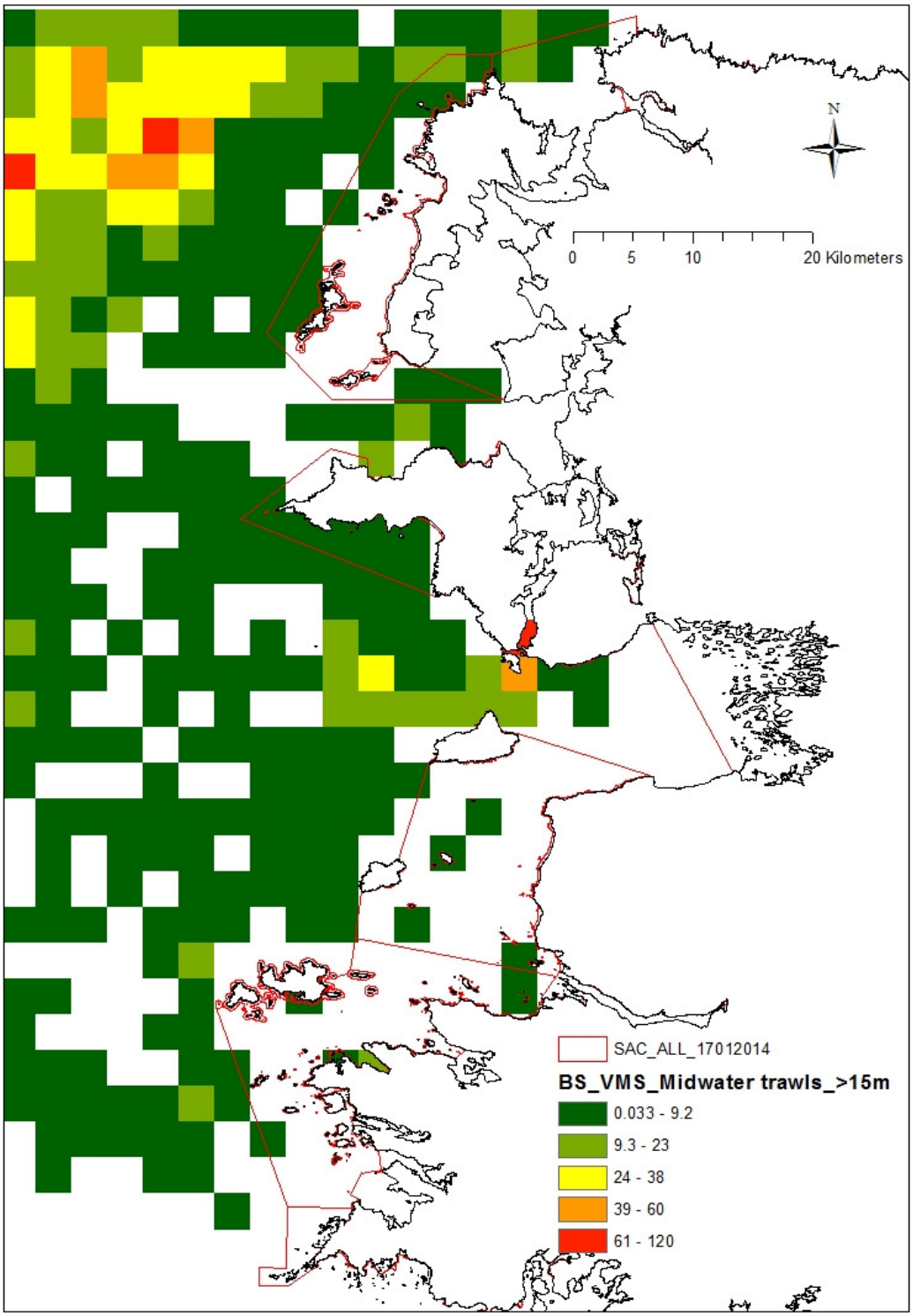

Figure 31. Distribution and intensity of fishing with mid-water trawls in the area Benwee Head to Slyne Head

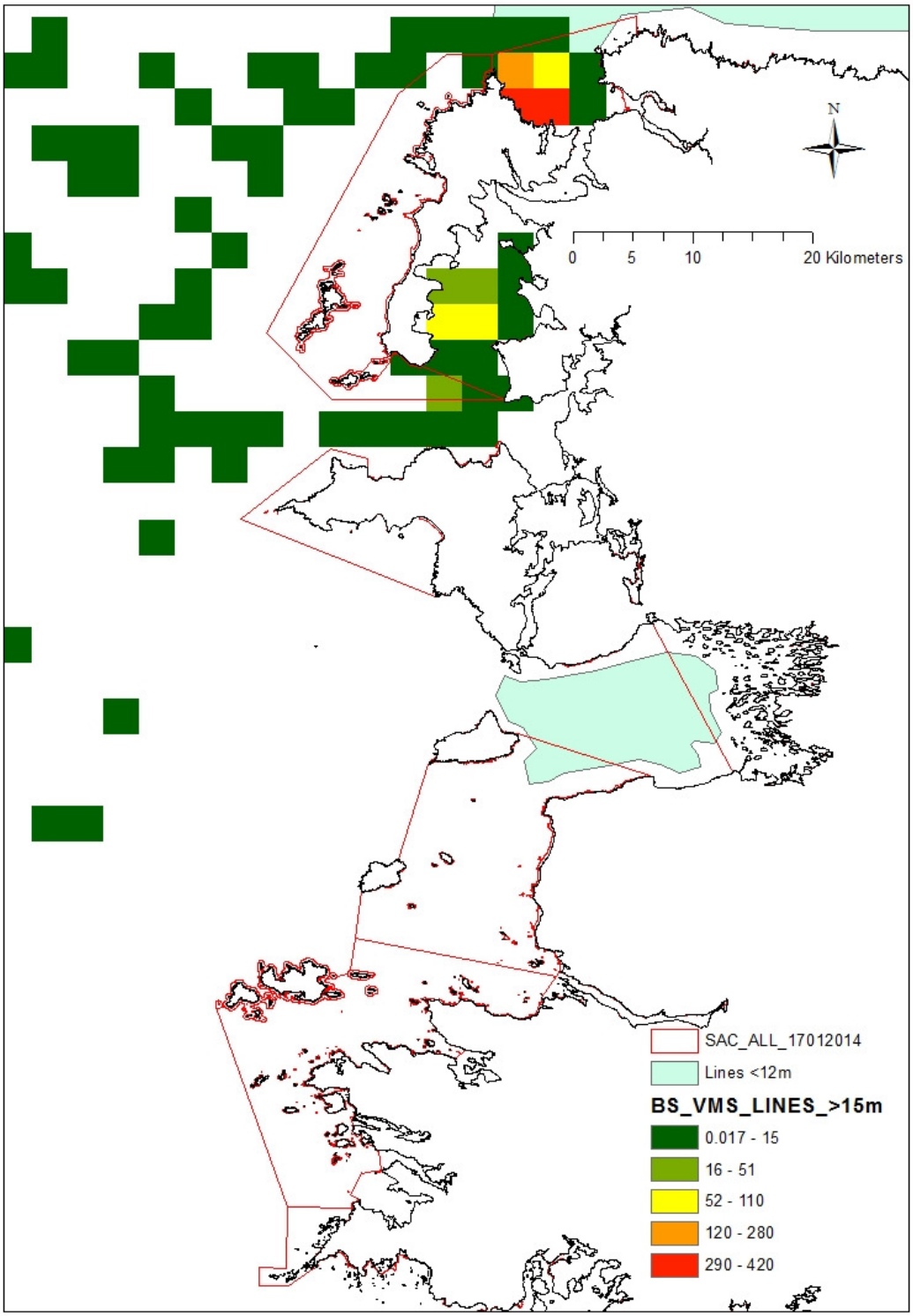

Figure 32. Distribution and intensity of fishing with hooks and lines in the area Benwee Head to Slyne Head

8.5 Description of fisheries at Loop Head to Slyne Head

8.5.1 Crustacean and mollusc trap fisheries

See maps in Section 8.6

8.5.1.1 Crab

The brown crab fishery occurs off the west Clare coast and in open waters in outer Galway Bay. Off the Clare coast 3 vessels operate approximately 1500 traps from Mar-Nov. Up to 15 vessels may fish for crab in outer Galway Bay using up to 3000 traps. A fishery for velvet crab occurs in inner Galway Bay and especially along the south shore. Up to 10 vessels catch velvet crab either as a targeted catch or as a by-catch in the lobster fishery. Velvet crab are also caught by lobster boats in sheltered Bays in Connemara and the Shannon estuary. Velvets are targeted by 3 vessels (1200 pots in total) in the Shannon estuary in Spring and Summer. A fishery for spider crab is developing as both a by-catch on lobster boats and a targeted fishery; an estimated 10 vessels, fishing 3000 pots, target spider crab in Spring and Summer in the region.

8.5.1.2 Lobster

The lobster fishery operates closer to shore than the crab fishery. It is an important fishery in all areas from Slyne east to Spiddal (96 vessels, 32000 traps, 100-120 days per vessel per year), the Aran Islands (19 vessels, 3000 traps, 70 days per vessel per year), on the west Clare coast from Blackhead to Loop Head (21 vessels, 8400 traps, 100 days per vessel per year) and in inner Galway Bay (14 vessels, 2400 pots, 118 days per vessel per year).

8.5.1.3 Shrimp

The shrimp fishery occurs in the Connemara area from approximately Roundstone in the west to Spiddal in the east (58 vessels, 24400 pots, Aug-Feb). In addition an important shrimp fishery operates in inner Galway Bay (22 vessels, 6350 potential pot hauls per day, Sept-Jan).

A total of 6hrs of VMS potting activity was reported in this area during 2006-2014

8.5.2 Benthic dredge fisheries

See maps in Section 8.6.

Local dredge fisheries for bivalves occur or may potentially occur in the area. These include fisheries for scallop and oyster. In addition there are fisheries or potential fisheries for surf clams and razor clams. Vessels involved are all less than 12m in length. Blade or fixed

toothed dredges are used to fish for scallops and oysters while box dredges and hydraulic non-suction dredges are used for surf clams and razor clams respectively.

8.5.2.1 Scallop

Scallop fisheries occur in various areas of Galway Bay, Kilkieran Bay and Bertraghbuoy Bay. These fisheries are seasonal (Kilkieran, Bertraghbuoy Bay) or episodic and irregular (Galway Bay). The Kilkieran Bay and Bertraghbuoy Bay fisheries are managed by the local co-operative (Comharcumann Sliogeisc Conamara) under an Aquaculture licence issued to the co-op. This enables the Co-op to determine how the fishery is regulated. The minimum size for scallop in the co-op area is 120mm (compared to a national limit of 100-110mm). Historically the stock was enhanced by importing juvenile scallop from Mulroy Bay. The fishery may not open annually; this depends on markets, stock levels and biotoxins. The fishery occurs in late autumn and winter. Spring loaded dredges are forbidden in the area. The distribution of the stock in Kilkieran is known from recent MI surveys.

The Galway Bay fishery is episodic and small scale when it does occur. The fishery is regulated by minimum size of 100mm. There are no other regulations other than those related to compliance with biotoxin levels.

8.5.2.2 Oyster

Fisheries for native oysters occur in Kilkieran Bay and in the south east corner of Inner Galway Bay.

The Kilkieran Bay fishery is regulated by the Co-op as described for scallop. The fishery occurs in late Autumn. The distribution of the stock is known from recent MI surveys

The Galway Bay fishery is partly regulated by the Clarinbridge Oyster Co-operative through Fishery Orders issued in 1978 and 1980. However, not all of the native oyster beds are within the order areas. The current distribution of oysters is known from recent MI surveys and occurs in an area north east of Eddy Island and east to the Clarin River. A proportion of this area is not included in the fishery order and is a public bed. As specified in the Fishery Order the fishery opens in December only.

The number of licences issued in the Galway fishery has been restricted in recent years pending Article 6 assessments.

In addition to native oyster the Clarinbridge Oyster Co-op also produces Pacific oysters from extensive growout on the seabed in the Clarin River estuary and within the 1978 Fishery

Order Area. Although this species is introduced and is generally cultured on trestles harvesting of it with dredges also requires a dredge licence as the two species are not distinguished in the 1959 Fisheries Act (Part IV Oysters).

8.5.2.3 Surf clam

Two surf clam fisheries are active in the Slyne to Loop Hd area. There is a discrete bed in inner Galway Bay, just north of Eddy Is., which is fished regularly by 1 vessel. Clifden Bay is also classified as a clam production area.

Two other areas are identified as containing commercial quantities of surf clam; an area close to Roundstone in Bertraghbuoy Bay and a second bed south of Carna in Connemara. Neither of these areas are currently classified production areas for surf clams and are, accordingly, not fished.

8.5.2.4 Razor clam fishery

A number of razor clam beds may occur in the area. None of them, however, currently have a microbiological classification and all these potential fisheries are therefore inactive. Stock status and spatial extent of these razor clam beds is unknown. Beds are reported to exist east of Inisoir and Inismaan, south of Ballyconneally, south of Carna, in outer Kilkieran Bay and along the north shore of Galway Bay.

Only 28hrs of VMS dredging activity was reported in this area during the period 2006-2014.

8.5.3 Set net fisheries

See Figure 33 maps in Section 8.6**.**

8.5.3.1 Tangle netting

Crayfish and to a lesser extent turbot, are targeted with tangle nets in waters off south Connemara and into outer Galway Bay. Up to 32 vessels may be involved from May-Nov. The amount of gear used is unknown. Tangle netting also occurs on the Clare coast.

8.5.3.2 Bottom set gill nets

Bottom set gill nets are reported by vessels over 15m (VMS data) mainly off the west Clare coast. This fishery targets demersal fish species. Small vessels may sporadically engage in this fishery in outer Galway Bay, Clare coast or Connemara coasts. Depradation by seals is, however, reported to be very problematic in this fishery and smaller vessels have generally abandoned the fishery.

8.5.3.3 Trammel net fisheries

A proportion of vessel operators fishing with pots for crustaceans may also use trammel nets to catch bait (dogfish, wrasse). The level of activity is unknown. Potting vessels (with a pot licence only) are not entitled to fish trammel nets. Also it is more common for polyvalent potters, who are entitled to fish with trammels, to purchase bait. For instance questionnaire data for Galway Bay in 2010 indicated that 3/26 (11%) of vessels fished for bait.

In this assessment the spatial extent of trammel netting is presumed to be the same as the spatial extent of the lobster fishery even if the level of activity is unknown.

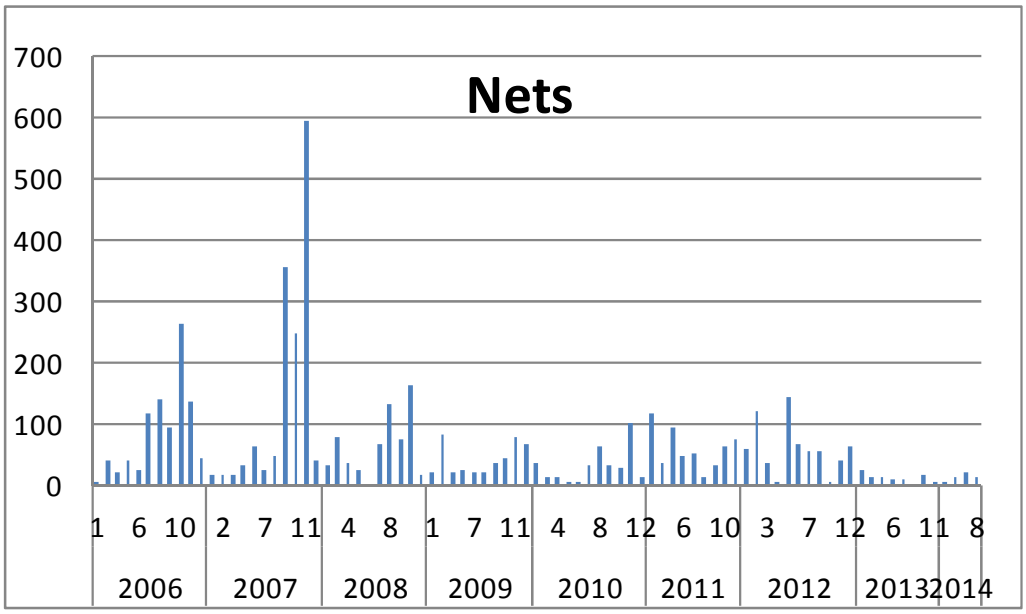

Figure 33. VMS hrs of activity by vessels >15m using nets in the Slyne Head to Loop Head region by month during the period 2006-2014

8.5.4 Bottom trawl fisheries

See Figure 34 and maps in Section 8.6.

Bottom trawl (demersal) fishing by vessels over 15m in length occurs throughout the Slyne to Loop area but is heavily concentrated west and south west of Aran, on Nephrops grounds, and to lesser extents south of Slyne Head (also Nephrops) and in outer Galway Bay (Nephrops on north shore). The expert knowledge data for this fishery shows the same pattern as the VMS but may be displaced spatially relative to the position of the VMS data. There is little activity in shallow coastal waters other than off the Clare coast.

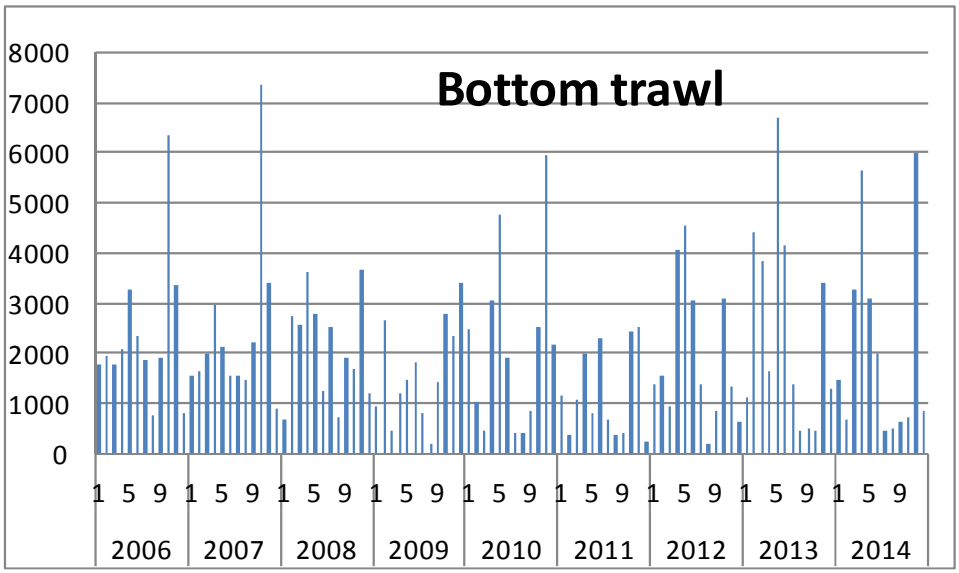

Figure 34. VMS hrs of activity by vessels >15m using bottom trawls in the Slyne Head to Loop Head region by month during the period 2006-2014

8.5.5 Pelagic fisheries

See Figure 35 and maps in Section 8.6.

Pelagic fishing for herring may occur in winter along the north shore of Galway Bay. Fishing activity has declined in this area as the herring stock is at a low level. Fishing for sprat may occur in winter and spring in inner Galway Bay. Reported VMS activity is very low in inner Galway Bay however (Figure 35).

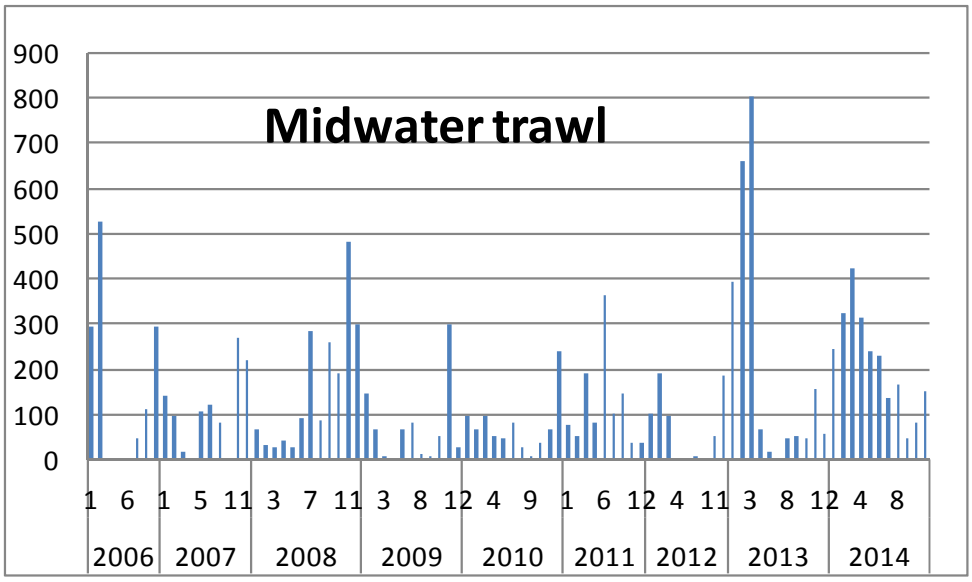

Figure 35. VMS hrs of activity by vessels >15m using mid-water trawls in the Slyne Head to Loop Head region by month during the period 2006-2014

8.5.6 Hook and Line fishing

See Figure 36 and maps in Section 8.6.

Vessels under 15m fish for pollack and mackerel with lines around the Aran Islands, in outer Galway Bay and west to Connemara. Some VMS activity with lines is reported west of Ireland.

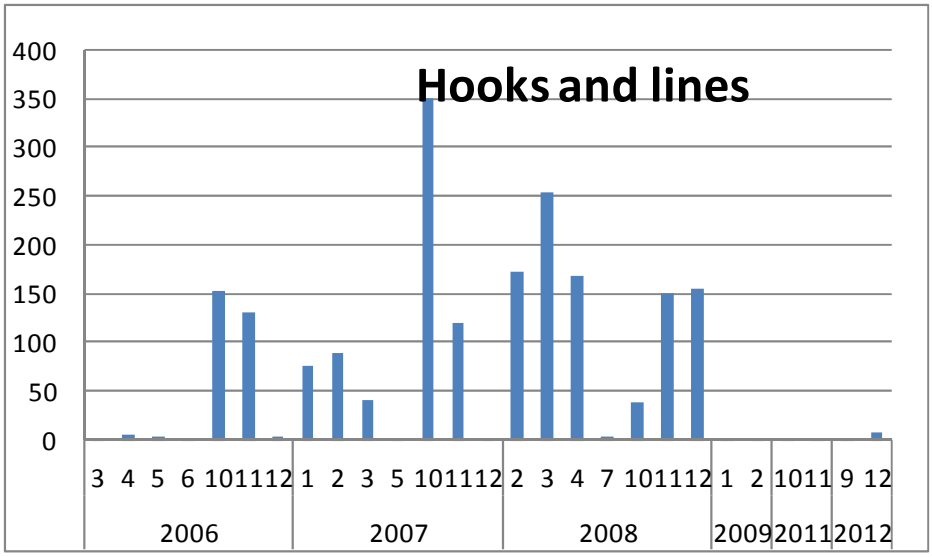

Figure 36. VMS hrs of activity by vessels >15m using hooks and lines in the Slyne Head to Loop Head region by month during the period 2006-2014

8.6 Maps of fishing activity Slyne Hd to Loop Hd.

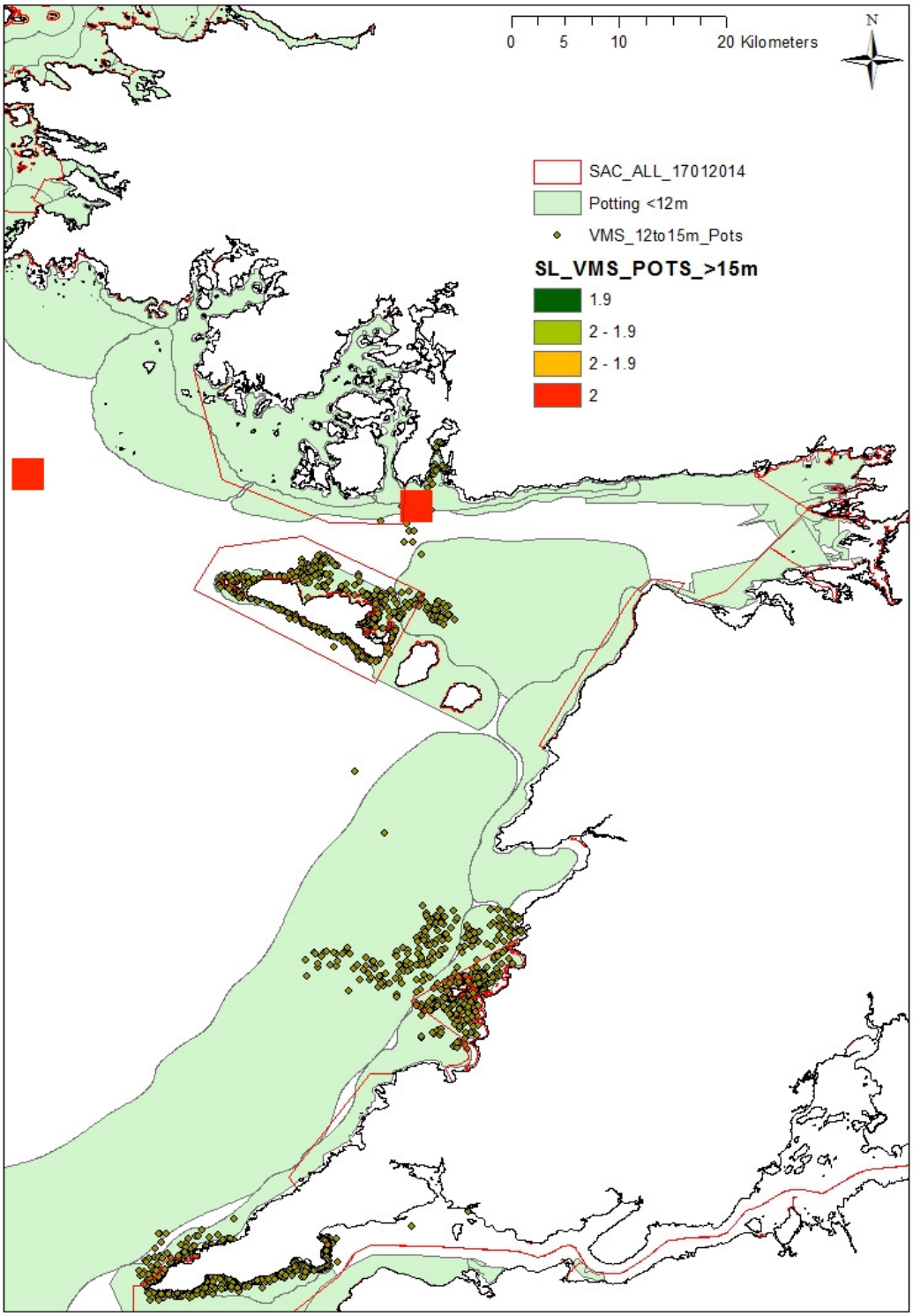

Figure 37. Distribution of pot fisheries for crustaceans in the Loop to Slyne area.

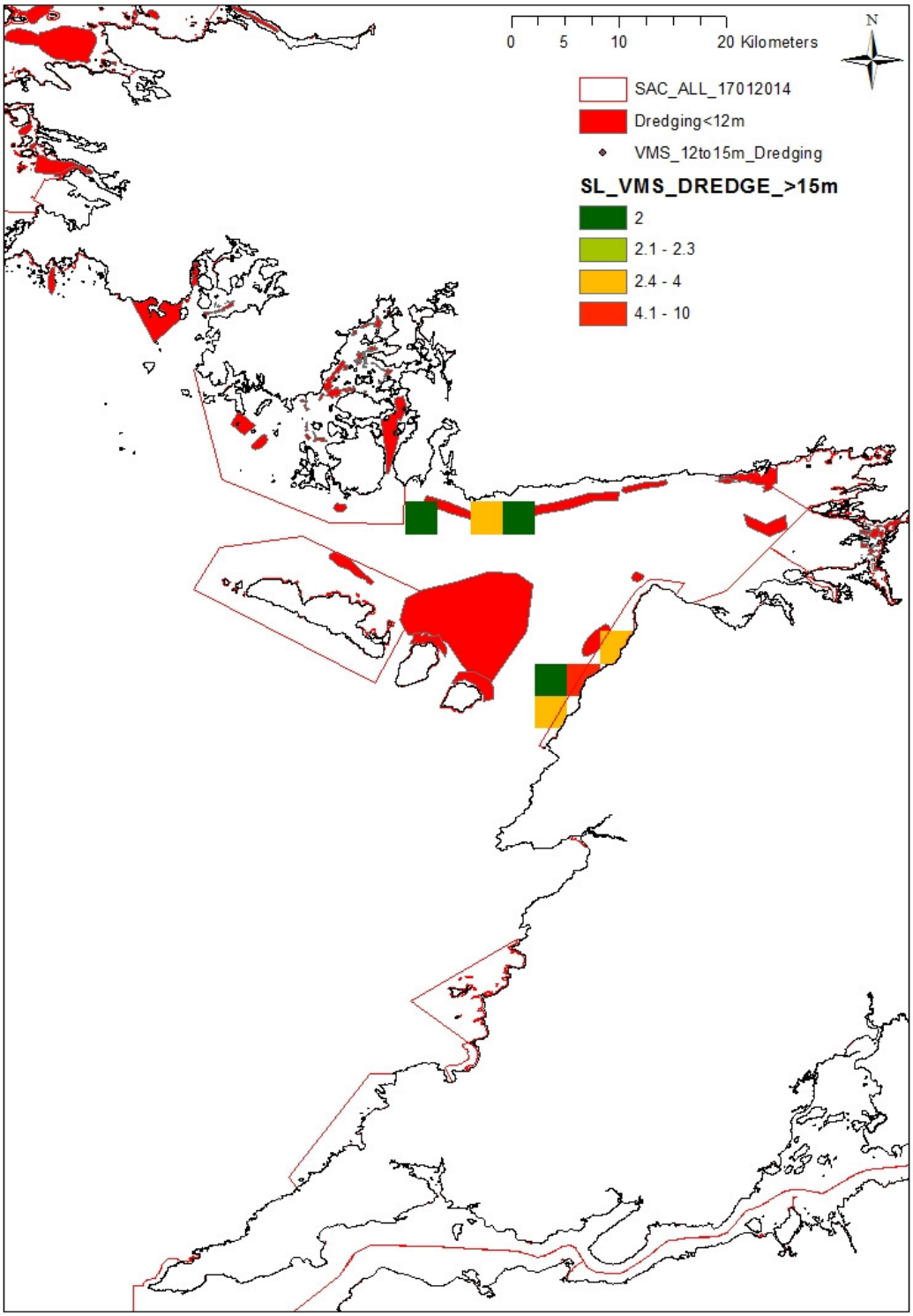

Figure 38. Distribution of dredge fisheries for bivalves in the Slyne Head to Loop Head area

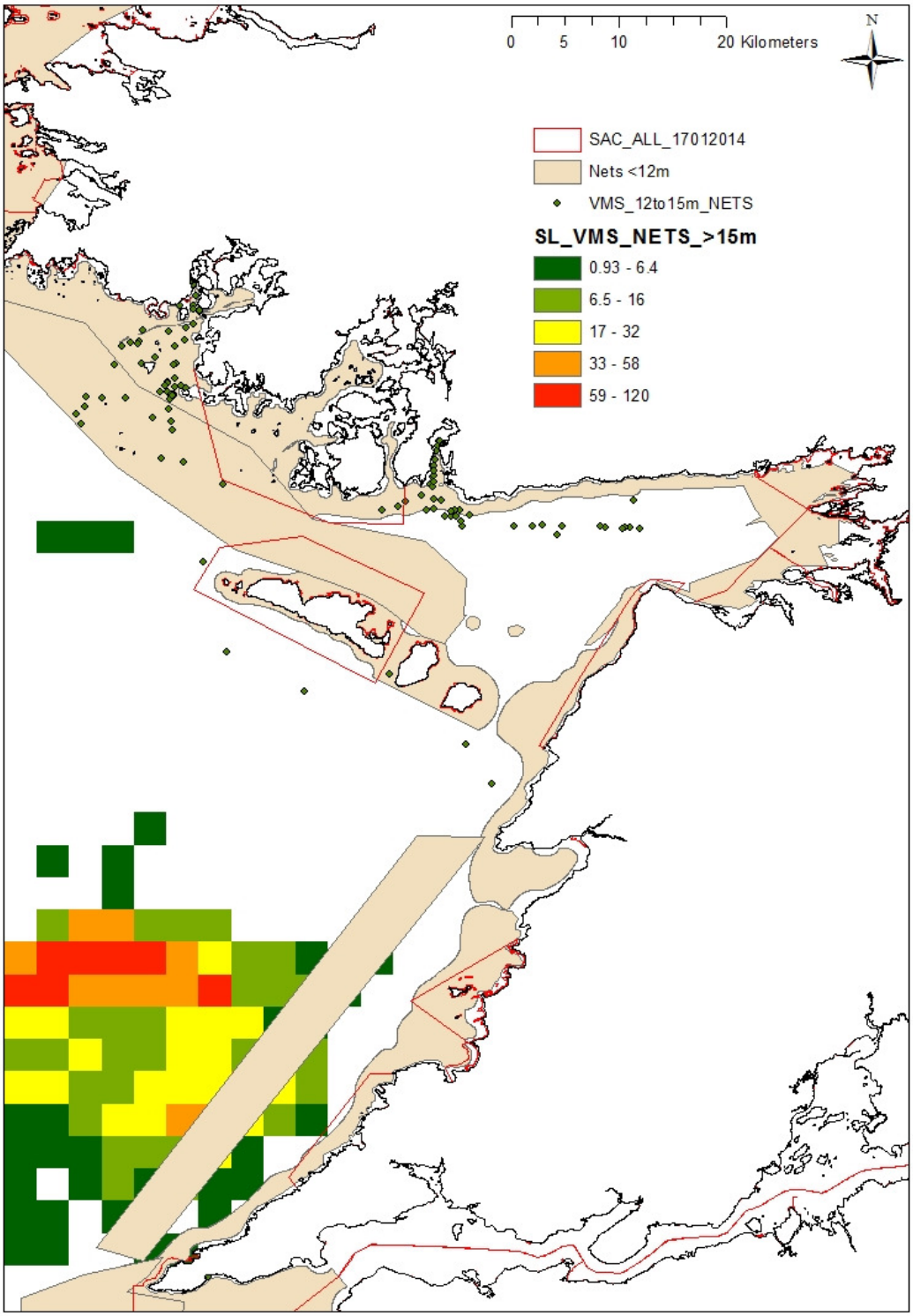

Figure 39. Distribution of set net fisheries in the Slyne to Loop area.

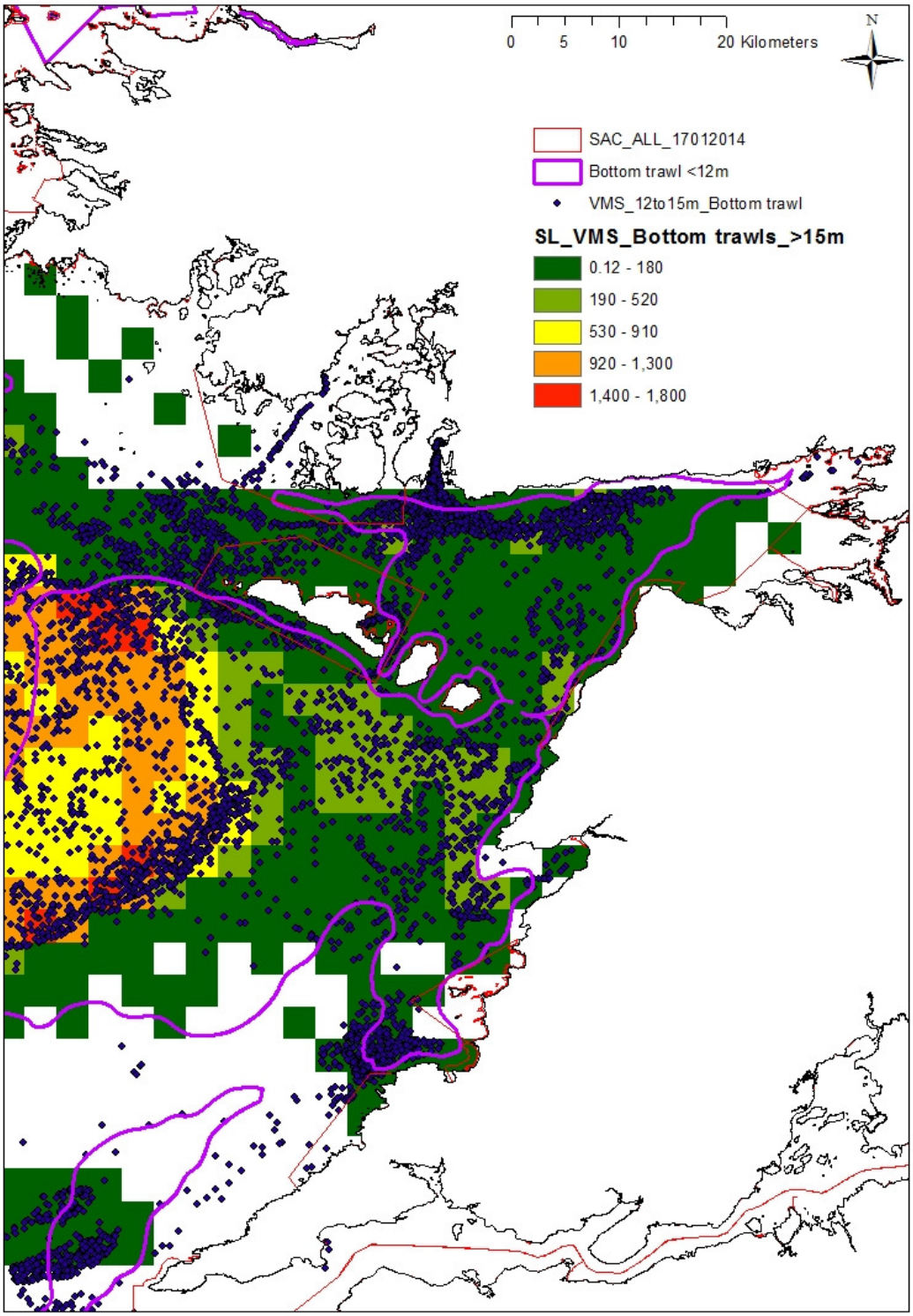

Figure 40. Distribution of bottom trawl fisheries in the Slyne to Loop area

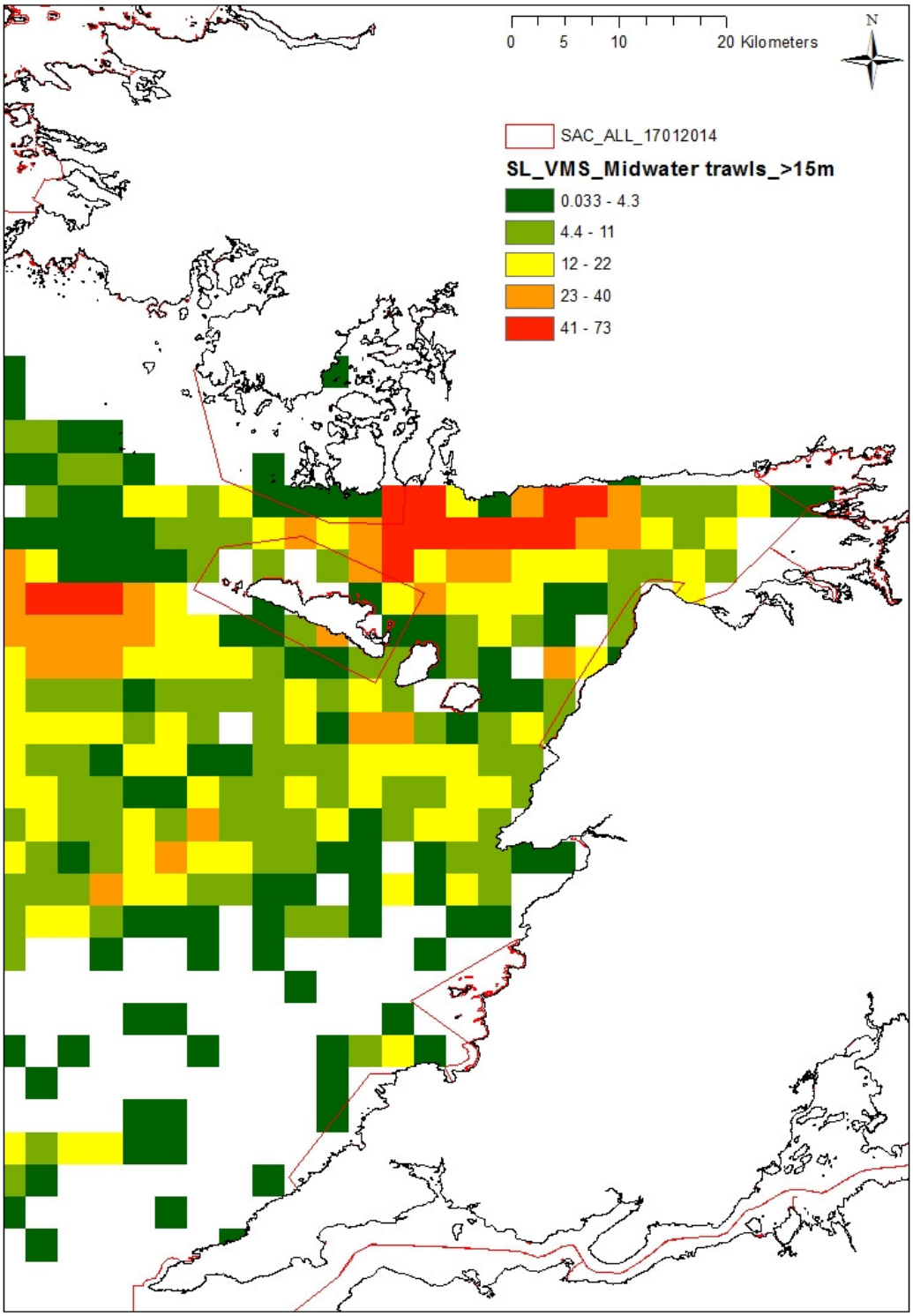

Figure 41. Distribution of pelagic trawl fisheries in Slyne to Loop.

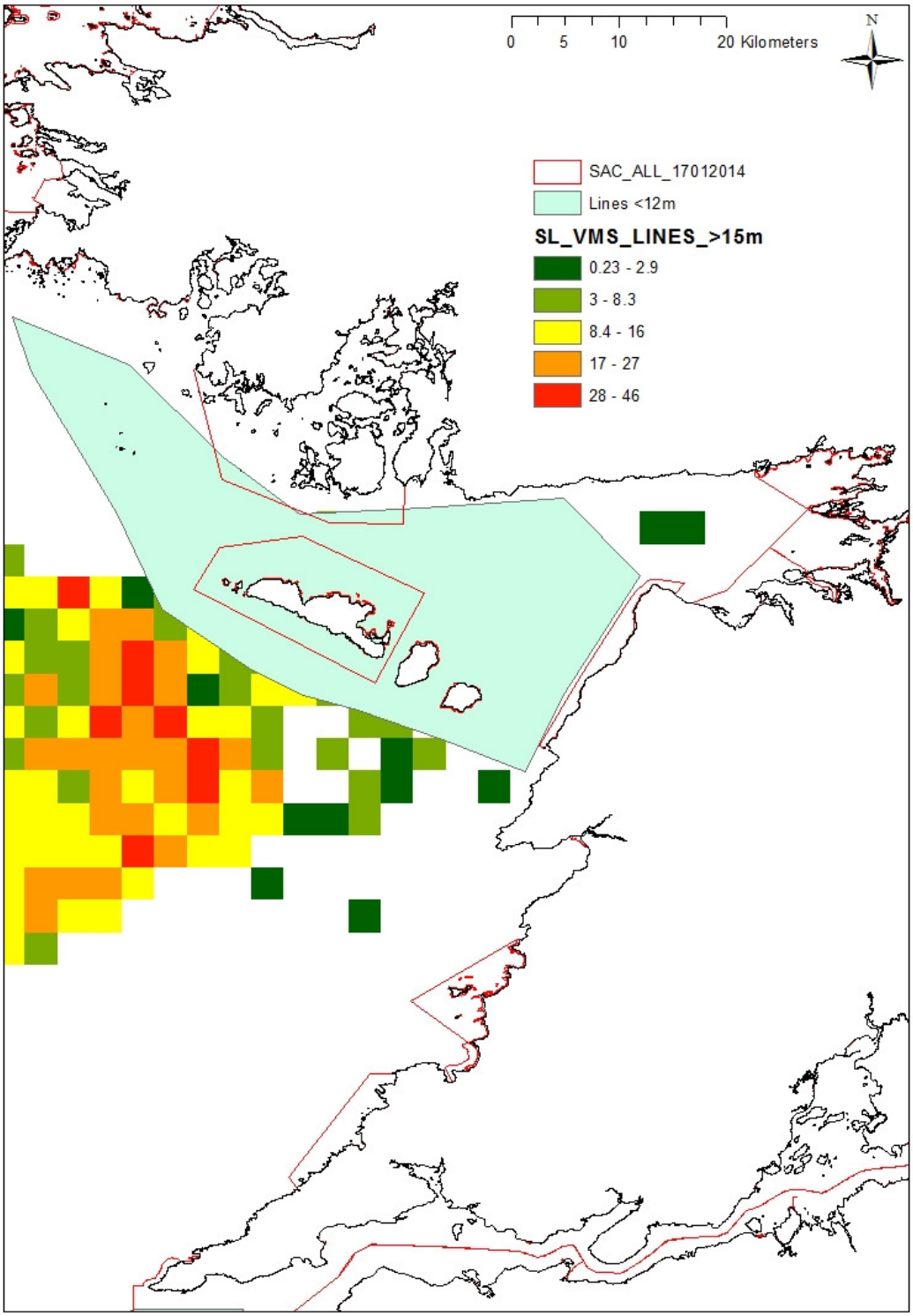

Figure 42. Distribution of hook and line fishing in the Loop to Slyne area.

8.7 Description of fisheries Loop Head to Reen Point

8.7.1 Crustacean and mollusc trap fisheries

See Figure 43 and maps in Section 8.8.

8.7.1.1 Lobster_Crab

Much of the pot fishery off the south west coast is a mixed fishery for lobster and crab. Targeted crab fishing occurs in deeper waters off the Kerry coast at the Skelligs where 4 vessels may fish 3000 pots west of Dursey and off Mizen Head.

Mixed crab and lobster fishing occurs in deeper waters on the Kerry head shoals and along the coast from Blasket north to Brandon, Brandon Bay and Tralee Bay, Ballyheigue and north again to the Shannon Estuary. In these areas approximately 40 vessels fish up to 10000 pots. Smaller vessels in shallow waters of Ventry and Smerwick may fish for just 50 days per year while in other areas vessels may fish 150 days per year. In inner Dingle Bay 11 vessels fish lobster and crab with 2250 pots for approximately 150 days per year. An additional 9 vessels with 1750 pots fish south Dingle Bay also for 150 days per year and between Doulus Head and Bray Head 7 vessels fish 950 pots. Two vessels fish 400 pots in Ventry Hbr during the summer. Further west 16 vessels using 6300 pots fish the waters around the Blasket Is. Six vessels less than 8m in length fish the coast from Ballinskelligs into Kenmare River using 1500 pots and a further 8 vessels under 10m in length fish 2500 pots in inner Kenmare.

In addition to lobster and brown crab a spider crab fishery has operated for the past 30 years during spring in Brandon Bay and Tralee Bay. Up to 17 vessels fish over 7000 pots for up to 80 days per year in this fishery. These same vessels fish for lobster and crab further offshore at the Kerry Head shoals in summer and autumn.

8.7.1.2 Shrimp

Shrimp fishing is important in the area and a high proportion of the national landings originates from the region. The fishery occurs between Aug and Feb. Small fisheries for shrimp occur in Ballylongford, north shore of Shannon estuary, Tarbert, Fenit and in Dingle Harbour (total of 7 vessels). Larger scale fisheries occur in Valencia (14 vessels, 6000 pots), inner Kenmare River (19 vessels, 9500 pots), Bantry Bay and Dunmanus Bay. Approximately 13500 pots are fished in Roaringwater Bay.

8.7.1.3 Prawns

Although the majority of prawn fishing in the area is with bottom trawls potting for prawns on mud and sand mud grounds occurs in shallow waters at the edge of trawling ground in Bantry Bay, Kenmare River and Dunmanus Bays.

Three Irish registered vessels and 1 UK registered vessel over 15m in length have reported potting activity in the area between 2006-2014.

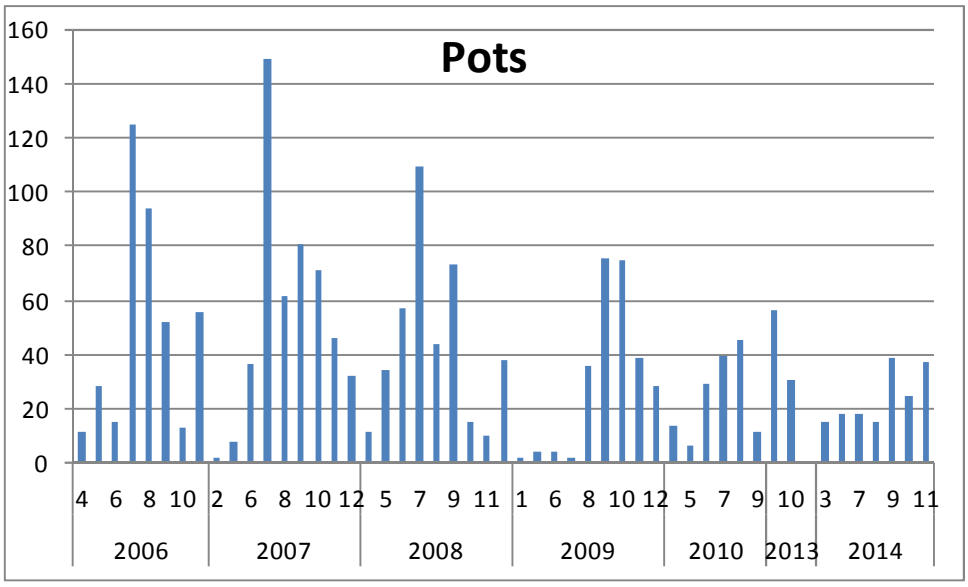

Figure 43. VMS hrs of activity by vessels >15m using pots in the Loop Head to Reen Point region by month during the period 2006-20144

8.7.2 Benthic dredge fisheries

See Figure 44 and maps in Section 8.8.

8.7.2.1 Oysters

Dredging for oysters occurs in inner Tralee Bay during autumn. This is an important fishery with up to 80 vessels participating. Annual landings in recent years have varied from 80-160 tonnes. The main fishery occurs east of Fenit Hbr. Smaller and less frequent fisheries occur in outer Tralee Bay in Spring. Oyster recruitment in this outer area is, however, irregular and oyster biomass is low. The stock is surveyed annually by the Marine Institute. The fishery is managed by the Tralee Bay Oyster Co-operative Society Ltd. Management measures include daily and seasonal quotas, minimum landing size of 78mm, cleaning of spat from harvested oysters and time restrictions.

8.7.2.2 Scallops

Scallop fisheries occur in Valentia Harbour, in waters surrounding the Blasket Islands (up to 5 vessels), outer Bantry Bay and Kenmare River. The Valentia fishery is managed by the Valentia Harbour Fisheries Co-operative Society Ltd. The Society have an Aquaculture licence for the area. The stock has periodically been enhanced by relay of juvenile scallop on the seabed. Effectively, however, the stock is wild and the fishery relies on natural recruitment even if it operates under an Aquaculture licence. The fishery is not open every year and the season is restricted to a number of weeks if it is open. Vessels quotas may apply and there is a minimum landing size. Some areas of the Harbour may be closed to fishing. The number of vessels operating by permit from the Society may vary from 10-16. No fishery occurred in 2012 or 2013.

A scallop fishery also occurs around the Blasket Islands. Scallops are found also in Ballinskelligs Bay, west from Puffin Is to Skelligs and Ventry. One vessel over 15m has fished the Blasket area between 2006-2012.

8.7.2.3 Seed mussel

A seed mussel bed in inner Dingle Bay is fished under permit annually if the biomass of seed is sufficient. This seed is re-laid intertidally in Castlemaine Harbour. This fishery was subject to appropriate assessment in 2011. Vessel activity is monitored by VMS (Figure 84).

8.7.2.4 Cockle

A small cockle bed occurs in Castlemaine Harbour towards Glenbeigh. This bed is currently being classified microbiologically and no fishing has occurred. The bed at least partly overlaps with an existing aquaculture site that produces clams. Cockles are common throughout Castlemaine Harbour. Cockle fishing was not included in the appropriate assessment of fishing activities in Castlemaine Harbour in 2011.

Cockle Beds may occur in Tralee Bay. A small cockle bed may occur at Crookhaven in the Crookhaven shellfish production area. None of these beds have been surveyed and the species is not classified for production in either area.

8.7.2.5 Surf clams

Surf clams may occur in outer Bantry Bay south of Bere Is. These beds have not been surveyed and although they are in the outer Bantry shellfish production area this area is not classified for the production of surf clams.

8.7.2.6 Razor clams

A razor clam bed may occur in Bantry Bay north and east of Bere Is. These beds are in the outer Bantry shellfish production area but Razor clams are not included in the list of classified species for the area. A razor clam bed may occur at Crookhaven, in the Crookhaven shellfish production area, but is not currently classified. A second bed may occur within and south of the Schull shellfish production area. Razor clam may occur at Barrow Hbr. (Tralee Bay). None of these beds have been surveyed.

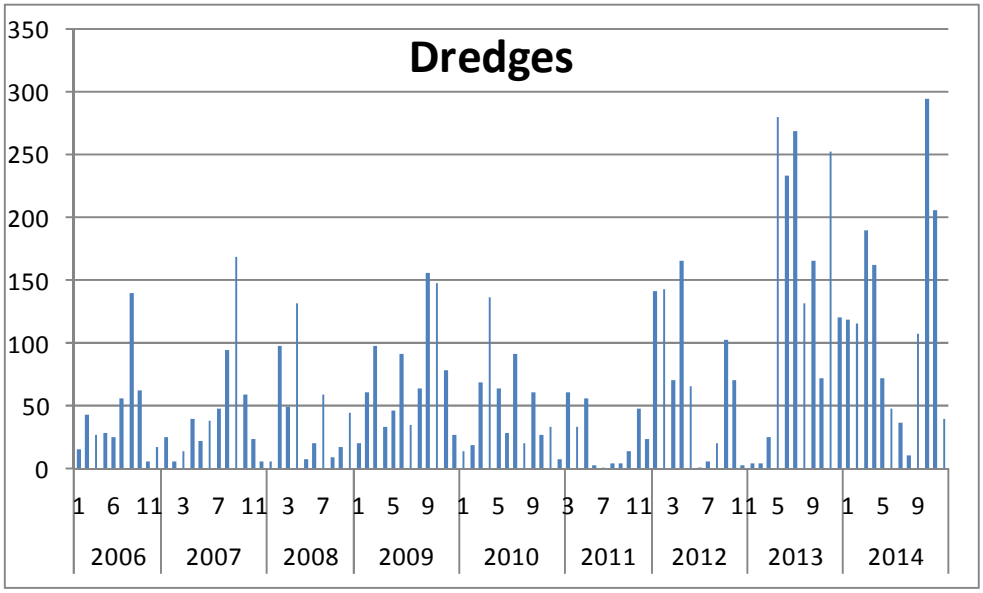

Figure 44. VMS hrs of activity by vessels >15m using dredges in the Loop Head to Reen Point region by month during the period 2006-2014.

8.7.3 Set net fisheries

See Figure 45 maps in Section 8.8.

8.7.3.1 Tangle netting

Tangle netting for crayfish in inshore waters occurs from May to October. In 2007 up to 18 vessels fished tangle nets off the Kerry coast using 110nm of net. A further 23 fished off the Cork coast with 84 miles of net. The pattern of fishing and gear use is, however, not well known. Long soak times of a number of days are typical in this fishery.

The fishery targets crayfish (*Palinurus*) but the catch may be diverse and include a number of commercial fish and shellfish species. This catch diversity varies by location. In north Kerry the fishery may capture up to 20 species of commercial fish while in west Cork 10 commercial fish species have been recorded in by-catch. The landings are dominated by

monkfish and turbot rather than crayfish. Other species individually account for less than 5% of landings.

8.7.3.2 Trammel netting

Trammel netting for turbot occurs outside of Tralee Bay on the Kerry shoals and surrounding areas.

Trammel nets may also be used to catch bait by a subset of the lobster fleet working in shallow waters.

8.7.3.3 Gill nets

A deep water gill net fishery occurs off the Kerry coast. A variety of demersal fish may be targeted by this fishery. The fishery is seasonal and peaks in late spring and summer. Inshore vessels target Pollack using gill nets. Approximately 50% of the landings composition is comprised of Pollack.

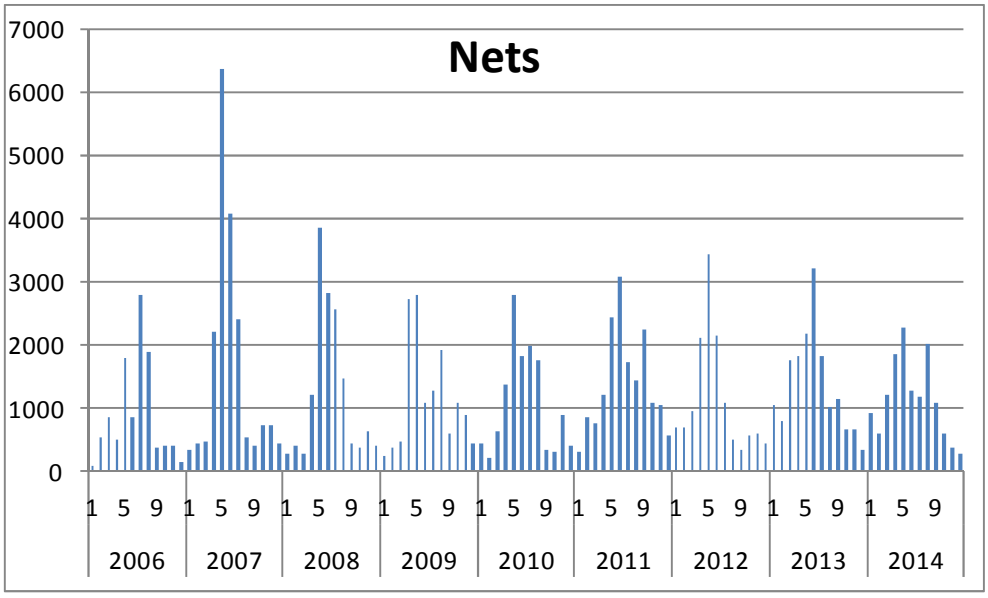

Figure 45. VMS hrs of activity by vessels >15m using nets in the Loop Head to Reen Point region by month during the period 2006-2014

8.7.4 Bottom trawl fisheries

See Figure 46 and maps in Section 8.8.

Bottom trawling occurs through the area both in inshore and offshore areas targeting mixed demersal fish. Crab are a significant by-catch. The intensity of this fishery has declined year

on year from 92000hrs in 2006 to 67000 hrs in 2012. In addition vessels under 15m in length use bottom trawls to target *Nephrops* and demersal fish in Bantry Bay and Roaringwater Bay.

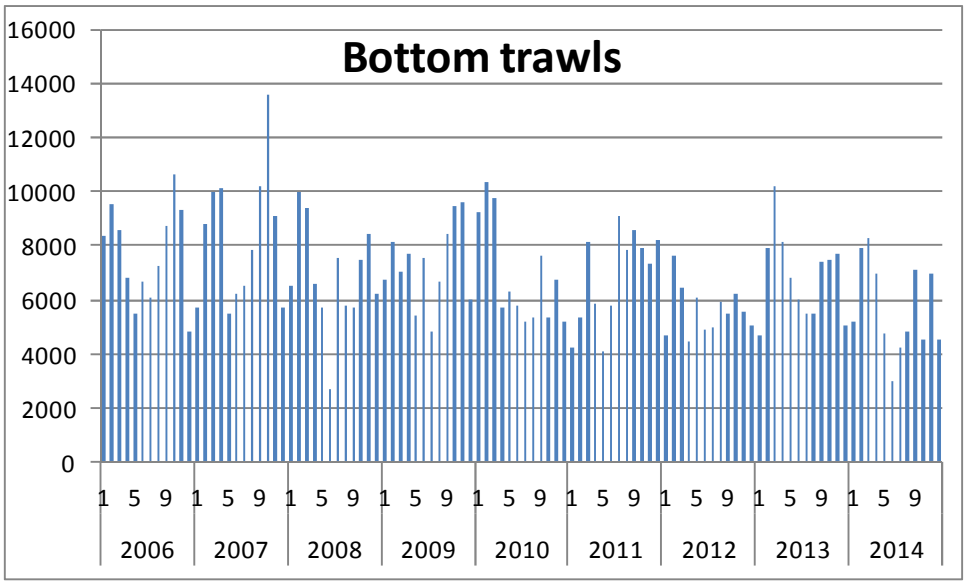

Figure 46. VMS hrs of activity by vessels >15m using nets in the Loop Head to Reen Point region by month during the period 2006-2014.

8.7.5 Pelagic fisheries

See Figure 47, Figure 48 and maps in Section 8.8.

Pelagic trawling and seining for sprat (Kenmare and Bantry) and herring (outer Tralee and Dingle Bays) occurs mainly in winter and spring. Boar fish and mackerel and caught in offshore waters to the south west. Mid-water trawling increased year on year in the area from 2154hrs in 2006 to 7404hrs in 2012. Seine netting was also significantly higher in 2010-2012 than in 2006-2009.

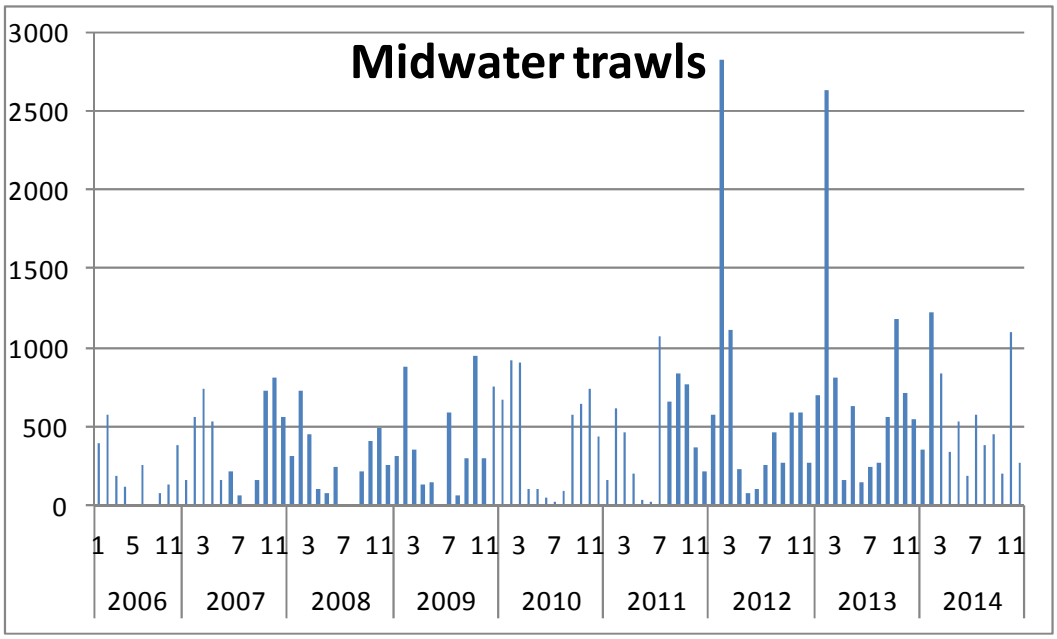

Figure 47. VMS hrs of activity by vessels >15m using pelagic trawls in the Loop Head to Reen Point region by month during the period 2006-2014

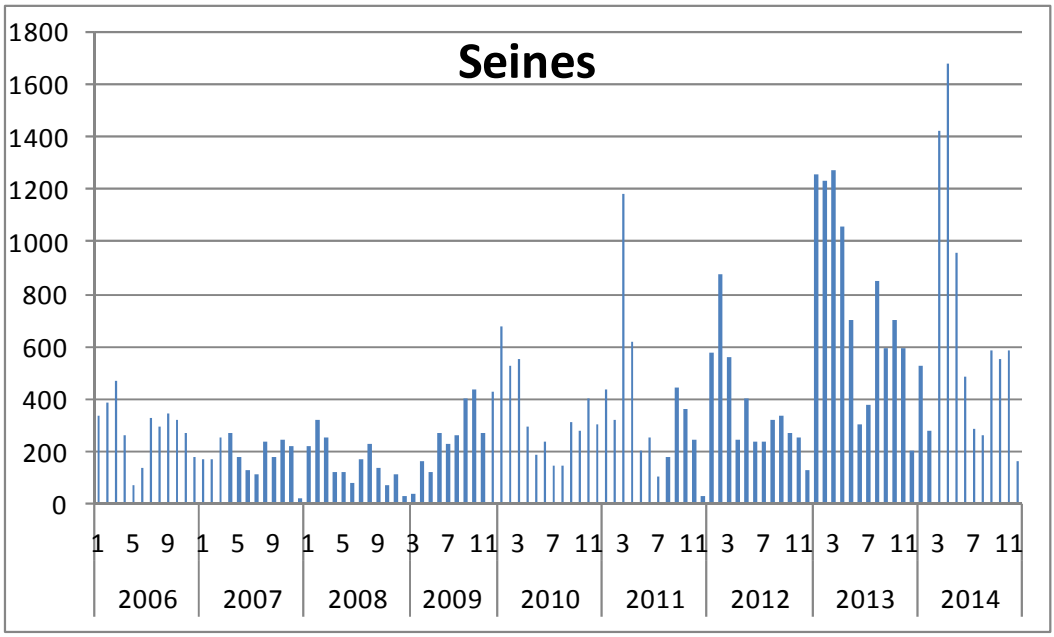

Figure 48. VMS hrs of activity by vessels >15m using seine nets in the Loop Head to Reen Point region by month during the period 2006-2014

8.7.6 Hook and Line fishing

See Figure 49 and maps in Section 8.8.

Hook and line fishing for demersal fish occurs in both offshore and inshore waters in the area. Inshore vessels may fish for pollack and mackerel, mainly in summer, in coastal waters.

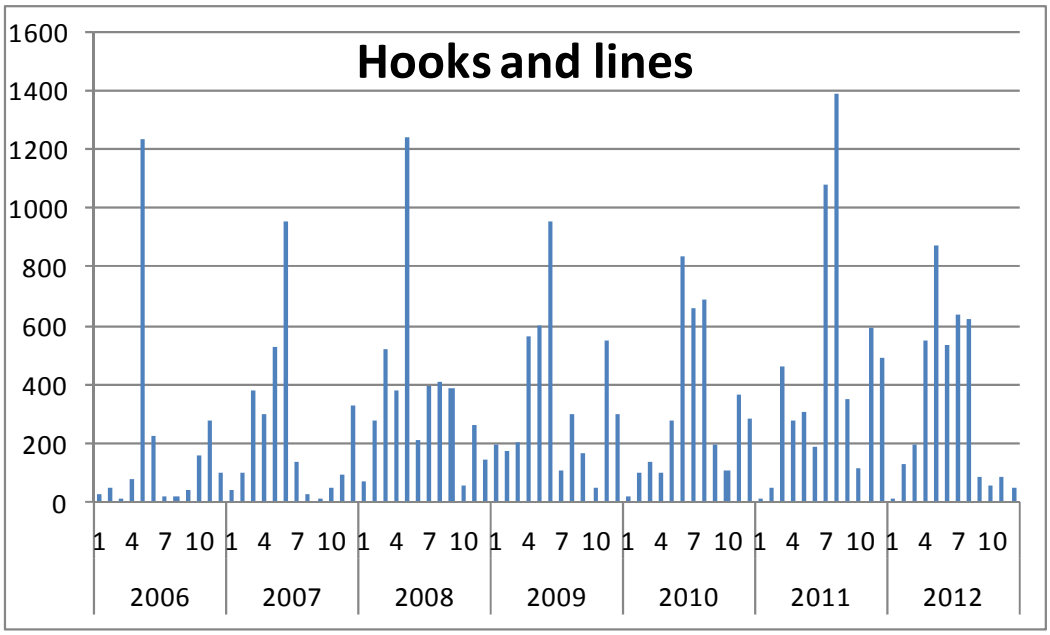

Figure 49. VMS hrs of activity by vessels >15m using hooks and lines in the Loop Head to Reen Point region by month during the period 2006-2012

8.7.7 Beam trawls

See Figure 50 and maps in Section 8.8.

Beam trawls are fished in the Celtic Sea south of Mizen head and east. These gears are not used off the Kerry coast. This activity has declined in the Loop to Reen Pt sea area from 2203hrs in 2007 to 209hrs in 2012.

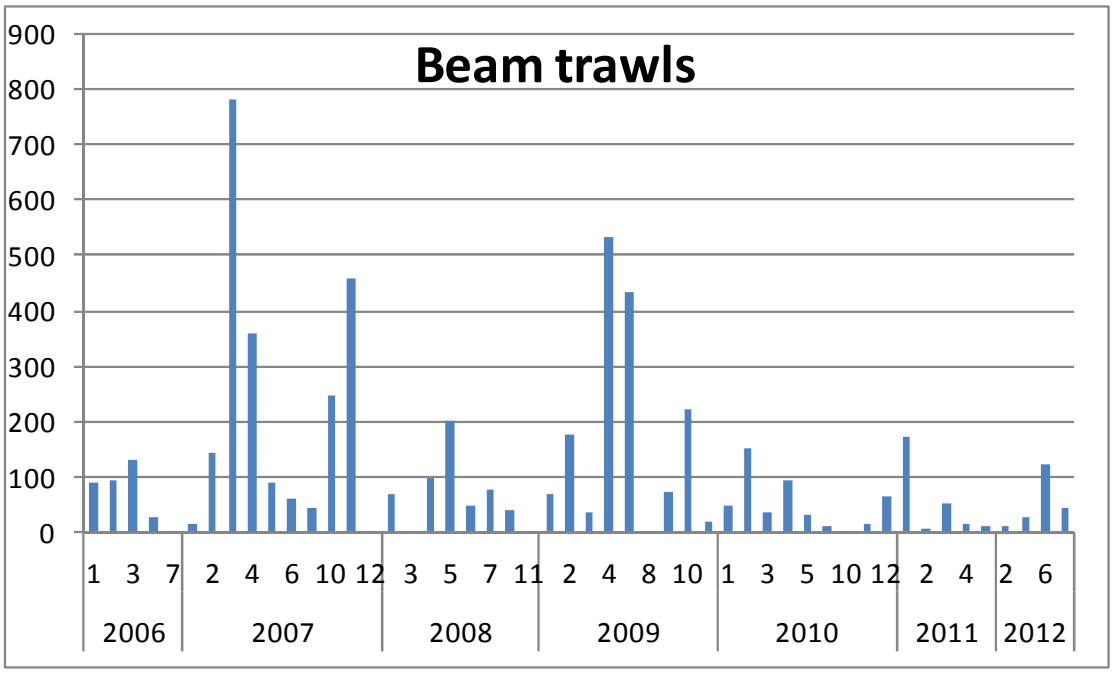

Figure 50. VMS hrs of activity by vessels >15m using beam trawls in the Loop Head to Reen Point region by month during the period 2006-2012

8.8 Maps of fishing activity Loop Head to Reen Point

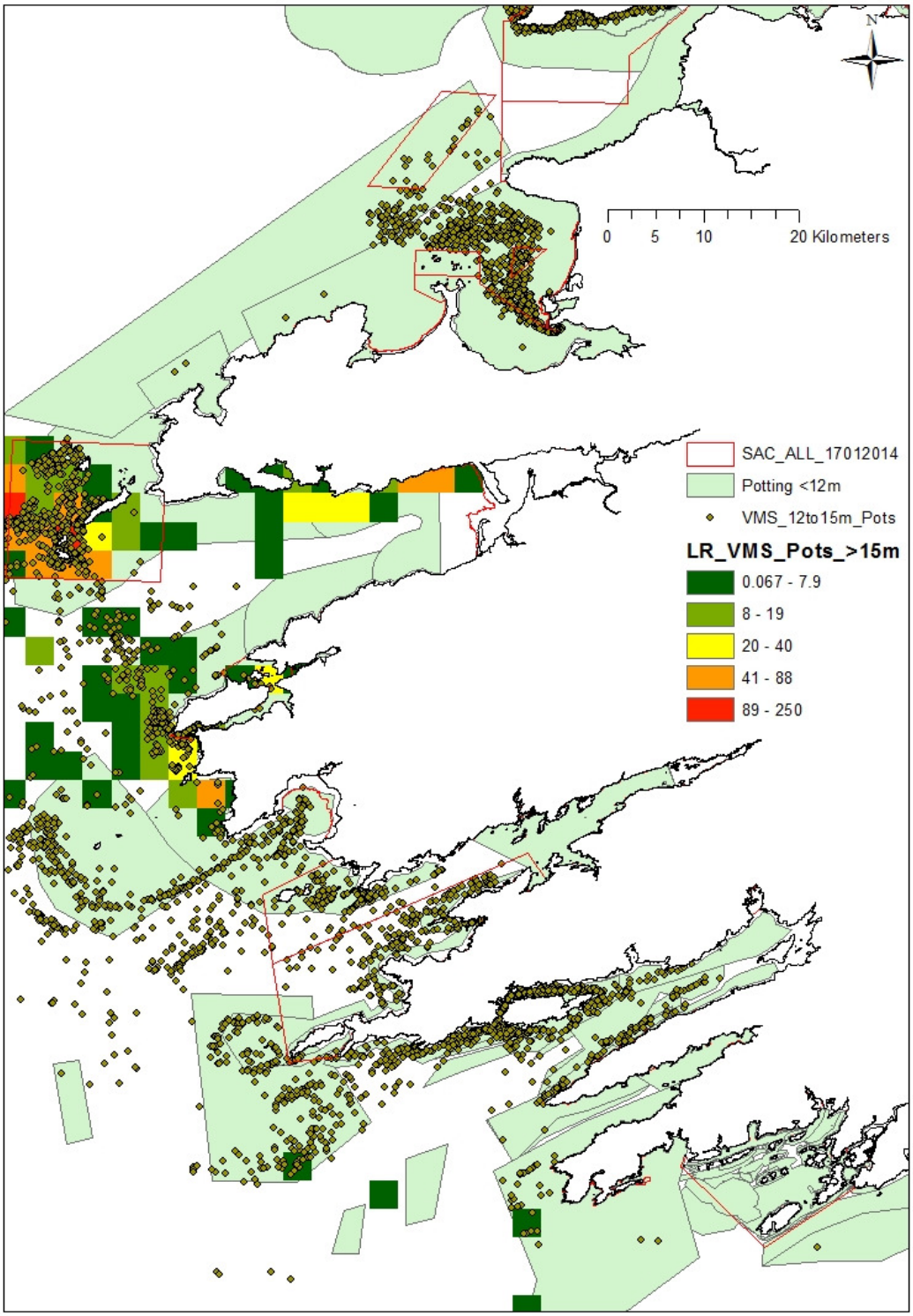

Figure 51. Distribution of fishing with pots in the Loop to Reen Point area

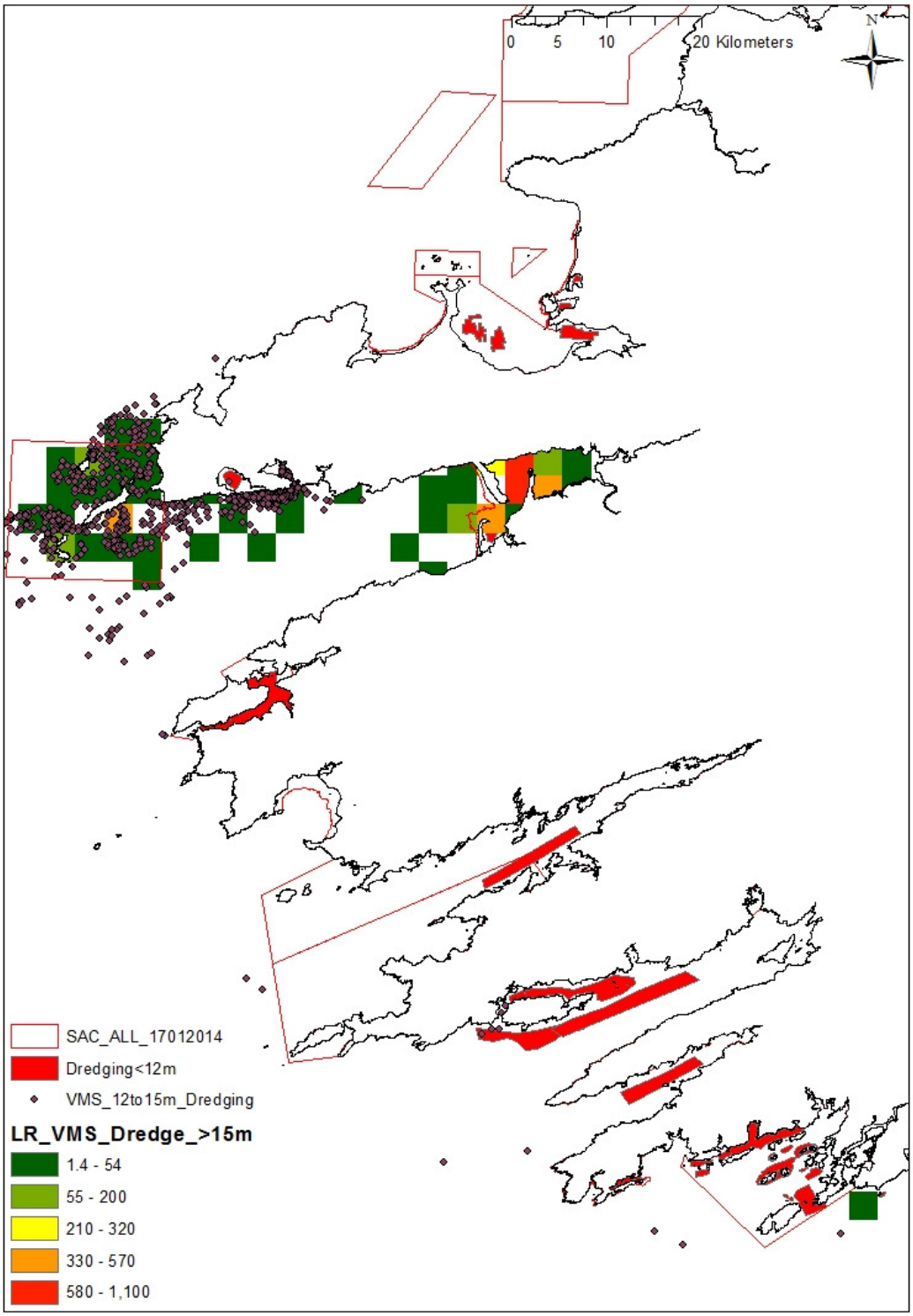

Figure 52. Distribution of fishing with dredges in the Loop to Reen Point area.

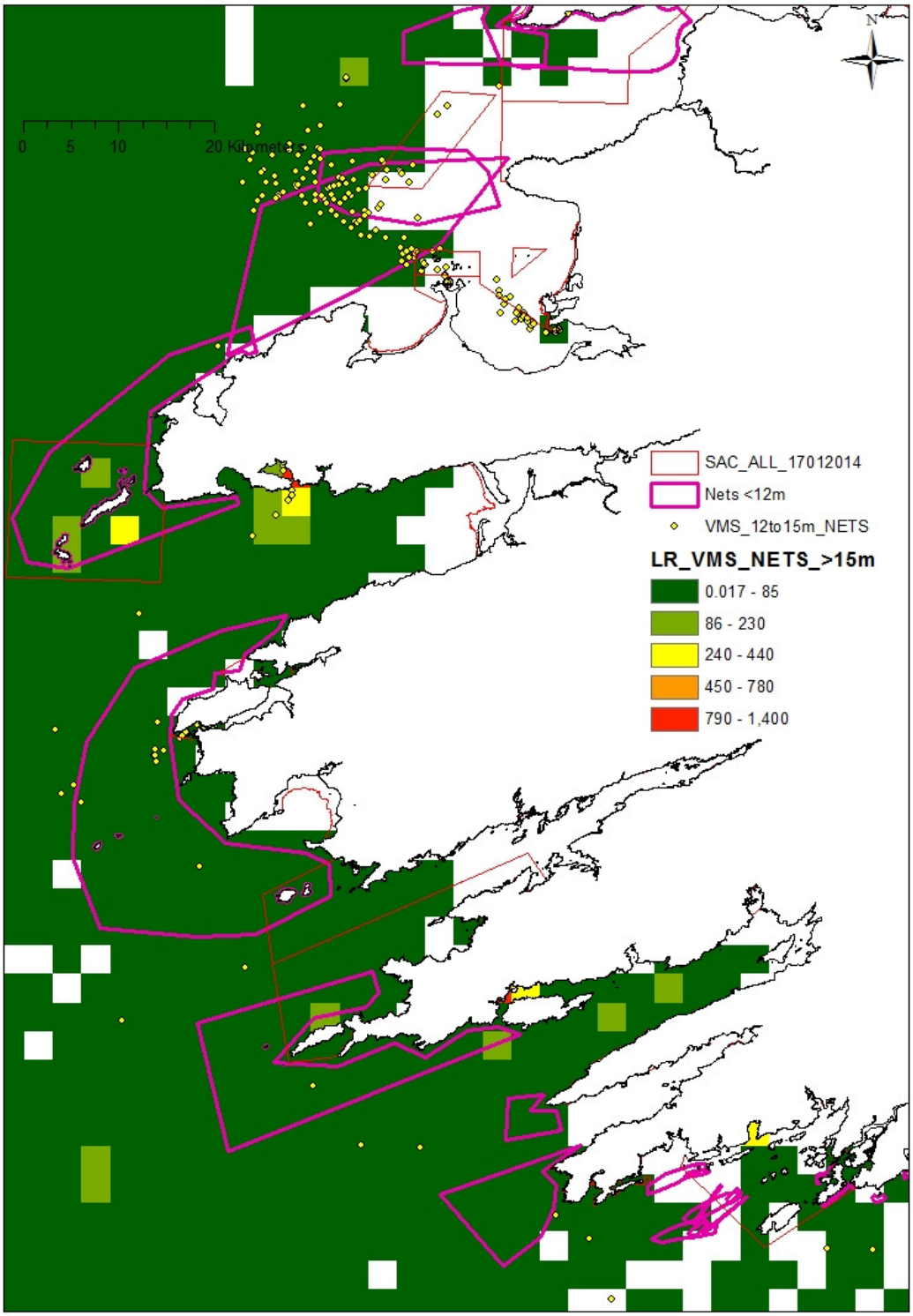

Figure 53. Distribution of fishing with set nets in the Loop to Reen Point area.

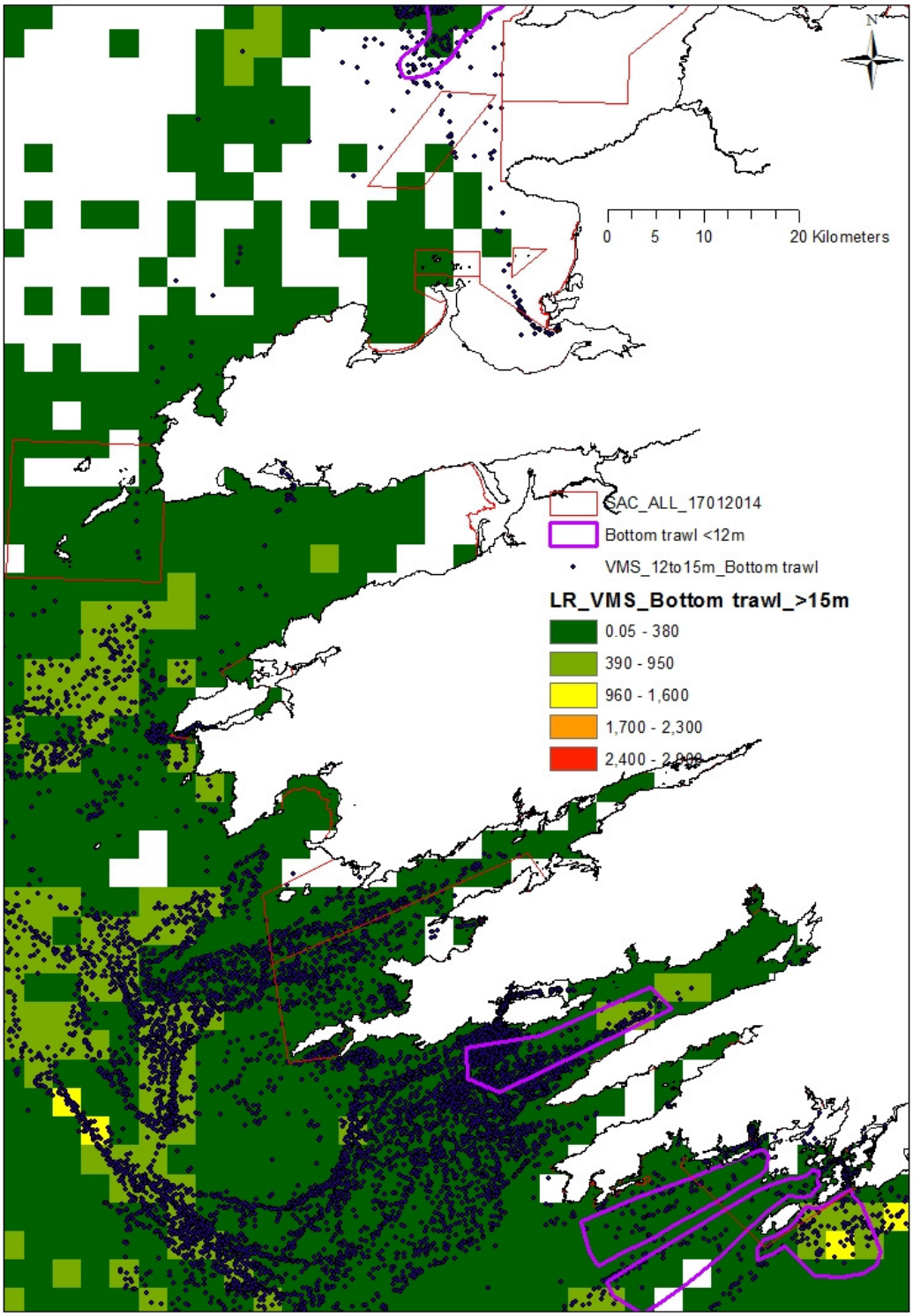

Figure 54. Distribution of fishing with bottom otter trawls in the Loop to Reen Point area.

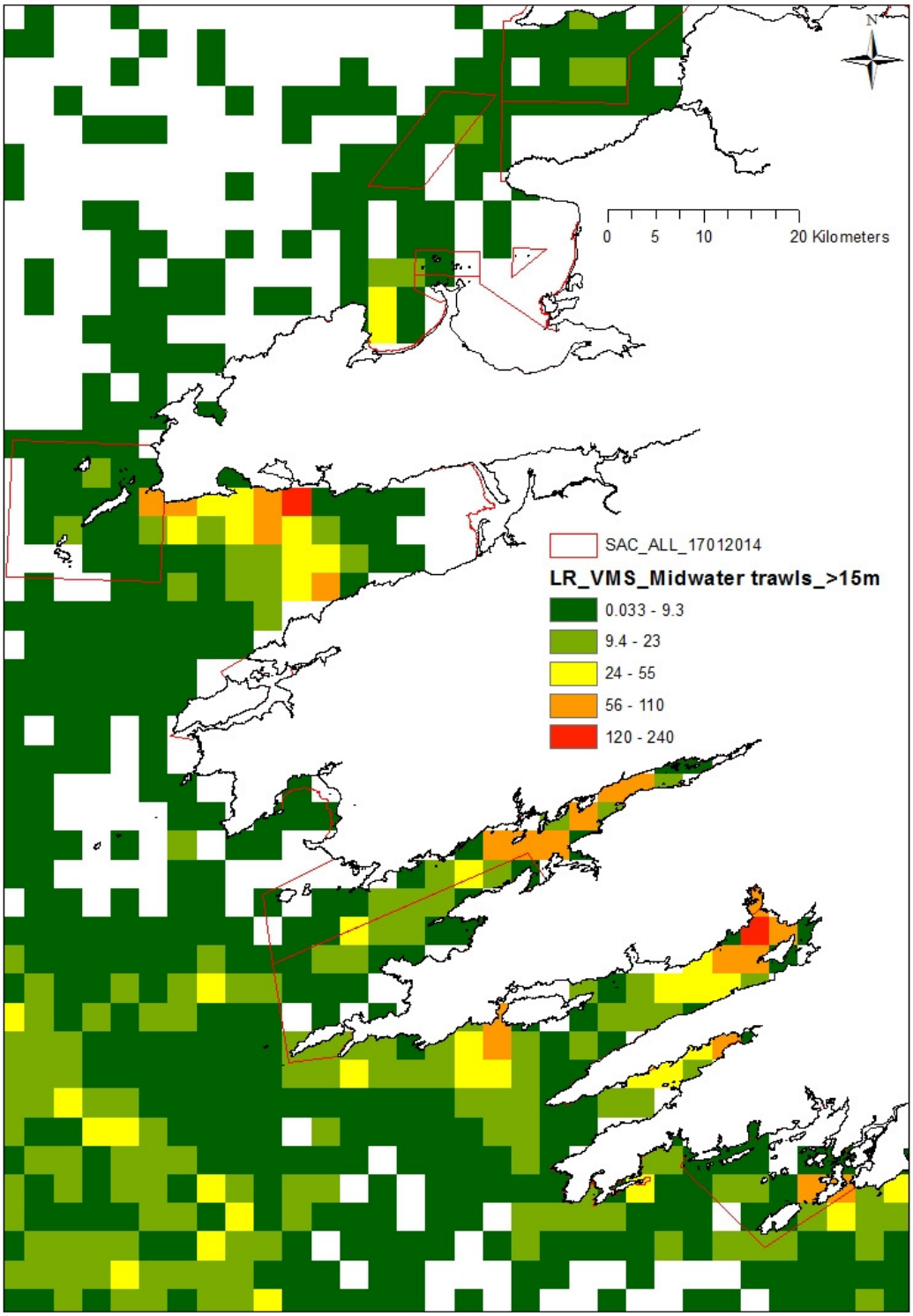

Figure 55. Distribution of fishing with mid-water trawls in the Loop to Reen Point area.

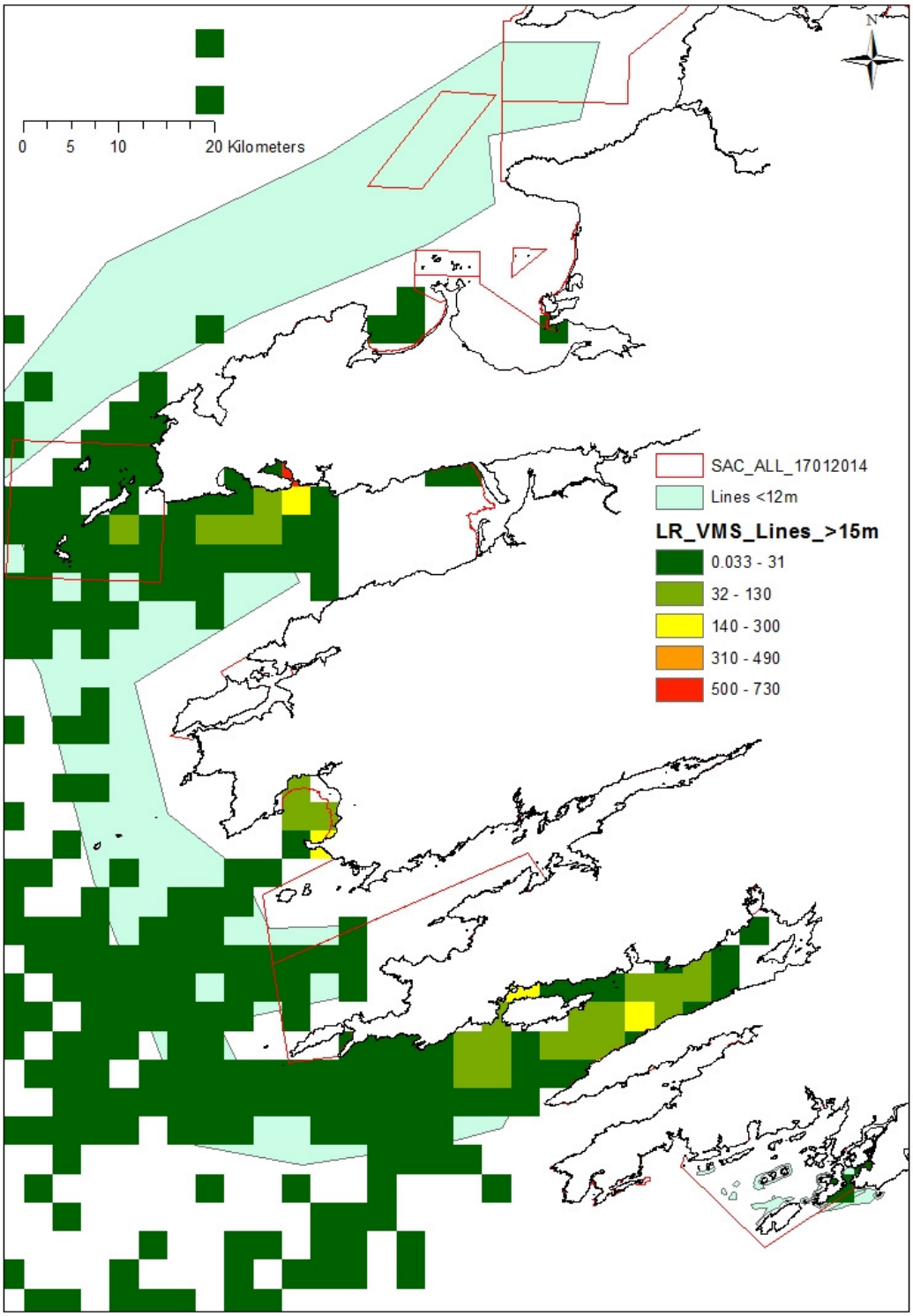

Figure 56. Distribution of fishing with hooks and lines in the Loop to Reen Point area.

8.9 Description of fisheries Reen Point to Carnsore Point

8.9.1 Crustacean and mollusc trap fisheries

See Figure 57 and maps in Section 8.10

8.9.1.1 Lobster_Crab

Lobster and crab are fished in coastal waters (<6nm) towards the west of the area from Mizen to Kinsale. Further east from Kinsale to Carnsore pot fishing extends 12-20miles offshore. French vivier vessels fish for crab 30-50miles directly south of Hook Head. Twenty eight vessels under 10m in length fish from Baltimore east to Kinsale between Mar and Oct. A further 23 vessels, under 10m in length, fish from Kinsale to Cork Harbour. Twenty vessels under 10m fish from Roches Point east to Helvick and overlap with 10 vessels fishing west from Helvick. Some of these vessels and larger vessels 10-12m in length also fish further offshore south of Helvick and Waterford Hbr targeting mainly brown crab. In addition 13 vessels from Dunmore fish this area and east to the Saltees and overlap with 35 vessels fishing mainly from Kilmore Quay in waters off south Wexford.

8.9.1.2 Shrimp

Shrimp are fished along the south coast from Baltimore to Wexford. The fishery is coastal and the vessels are generally less than 10m in length. Many of these vessels also fish for lobster and crab. Twenty eight vessels fish from Baltimore to Kinsale, 21 vessels fish south of and into Cork Harbour, 20 vessels fish from Roches point east to Youghal and 15 vessels fish from Youghal to Waterford Harbour. A small fishery for shrimp occurs in Ballytiegue Bay in south Wexford and in Rosslare Hbr.

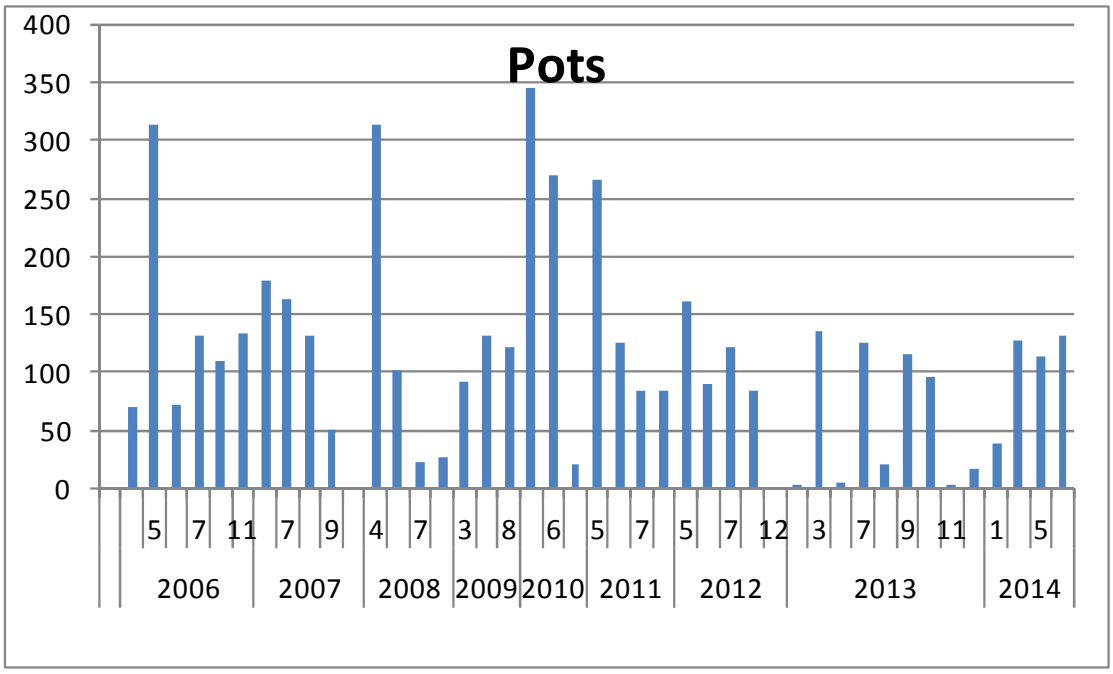

Figure 57. VMS hrs of activity by vessels >15m using pots in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.9.2 Benthic dredge fisheries

See Figure 58 and maps in Section 8.10.

8.9.2.1 Scallop

The main fishery for scallops in Irish waters occurs in the north east Celtic Sea and south Irish Sea. The fleet is based mainly in Kilmore Quay. This fle*et al*so fishes in the eastern Irish Sea and English Channel. Scallop vessels over 10m in length require a scallop authorization. The capacity of this fleet is also ring-fenced which limits the number of vessels in the fishery. These measures were introduced following a decommissioning scheme in 2006. Only 5 vessels were authorized in 2006 but this increased to 22 in 2010 and declined to 15 in 2012. The average size of the vessels has declined since 2006; average GT was 129 in 2006 and 64 in 2012. Non Irish registered vessels also fish in the area and land into Ireland. VMS effort hrs of all the dredging fleet increased from 4715hrs in 2006 to 14596hrs in 2012.

8.9.2.2 Cockle

Cockle beds occur in the Waterford estuary at Woodstown Strand, at Duncannon and in Tramore Backstrand. These beds (other than Duncannon) have been surveyed repeatedly in recent years. The Woodstown strand bed has supported hydraulic dredge fisheries but

recruitment is irregular and overwinter mortality can be very heavy due to freshwater inflows from upstream. Its microbiological classification has lapsed. The Tramore bed supports up to 2500 tonnes of cockles but is not fished, is not classified microbiologically and is not in an existing shellfish production area.

Other cockle beds may occur in Bannow Bay, Harrylock Bay in Waterford estuary, at Dungarvan, Youghal Bay and Courtmachserry. None of these beds are classified microbiologically although some, (Bannow, Harrylock, Dungarvan) occur in shellfish production areas.

8.9.2.3 Razor clam

There are no fisheries for razor clams currently along the south coast. Razor clam beds may occur in Courtmachserry Bay, at Kinsale, Ballycotton and Youghal Bays at Dungarvan, seaward of Tramore beach, in subtidal waters east of Woodstown in the Waterford estuary and at the entrance to Bannow Bay and west of Kilmore Quay towards the Keeragh Islands. These beds are not classified microbiologically.

8.9.2.4 Surf clam

A surf clam fishery occurs annually in Harrylock Bay in Waterford estuary. This fishery is usually fished by 3-5 boats for a period of weeks in later spring. There are a number of management measures in place such as limited days per week, daily fishing times and catch limits and dredge specifications. The opening and closing dates are agreed following survey each year. Catch rate data are monitored to detect depletion.

Other surf clam beds may occur in Youghal Bay, off Kinsale and at Courtmachserry. A small surf clam bed also exists adjacent to the small Saltee Island but has not been fished commercially in recent years.

8.9.2.5 Seed mussel

Seed mussel or mussel beds may occur in Ballycotton Bay, Youghal Bay / Ballymacoda and in the estuary of the Blackwater River. These areas are not currently fished and are closed to fishing. The potential fishery is a dradge fishery for seed or grown mussel. The mussel beds in the area have not been surveyed.

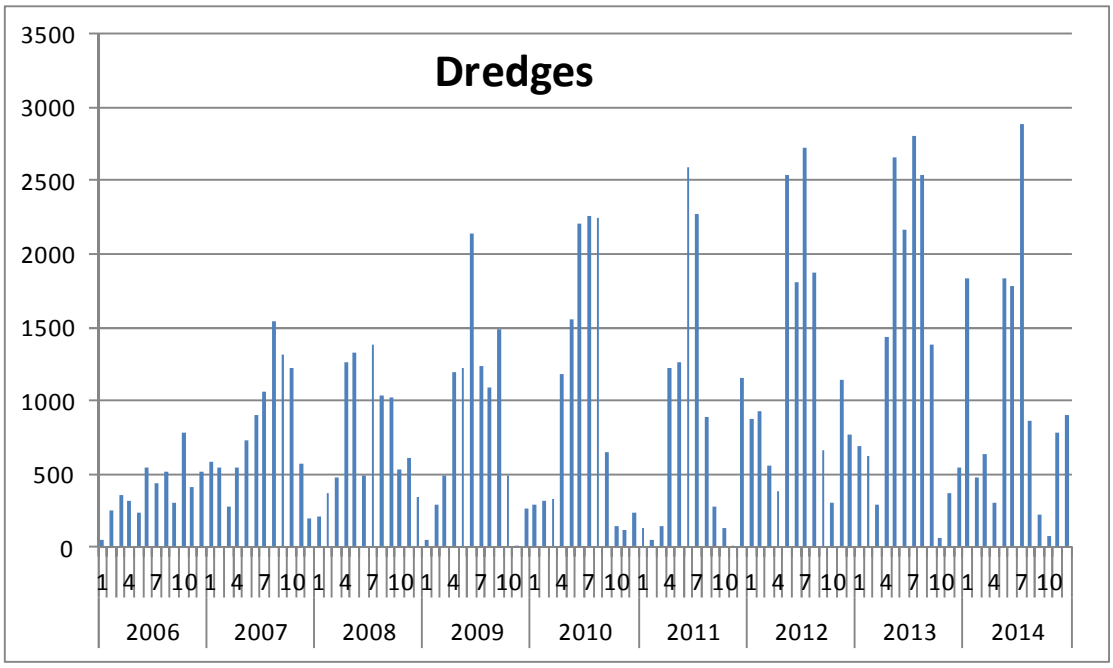

Figure 58. VMS hrs of activity by vessels >15m using dredges in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.9.3 Set net fisheries

See Figure 59 and maps in Section 8.10

8.9.3.1 Gill nets

Gill net fishing is reported by vessels >15m in length in offshore waters in the western Celtic Sea. In the eastern Celtic Sea this fishery also occurs in inshore waters. Inshore vessels also use nets to target cod in the first quarter south of Cork and Waterford and east to Wexford.

8.9.3.2 Tangle nets

There is no tangle netting for crayfish east of Roaringwater Bay.

8.9.3.3 Trammel nets

Trammel nets may be used to fish for bait by lobster vessels.

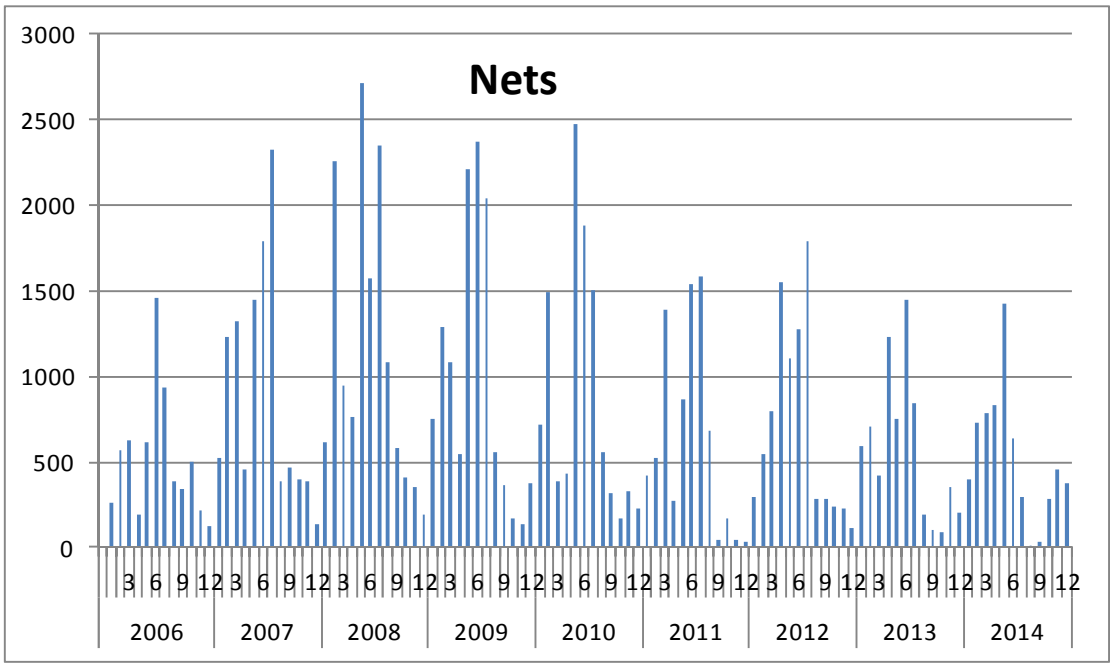

Figure 59. VMS hrs of activity by vessels >15m using nets in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.9.4 Bottom trawl fisheries

See Figure 60 and maps in Section 8.10

The bottom trawl fishery occurs throughout the Celtic Sea. Nephrops and demersal fish are the target species. Effort in bottom trawl fisheries in the Celtic Sea was stable between 99000-126000hrs between 2006-2012 and increased to 150759hrs in 2013.

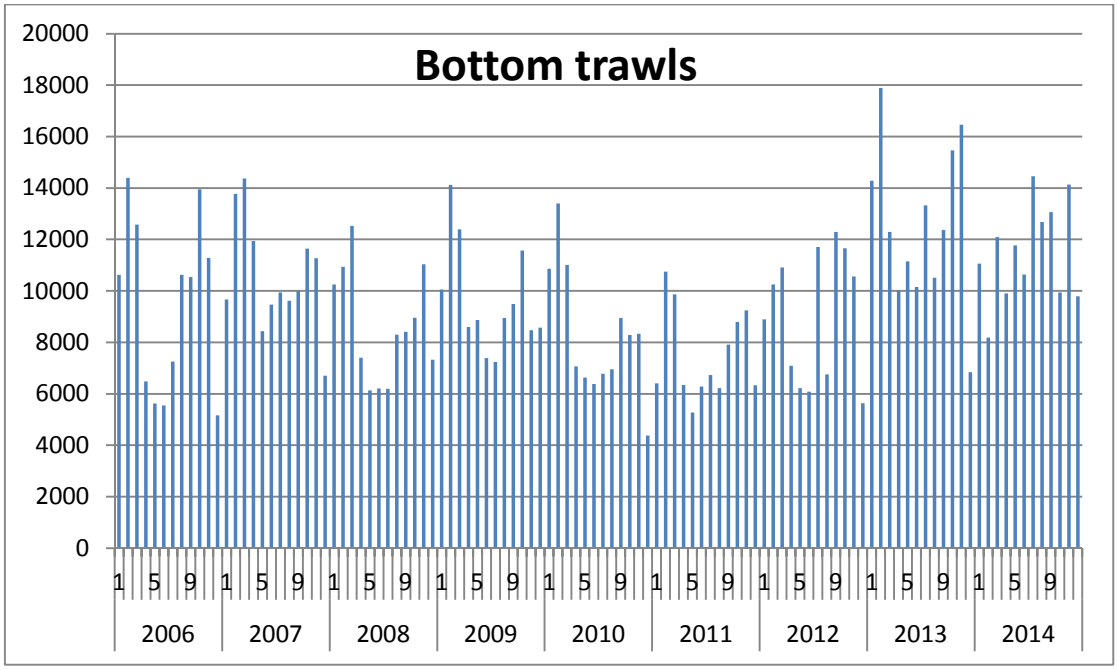

Figure 60. VMS hrs of activity by vessels >15m using bottom trawls in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.9.5 Pelagic fisheries

See Figure 61, Figure 62 and maps in Section 8.10.

Mid-water trawl effort peaked in 2010 at 5042hrs and declined to 4019hrs in 2012. The pelagic fishery in the Celtic Sea is essentially for herring. Minor species include pilchard and sprat.

The Herring fishery takes place in Autumn and Winter. This fishery is ring-fenced, requiring an annual permit, and operates under the Celtic Sea herring Management Plan. In 2013 the quota was 16,400t. Of this 11% is retained for a so called 'sentinel' fishery which is confined to vessels <17m in length and to the Dunmore box (an area south of Dunmore East). The fishery opened on Sept 22nd 2013 for a period of 8 weeks with possible extension by a further 2 weeks depending on landings. Weekly catch limits applied.

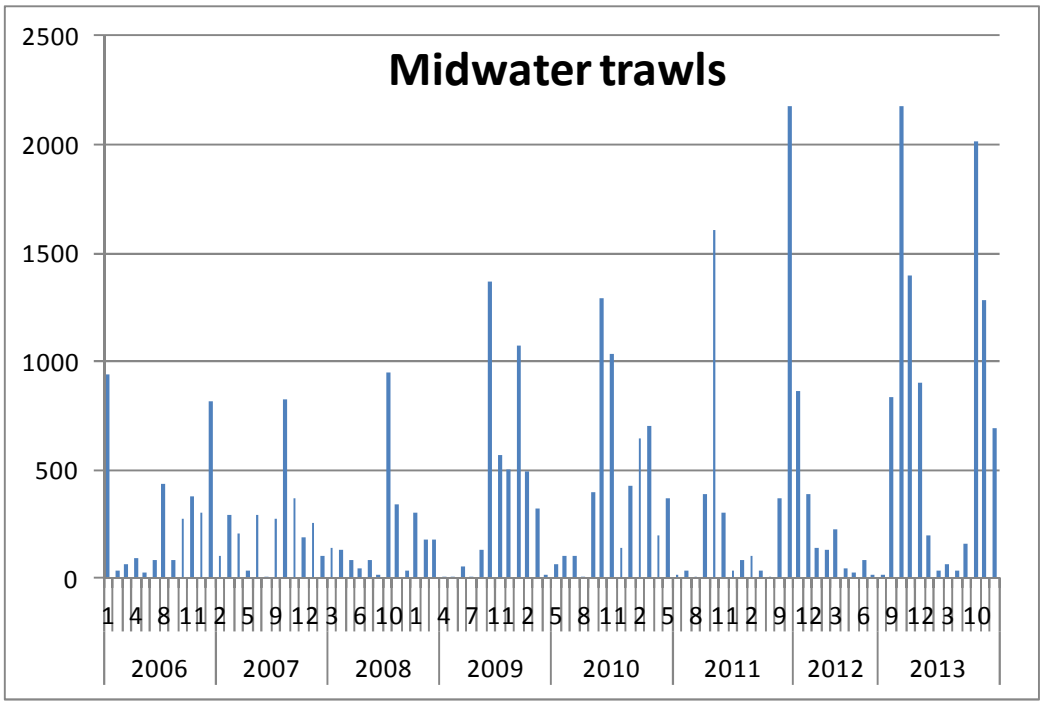

Figure 61. VMS hrs of activity by vessels >15m using mid-water trawls in the Reen Point to Carnsore Pt region by month during the period 2006-2014

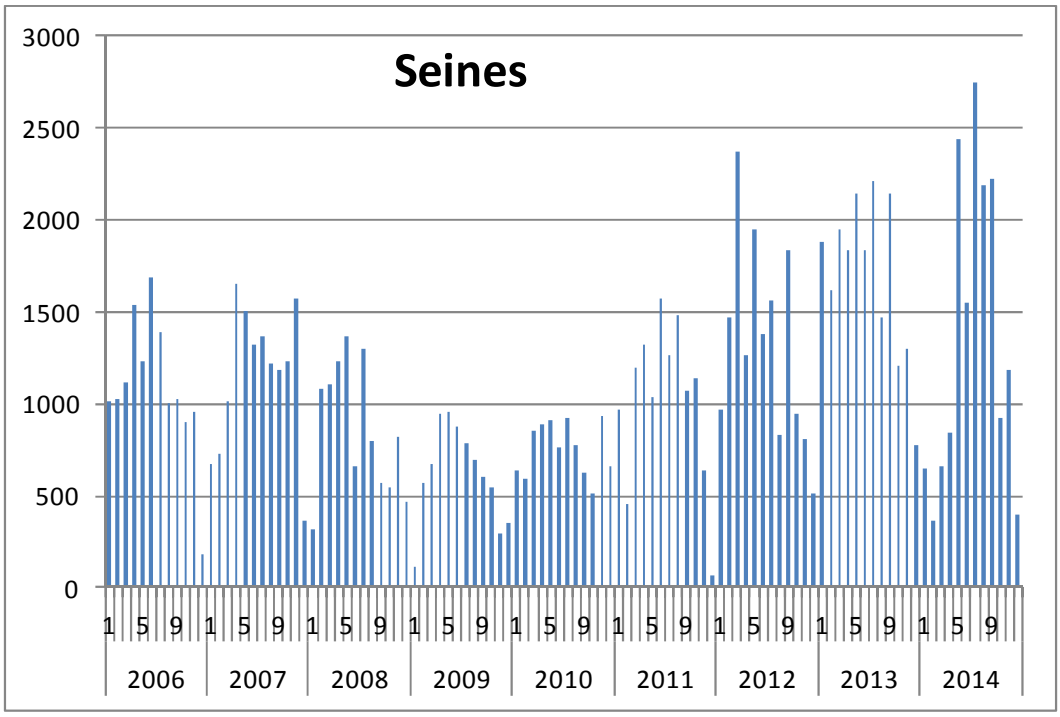

Figure 62. VMS hrs of activity by vessels >15m using seine nets in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.9.6 Hook and Line fishing

See Figure 63 and maps in Section 8.10

Hook and line fishing by vessels over 15m totaled between 200-300hrs per year in 2006-2008 but declined to 2-12hrs in 2010-2012. In addition under 15m vessels from Dunmore East fish for mackerel in the same area. Very little activity was recorded in 2013 and 2014.

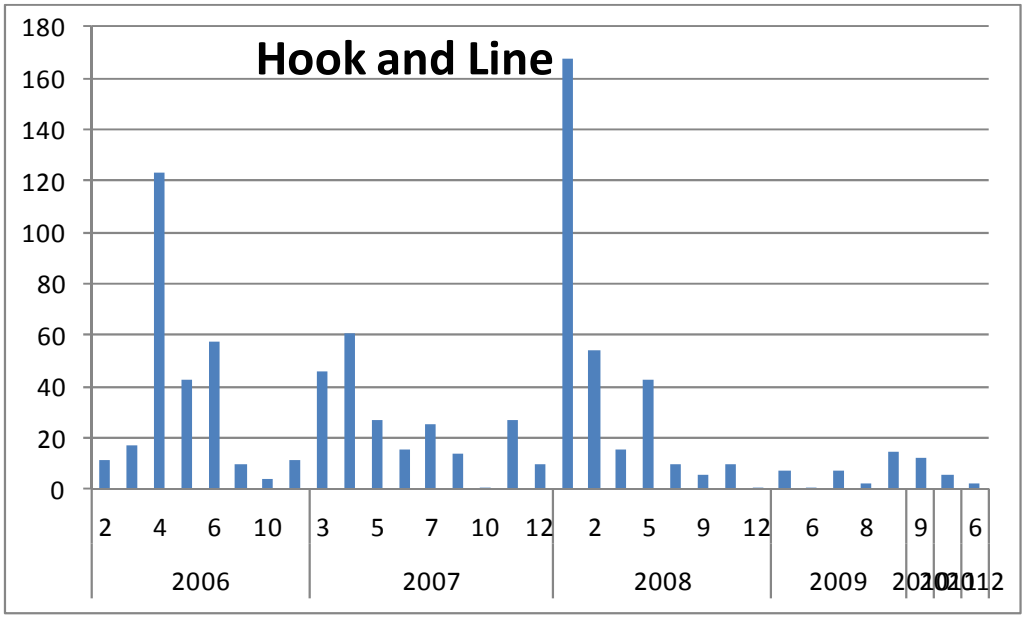

Figure 63. VMS hrs of activity by vessels >15m using hooks and lines in the Reen Point to Carnsore Pt region by month during the period 2006-2012

8.9.7 Beam trawls

See Figure 64 and maps in section 8.10.

Beam trawling by vessels over 15m decreased from 48829hrs in 2006 to 22377hrs in 2011 and 28728hrs in 2012. Small increases were recorded in 2013 and 2014.

Beam trawls target demersal flatfish in sedimentary habitats.

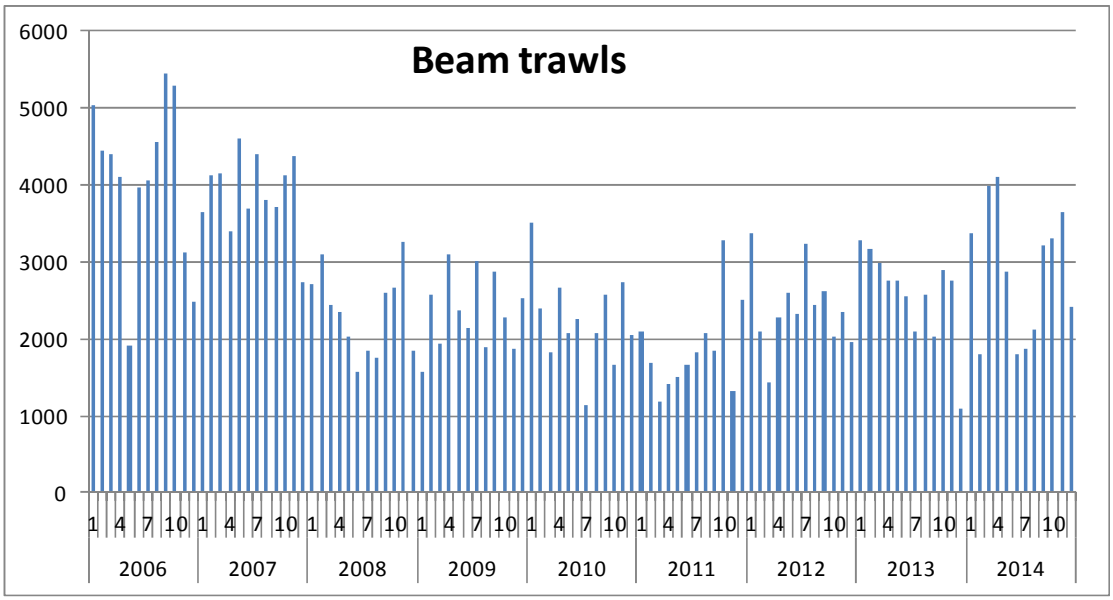

Figure 64. VMS hrs of activity by vessels >15m using beam trawls in the Reen Point to Carnsore Pt region by month during the period 2006-2014

8.10 Maps of fishing activity Reen Pt to Carnsore Pt

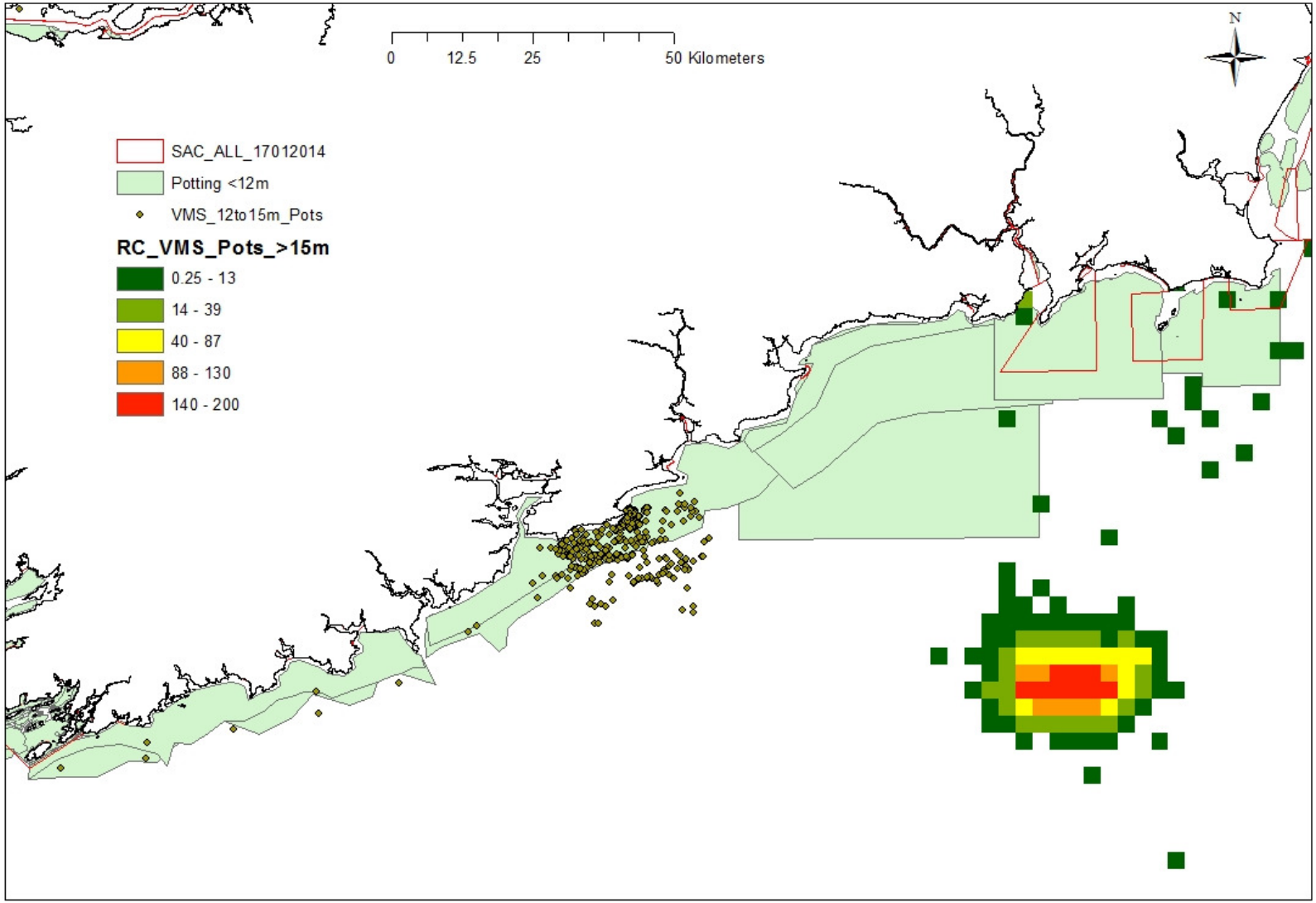

Figure 65. Distribution of fishing with pots in the Reen Point to Carnsore Pt area. The offshore cluster of VMS points is mainly French fishing effort on crab

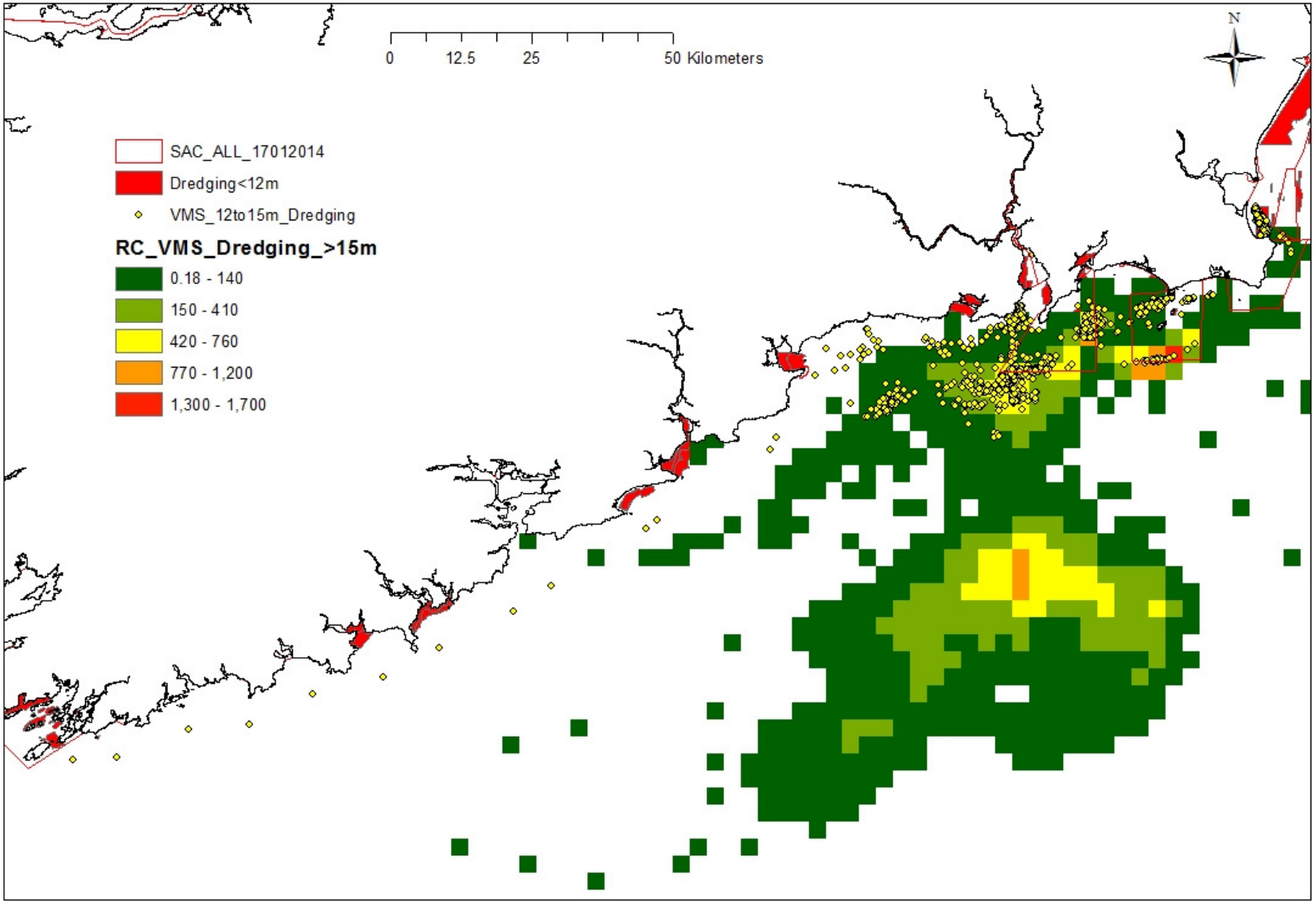

Figure 66. Distribution of fishing with dredges in the Reen Point to Carnsore Pt area. The clusters of VMS points is the scallop fishery

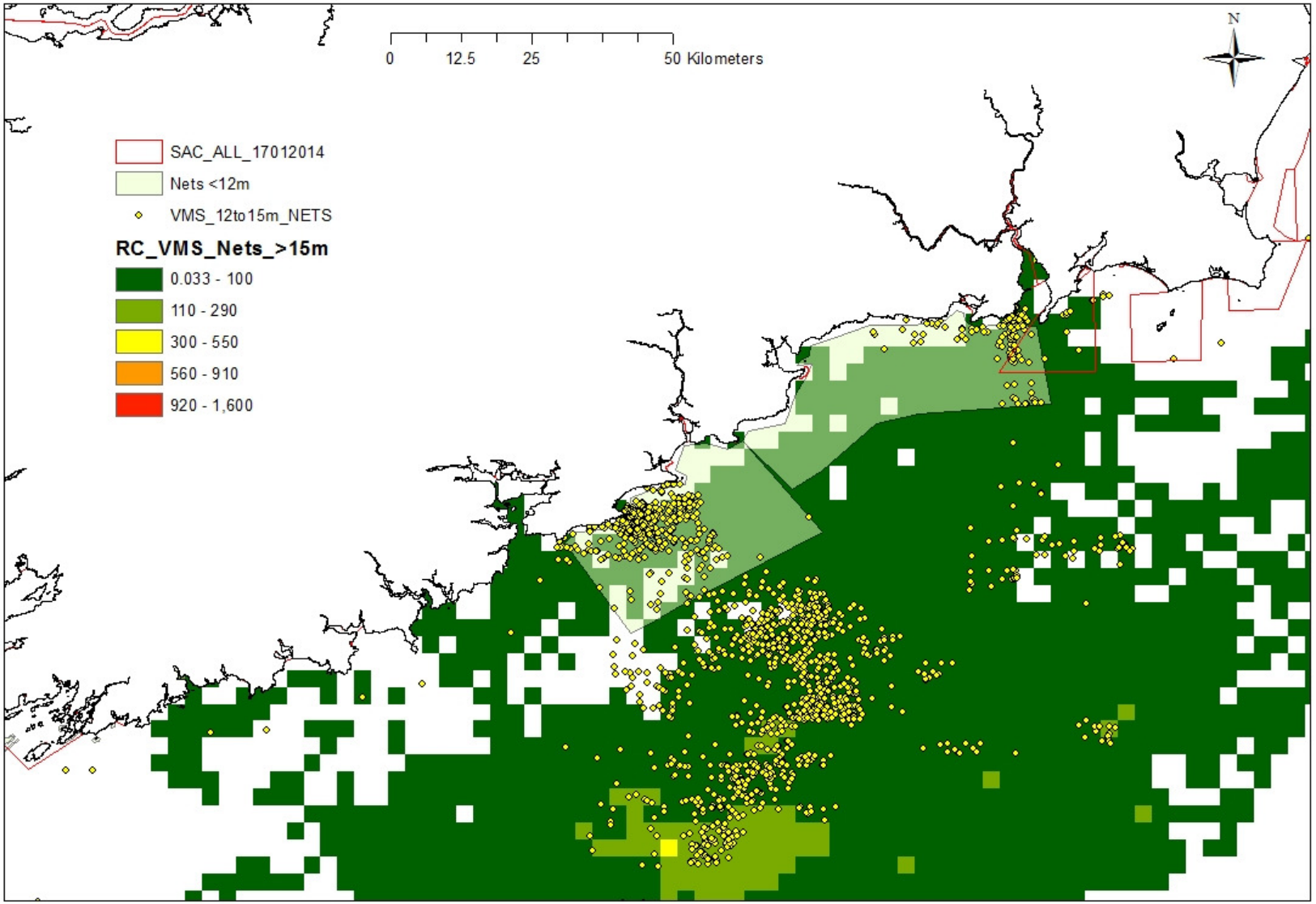

Figure 67. Distribution of fishing with set nets in the Reen Point to Carnsore Pt area.

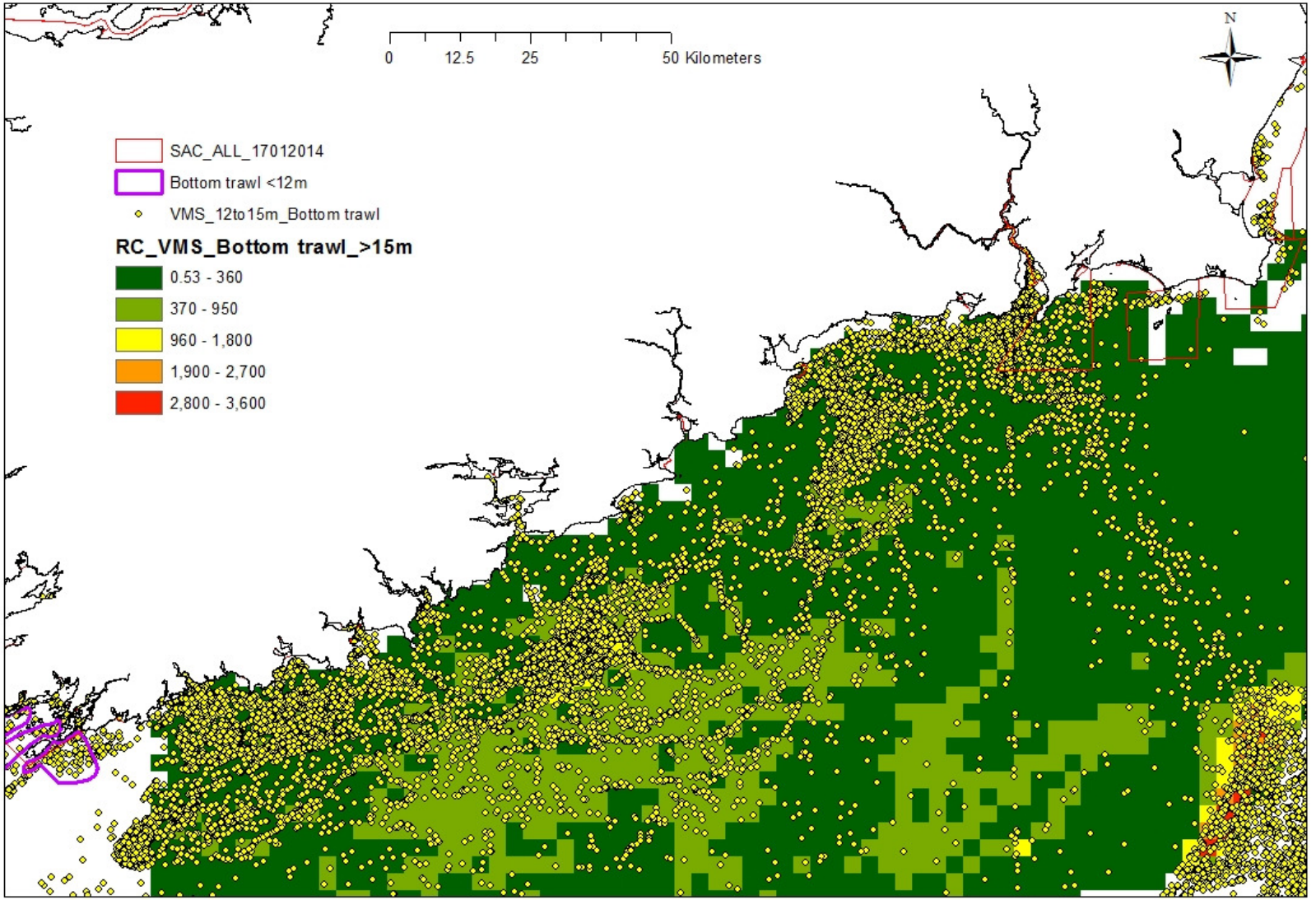

Figure 68. Distribution of fishing with bottom trawls in the Reen Point to Carnsore Pt area.

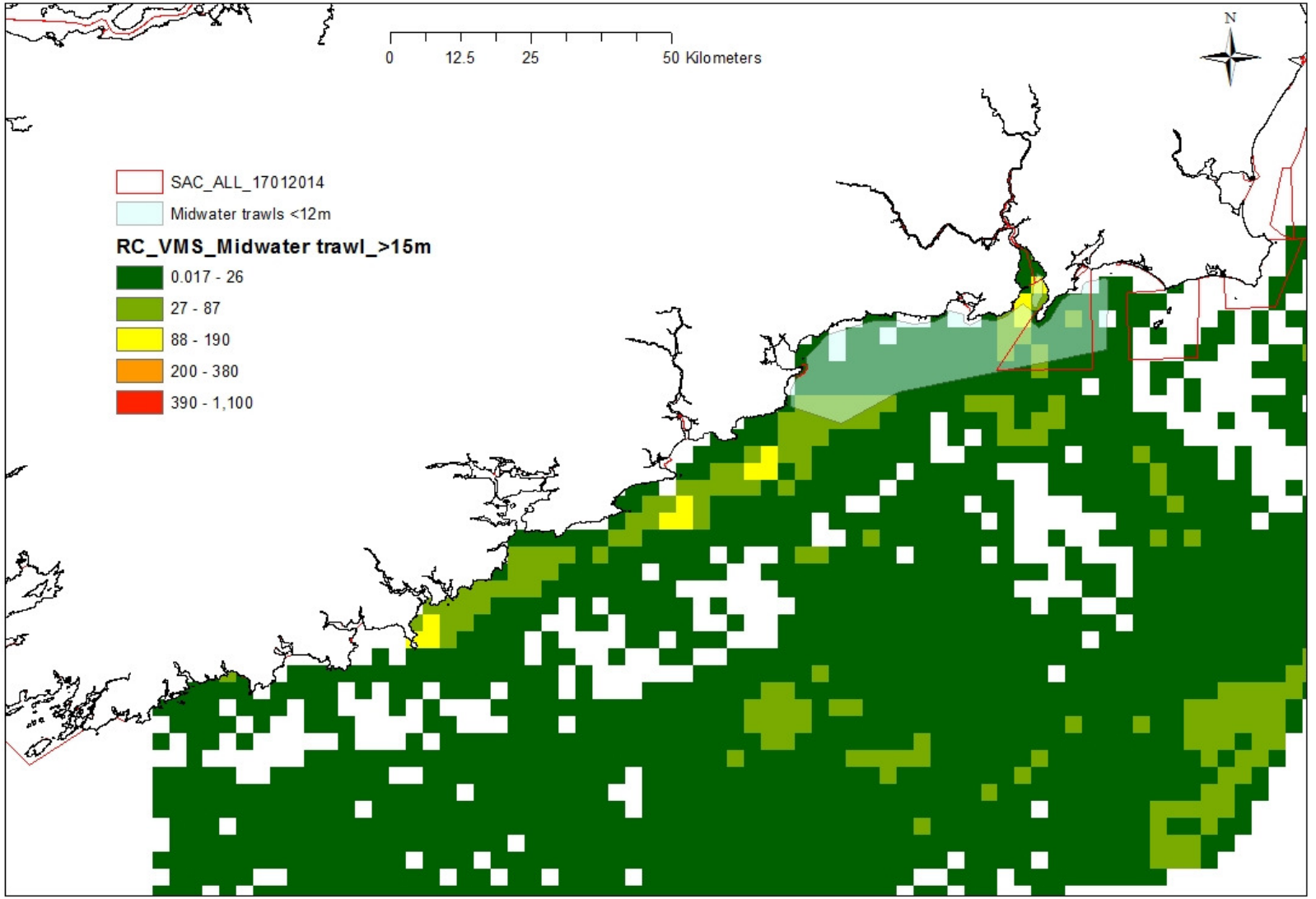

Figure 69. Distribution of fishing with pelagic trawls in the Reen Point to Carnsore Pt area.

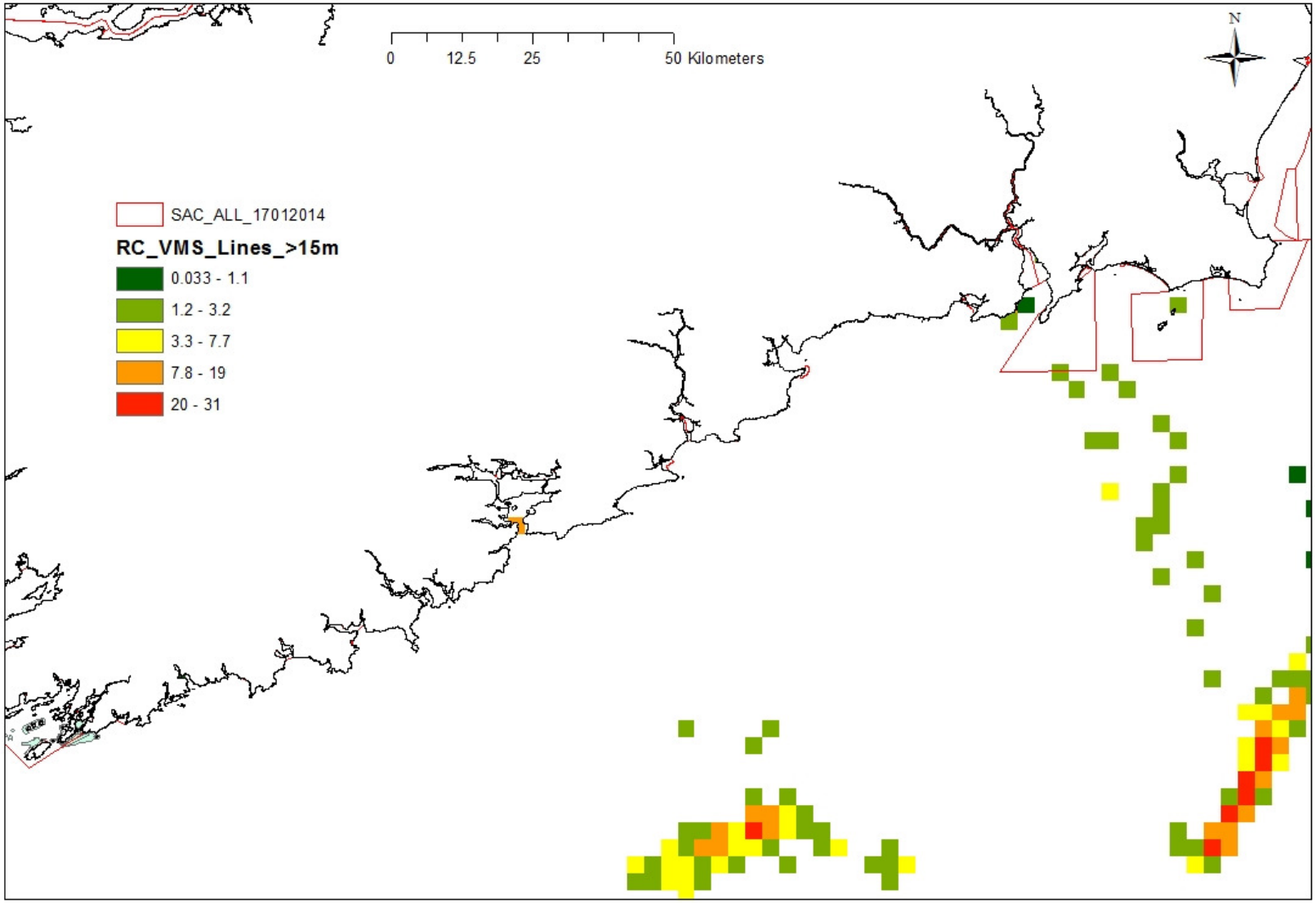

Figure 70. Distribution of fishing with hooks and lines in the Reen Point to Carnsore Pt area.

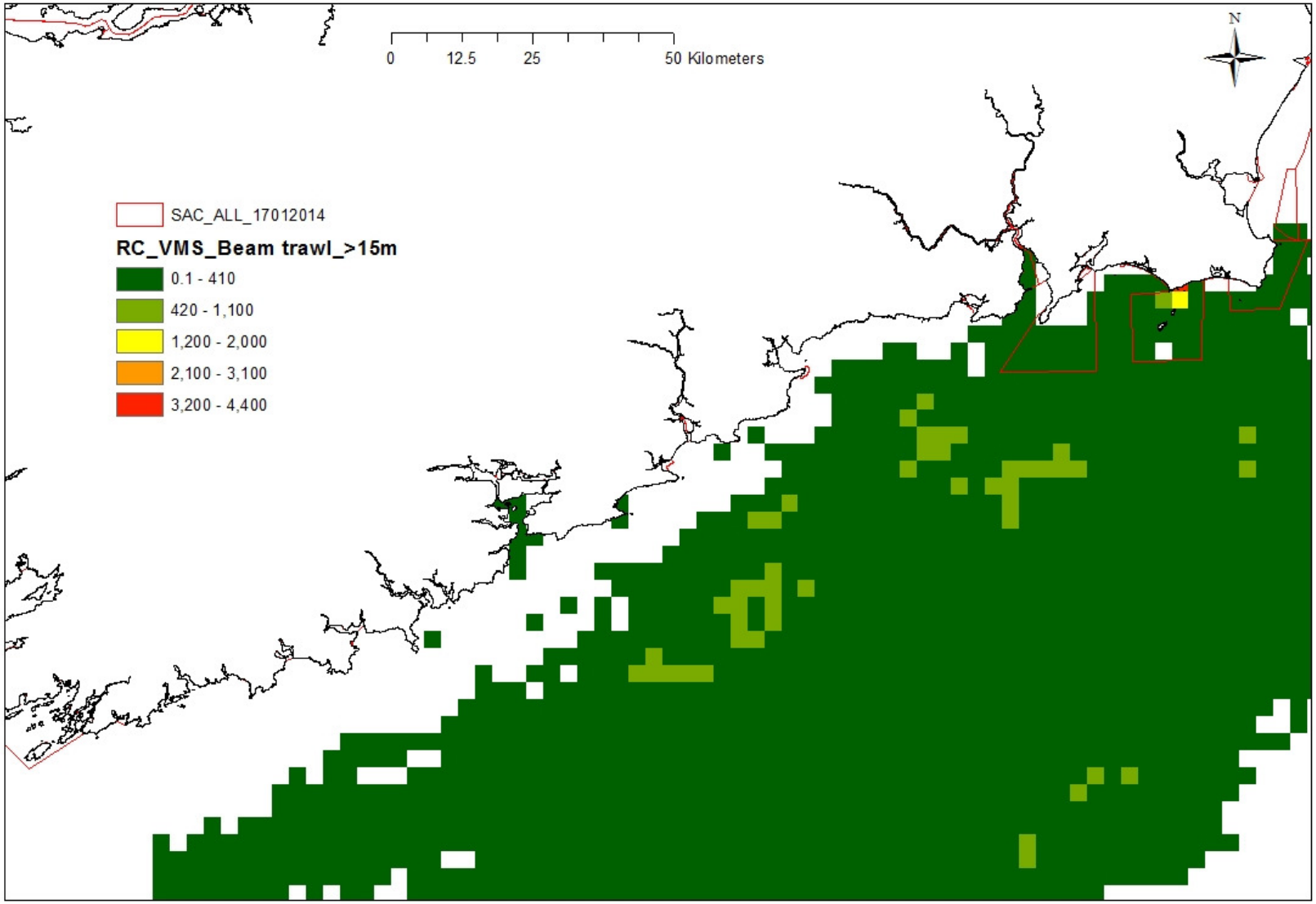

Figure 71. Distribution of fishing with beam trawls in the Reen Point to Carnsore Pt area.

9 Natura Impact Statement for fisheries

9.1 Fisheries

- Fisheries on south and west coasts use a variety of fishing gears to fish for benthic, demersal and pelagic species (Table 8).
- The main potential pressures are physical abrasion and disturbance, removal of fish and other non-target species which may be important as prey for Annex species and direct capture of Annex species in fishing gear
- Physical abrasion of the seabed
    - Dredge fisheries for scallop and razor clam will cause physical abrasion at the sea bed and in the sediment. Both gears penetrate the sediment. Razor clam gear can cause disturbance down to 25cm. Box dredges, blade dredges and fixed tooth dredges are used on small inshore vessels to target clams and oysters. Scallop gear can be modified (spring loaded dredges) to work in mixed ground with reef patches
    - Bottom trawls and beam trawls also cause abrasion of the seabed. This abrasion is mainly caused by the trawl doors, the beam in the case of beam trawls, the ground rope or chains. Disturbance is at the sediment surface and the gear also causes shallow disturbance in sedimentary habitats. Bottom trawls can be modified for use in areas with patches of reef or hard substrate. Trawlers working in inshore waters close to reef or in mixed ground types may use these modified rock hopper gears
    - Pots may cause abrasion locally in the footprint of the pot. The pot is connected to the main ground rope by a toggle rope of 1-2m which allows the pot to swivel in position which increases the footprint of the pot on the seabed. Each line of lobster/crab pots is generally deployed using two anchors which penetrate the sediments or reef. Pots are connected with rope which may be leaded or unleaded. Pots may be deployed without anchor where tidal currents are weak.
    - Set nets are anchored to the seabed and the ground rope may be in contact with the seabed or especially with emergent epifauna
- Removal of prey

- All fisheries, by definition, extract fish resources from coastal marine waters and therefore potentially reduce fish availability to Annex species such as cetaceans and seals.
- Pelagic fish and, to a lesser extent demersal fish, are more important prey for marine mammals than sub-tidal shellfish. The effect of demersal fisheries may be to reduce recruitment and therefore the abundance of juveniles fish which may be preyed upon marine mammals.

– By-catch of Annex species
  - Static nets such as gill nets, tangle nets and trammel nets and other gears such as pelagic and demersal trawls may catch seals and cetaceans.

– Disturbance
  - Fishing activity may disturb populations of marine mammals and lead to a reduction in the use of preferred or essential marine habitats by these species.

Table 8. Potential indicative environmental pressures of fishing activities and aquaculture activities in the Irish Sea. Disturbance and alteration of behaviour of feeding and roosting birds can to varying degrees be a factor in all fisheries

METIER/ ACTIVITY	PRESSURE CATEGORY	PRESSURE	POTENTIAL OR ACTUAL EFFECTS	FISHING GEARS	TIME OF YEAR	FACTORS CONSTRAINING THE ACTIVITY
Crustacean pot fishery	Physical	Surface disturbance	Abrasion at the sediment / reef surface	Shrimp pots, Soft eye side entrance creels, top entrance pots	Mar-Sept primarily Sept-Dec (Shrimp)	catch rate, costs, weather, market
	Biological	Extraction	Removal of shrimp, lobster and crab			
		By-catch	Mortality of fish species in by-catch			
Dredging for scallops, oysters, clams and cockle	Physical	Surface disturbance	Abrasion at the sediment / reef surface, sediment suspension (mussel, scallop, razor)	Fixed toothed dredges, blade dredge, box dredge, hydraulic dredge	Clams (Spring) Cockle (autumn) Oyster (winter) Scallop (autumn winter inshore)	catch rate, weather, market, microbiological classification, biotoxins, effort regime
		Shallow disturbance	Sub-surface abrasion to 25mm (scallop, razor), sediment suspension			
	Biological	Extraction	Removal of target species			
		By-catch mortality	Mortality of organisms captured or disturbed during the fishing process, damage to structural fauna of reefs			
Set netting for demersal fish and crustaceans	Physical	Surface disturbance	Abrasion at the sediment / reef surface	Gill nets, tangle nets, trammel nets	All year	Quota, weather
	Biological	Extraction	Removal of cod, Pollack, other target species			
		By-catch	Removal of non-target species, Potential by-catch of Annex species (cetacean, seal).			

METIER/ ACTIVITY	PRESSURE CATEGORY	PRESSURE	POTENTIAL OR ACTUAL EFFECTS	FISHING GEARS	TIME OF YEAR	FACTORS CONSTRAINING THE ACTIVITY
Mixed fisheries demersal trawling	Physical	Surface disturbance	Abrasion at the sediment / reef surface, sediment suspension	Demersal single and multi-rig bottom otter trawls	All year	Quota restrictions
		Shallow disturbance	Sub-surface abrasion by trawl doors, sediment suspension			
	Biological	Extraction	Removal of fish			
		By-catch mortality	Mortality of organisms in contact with fishing gear, potential for by-catch of cetaceans and seals			
Mixed fisheries beam trawling	Physical	Surface disturbance	Abrasion at the sediment / reef surface, sediment suspension	Beam trawl	All year	Quota restrictions
		Shallow disturbance	Sub-surface abrasion by beam and chains, sediment suspension			
	Biological	Extraction	Removal of target species (mainly flatfish)			
		By-catch mortality	Mortality of organisms in contact with fishing gear			
Pelagic fisheries	Physical	None	Effectively none	Pelagic trawl, seine nets	Mainly winter	Quota restrictions
	Biological	Extraction	Removal of target species (sprat, herring, mackerel)			
		By-catch mortality	Potential for by-catch of cetaceans, seals			

METIER/ ACTIVITY	PRESSURE CATEGORY	PRESSURE	POTENTIAL OR ACTUAL EFFECTS	FISHING GEARS	TIME OF YEAR	FACTORS CONSTRAINING THE ACTIVITY
Periwinkles	Physical	Surface disturbance	Trampling and compaction of fauna	Hand gathering	Mar-Sept	Market
	Biological	Extraction	Removal of periwinkles			
Bait fisheries	Physical	Surface disturbance	Abrasion on sediment surface or on reefs	Trammel nets	Mar-Sept	Availability and price of bait
	Biological	Extraction	Removal of non-commercial fish species			
		By catch	Potential catch of designated species, porpoise and seal			

10 Conservation objectives

10.1 SACs

Detailed conservation objectives (COs) are described in NPWS documentation for a proportion of sites (www.npws.ie). Detailed COs are not yet published for a small number of sites (as described in 5.3 above).

10.1.1 General description for Habitats

- The status of given qualifying interest habitats within the national territory is reported under Article 17 on a 6 yearly cycle by NPWS and describes the status of a number of attributes of the qualifying interest habitat generally at national scale, the future prospects for it and the reference period to which the assessment applies. The following attributes are reported
  - Surface area
  - Range
  - Short term trend period, direction and magnitude
  - Long term trend period, direction and magnitude
  - Favourable reference range
  - Reasons for change (in conservation condition)
  - Pressures and threats to which the habitats are exposed
  - The species composition and structure and function of the habitat
  - Future prospects
  - Overall assessment of conservation status and trend in status
  - Conservation measures, including the legislative framework, for the habitat
- The status, as reported under Article 17, of a habitat within the national territory is obviously a function of the status of this habitat within each designated site (SAC). Therefore the conservation of habitat at site level is of obvious importance.
- The detailed COs for habitats published for individual sites reflect the requirement to maintain range, area, structure and function and future prospects of the habitat within the site and which will, as a result, contribute to favourable conservation status of the habitat nationally and as reported under Article 17. Favourable conservation status of a habitat is achieved when
  - its natural range, and area it covers within that range, are stable or increasing, and
  - the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
  - the conservation status of its typical species is favourable.
- More specifically, within each site, the typically species and the inferred structure and function of specific communities of flora and fauna within each qualifying interest habitat, are described and

mapped from analysis of survey point data. NPWS also provide specific guidance on the conservation of these marine communities and their consistuent species in the detailed conservation objectives for each site given that these communities have variable sensitivities to pressures that might arise from fishing or other activities. Constituent species and the habitats required to support them are therefore the building blocks for the achievement of favourable conservation status within a site.

- SACs designated for habitats have fisheries operating in them for many decades. These are not areas closed to industry activity. Pressures caused by fisheries to marine habitats will result in variable response of the habitat depending on its sensitivity to the type of pressure it is subjected to. This variable sensitivity is reflected in both the NPWS guidance notes on management of these habitats and in the risk assessment framework used here (see Section 11).

10.1.2 General description for Species

- The status of given qualifying interest species within the national territory is also reported under Article 17 on a 6 yearly cycle by NPWS. The attributes reported for species are similar to those for habitat but also include reference population sizes and the status of habitats required to support the species.
- The detailed COs for each species, at individual sites, reflect the need to protect both the population and its productivity and also the habitat required by the species during different stages of its life cycle and the various habitats that are used to support different life history functions (foraging, resting, breeding). For many species the interaction with fisheries may occur not only within the site but also outside of it. The geographic range of this interaction depends on the migratory and movement patterns of the species but individuals from designated populations, irrespective of where the interaction with fisheries occurs, should be protected to the extent that the conservation condition of the designated population remains favourable.
- The objectives may require restoration of a population rather than maintenance. In the former case there will be evidence of some negative change in the status of the population against a reference period and the targets for the population will reflect the requirement to restore the species to a level defined during the reference period.
- In this assessment the CO targets for each species are listed in the risk assessment for each species (Section 12).

10.1.3 SAC qualifying interests

10.1.3.1 Habitats

There are a number of marine habitats in SACs that are designated under Annex I of the Habitats Directive. These are

- 1160 - Large shallow inlet and bay
    - A habitat complex comprising a mosaic of interdependent subtidal and intertidal habitats. Some of these habitats, 1140, 1130, 1170, are listed separately in Annex I
- 1110 - Sandbanks which are slightly covered by sea water all the time
    - Consisting of sandy sediments typically at depths of 20m but sometimes deeper
- 1130 - Estuaries
    - A mosaic of intertidal and sub-tidal habitats closely associated and influence by surroudning terrestrial habitat and having a low salinity regime due to freshwater inflow. May incorporate habitat 1140, 1110 and 1170
- 1140 - Mud and sand flats not covered by water at low tide
    - Sub-merged at high tide and exposed at low tide. Sediments ranging from coarse sand to muds.
- 1170 – Reefs
    - Consisting of geogenic and biogenic reefs both intertidally and sub-tidally. Geogenic reefs consist of flora and fauna growing from stable rock or cobble substrates. Biogenic reef is where the structure itself is formed by concretions of animals or of animal or plant origin.
- Coastal lagoons
    - Areas of shallow coastal seawater wholly or partially separated from open sea by sandbanks or shingle.

There are also a number of coastal habitats that occur at the terrestrial-marine boundary listed in Annex I.

10.1.3.2 Marine Community Types within Habitats

- Annex I Habitats within SACs in Irish coastal waters were surveyed during the period 2009-2012. The resulting data has been used to identify and map marine community types (MCTs) that occur within the Annex I Habitats. These MCTs and their constituent species are the subject of detailed conservation objectives and specific targets for a number of important attributes relevant to their conservation as described above.

- MCTs have not been described and mapped for all habitats in all sites; this is an ongoing process. The MCTs for each site included in this assessment and for which detailed COs are published are shown for each region.
- Much of the risk assessment provided below represents an analysis of how each type of fishery overlaps each of the MCTs within each site and assesses the consequences of this overlap for the MCT relative to the detailed attributes and targets of the COs for that MCT
- MCT maps for SACs where detailed conservation objectives are published are shown below.

10.1.3.2.1 SAC MCT maps Quigleys point to Benwee Head

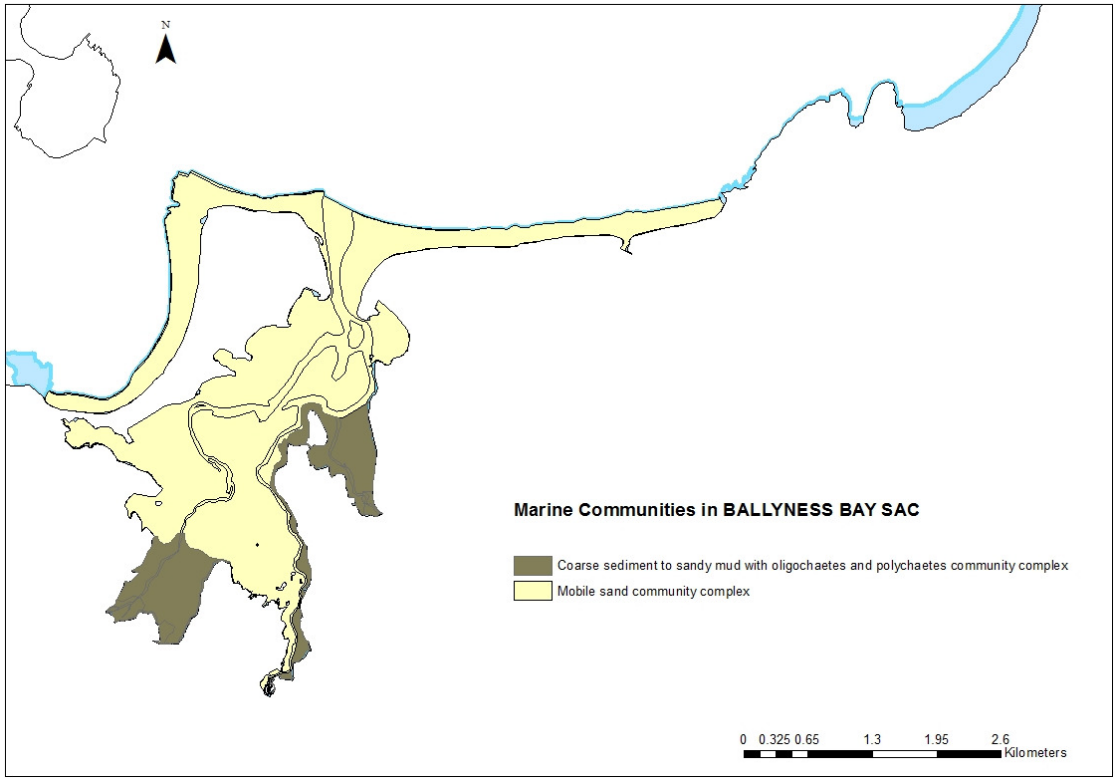

Figure 72. Marine Community map for Ballyness Bay SAC

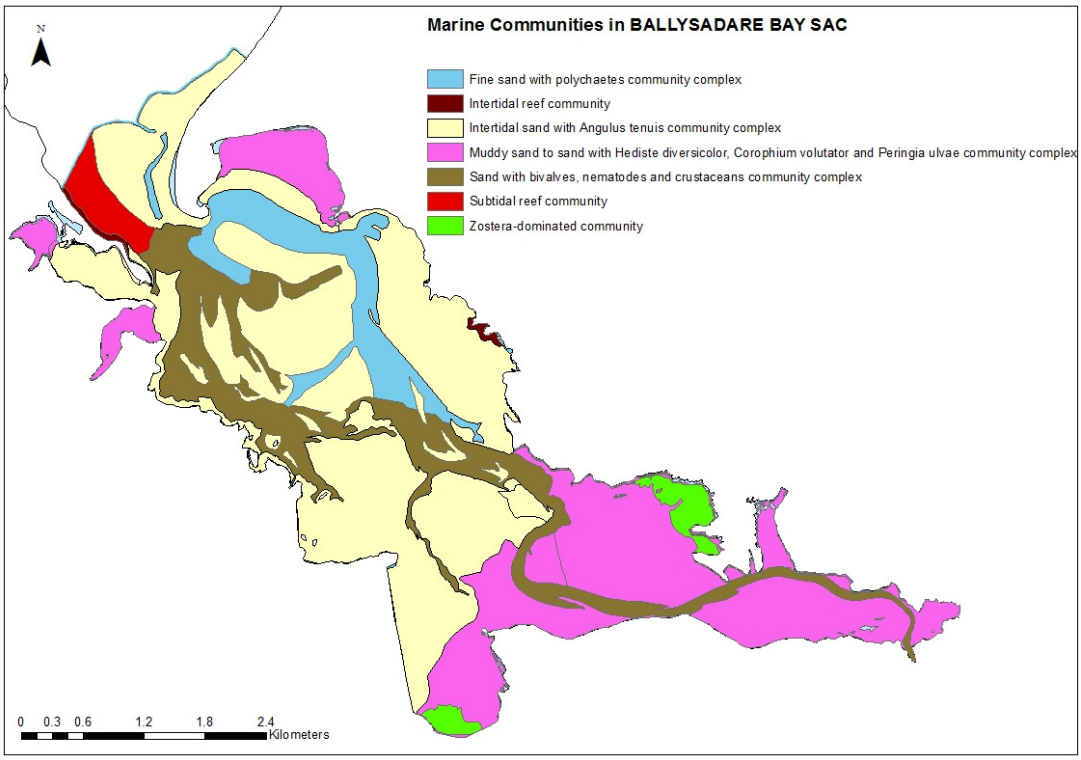

Figure 73. Marine Community map for Ballysadare Bay SAC

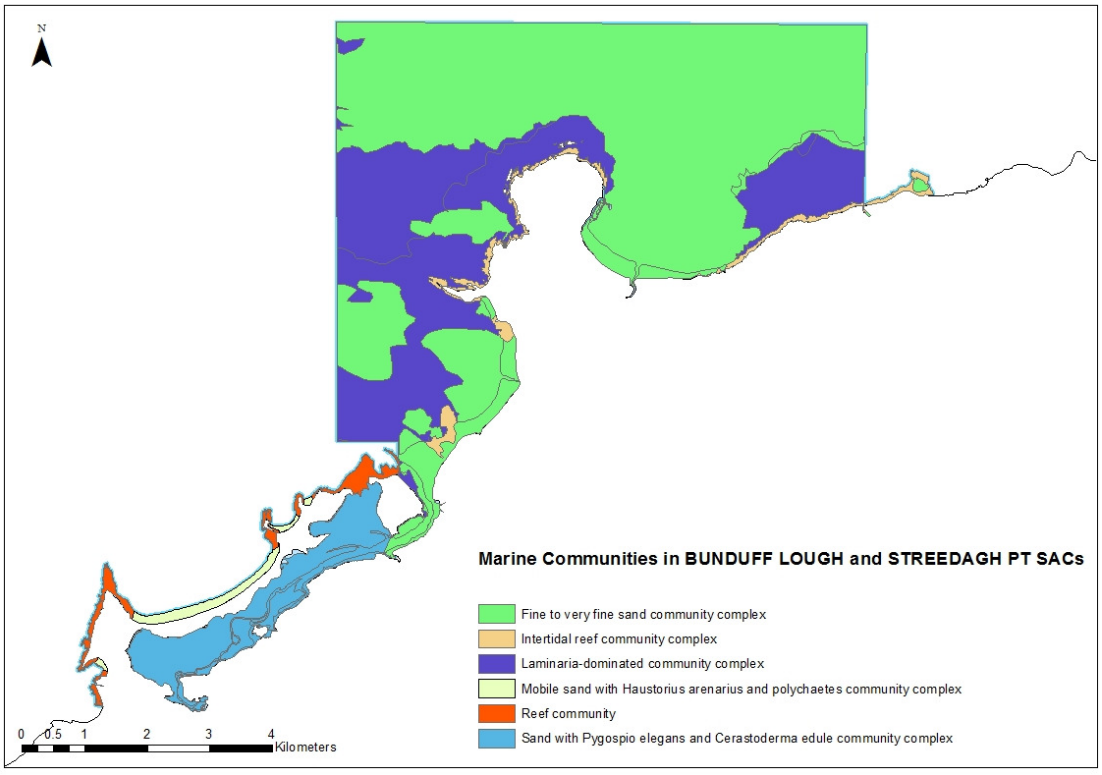

Figure 74. Marine Community map for Bunduff Lough and Streedagh Pt SACs

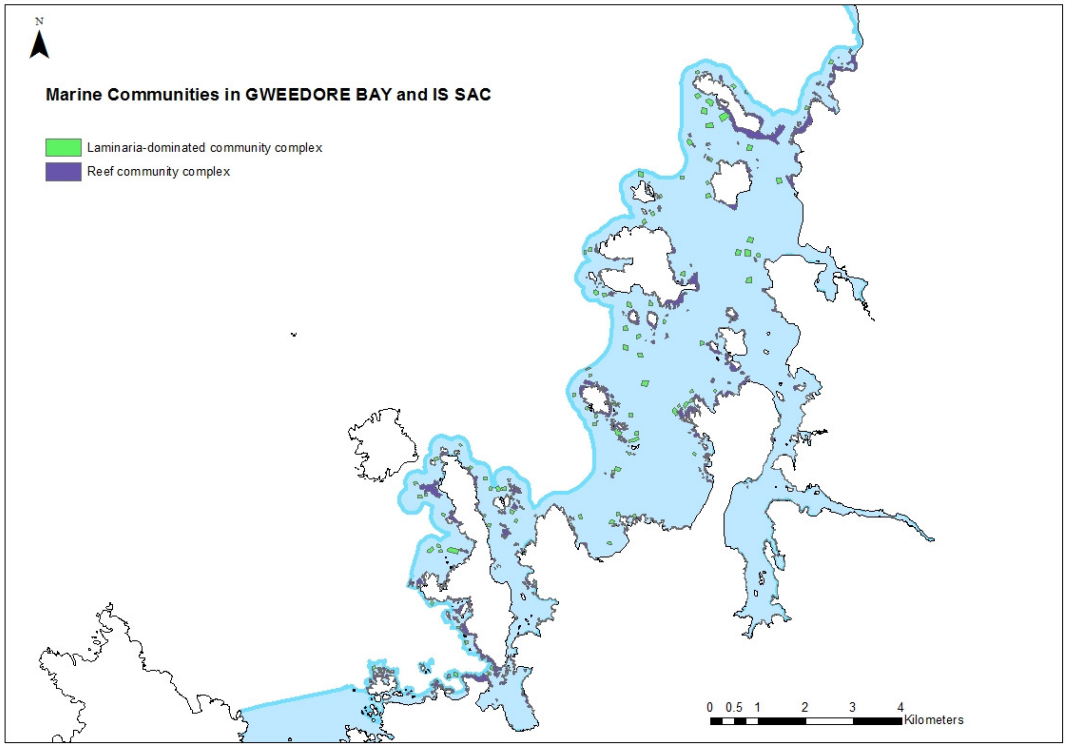

Figure 75. Marine Community map for Gweedore Bay SAC

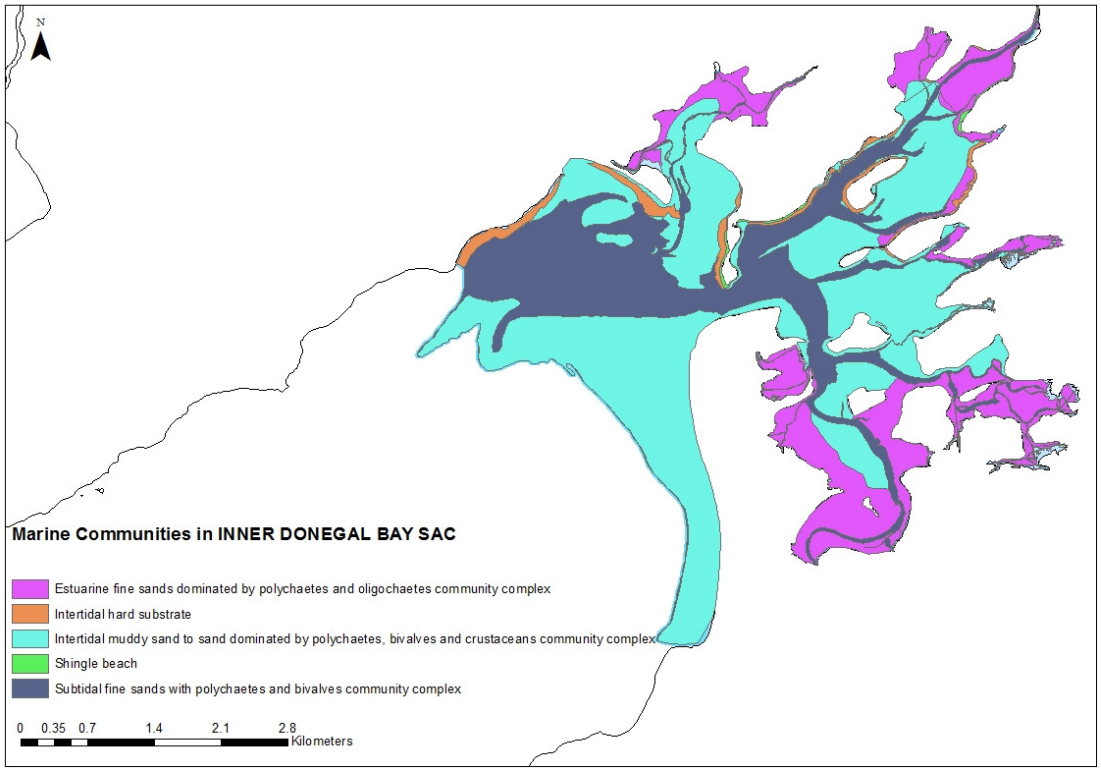

Figure 76. Marine Community map for Inner Donegal Bay SAC

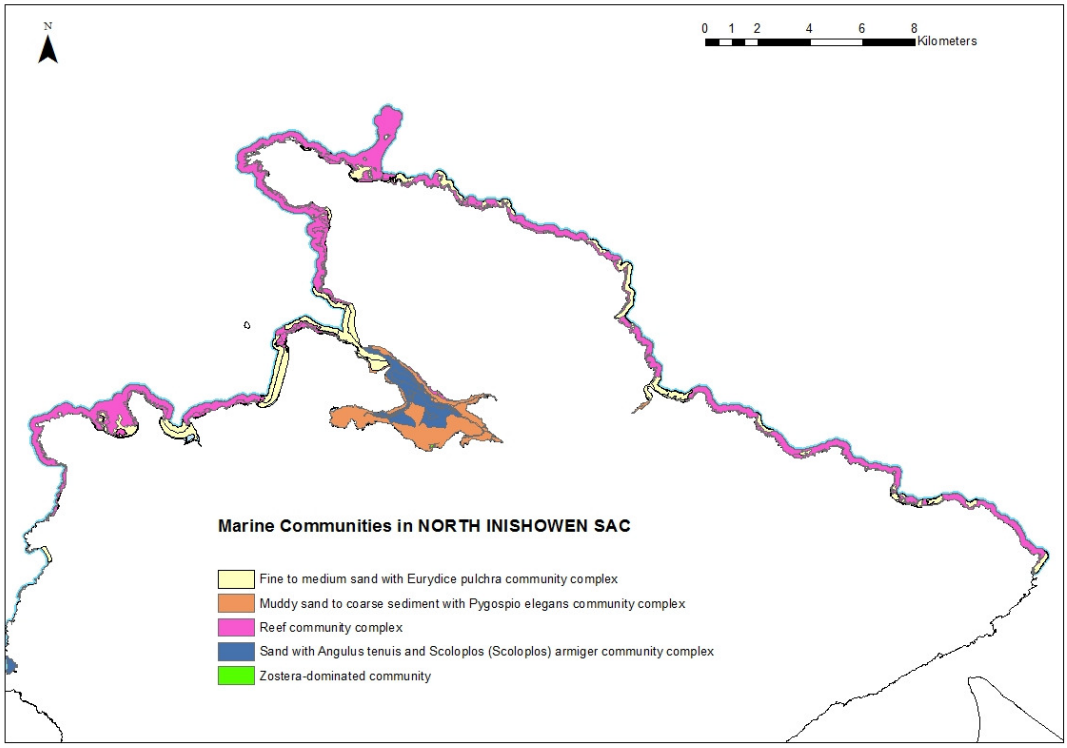

Figure 77. Marine Community map for North Inishowen SAC

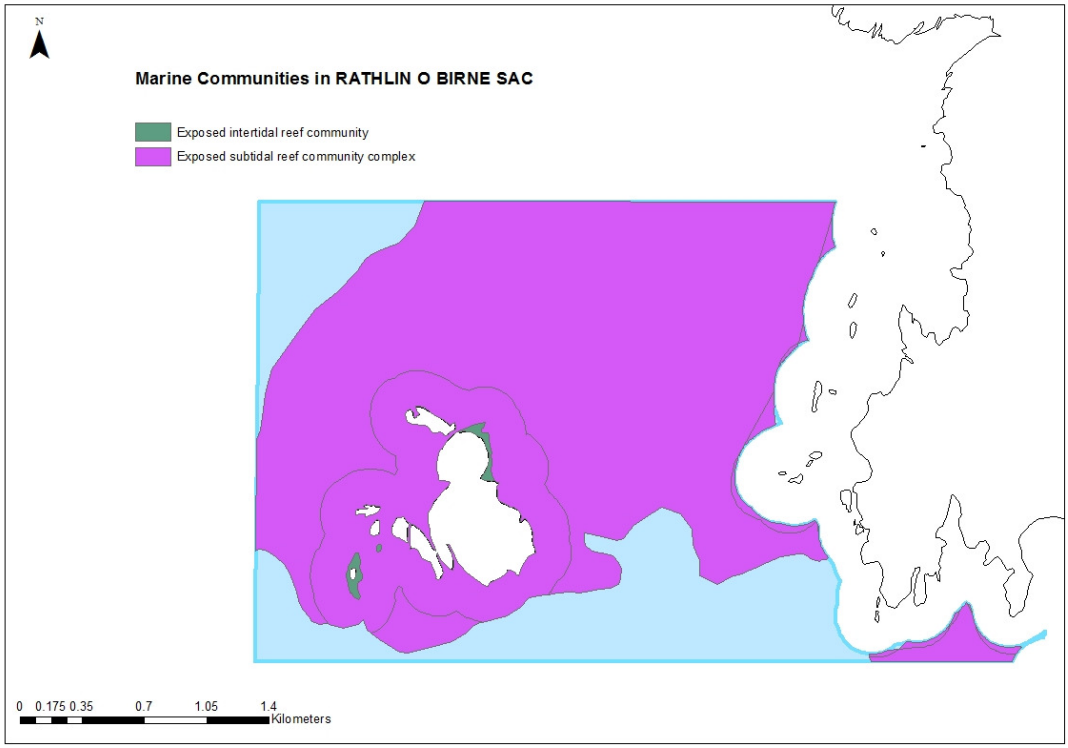

Figure 78. Marine Community map for Rathlin O Birne SAC

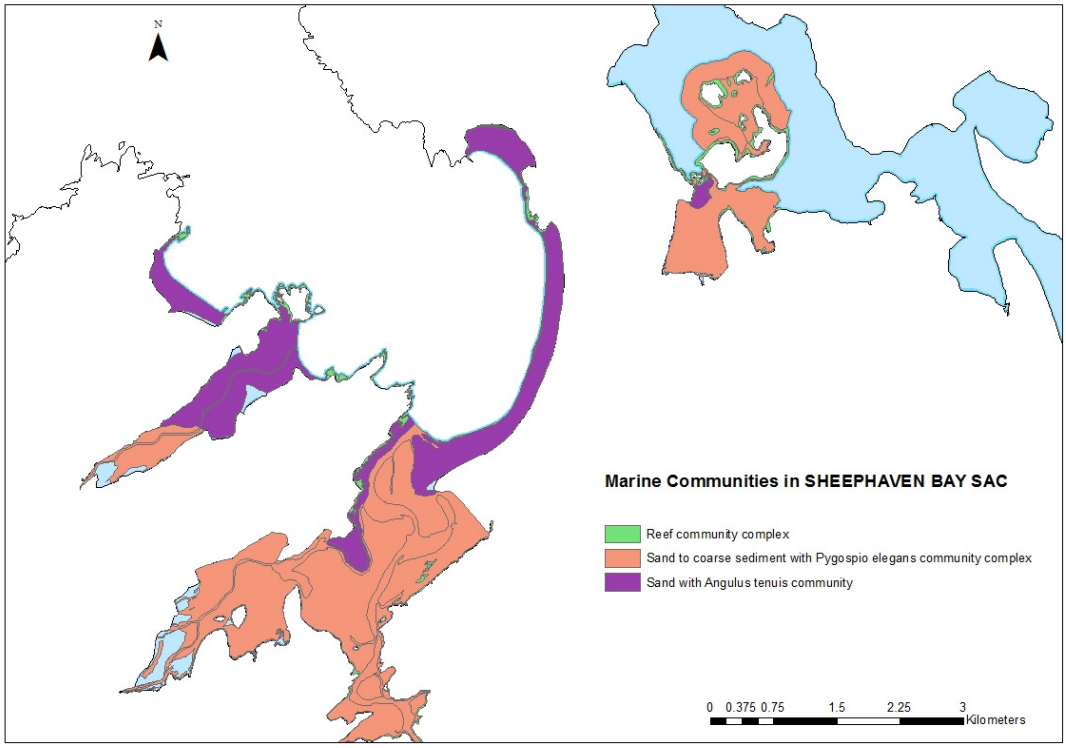

Figure 79. Marine Community map for Sheephaven Bay SAC

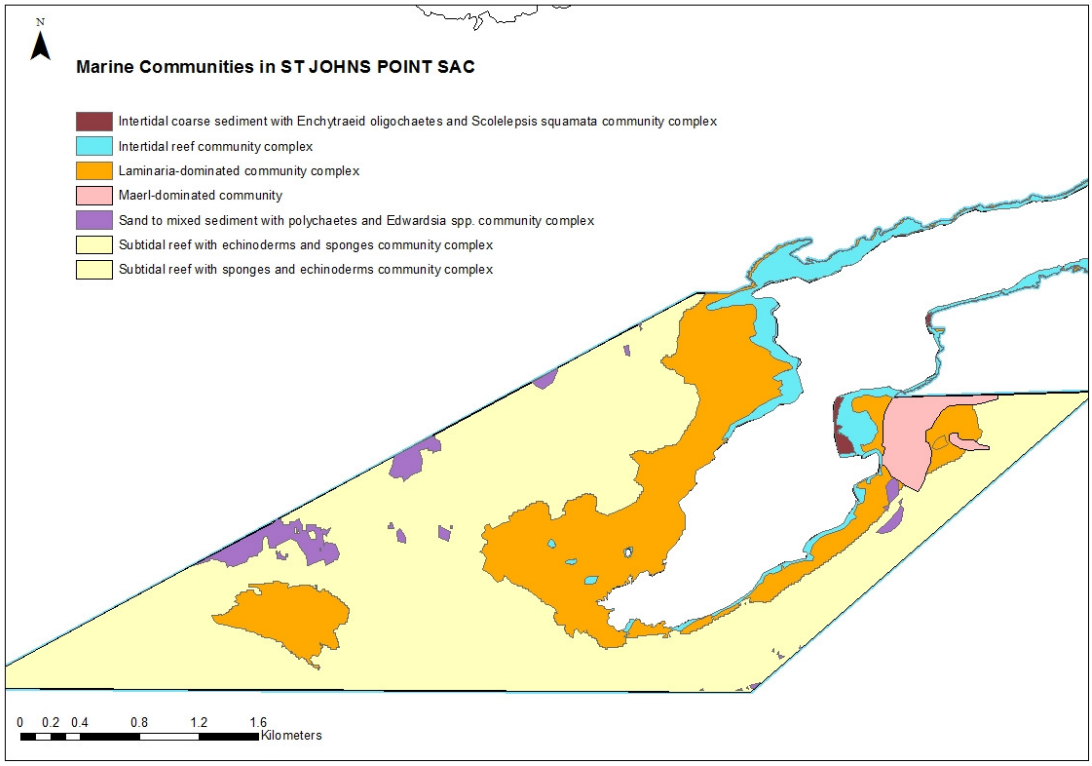

Figure 80. Marine Community map for St Johns Pt SAC

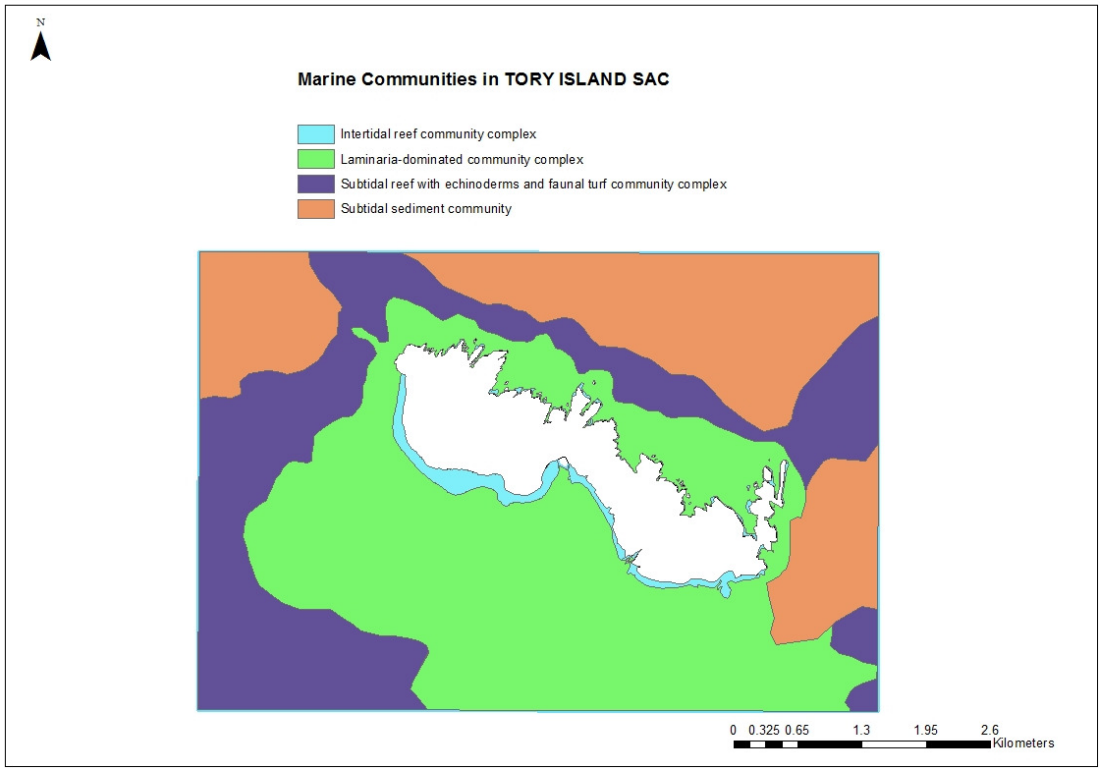

Figure 81. Marine Community map for Tory Island SAC

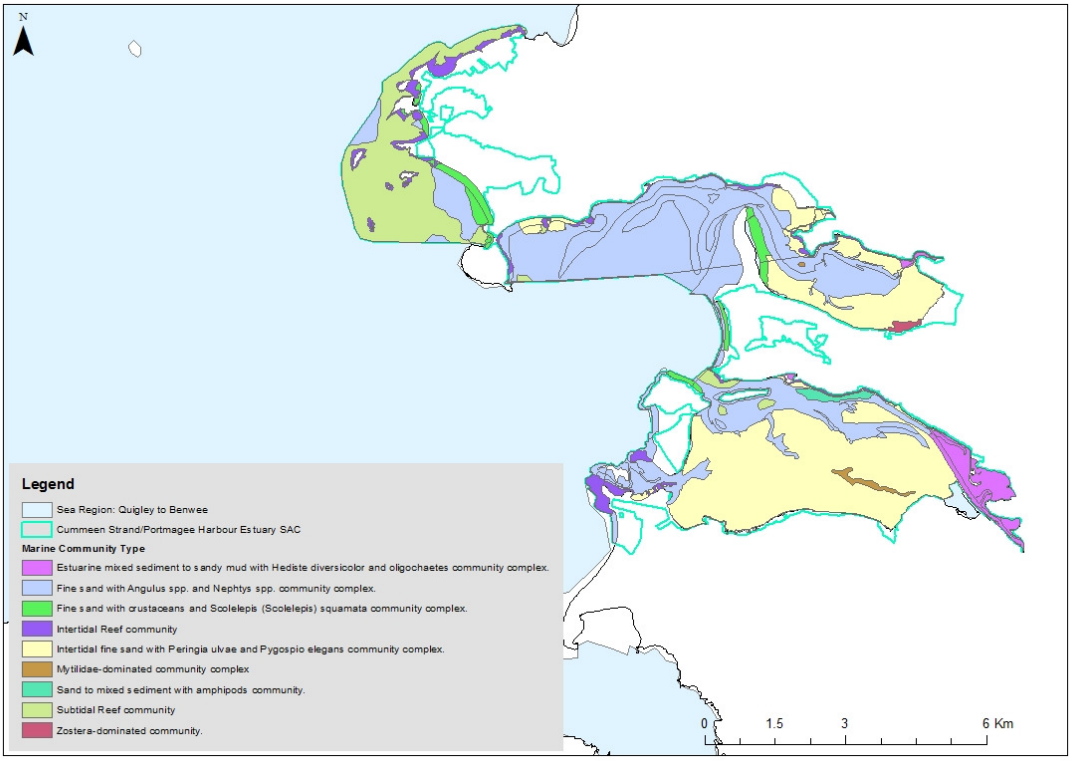

Figure 82. Marine Community map for Cummeen strand/Drumcliffe Bay SAC

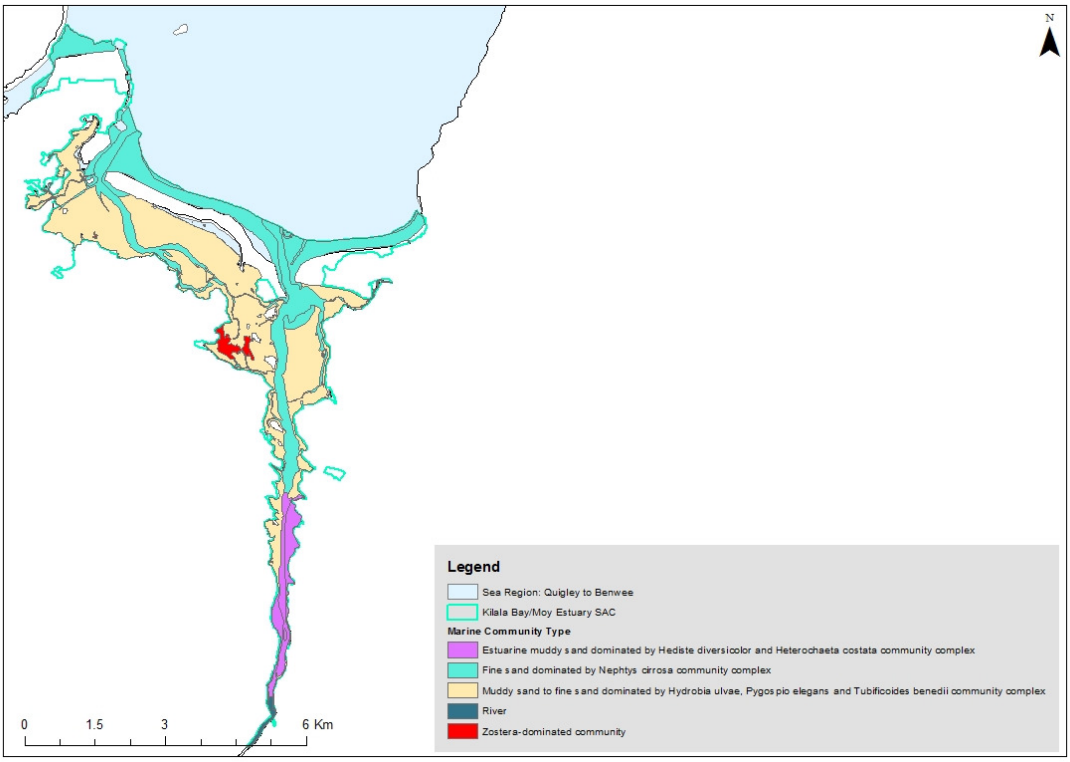

Figure 83. Marine Community map for SAC 458 (Killala Bay/Moy Estuary)

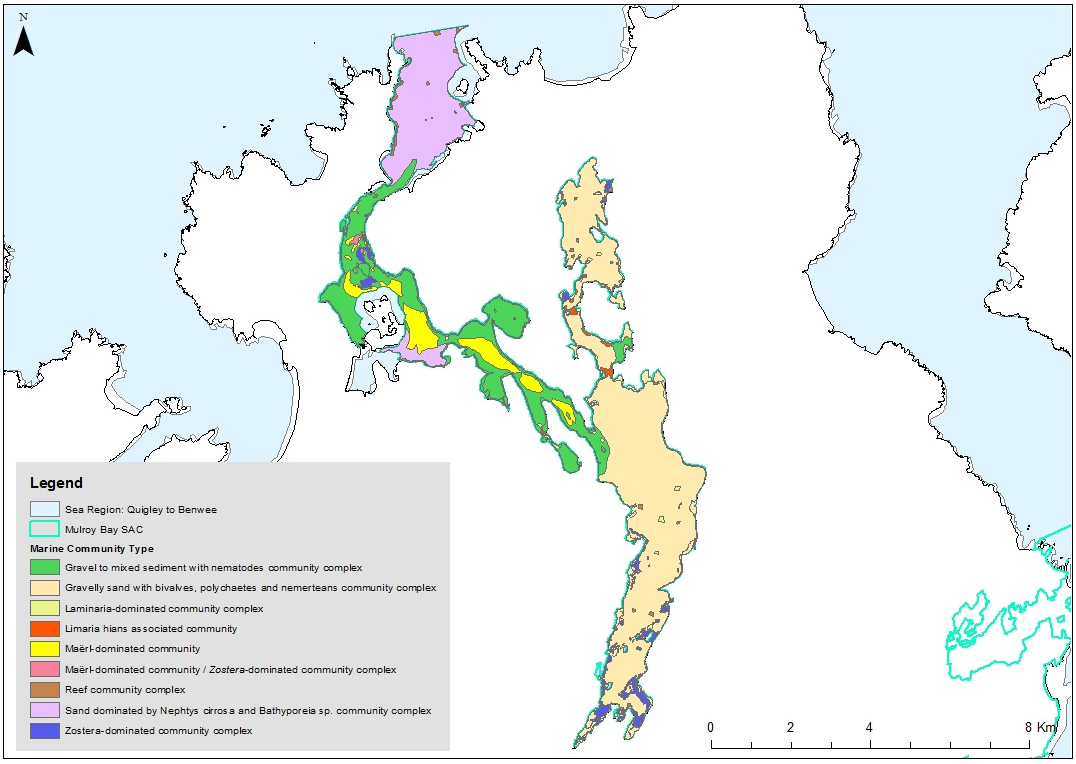

Figure 84. Marine Community map for SAC 2159 (Mulroy Bay)

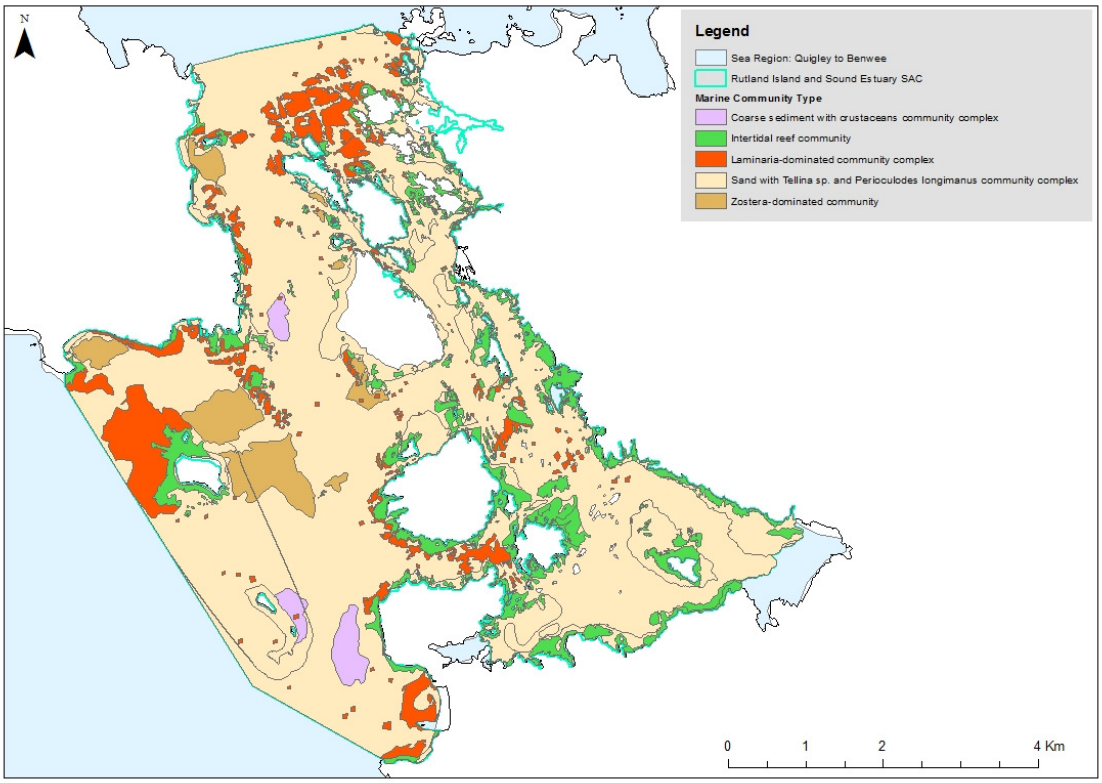

Figure 85. Marine Community map for SAC 2283 (Rutland Is and Sound)

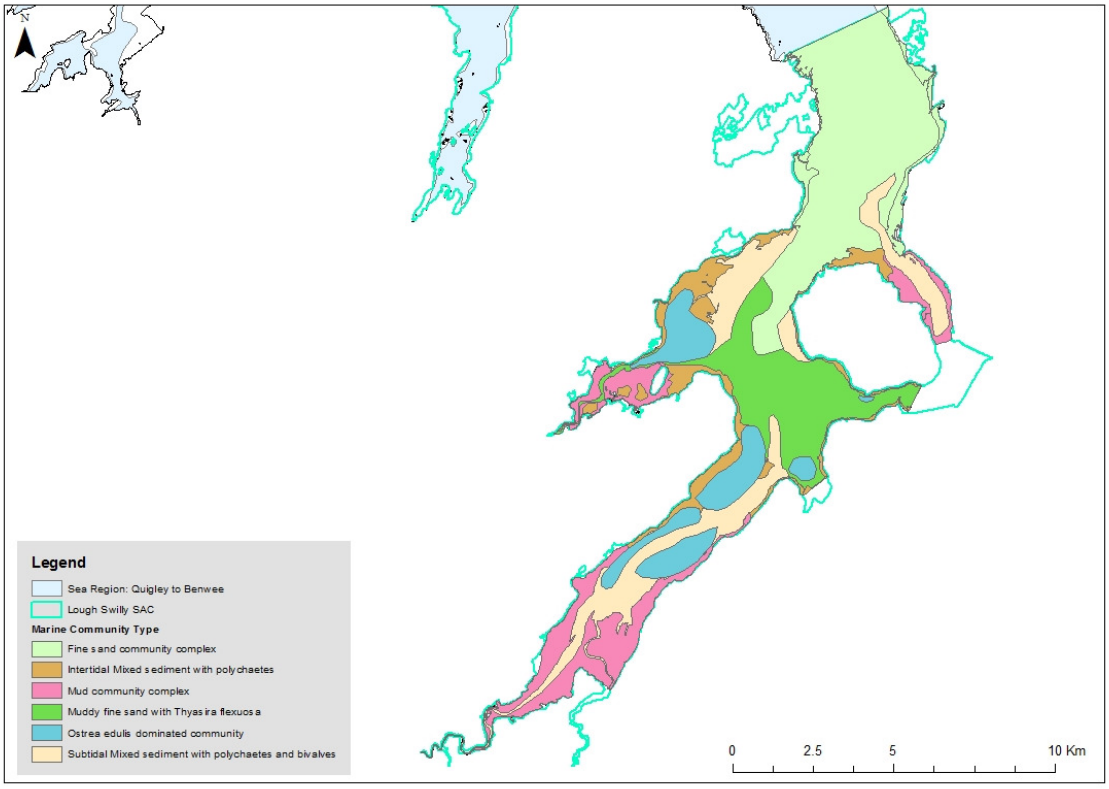

Figure 86. Marine Community map for SAC 2287 (Lough Swilly)

10.1.3.2.2 SAC MCT maps Benwee Head to Slyne Head

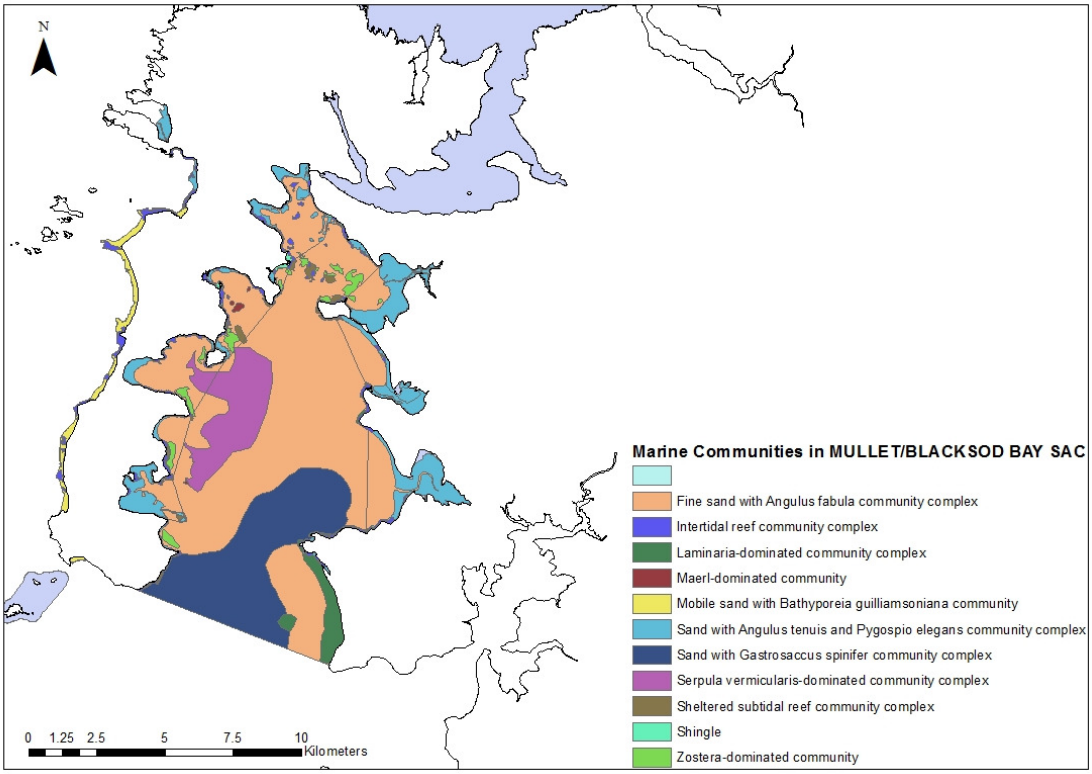

Figure 87. Marine Community map for Mullet/Blacksod Bay SAC

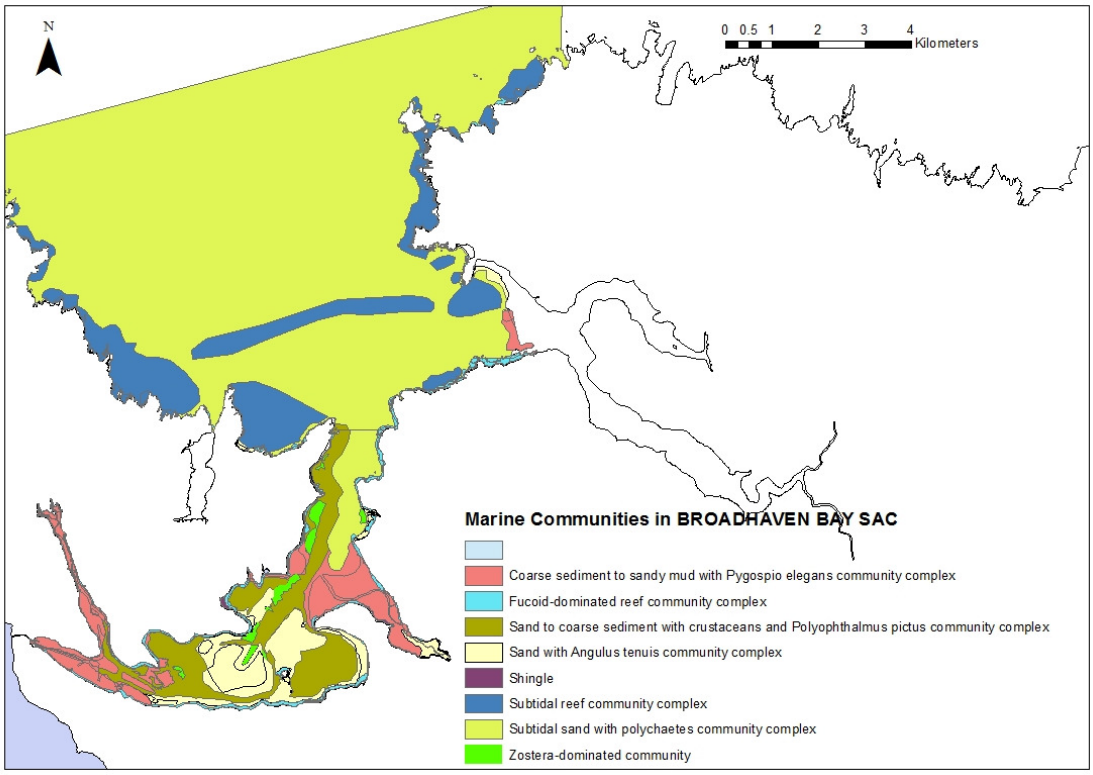

Figure 88. Marine Community map for Broadhaven Bay SAC

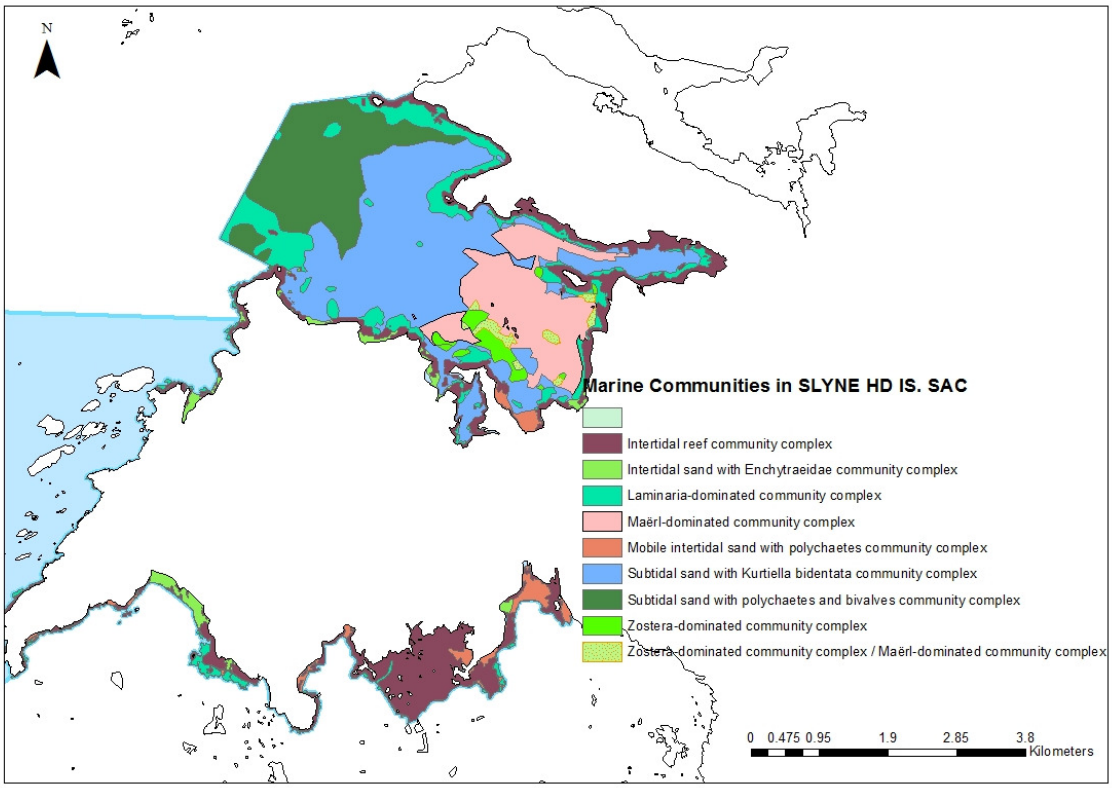

Figure 89. Marine Community map for Slyne Head Peninsula SAC

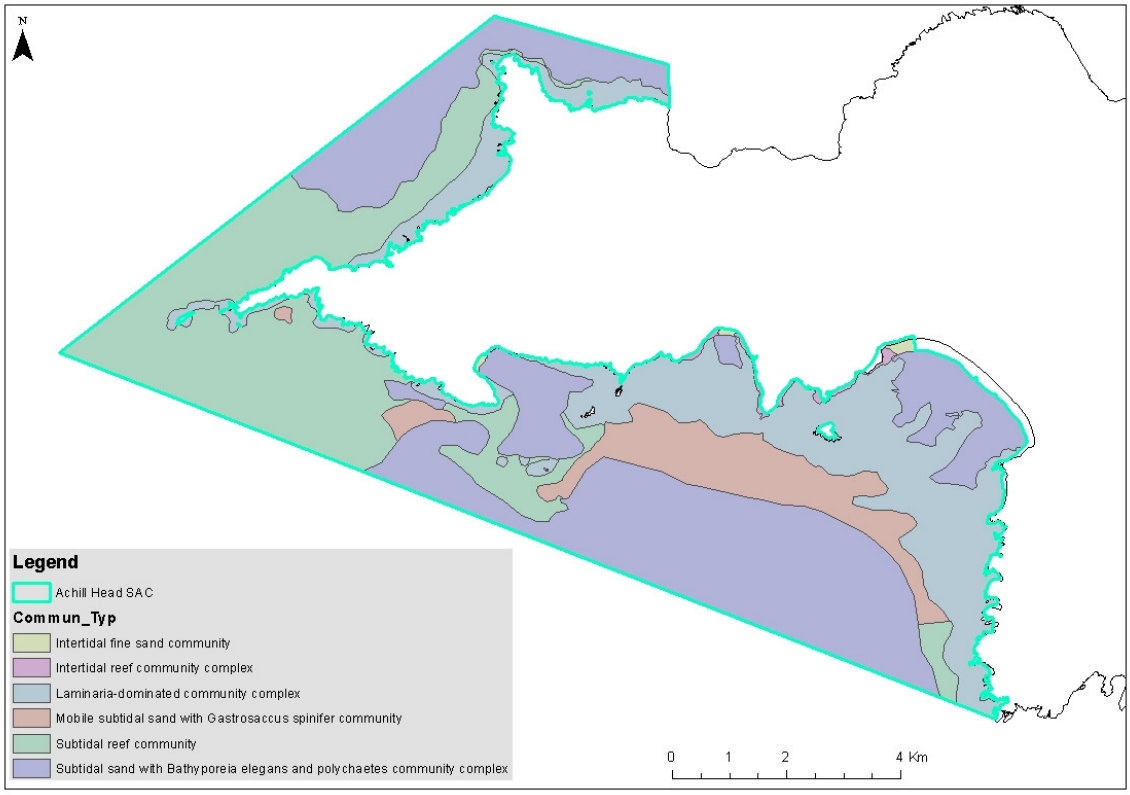

Figure 90. Marine Community map for SAC 2268 (Achill Head)

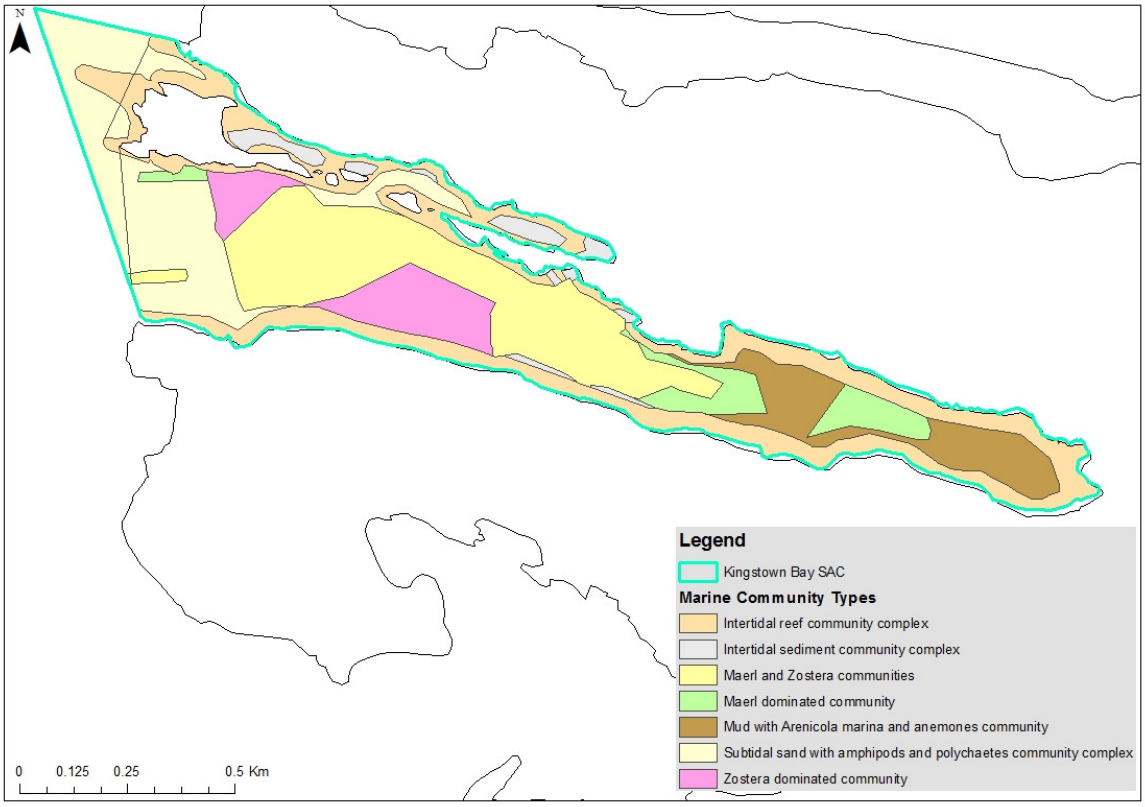

Figure 91. Marine Community map for SAC 2265 (Kingstown Bay)

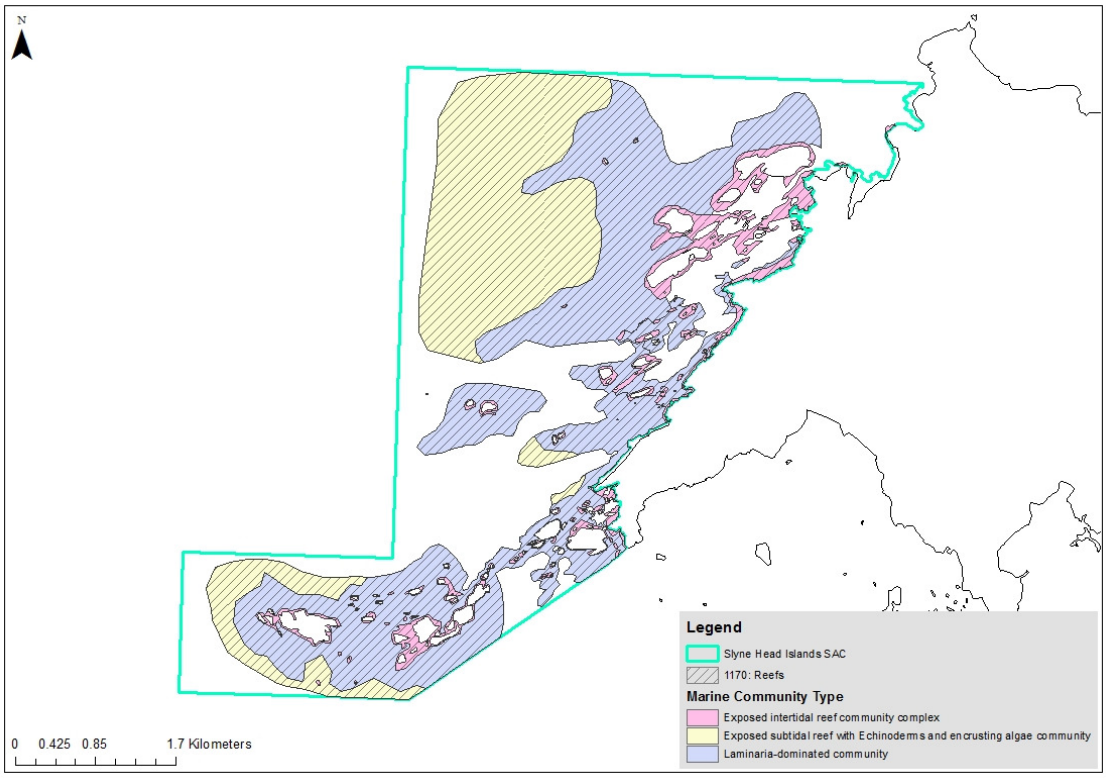

Figure 92. Marine Community map for SAC 328 (Slyne Head Islands)

10.1.3.2.3 SAC MCT maps Slyne Head to Loop Head

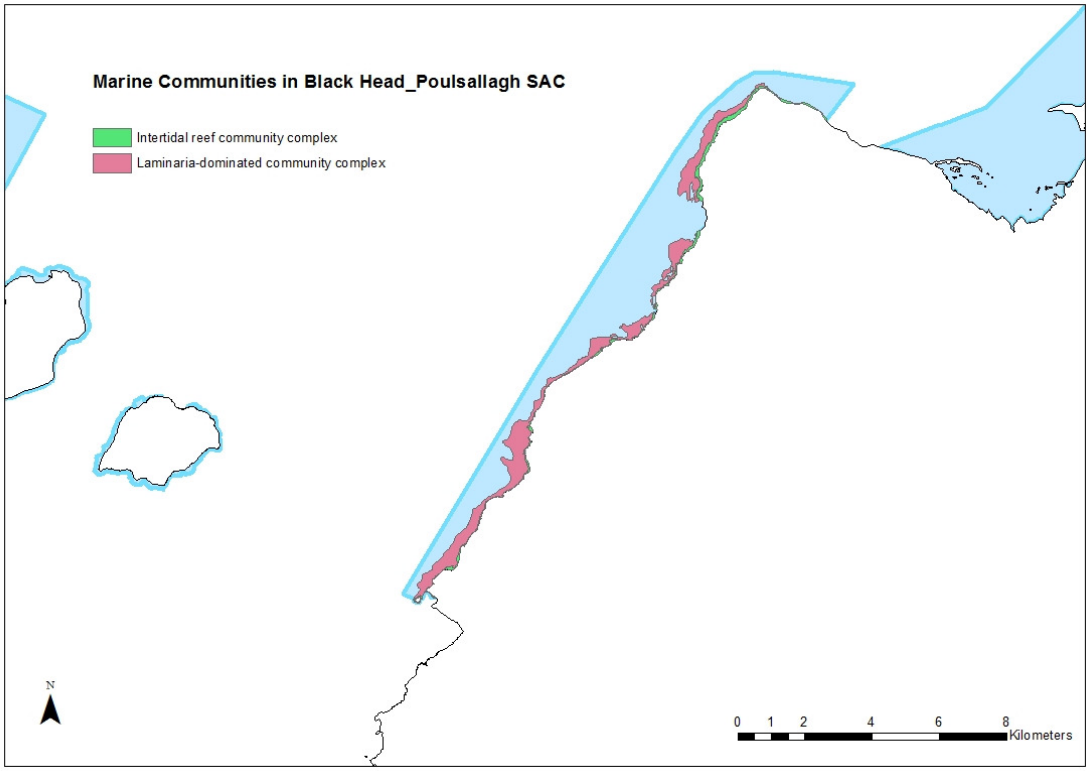

Figure 93. Marine Community map for Black Head_Poulsallagh SAC

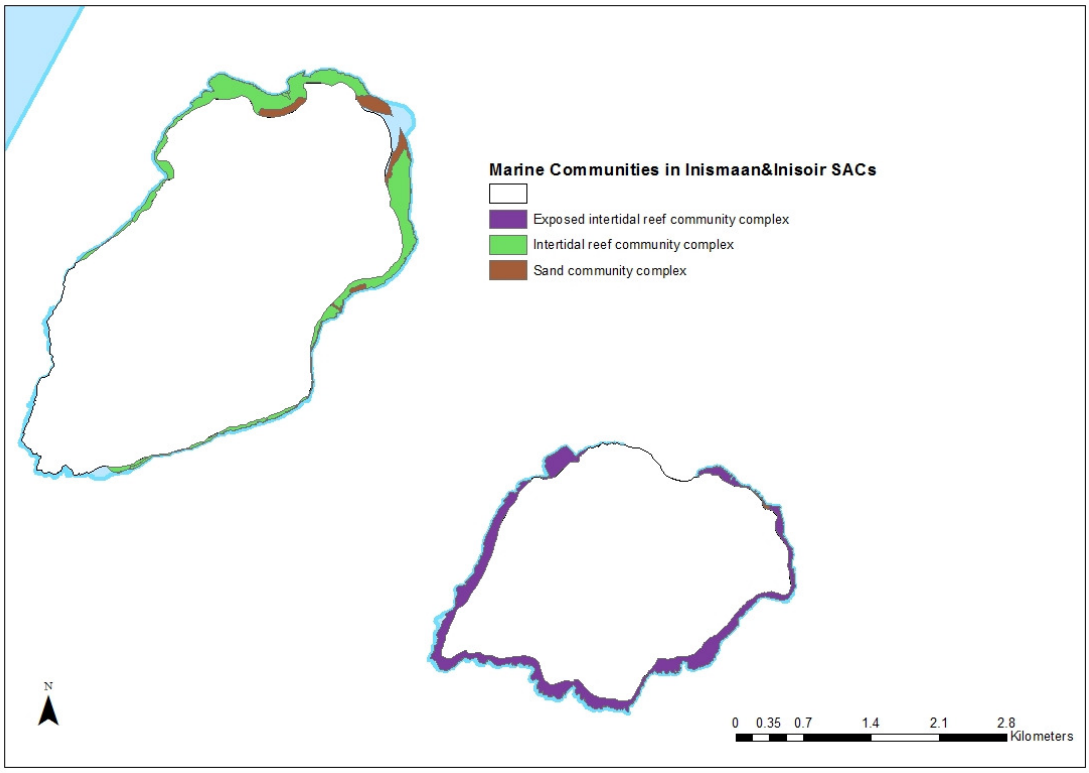

Figure 94. Marine Community map for Inismaan and Inisoir SACs

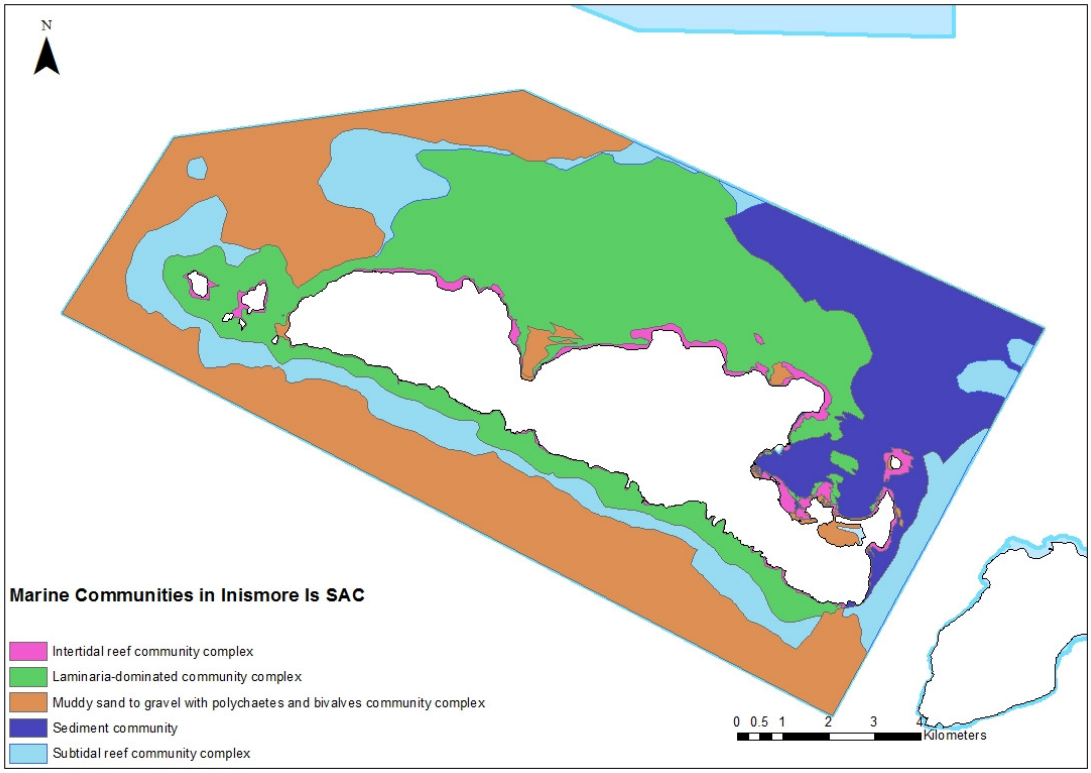

Figure 95. Marine Community map for Inismor SAC

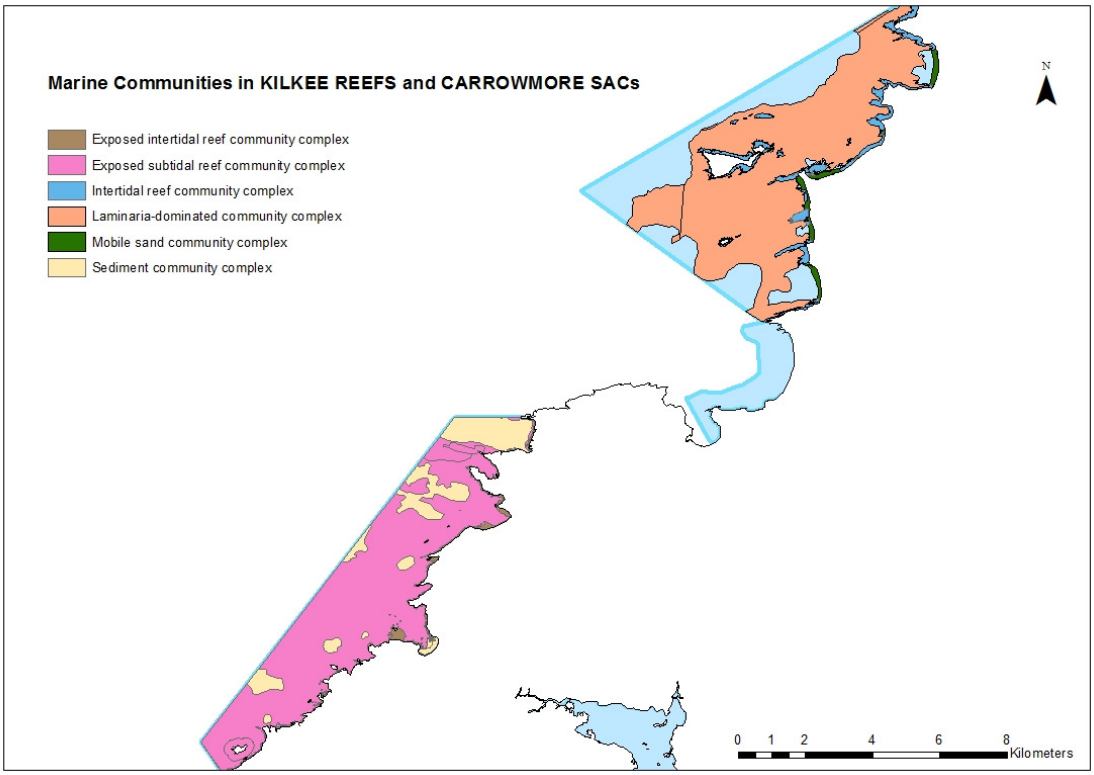

Figure 96. Marine Community map for Kilkee Reef and Carrowmore dunes SAC

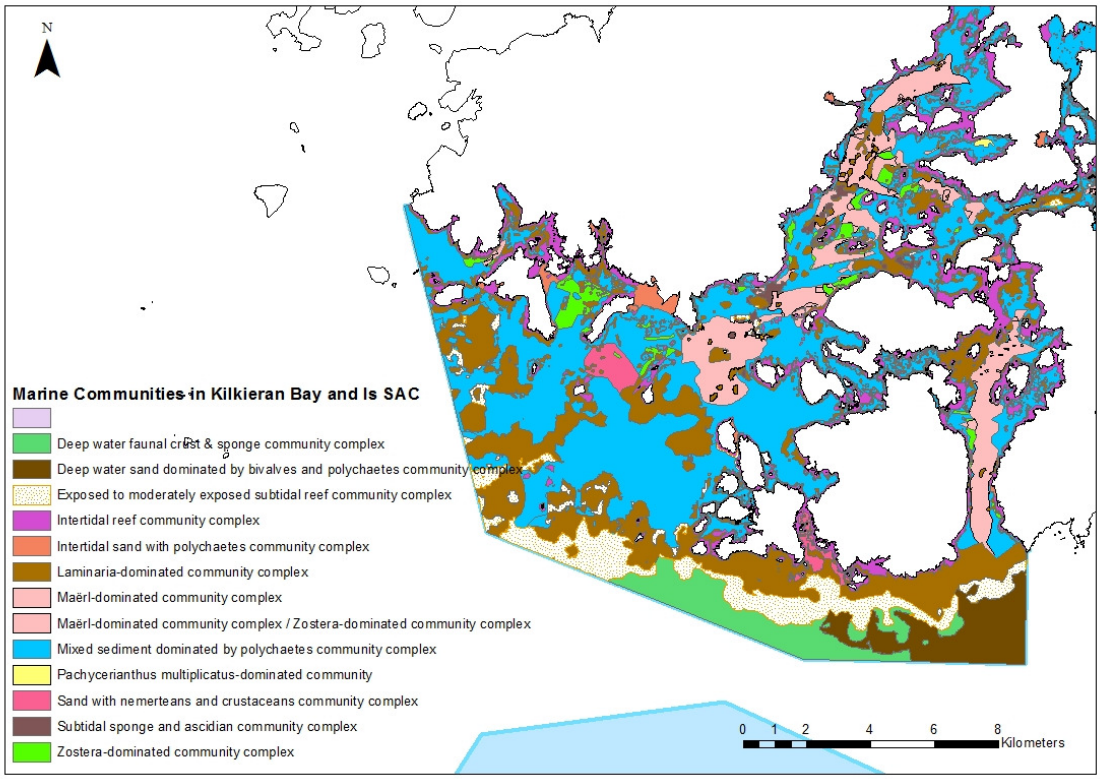

Figure 97. Marine Community map for Kilkee Reef and Carrowmore dunes SAC

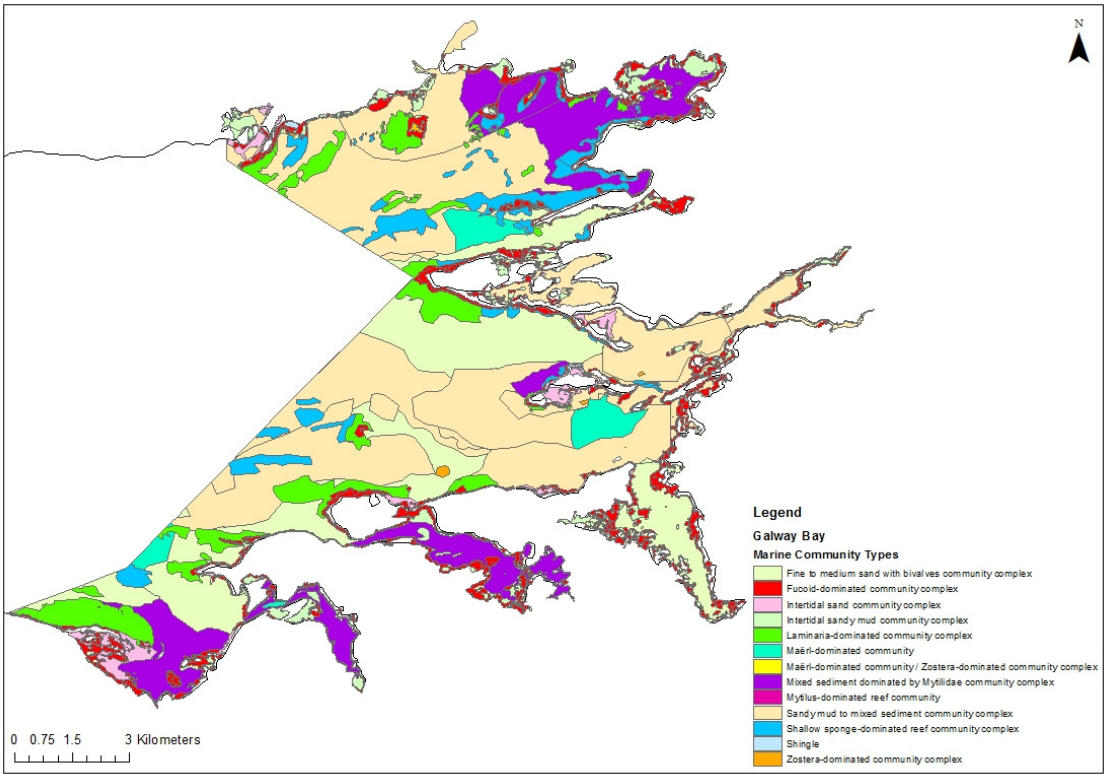

Figure 98. Marine Community map for SAC 268 (Galway Bay complex)

10.1.3.2.4 SAC MCT maps Loop Head to Reen Point

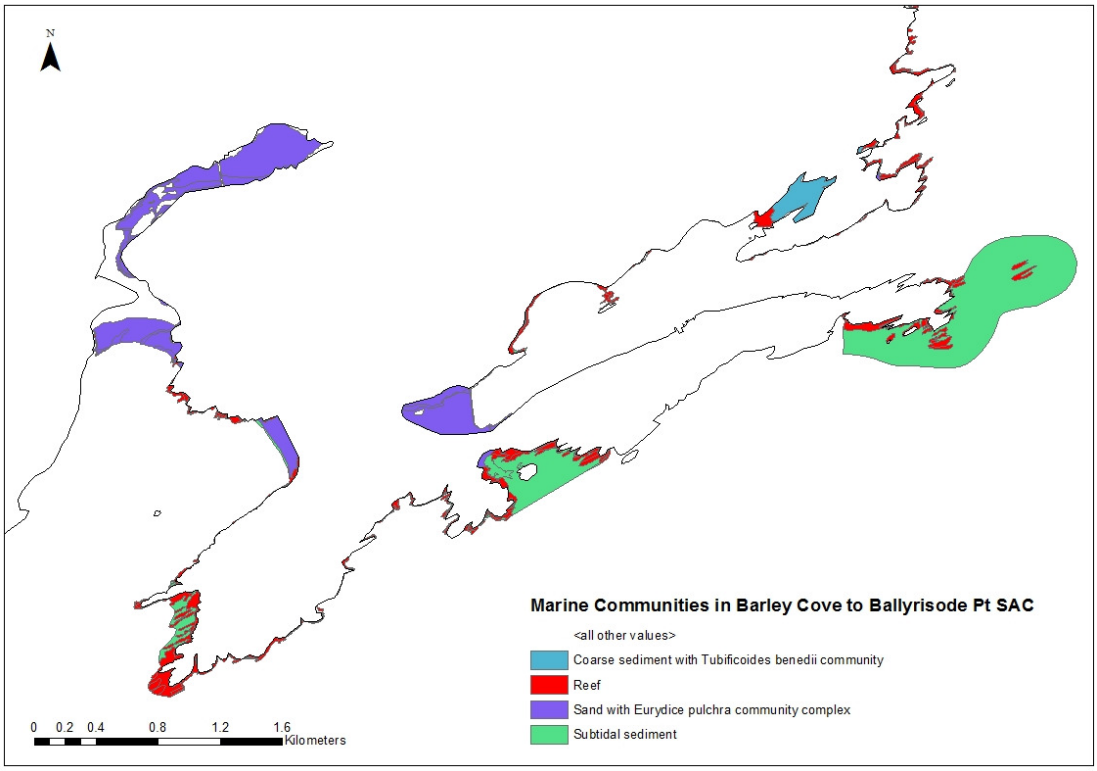

Figure 99. Marine Community map for Barley Cove to Ballyrisode Pt SAC

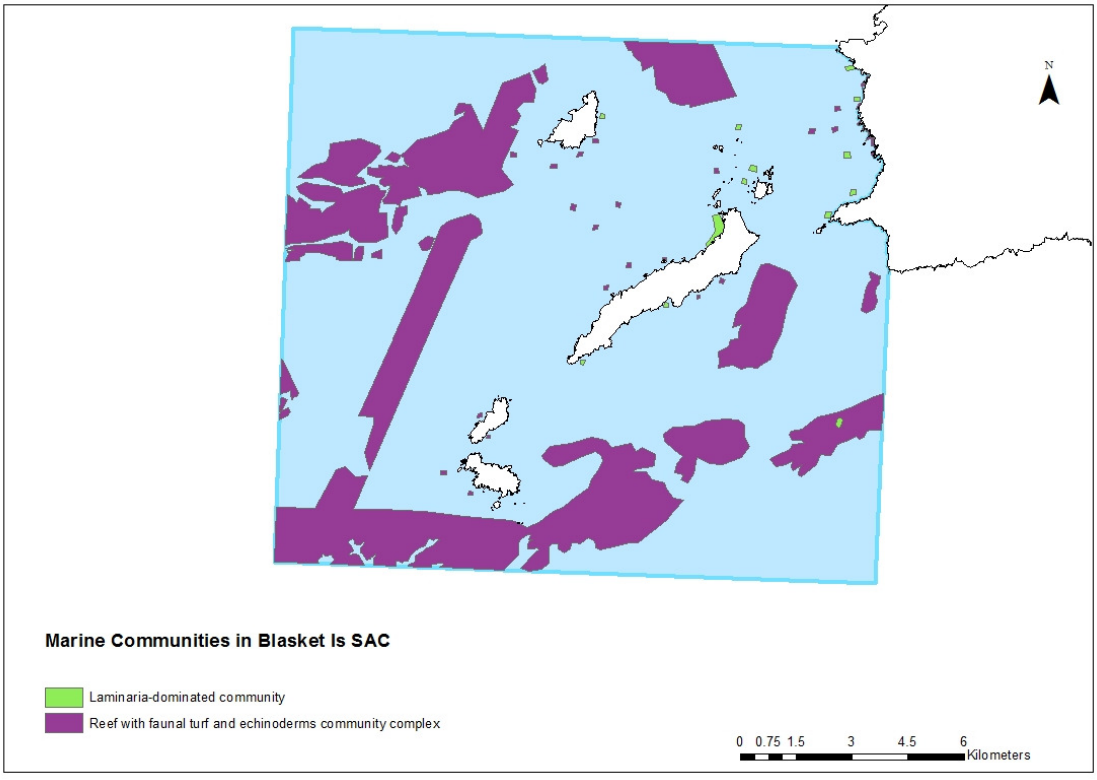

Figure 100. Marine Community map for Blasket Islands SAC

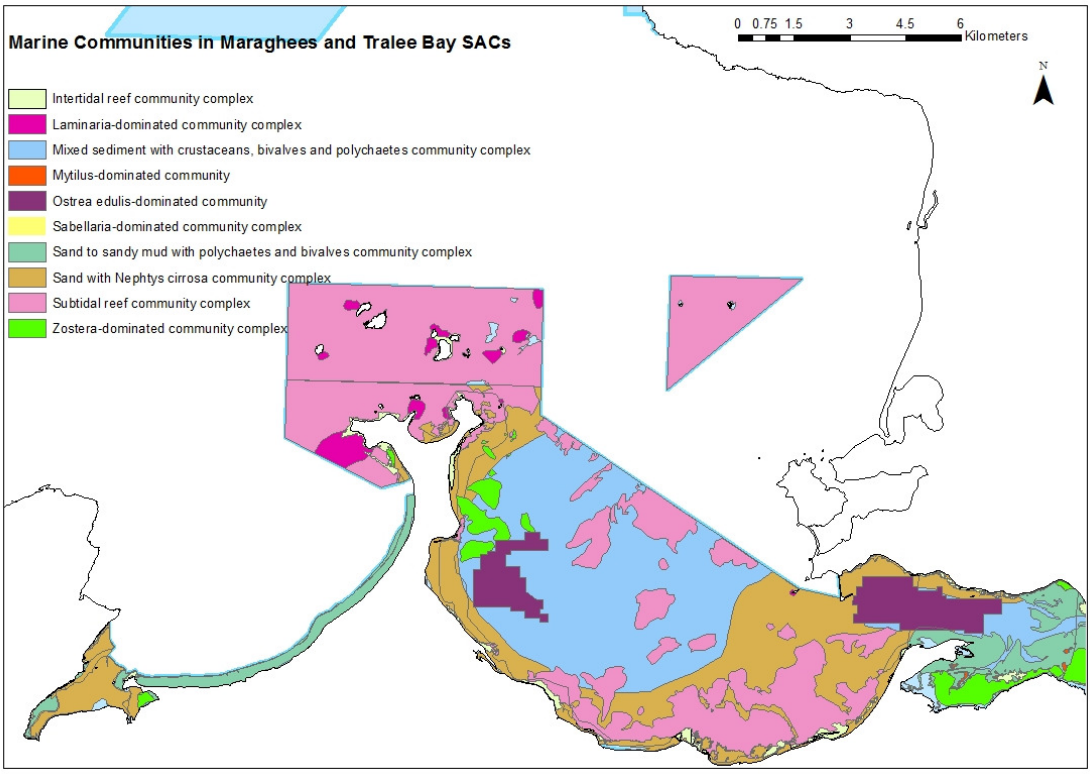

Figure 101. Marine Community map for Magharees and Tralee Bay SACs

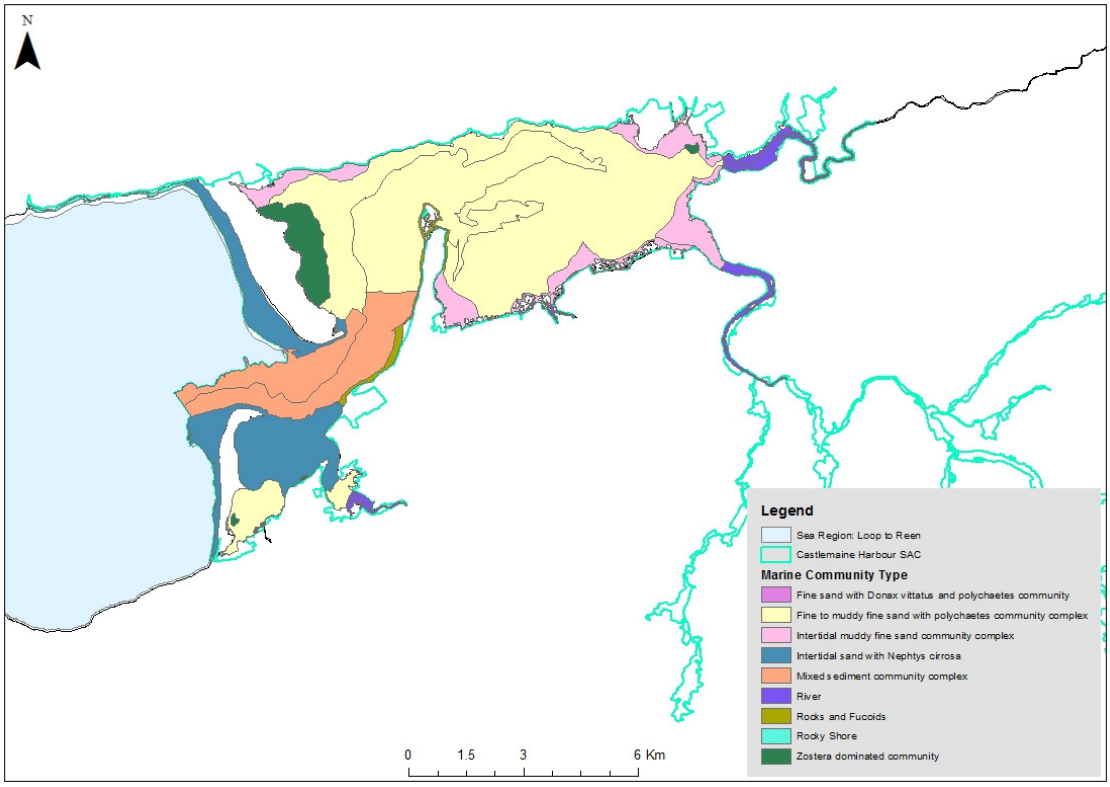

Figure 102. Marine Community map for SAC 343 (Castlemaine Harbour)

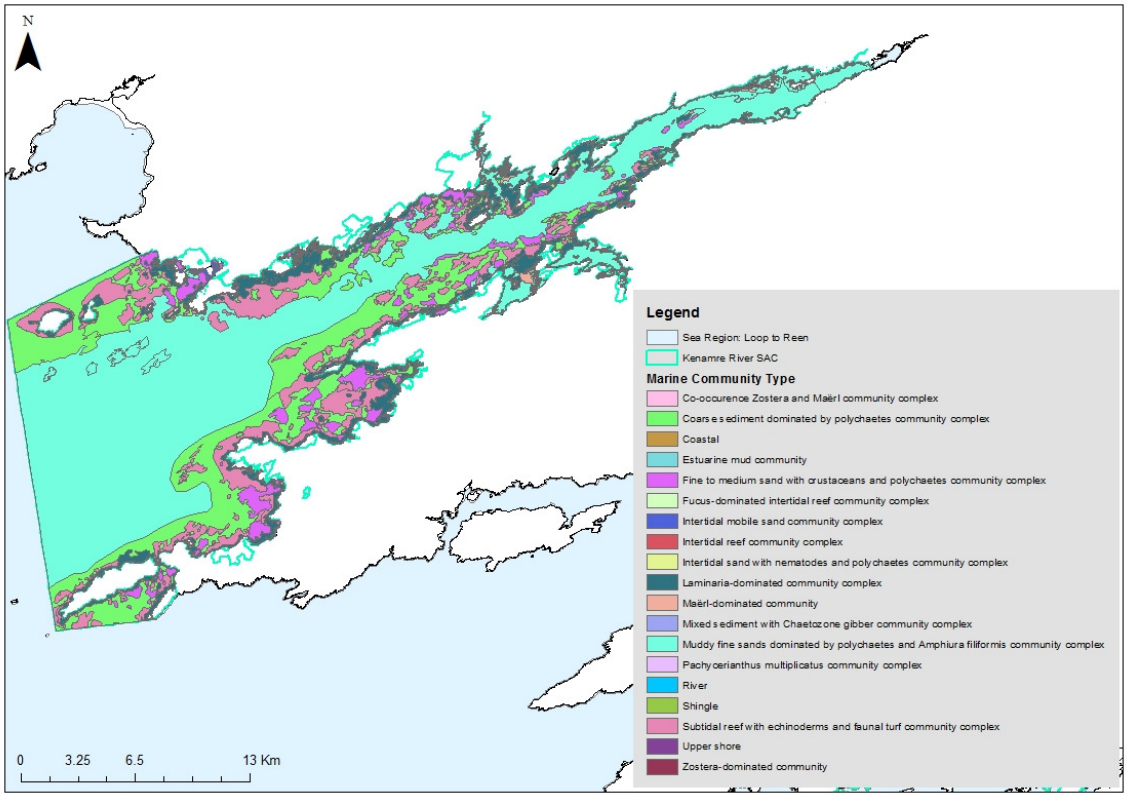

Figure 103. Marine Community map for SAC 2158 (Kenmare River)

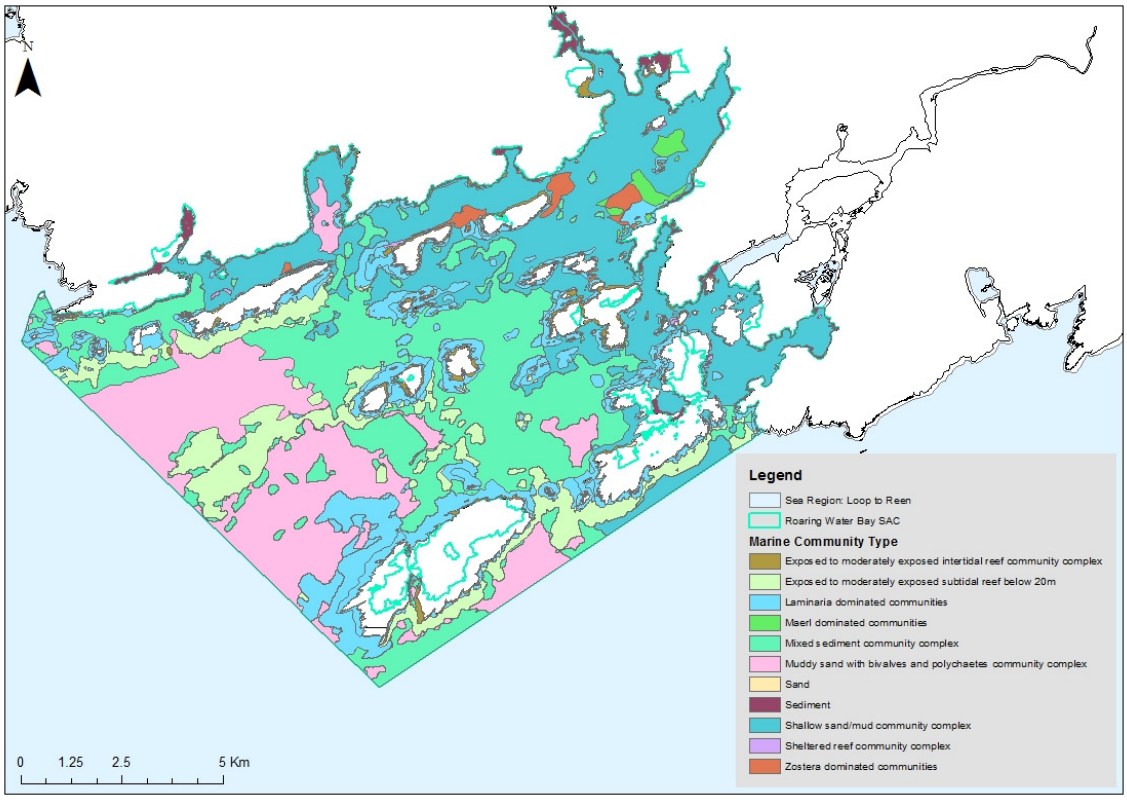

Figure 104. Marine Community map for SAC 101 (Roaringwater Bay).

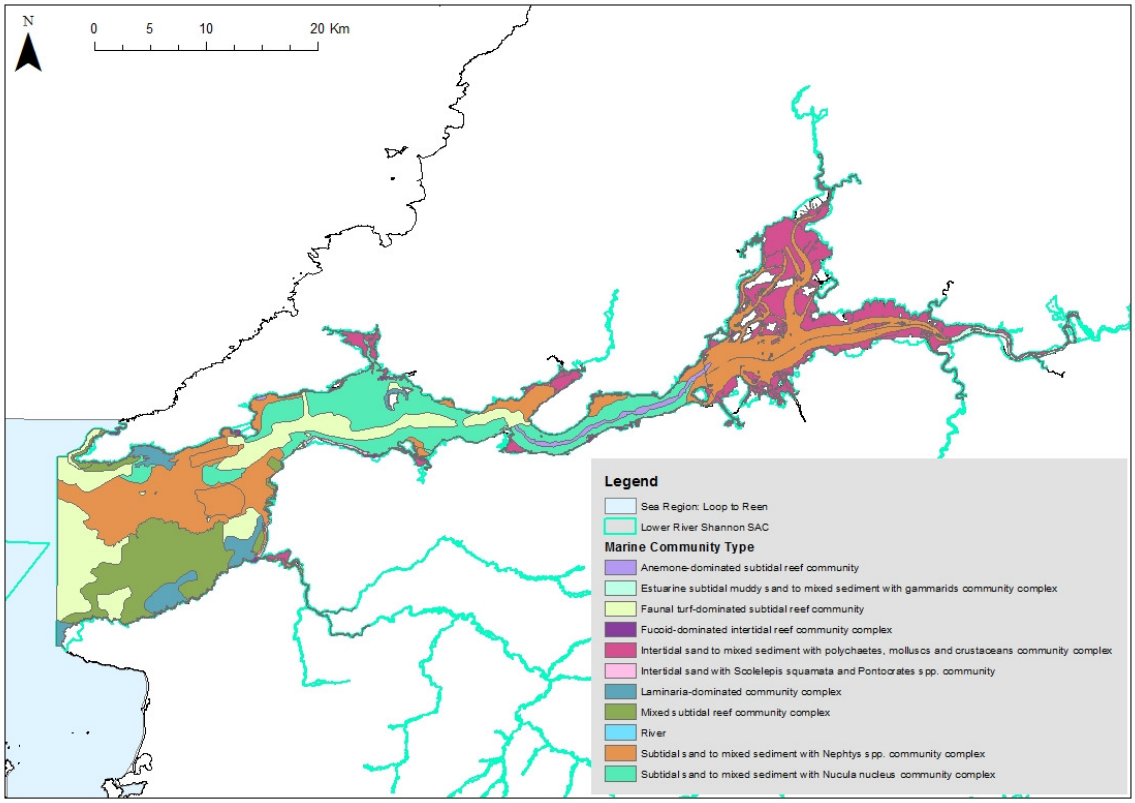

Figure 105. Marine Community map for SAC 2165 (Lower River Shannon)

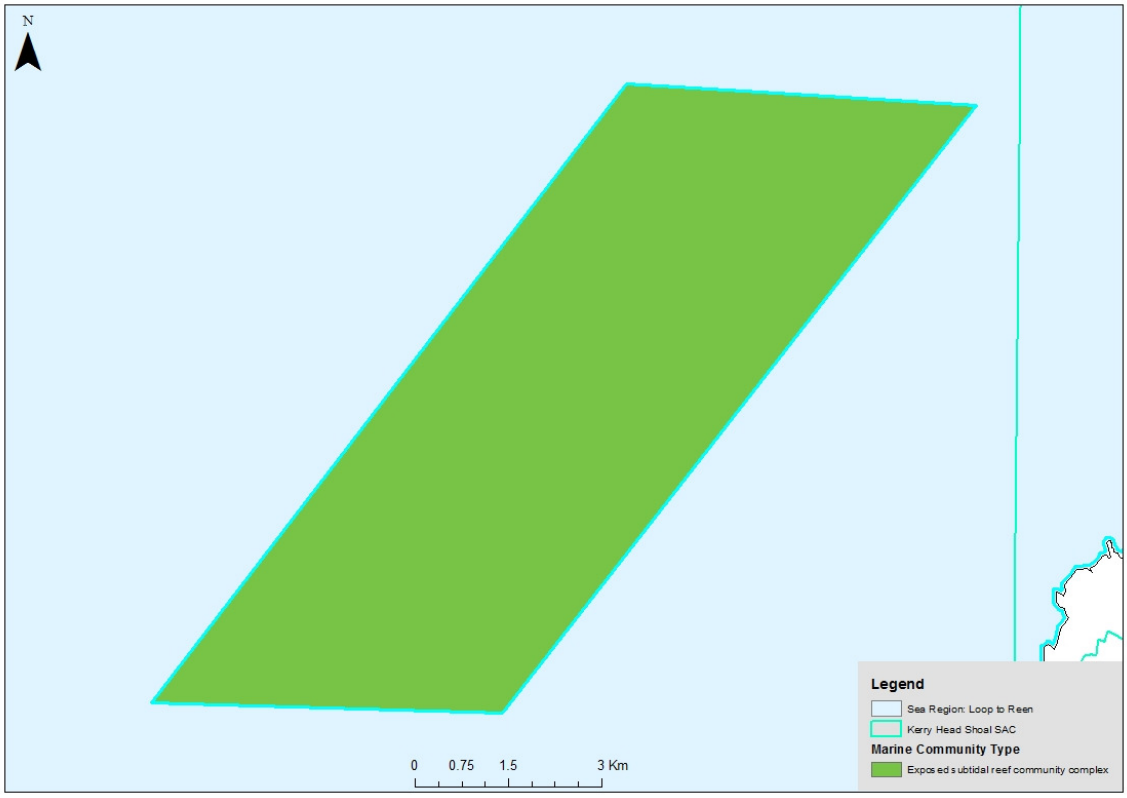

Figure 106. Marine Community map for SAC 2263 (Kerry Head shoal)

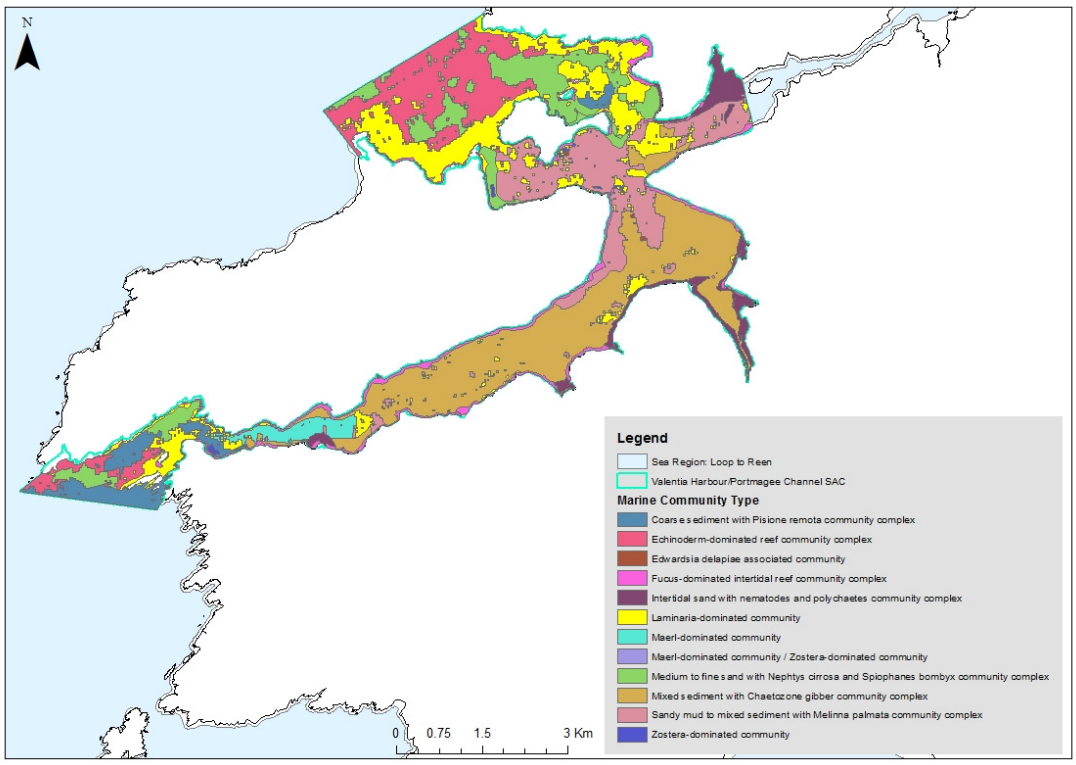

Figure 107. Marine Community map for SAC 2262 (Valentia Harbour/Portmagee Channel)

10.1.3.2.5 SAC MCT maps Reen Point to Carnsore Point

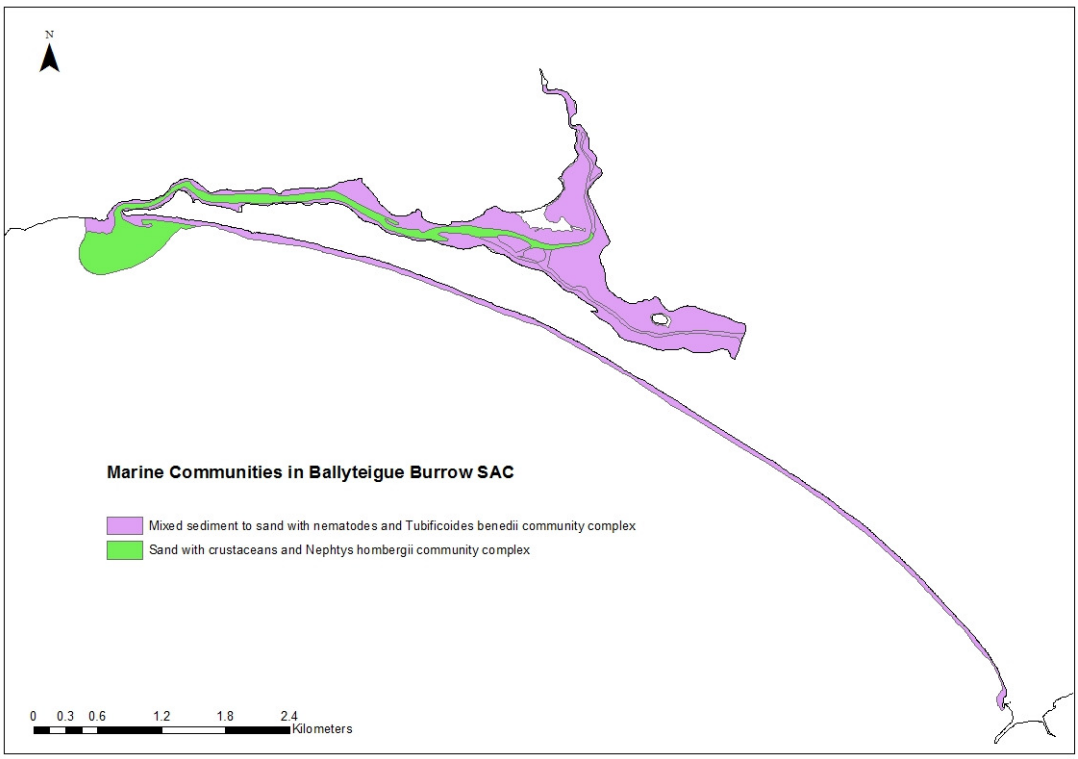

Figure 108. Marine Community map for Ballyteigue Burrow SAC

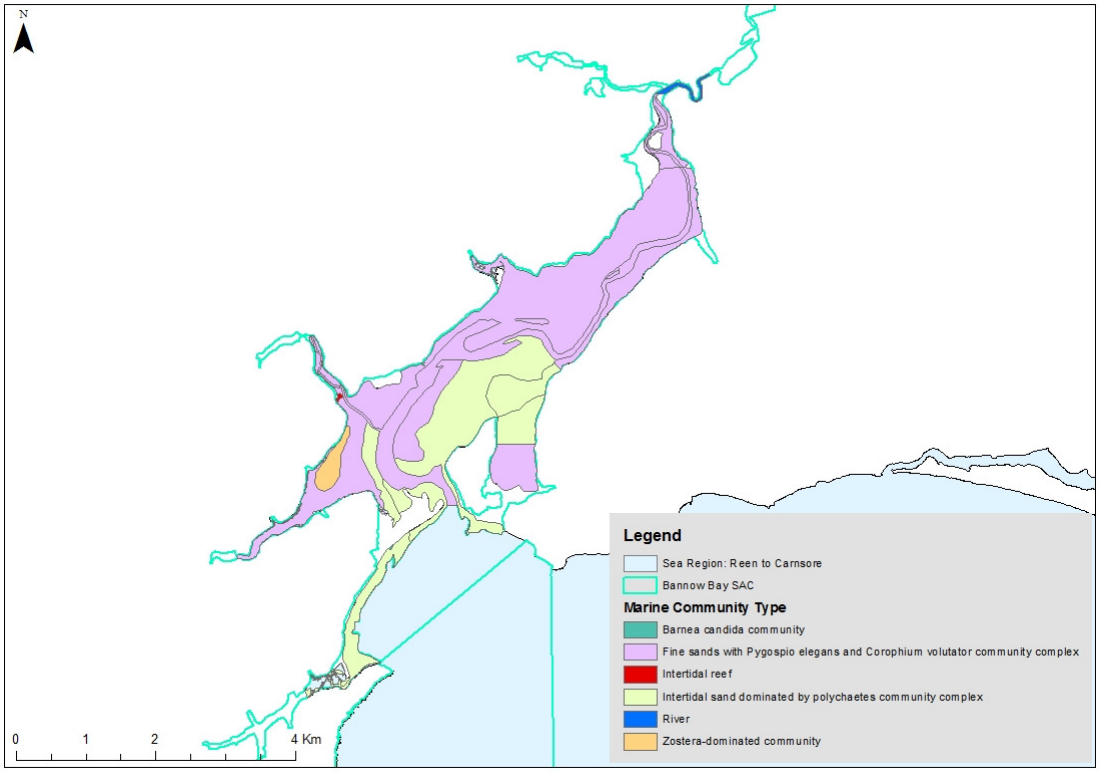

Figure 109. Marine Community map for SAC 697 (Bannow Bay)

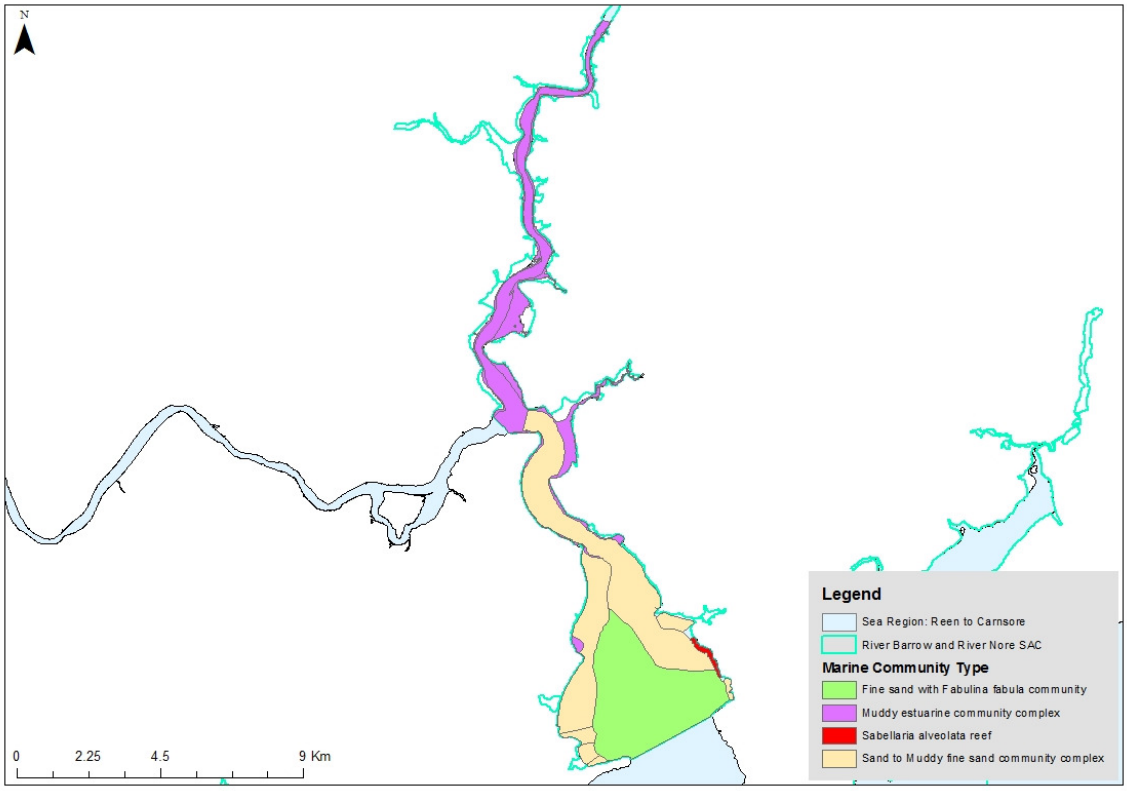

Figure 110. Marine Community map for SAC 2162 (River Barrow/River Nore)

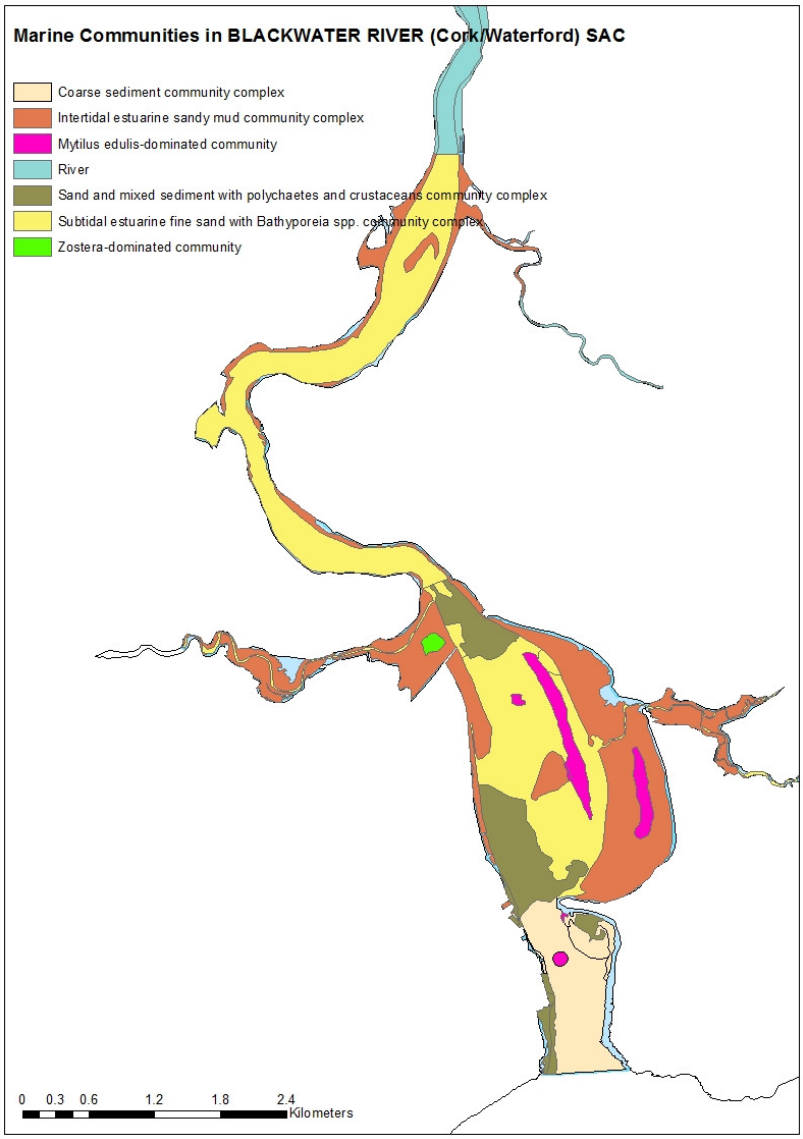

Figure 111. Marine Community map for SAC 2170 (Blackwater River Cork/Waterford)

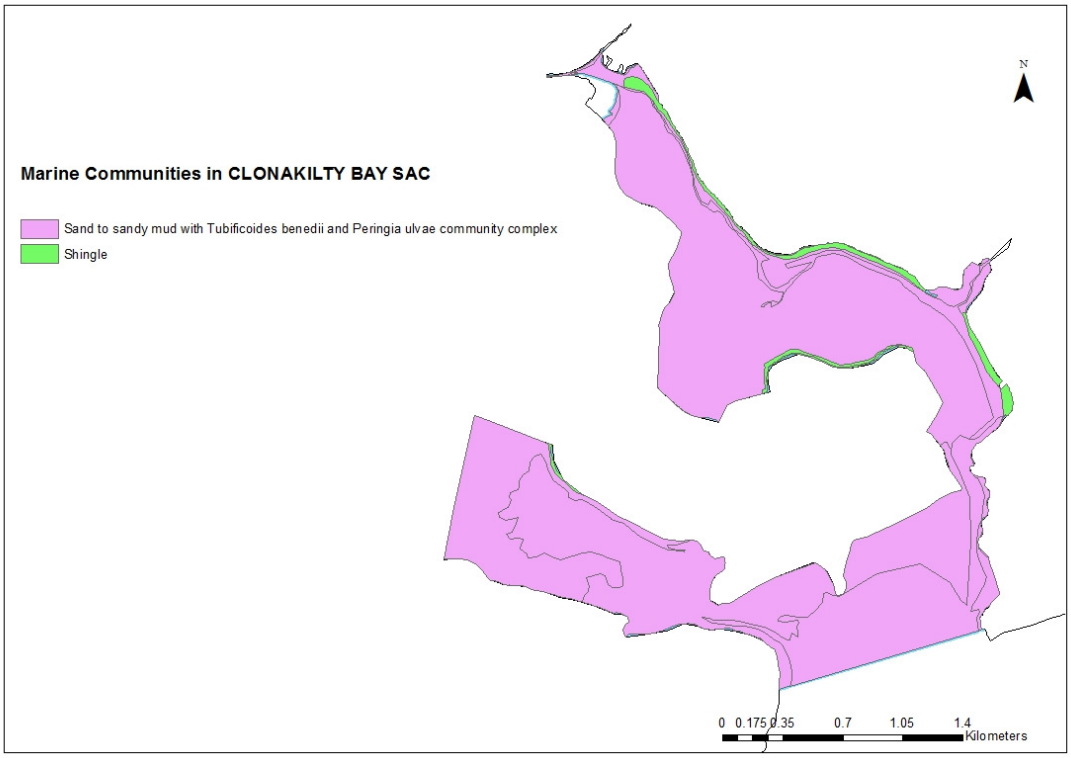

Figure 112. Marine Community map for Clonakilty Bay SAC

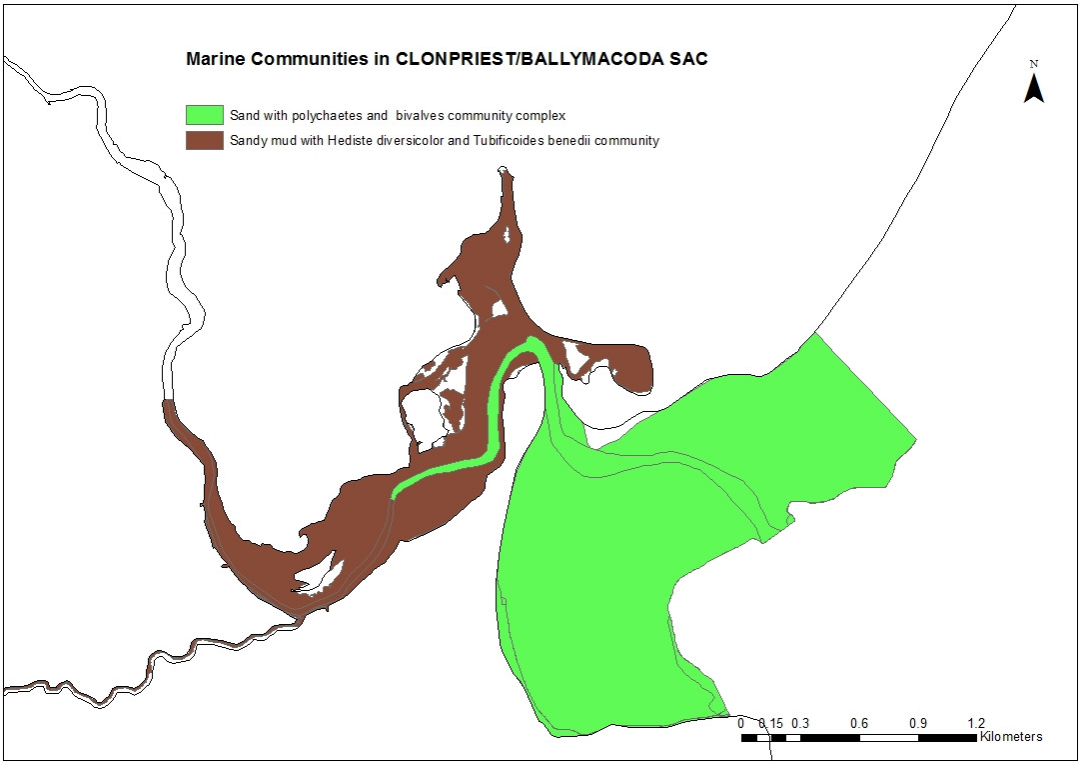

Figure 113. Marine Community map for Clonpriest/Ballymacoda SAC

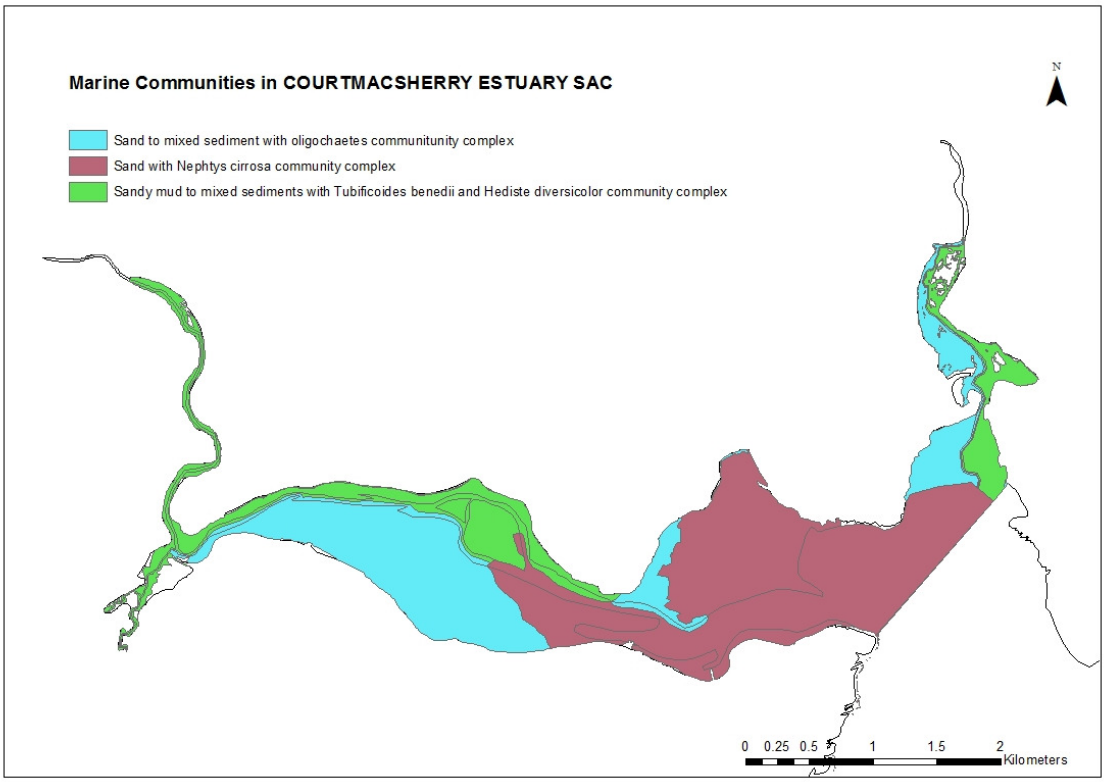

Figure 114. Marine Community map for Courtmacsherry Estuary SAC

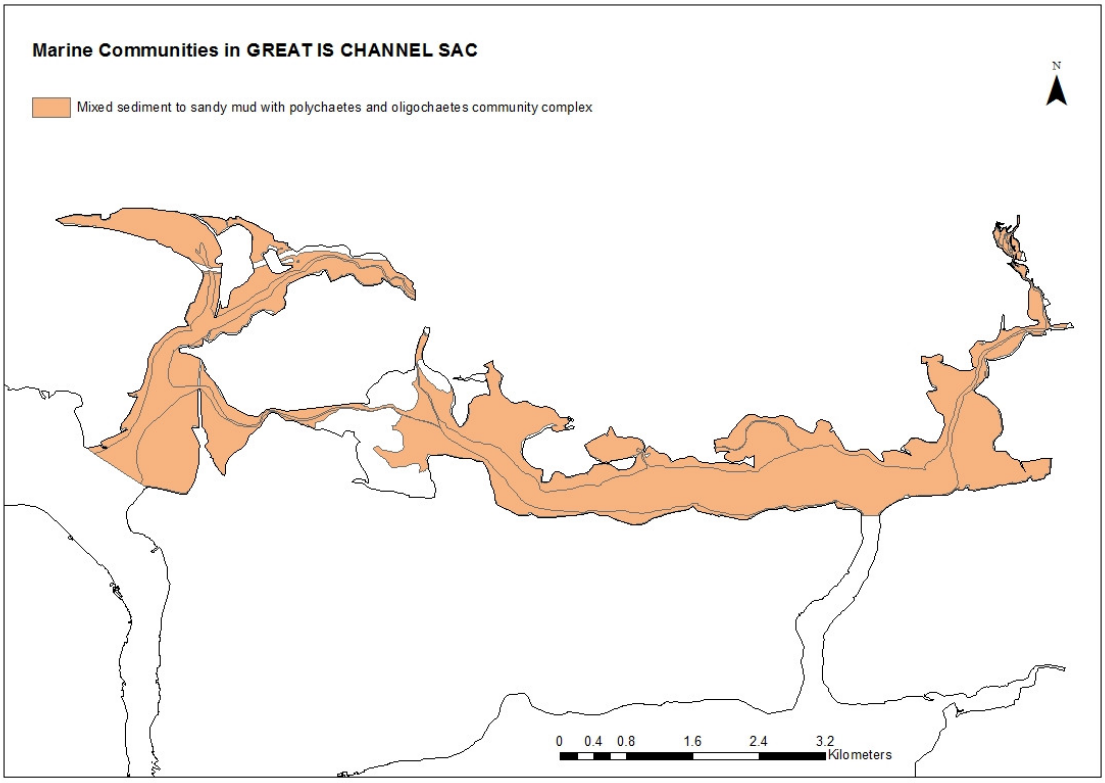

Figure 115. Marine Community map for Great Island Channel SAC

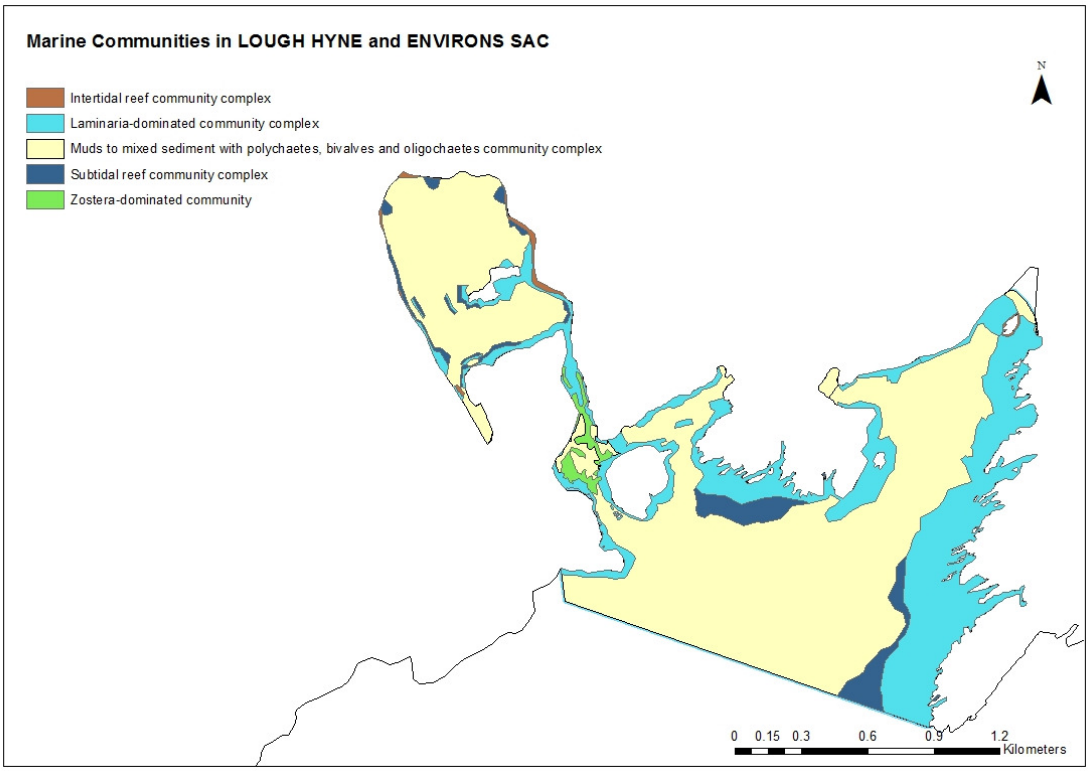

Figure 116. Marine Community map for Lough Hyne and Environs SAC

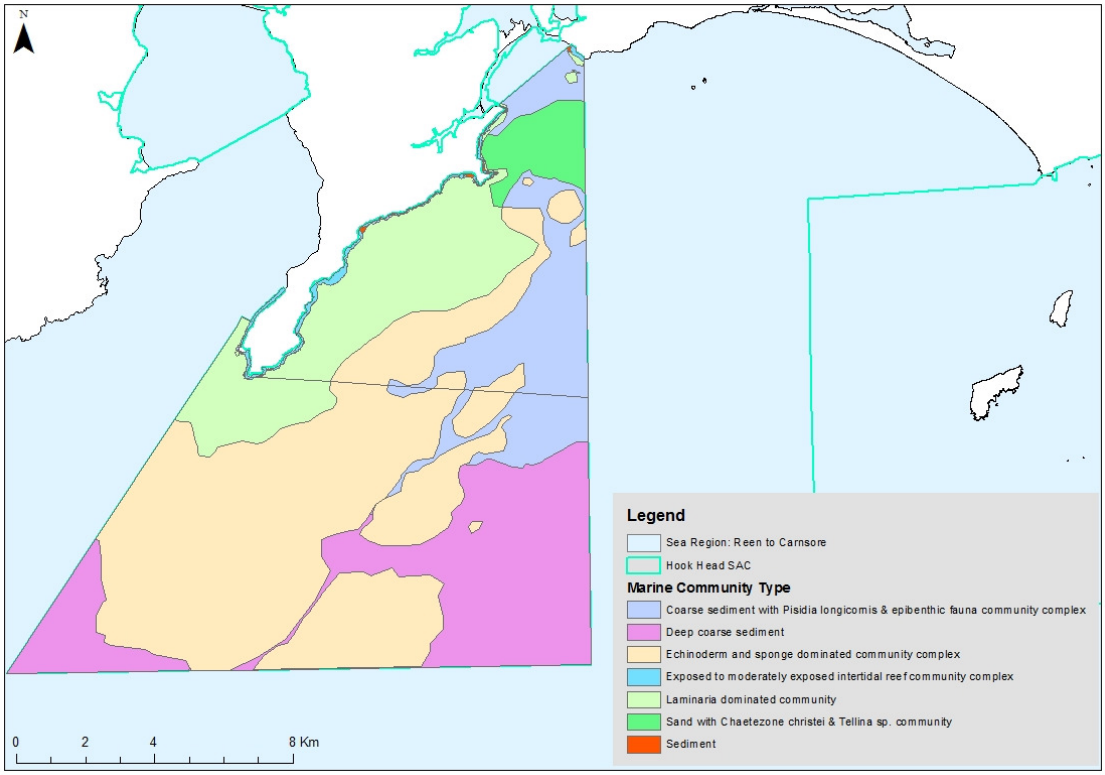

Figure 117. Marine Community map for SAC 764 (Hook Head)

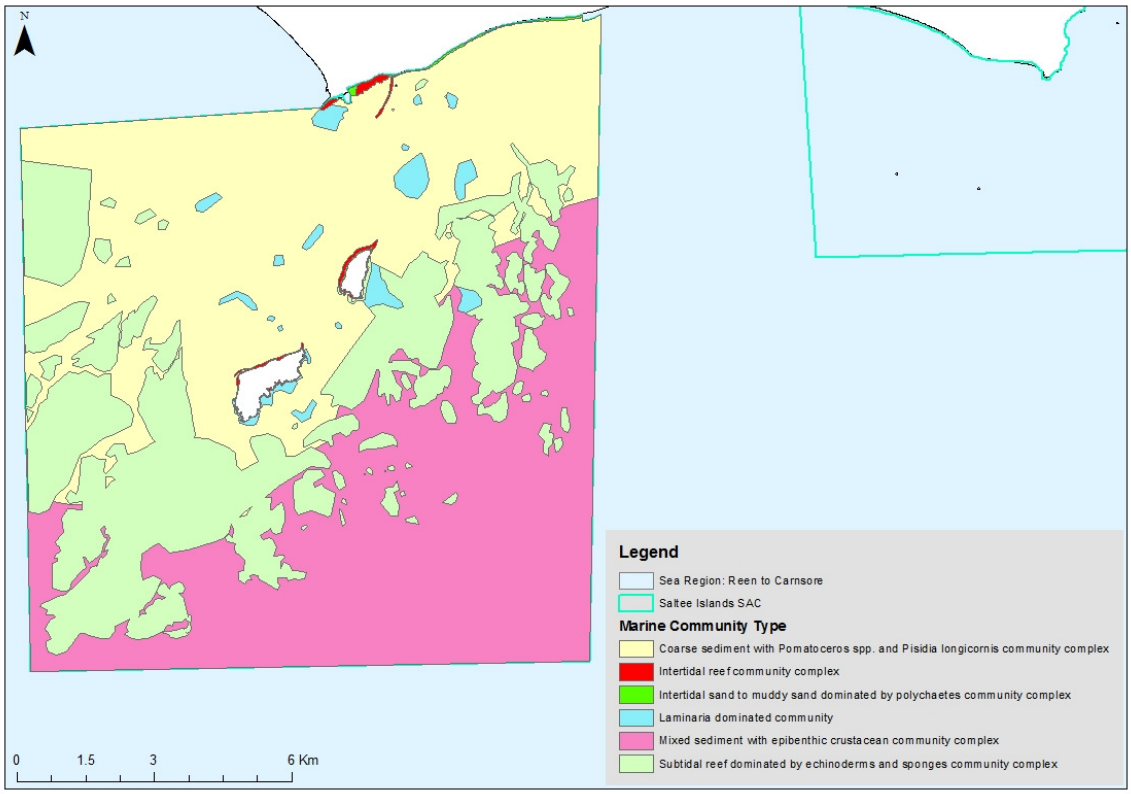

Figure 118. Marine Community map for SAC 707 (Saltee Islands)

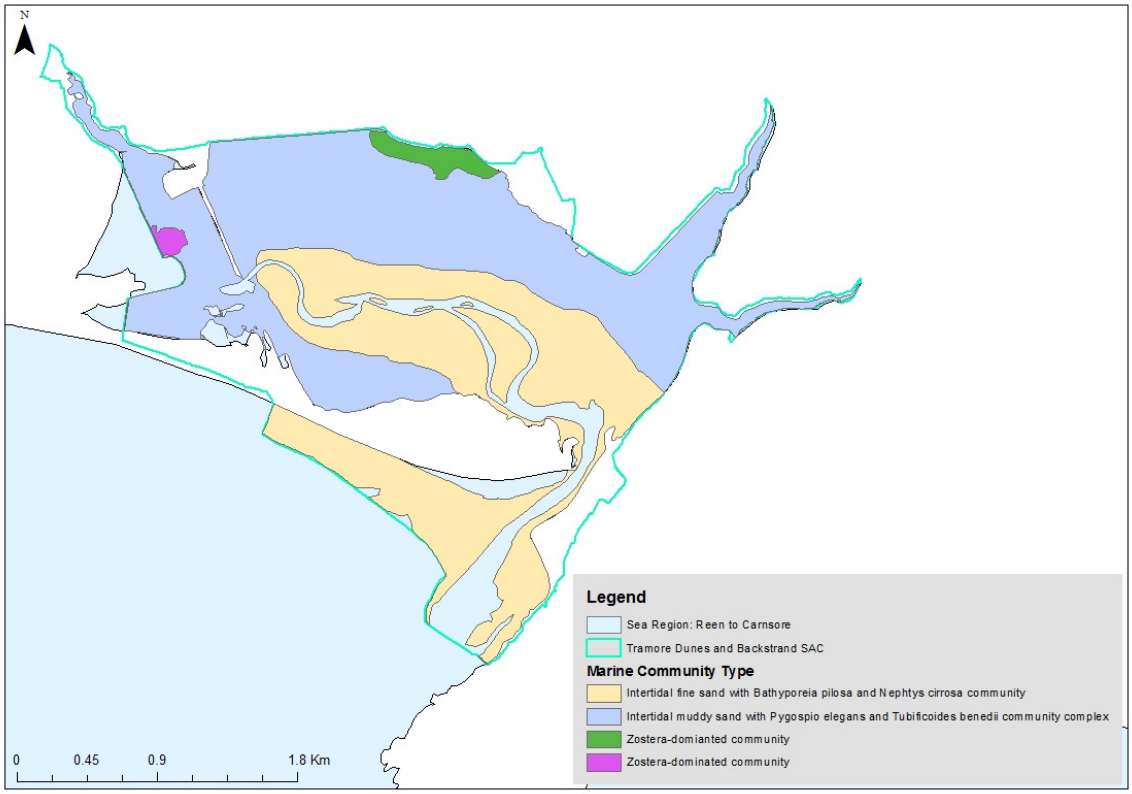

Figure 119. Marine Community map for SAC 671 (Tramore Dunes and Backstrand)

10.1.3.3 Species

The following marine species are listed in Annex II and Annex IV of the Directive.

- Annex IV: Bottle-nosed dolphin (Tursiops truncatus) [1349]
- Annex IV: Harbour porpoise (Phocoena phocoena) [1351]
- Annex II: Grey seal (Halichoerus grypus) [1364]
- Annex II: Harbour seal (Phoca vitulina) [1365]
- Annex II: Otter (Lutra lutra) [1355]
- Annex II: Salmon (Salmo salar) [1106]
- Annex II: Sea lamprey (Petromyzon marinus) [1095]
- Annex II: Twaite shad (Alosa fallax fallax) [1103]

Conservation objectives and attributes for these species are described in the Risk Assessment of each species in 12.2.

11 Risk Assessment screening

A screening exercise is an initial evaluation of whether an activity could have or could not have an effect on QIs within SACs or on those QIs if they move out of the protected sites. The screening process may therefore lead to exclusion of certain activities, projects or plans from appropriate assessment or risk assessment, thereby simplifying the assessments, if this can be justified, unambiguously, using limited and clear cut criteria. Screening should be used as a conservative filter that minimises the risk of false negative risk finding.

11.1 Fishery Activity Screening

11.1.1 Screening methods

Screening filters have been applied to the matrix of QIs and fisheries activities to determine if they can be excluded from further assessment as follows and as shown in Figure 159.

1. Site screening: some coastal sites included in the geographic scope of the assessment do not have any marine habitats or species which could interact with fisheries either within or out with the site. These **sites** are screened out and not considered further
2. QI screening: In sites which have marine designated features some QIs, for such sites, are not marine and have no possible interaction with fisheries. These **QIs** are screened out and are not considered further
3. Fishery screening 1: In some sites which have marine designated features there is no fishing activity currently or likely to be in the future. These **sites are screened out following review of fishing activity data**
4. Fishery screening 2: In a given region, across all sites in that region which have marine designated features, there is usually a limited range of fisheries present. **Fisheries** that are currently or, as reasoned, in the future to be absent **are screened out following review of fishing activity data**. These fisheries are not retained in the risk scoring matrix.

QI-fishery interactions that are **retained** for assessment therefore **include** the following

1. Where a fishery currently or potentially in the future overlaps spatially with a QI in the site
2. Fishing activity that may be outside of the site but which can interact with the QI because of the behaviour of the species (eg. marine mammals foraging or migrating between sites). In these situations the geographic scope of the assessment is determined on a case by case basis with the objective of capturing all activity that may interact with the QI for which the site is designated. This is the reason for extending the scope fo the assessment to areas outside the site.

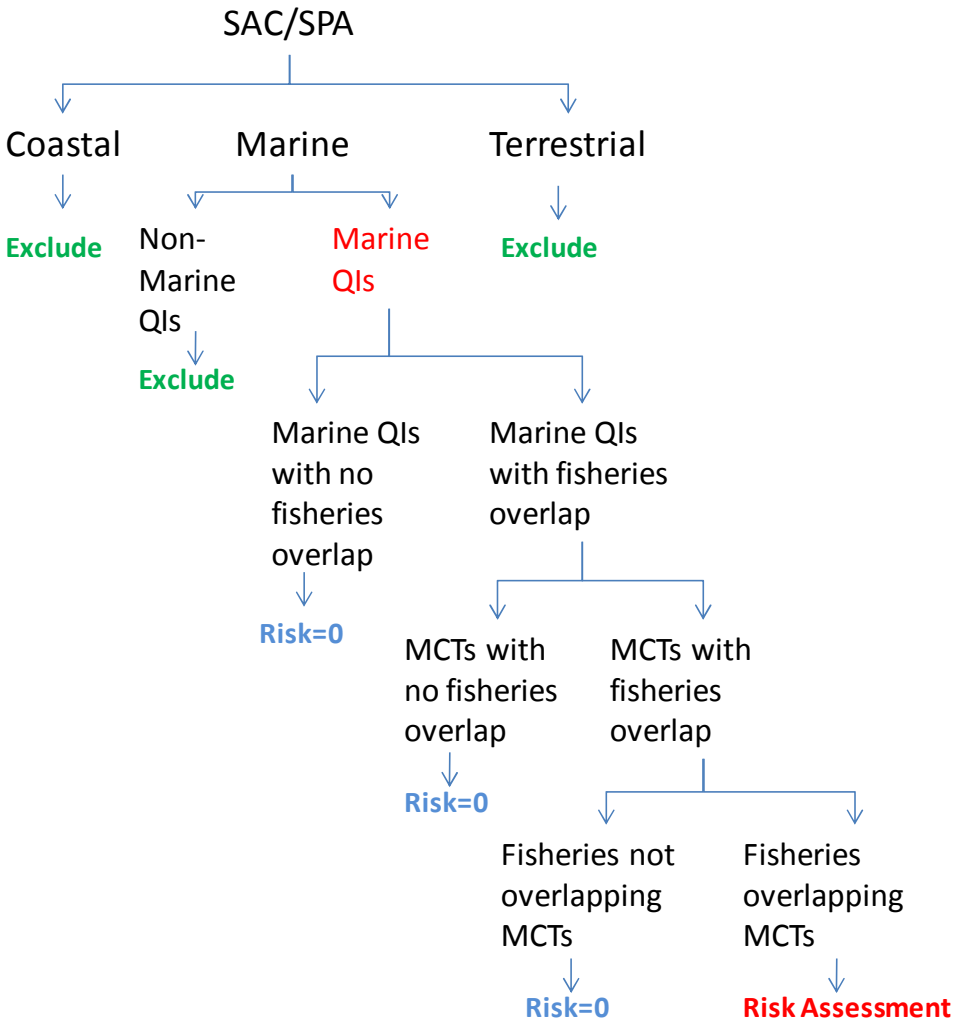

Figure 159. Sequence of decisions for screening and risk assessment (RA) of fisheries interactions with Natura sites, qualifying interests (QIs) and marine community types (MCTs). Exclusion of non-marine features from RA does not involve analysis of spatial fisheries data. For all Marine QIs some analaysis of fishing data is used to exclude or retain QIs within a given site for risk assessment. For marine community types with overlapping generally only a subset of such fisheries will occur in any MCT in a given site. Marine QIs and MCTs with no fishery overlaps are exposed to zero risk. Fisheries not overlapping with an MCT pose a zero risk by default. The specific fisheries which overlap with each MCT are subject to RA.

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11.1.2 Screening outcome

11.1.2.1 Sites with no marine designated features

Some coastal sites were screened out completely as none of their QIs are marine or have any potential to interact with marine fisheries either within or out with the site (Table 9).

Table 9. Sites screened out from risk assessment. These sites have no marine QI with which fisheries could overlap. The number in the table is the number of qualifying interests in the site

	Region				
Site name	Benwee to Quiqleys Pt	Loop to Reen Point	Reen point to Carnsore	Slyne to Benwee	Slyne to Loop
Akeragh, Banna and Barrow Hbr		9			
Aran Island (Donegal) cliffs	5				
Ardmore Hd			2		
Ballyhoorisky Point to Fanad Head	6				
Ballinskelligs Bay		3			
Durnesh Lough	2				
Fanad Head					
Galley Head to Duneen Head					
Inagh River estuary					5
Inisbofin, Omey Island and Turbot Island					
Inistrahull	1				
Lackan Saltmarsh and Kilcummin Hd	5				
Mullet Peninsula					
Omey Island machair				3	
Seven Heads					
Sheeps Head to Toe Head					

11.1.2.2 QIs screened out at all sites

Within some sites which were not screened out completely some QIs are not marine and have no possible interaction with marine fisheries either within or out with the site (Table 10).

Table 10. QIs screened out from risk assessment. These QIs have are not marine and have no possible interaction with fisheries. The number in the table is the number of sites in which they are designated features. Listed alphabetically.

	Pending		Published				
Qualifying interest	Benwee to Slyne	Quigley to Benwee	Benwee to Slyne	Loop to Reen	Quigley to Benwee	Reen to Carnsore	Slyne to Loop
(Juniperus communis) formations on heaths or calcareous grasslands [5130]							1
(Salicornia) and other annuals colonizing mud and sand [1310]							1
Alkaline fens [7230]		1	2		2		1
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]				4		2	
Alpine and Boreal heaths [4060]		2			1		2
Annual vegetation of drift lines [1210]			2	2	2	5	
Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150]		2	1		1	2	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]		1	3	5	4	8	2
Blanket bog (*active only) [7130]		2					
Calaminarian grasslands of the Violetalia calaminariae [6130]				1			
Calcareous fens with (Cladium mariscus) and species of the Caricion davallianae* [7210]							1
Coastal lagoons [1150]	1		2	2	4	1	5
Decalcified fixed dunes with Empetrum nigrum [2140]		2			1		
Depressions on peat substrates of the Rhynchosporion [7150]		1					
Dunes with Salix repens ssp.argentea (Salix arenariae) [2170]		1		2	2		1
Embryonic shifting dunes [2110]		1	2	1	7	5	3
European dry heaths [4030]	1	1	1	3	2	1	3
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]		1	1	3	12	5	2
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]			1				

Humid dune slacks [2190]		1		2	6		1
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]						1	
Juniperus communis formations on heaths or calcareous grasslands [5130]		1	1		3		1
Limestone pavements [8240]					1		4
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510]		1	1				5
Machairs [21A0]		1	3		5		3
Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) [1420]						2	
Mediterranean salt meadows (Juncetalia maritimi) [1410]		1	1	4	3	6	2
Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae) [6410]		1	1	2	1		
Natural euthrophic lakes with Magnopotamion or Hydrocharition-type vegetation [3150]			1				
Northern Atlantic wet heaths with Erica tetralix [4010]	1	1					
Old sessile oak woods with Ilex and Blechnum in British Isles [91A0]				1	2	2	
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]	1	1	1		1		
Perennial vegetation of stony banks [1220]			2	5	4	5	5
Petrifying springs with tufa formation (Cratoneurion) [7220]					1	1	2
Salicornia and other annuals colonizing mud and sand [1310]			1	4	1	7	
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) [6210]		1	1		2		5
Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]		2	3	3	10	5	3
Spartina swards (Spartinion maritimae) [1320]				2	1	5	
Submerged or partly submerged sea caves [8330]			1	2	1	2	3
Taxus baccata woods of the British Isles [91J0]						1	
Turloughs* [3180]							1
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]		1		4	2	2	2
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]				1		2	1
Grand Total	4	27	32	53	82	70	60

11.1.2.3 Sites with marine QIs but with no fisheries

A number of sites, with marine QIs, have no marine fisheries currently active within them nor is there any likelihood that fisheries will develop in these sites (Table 11). If the QIs for such sites could be affected by fisheries, outside of the site, then the site is not screened out. There are also other sites with no current fisheries but where there is a possibility that fisheries could develop in them. These sites are **not** screened out.

11.1.2.4 Marine QIs with no fisheries

A number of marine QIs at sites where fisheries occur have no current or future likelihood of fisheries occurring on or affecting that QI. These cases are in effect screened out but are shown in the fishery habitat matrices (green shaded rows) below.

Table 11. SACs with marine QIs but which have no fisheries

Site	Qualifying interest
Ballyteigue Burrow	Estuaries [1130]
	Mudflats and sandflats not covered by seawater at low tide [1140]
Clonakilty Bay	Mudflats and sandflats not covered by seawater at low tide [1140]
Donegal Bay (Murvagh)	Mudflats and sandflats not covered by seawater at low tide [1140]
Great Island Channel	Estuaries [1130]
	Mudflats and sandflats not covered by seawater at low tide [1140]
Mulroy Bay	Large shallow inlets and bays [1160]
	Reefs [1170]
Streedagh Point Dunes	Mudflats and sandflats not covered by seawater at low tide [1140]

12 Risk Assessment Methodology

12.1 Methods

The risk assessment framework follows, where feasible, EC guidance (2012) and includes elements of risk assessment from Fletcher (2005). The qualitative and semi-quantitative framework is described in Marine Institute (2013) and criteria for risk categorization is shown in Table 12 and Table 13 below. The framework uses categorical conditional probability matrices of likelihood and consequence to assess the risk of an activity to a conservation feature. Categorical likelihood and consequence scores for each such 'incident' (fishery-designated feature interactions) is provided by expert judgement and a literature resource which has been pre-compiled for each habitat type defined in the COs.

- Separate conditional probability matrices for habitats and designated species are used to assess risk. In the case of habitats the consequence criteria largely follow the definitions and methodologies used for AA of projects and plans. In the case of species the consequence categories relate to the degree to which populations and their supporting habitats may be negatively affected by the given activity.
- The risk assessment scoring system incorporates guidance on interpreting of the Conservation Objectives provided by NPWS in their site documentation. Overlaps of fishing activities and habitats of over 15% are regarded as a threshold for assessing of impacts. This is distinguished in different consequence scores in the risk assessment scoring system. Non disturbing, non-cumulative disturbing and persistent and cumulative disturbance of habitats by fisheries are also reflected in increasing consequence scores for habitats.
- In the case of species the assessment is estimating if a given fishing activity will cause an adverse effect on the population. This attribute of the conservation objective is disaggregated to different levels of consequence in the risk assessment scores; there may be no effect on any individuals in the population, some individuals may be affected but the population will not be compromised or the effect could be such that the population may decline. Furthermore these effects could develop from different pressures due to fishing activity. In all cases the effects of fisheries can be described using three pressure indicators; by-catch causing mortality, prey depletion and human disturbance. Risk scores are provided for each pressure separately.

Table 12. Risk categorization for fisheries and designated habitat interactions (Marine Institute 2013). The risk score is the product of the consequence and likelihood and signals the degree to which mitigations may be required to ensure that COs for QIs / SCIs are protected.

Habitats			**Consequence criteria**					
			Activity is not present or has no contact with habitat	Activity occurs but is non-disturbing to habitat	Up to 15% of habitat disturbed seasonally	Over 15% of habitat disturbed through fixed or roving fishing activity seasonally	Over 15% of habitat disturbed persistently leading to cumulative impacts	Impact is effectively permanent due to severe habitat alteration
			No change due to fishing activity can occur	Individual effects on characterising species but this is undetectable relative to background natural variability	Seasonal change in characterising species and community structure and function	Seasonal change in characterising species and structure and function	Persistent change in characterising species, structure and function	Biodiversity reduction associated with impact on key structural species
						Frequency of disturbance < recovery time. Non-cumulative	Frequency of disturbance> recovery time. Cumulative	No recovery or effectively no recovery
Likelihood	**%**	Level	**0**	**1**	**2**	**3**	**4**	**5**
Highly likely	>95	**5**	0	5	10	15	20	25
Probable	50-95	**4**	0	4	8	12	16	20
Possible	20-50	**3**	0	3	6	9	12	15
Unlikely	1-20	**2**	0	2	4	6	8	10
Remote	1	**1**	0	1	2	3	4	5

Table 13. Risk categorization for fisheries and designated species interactions (Marine Institute 2013). The risk score is the product of the consequence and likelihood and signals the degree to which mitigations may be required to ensure that COs for QIs / SCIs are protected.

Species			**Consequence criteria**					
			Activity is not present and population cannot be affected	Activity present. Individuals in the population affected but effect not detectable against background natural variability	Direct or indirect mortality or sub-lethal effects caused to individuals but population remains self-sustaining	In site population depleted but regularly subvented by immigration. Ex situ or in situ pressures	Population depleted by ex situ and/or in situ fishing pressures. Immigration insufficient to maintain local population	Population depleted and supporting habitat significantly depleted and unable to support population
Likelihood	**%**	Level	**0**	**1**	**2**	**3**	**4**	**5**
Highly likely	>95	**5**	**0**	**5**	**10**	**15**	**20**	**25**
Probable	50-95	**4**	**0**	**4**	**8**	**12**	**16**	**20**
Possible	20-50	**3**	**0**	**3**	**6**	**9**	**12**	**15**
Unlikely	1-20	**2**	**0**	**2**	**4**	**6**	**8**	**10**
Remote	1	**1**	**0**	**1**	**2**	**3**	**4**	**5**

13 Risk assessment of the impacts of fisheries

13.1 Habitats

13.1.1 Quigleys point to Benwee Head

- There were 1659 possible fishery marine QI/MCT interactions in the Benwee Hd. to Slyne Hd. Region.
- 1534 possible fishery – marine QI/MCT interactions in the fishery-habitats matrix for this region did not occur and were, therefore, not assessed further.
- 125 fishery – marine QI/MCT interactions, involving 15 fishing metiers were recorded in the Quigleys Pt to Benwee Hd region. Presence/absence and overlaps between fisheries and MCTs are in Table 14 and risk scores for these interactions are in Table 15. The risk profile is summarized in Figure 121.

13.1.1.1 Dredge and and gathering fisheries for cockles

- Risk scores of 16 were given to cockle fisheries in intertidal mud and sand flats in Ballysadare Bay, Gweedore Bay, Cumeen Strand/Drumcliffe Bay, Killala Bay, Sheephaven Bay and west of Ardara/Maas Rd.
- Only Cumeen Strand/Drumcliffe Bay is currently classified for production of cockles. A hand gathering fishery occurs in this area. There are no cockle fisheries in the other areas.
- No cockle stock surveys have been undertaken in these sites. The commercial potential and the likehihood of a request for classification as cockle production areas is, therefore, unknown.
- Although only a limited hand gatherer fishery for cockle occurs in 1 area the risks posed to habitats by potentially unlimited fisheries for cockle in these areas is high.
- ABPMer (2012, Mixed sediments report, Appendix F, Table III.2) summarise the effects of physical disturbance and extraction caused by dredging in intertidal muds and sands. Effects include changes in faunal abundance, species composition and loss of fine sediment fractions. These changes have knock on impacts on waterbirds.
- The pressures imposed by dredging and hand gathering of cockles are the same; surface and shallow disturbance of sediments and extraction. The consequences therefore for sedimentary habitat community distribution and composition may also

be the same although the likelihood of a given consequence is lower for hand gathering given that the scale and intensity of hand gathering operations is usually less would be the case for dredge fisheries.

- Sensitivity (resistance * resilience) varies across species and marine community and recovery will depend on the intensity and frequency of disturbance in each habitat type
- **Uncontrolled cockle fisheries in these habitats pose a significant risk to habitat community structure and function**

13.1.1.2 Dredge fishing for oyster

- A fishery for native oyster occurs in L. Swilly. This fishery, and a five year plan for it, was subject to Article 6.3 assessment in March 2013. The plan was considered broadly consistent with the conservation objectives for habitats in L. Swilly. However, the plan has not been implemented.
- **The current unlimited fishery poses a high risk to the *Ostrea edulis* dominated community in L. Swilly. Oyster density is significantly reduced by the fishery and in parallel with infrequent or irregular recruitment which is characteristic of native oyster stocks there is a real risk of population collapse.**

13.1.1.3 Dredging for razor clams

- A fishery for razor clams has been proposed in the Rutland Is. channel and at Kincasslagh. The fishery will use hydraulic dredges to fish.
- The fishery will occur on sedimentary habitats but in close proximity to sensitive *Zostera* habitat
- **Uncontrolled or unlimited fishing for razor clams poses a risk to sedimentary habitats in Rutland Is. Indirect downstream effects are possible on *Zostera*.**

13.1.1.4 Dredging for scallop and bottom trawling for demersal fish

- **Scallop dredging and bottom trawling potentially pose a moderate risk to sandbank habitats designated at Hemptons Bank north of Inishowen (ABPMer 2012. Sands report. Annex F, Table II.9).**
- Conservation Objectives have not been published for the site.

13.1.1.5 Pot fisheries for crab and lobster

- Potting in sedimentary habitats in the sites is thought to pose low risk to these habitats. It is probable that there will be no change to characterizing species in these habitats
- Pot fishing for lobster and crab and associated trammel netting for bait may (likelihood = 3) cause seasonal changes to reef fauna. Pressure from pot fisheries arises from the physical abrasion caused by pots and ropes and the shallow disturbance effect of anchors on reef and edge of reef habitats. Footprints are assumed to be greater than 15% of reef habitat where COs are not published (consequence = 3). The intensity of the activity is not thought to be high compared to other coastal areas in the sites identified (Rutland Is and sound, Tory Is. coast, Rathlin O'Beirne and Gweedore Bay and Islands.). Effects are unlikely to be cumulative (ABPMer 2012. Reefs report. Annex F, Table VIII.14)
- Pot fishing may pose a moderate risk (12) to seagrass in Rutland Island and sound. Sea grass is sensitive to high intensity potting (5 pots per hectare hauled daily). Recovery depends on the scale of the impacted area (ABPMer 2012. Saltmarh and seagrass. Annex F, Table VIII.9).
- **The intensity of pot fishing in seagrass in Rutland Is may have negative impacts on the quality and extent of seagrass.**

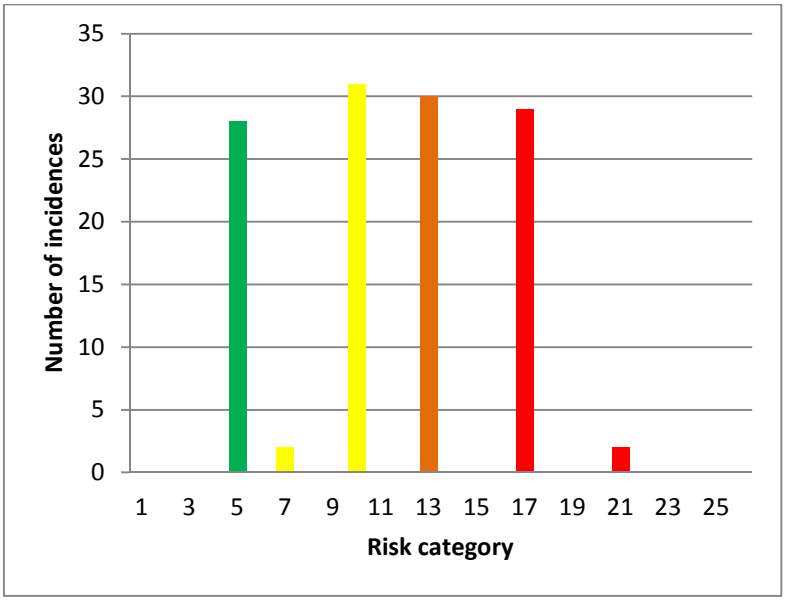

Figure 121. Risk profile for fisheries habitat interactions in the Quigleys Point to Benwee Head region. Colours refer to the level of risk as outlined in Table 12.

Table 14. Presence / absence and spatial overlaps of fisheries and habitats in SACs in the Quigleys Pt to Benwee Head region. Shaded rows indicate no fishing activity overlap with the QI/MCT. Effectively these QIs or MCTs are screened out.

Site name	COs	QI/SCI	MCT	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Dredge - scallop	Dredge oyster	Dredge - razor clam	Dredge cockle	Gill net	Trammel netting bait	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines
Ballyness Bay	Published	Estuaries [1130]	Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballyness Bay	Published	Estuaries [1130]	Mobile sand community complex	Yes	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballyness Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment to sandy mud with oligochaetes and polychaetes community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballyness Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mobile sand community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballysadare Bay	Published	Estuaries [1130]	Intertidal sand with Angulus tenuis community complex	No	0	0	0	0	0	0	0	78	0	0	0	0	0	78	0
Ballysadare Bay	Published	Estuaries [1130]	Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex	No	0	0	0	0	0	0	0	41	0	0	0	0	0	41	0
Ballysadare Bay	Published	Estuaries [1130]	Zostera-dominated community	No	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0.3	0
Ballysadare Bay	Published	Estuaries [1130]	Fine sand with polychaetes community complex	No	0	0	0	0	0	0	0	94	0	0	0	0	0	94	0

Ballysadare Bay	Published	Estuaries [1130]	Sand with bivalves, nematodes and crustaceans community complex	No	0	0	0	0	0	0	0	62	0	0	0	0	0	62	0
Ballysadare Bay	Published	Estuaries [1130]	Intertidal reef community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballysadare Bay	Published	Estuaries [1130]	Subtidal reef community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballysadare Bay	Published	Estuaries [1130]	Shingle	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with Angulus tenuis community complex	No	0	0	0	0	0	0	0	71	0	0	0	0	0	71	0
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex	No	0	0	0	0	0	0	0	41	0	0	0	0	0	41	0
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera-dominated community	No	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0.3	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine to very fine sand community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Large shallow inlets and bays [1160]	Fine to very fine sand community complex	Yes	17	20	20	0	0	0	0	0	38	20	0	1	0	0	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	43	1	43	0	0	0	0	0	33	1	0	0	0	0	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	43	1	43	0	0	0	0	0	33	1	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Intertidal fine sand with Peringia ulvae and Pygospio elegans community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Estuarine mixed sediment to sandy mud with Hediste diversicolor and oligochaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Mytilidae-dominated community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Fine sand with Angulus spp. and Nephtys spp. community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Sand to mixed sediment with amphipods community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal fine sand with Peringia ulvae and Pygospio elegans community complex	No	0	0	0	0	0	0	0	62	0	0	0	0	0	62	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Estuarine mixed sediment to sandy mud with Hediste diversicolor and oligochaetes community complex	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand with crustaceans and Scolelepis (Scolelepis) squamata community complex	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilidae-dominated community complex	No	0	0	0	0	0	0	0	91	0	0	0	0	0	91	0
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand with Angulus spp. and Nephtys spp. community complex	No	0	0	0	0	0	0	0	34	0	0	0	0	0	34	0
Gweedore Bay and Islands	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	14	14	0	0	0	0	0	0	0	14	0	0	0	0	0
Gweedore Bay and Islands	Published	Reefs [1170]	Reef community complex	Yes	3	3	0	0	0	0	0	0	0	3	0	0	0	0	0
Hempton's Turbot Bank	Pending	Sandbanks which are slightly covered by sea water all the time [1110]		Yes	1	1	0	0	1	0	0	0	0	1	1	1	0	0	0
Inner Donegal Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Estuarine fine sands dominated by polychaetes and oligochaetes community complex	No	0	0	0	0	0	0	0	11	0	0	0	0	0	11	0
Inner Donegal Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal muddy sand to sand dominated by polychaetes, bivalves and crustaceans community complex	No	0	0	0	0	0	0	0	11	0	0	0	0	0	11	0

Killala Bay/Moy Estuary	Published	Estuaries [1130]	Muddy sand to fine sand dominated by Hydrobia ulvae, Pygospio elegans and Tubificoides benedii community complex	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Zostera dominated community	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Estuarine muddy sand dominated by Hediste diversicolor and Heterochaeta costata community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Fine sand dominated by Nephtys cirrosa community complex	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to fine sand dominated by Hydrobia ulvae, Pygospio elegans and Tubificoides benedii community complex	No	0	0	0	0	0	0	0	30	0	0	0	0	0	30	0
Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Estuarine muddy sand dominated by Hediste diversicolor and Heterochaeta costata community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand dominated by Nephtys cirrosa community complex	No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Loughswilly	Published	Estuaries [1130]	Fine sand community complex	Yes	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0
Loughswilly	Published	Estuaries [1130]	Intertidal mixed sediments with polychaetes	Yes	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0
Loughswilly	Published	Estuaries [1130]	Subtidal mixed sediments with polychaetes and bivalves	Yes	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0
Loughswilly	Published	Estuaries [1130]	Muddy fine sand with Thyasira flexuosa	Yes	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0
Loughswilly	Published	Estuaries [1130]	Mud community complex	Yes	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Loughswilly	Published	Estuaries [1130]	Ostrea edulis dominated community	Yes	0	0	0	0	0	97	0	0	0	0	0	0	0	0	0
Rathlin O'Beirne Island	Published	Reefs [1170]	Exposed intertidal reef community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rathlin O'Beirne Island	Published	Reefs [1170]	Exposed subtidal reef community complex	Yes	87	87	0	0	0	0	0	0	0	87	0	1	0	0	0
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Coarse sediment with crustaceans community complex	Yes	58	0	0	42	0	0	22	0	0	58	0	0	0	0	0
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Sand with Tellina sp. and Perioculodes longimanus community complex	Yes	38	0	0	59	0	0	19	0	0	38	0	0	0	0	0
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes	88	0	0	54	0	0	2	0	0	88	0	0	0	0	0
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Intertidal reef community	Yes	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	45	0	0	44	0	0	1	0	0	45	0	0	0	0	0
Rutland Island and Sound	Published	Reefs [1170]	Intertidal reef community	Yes	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rutland Island and Sound	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	45	0	0	44	0	0	1	0	0	45	0	0	0	0	0
Sheephaven	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND TO COARSE SEDIMENT WITH PYGOSPIO ELEGANS COMMUNITY COMPLEX	No	0	0	0	0	0	0	0	25	0	0	0	0	0	25	0
Sheephaven	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND WITH ANGULUS TENUIS COMMUNITY	No	0	0	0	0	0	0	0	21	0	0	0	0	0	21	0
St. Johns Point	Published	Large shallow inlets and bays [1160]	Intertidal coarse sediment with enchytraeid oligochaetes and Scolelepis squamata community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
St. Johns Point	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Johns Point	Published	Large shallow inlets and bays [1160]	Sand to mixed sediment with polychaetes and Edwardsia spp. community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Johns Point	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Johns Point	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Johns Point	Published	Large shallow inlets and bays [1160]	Subtidal reef with echinoderms and sponges community complex	Yes	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
St. Johns Point	Published	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1

St. Johns Point	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Johns Point	Published	Reefs [1170]	Subtidal reef with echinoderms and sponges community complex	Yes	0	0	0	0	0	0	0	0	0	0	1	1	0	0	7
Tory Island coast	Published	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tory Island coast	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99
Tory Island coast	Published	Reefs [1170]	Sub-tidal reef with echinoderms and faunal turf community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
West of Ardara/Maas Road	Pending	Estuaries [1130]		No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West of Ardara/Maas Road	Pending	Mudflats and sandflats not covered by seawater at low tide [1140]		No	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
West of Ardara/Maas Road	Pending	Large shallow inlets and bays [1160]		No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine to medium sand with Eurydice pulchra community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to coarse sediment with Pygospio elegans community complex	No	0	0	0	0	0	0	0	14	0	0	0	0	0	14	0
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis and Scoloplos (Scoloplos) armiger community complex	No	0	0	0	0	0	0	0	35	0	0	0	0	0	35	0

Table 15. Consequence and likelihood scores for risk assessment of QI fishery interactions in Quigleys Point to Benwee Head region. Fisheries which do not occur and QIs where no fishery occurs have been deleted

Site name	COs	Qualifying interest	Marine Community type	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Dredge - scallop	Dredge oyster	Dredge cockle	Dredge razor clam	Gill net	Tramme netting bait	Otter trawl - demersal	Mid-water trawl	Hand gathering cockles	Hand gathering winkles	Hooks and Lines
Ballyness Bay	Published	Estuaries [1130]	Mobile sand community complex	Yes	4	4													
Ballysadare Bay	Published	Estuaries [1130]	Intertidal sand with Angulus tenuis community complex	No							16						12		
Ballysadare Bay	Published	Estuaries [1130]	Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex	No							16						12		
Ballysadare Bay	Published	Estuaries [1130]	Zostera-dominated community	No							20						12		
Ballysadare Bay	Published	Estuaries [1130]	Fine sand with polychaetes community complex	No							16						12		
Ballysadare Bay	Published	Estuaries [1130]	Sand with bivalves, nematodes and crustaceans community complex	No							16						12		
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with Angulus tenuis community complex	No							16						12		
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex	No							16						12		
Ballysadare Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera-dominated community	No							20						12		
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Large shallow inlets and bays [1160]	Fine to very fine sand community complex	Yes	4	4	4						4	4		4			

Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	9	9	9						9	9						
Bunduff Lough and Machair/Trawalua/Mullaghmore	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9	9	9						9	9						
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Estuaries [1130]	Intertidal reef community complex	No														9		
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal fine sand with Peringia ulvae and Pygospio elegans community complex	Yes							16						12			
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Estuarine mixed sediment to sandy mud with Hediste diversicolor and oligochaetes community complex	Yes							16						12			
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand with crustaceans and Scolelepis (Scolelepis) squamata community complex	Yes							16						12			
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilidae-dominated community complex	Yes							16						12			
Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand with Angulus spp. and Nephtys spp. community complex	Yes							16						12			
Gweedore Bay and Islands	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9	9								9						
Gweedore Bay and Islands	Published	Reefs [1170]	Reef community complex	Yes	9	9								9						
Hempton's Turbot Bank	Pending	Sandbanks which are slightly covered by sea water all the time [1110]		Yes	4	4			12					4	12	4				
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Muddy sand to fine sand dominated by Hydrobia ulvae, Pygospio elegans and Tubificoides benedii community complex	No							16						12			
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Zostera dominated community	No							16						12			
Killala Bay/Moy Estuary	Published	Estuaries [1130]	Fine sand dominated by Nephtys cirrosa community complex	No							16						12			

Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to fine sand dominated by Hydrobia ulvae, Pygospio elegans and Tubificoides benedii community complex	No							16						12		
Killala Bay/Moy Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand dominated by Nephtys cirrosa community complex	No							16						12		
Loughswilly	Published	Estuaries [1130]	Fine sand community complex	Yes						6									
Loughswilly	Published	Estuaries [1130]	Intertidal mixed sediments with polychaetes	Yes						9									
Loughswilly	Published	Estuaries [1130]	Subtidal mixed sediments with polychaetes and bivalves	Yes						9									
Loughswilly	Published	Estuaries [1130]	Muddy fine sand with Thyasira flexuosa	Yes						9									
Loughswilly	Published	Estuaries [1130]	Mud community complex	Yes						6									
Loughswilly	Published	Estuaries [1130]	Ostrea edulis dominated community	Yes						16									
Inner Donegal Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Estuarine fine sands dominated by polychaetes and oligochaetes community complex	No							16						12		
Inner Donegal Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal muddy sand to sand dominated by polychaetes, bivalves and crustaceans community complex	No							16						12		
Rathlin O'Beirne Island	Published	Reefs [1170]	Exposed subtidal reef community complex	Yes	9	9								9		4			
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Coarse sediment with crustaceans community complex	Yes	4			4				16		4					
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Sand with Tellina sp. and Perioculodes longimanus community complex	Yes	4			4				16		4					
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes	12			12				16		12					
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Intertidal reef community	Yes														9	
Rutland Island and Sound	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	9			9						9					
Rutland Island and Sound	Published	Reefs [1170]	Intertidal reef community	Yes														9	

Rutland Island and Sound	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9			9						9						
Sheephaven	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND TO COARSE SEDIMENT WITH PYGOSPIO ELEGANS COMMUNITY COMPLEX	No							16						12			
Sheephaven	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND WITH ANGULUS TENUIS COMMUNITY	No							16						12			
St. Johns Point	Published	Large shallow inlets and bays [1160]	Intertidal coarse sediment with enchytraeid oligochaetes and Scolelepis squamata community complex	Yes																4
St. Johns Point	Published	Large shallow inlets and bays [1160]	Subtidal reef with echinoderms and sponges community complex	Yes											16	4				4
St. Johns Point	Published	Reefs [1170]	Intertidal reef community complex	Yes												4				4
St. Johns Point	Published	Reefs [1170]	Subtidal reef with echinoderms and sponges community complex	Yes											16	4				4
Tory Island coast	Published	Reefs [1170]	Laminaria-dominated community complex	Yes																4
Tory Island coast	Published	Reefs [1170]	Sub-tidal reef with echinoderms and faunal turf community complex	Yes																4
West of Ardara/Maas Road	Pending	Mudflats and sandflats not covered by seawater at low tide [1140]		No							16						12			
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Muddy sand to coarse sediment with Pygospio elegans community complex	No							16						12			
North Inisowen Coast	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis and Scoloplos (Scoloplos) armiger community complex	No							16						12			

13.1.2 Benwee Head to Slyne Head

- There were 1386 possible fishery marine QI/MCT interactions in the Benwee Hd. to Slyne Hd. Region.
- 1196 possible fishery – marine QI/MCT interactions in the fishery-habitats matrix for this region did not occur and were therefore not assessed further.
- 190 fishery – marine QI/MCT interactions, involving 19 fishing metiers were recorded in the Benwee Head to Slyne Head region. Presence/absence and overlaps between fisheries and MCTs are in Table 16. Risk scores are in Table 17. The risk profile is summarized in Figure 122.

13.1.2.1 Dredge fisheries for cockles, razor clams and surf clams

- Dredge fisheries for cockles, razor clams and surf clam potentially pose a high risk to Mud and Sand Flats and Large Shallow Inlet and Bay qualifying interests in Broadhaven Bay and to the intertidal sandy mud marine community in Clew Bay
- No dredge or hand gathering fisheries for these species currently occur in these sites and the sites are not classified for production of these species
- **Uncontrolled cockle or razor clam fishing fishing in these habitats pose a risk to habitat structure and function**

13.1.2.2 Dredge fisheries for scallop and oyster

- Dredging for scallop overlaps with 53% and 63% of *Zostera* (seagrass) and Maerl (coral) habitats respectively in Clew Bay.
- Scallop dredges have teeth which penetrate the sediments. Dredging can destroy the thalli and structure of maerl and lead to a reduction in biodiversity in the habitat. Sea grass rhizomes can be uprooted and the quality of seagrass beds can be severely impacted by toothed dredges (ABPMer 2012, Biogenic Reefs, Appendix F, Table VI.12, ABPMer 2012. Saltmarh and seagrass. Annex F, Table VIII.9)
- Risks posed by scallop dredging to maerl and *Zostera* marine communities in Clew Bay are high.
- Scallop dredging poses a high risk to reef fauna (100% overlap) and the *Laminaria* dominated marine community (89% overlap) in Clew Bay and to *Laminaria* and to Serpulid reef in Blacksod Bay.
- Scallop fishing poses a moderate risk to sedimentary marine communities in Clew Bay, Broadhaven Bay and Blacksod Bay. Spatial overlaps with these habitats are

>40%. The impact will therefore depend on the frequency and intensity of fishing activity in these communities. Frequency is thought to be higher than the capacity of sedimentary communities to recover from dredging as there is no closed season and fishing occurs for up to 120 days per year.

- There is a small (1%) overlap between *Zostera*, Maerl and oyster fishing in Clew Bay. Toothed dredges are used to fish for oysters in Clew Bay and their impact may be similar to toothed scallop dredges although the oyster gear is lighter.
- Oyster dredging may pose a high risk to reef qualifying interest in the Mullet/Blacksod Bay complex and a lower risk to large shallow inlet and bay and mud and sand flat qualifying interests. COs are not published for the site.
- Based on recent survey data, which identified the distribution of commercial densities of oysters in Clew Bay and Blacksod Bay, the current spatial extent of the oyster fishery appears to be much less than for scallop. However, the actual distribution of oyster fishing is poorly known.
- **Scallop dredging is incompatible with maintenance of Maerl and Seagrass communities and may significantly impact reef fauna including Serpulid reef and *Laminara* reef in Clew Bay and Blacksod Bay. Impacts of scallop dredging in sedimentary habitats may be significant in Clew Bay, Broadhaven Bay and Blacksod Bay given the spatial extent of the fishery and the protracted fishing season. The seasonal oyster fishery will add cumulatively to this effect.**

13.1.2.3 Pot fisheries for crab, lobster, shrimp and Nephrops

- Pot fisheries for crab, lobster and shrimp, and associated trammel netting for bait, potentially overlap with 100% of maerl and seagrass in Kingstown Bay and pose a moderate and high risk to these communities respectively.
- Pot fishing for *Nephrops* will in effect be restricted to mud and sandy mud substrates. Potting will not have significant effects on this habitat.
- Pot fishing for shrimp overlaps 87% of Zostera and 34% of Maerl communities in Clew Bay. Although the intensity of activity in these communities is not well known there are 6900 shrimp pots used in the Bay.
- Pot fisheries overlap with reef fauna and *Laminaria* dominated community in Clew Bay. There are 4800 creels and 6900 shrimp pots used in the Bay. This intensity of activity may possibly lead to seasonal non-cumulative changes in these marine community types (ABPMer 2012. Reefs report. Annex F, Table VIII.14 and p.84).

Effects on reefs arise from the abrasive pressures of pots and ropes and the shallow disturbance pressure from anchors.

- Potting for lobster on exposed sub-tidal reef and Laminaria dominated community at Slyne Head Islands (4500 pots between Apr and Sept) and at Achill Head may lead to seasonal non-cumulative changes in these marine community types
- The rare sponges *Halicnemia verticillata* and *Spongionella pulchella* and the brachiopod *Novocrania anomala* are recorded south of Dysaghy Rocks within the Achill Hd. SAC, while the rare hydroid *Aglaophenia kirchenpaueri* is recorded from the west side of Carrickakin at the south-western extreme of the site. These sessile epifaunal species may be reduced by surface abrasion caused by pots and ropes.
- Potting on reef qualifying interest at Duvillaun, Broadhaven Bay, Mullet/Blacksod complex and Slyne Hd. Peninsula may pose similar risks to those above.
- Although pot fisheries are unlikely to pose an immediate threat to the favourable conservation status of reef and associated marine communities the intensity and frequency of the activity relative to the sensitivity of different reef communities should be considered.
    - **Maerl is highly sensitive to physical disturbance that may be caused by potting**
    - **Seagrass quality may be reduced by potting activity.**
    - **Potting on sub-tidal reef qualifying interests and reef communities may have non-impacting, non-cumulative impacting or cumulative impacting effects on these communities depending on the intensity of the activity and the level of natural disturbance to which the reef is exposed.**

13.1.2.4 Bottom trawling for demersal fish

- VMS data indicates the presence of bottom trawling in Achill Head SAC. Approximately 160 VMS points representing 320 hrs of activity over 6 years (53hrs per year) is reported.
    - Most of the activity is on sub-tidal sand communities with a much lesser amount on sub-tidal reef (however some rare species are recorded in this community)
- VMS data for Broadhaven Bay (Large shallow inlet and Bay and reef qualifying interests) indicates approximately 660hrs of bottom trawling per year in the SAC.

- VMS data in the Mullet/Blacksod Bay complex indicates approximately 60 hrs per year.
- Bottom trawling at the level of activity recorded is unlikely to have significant effects on sub-tidal sand communities (ABPMer 2012, Sands. Appendix F, Table II.9).
- **Bottom trawling in Achill Head, Broadhaven Bay and Mullet/Blacksod Bay complex may pose a risk to reef habitat and rare species recorded in these sites.**

13.1.2.5 Gill netting and tangle netting

- Gill netting and tangle netting may overlap with reef communities in Achill Hd, Broadhaven Bay, Mullet/Blacksod Bay complex, Slyne Hd Islands and Slyne Hd peninsula.
- Given the low intensity of activity and the effective footprint of these fisheries they are unlikely to lead to changes in the characterizing species in these communities (risk<5).

13.1.2.6 Hand gathering of winkles

- Winkle picking is a common activity on the shores of Clew Bay and probably occurs on intertidal reef communities. The spatial extent and intensity of the activity is unknown
- *Ascophyllum* and fucoid dominated shores are sensitive to trampling that may be caused by seasonal winkle picking (ABPMer 2012. Intertidal and sub-tidal Reefs, Appendix F, Table VII.2)
- **Intensive winkle picking may cause a seasonal non-cumulative change in species composition on fucoid dominated shores**

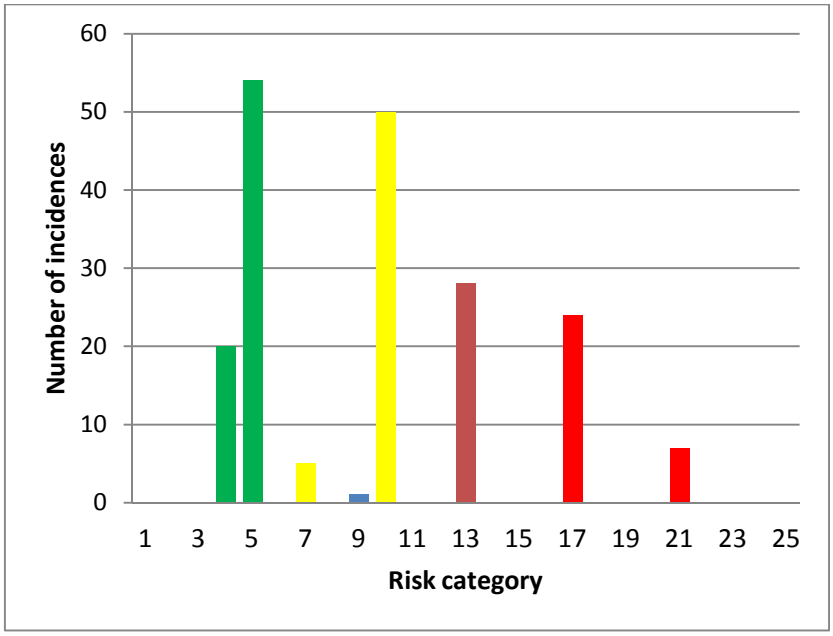

Figure 122. Risk profile for fisheries habitat interactions in the Benwee Head to Slyne Head region. Colours refer to the level of risk as outlined in Table 12.

Table 16. Presence / absence and spatial overlaps (where COs for MCTs are published) of fisheries and habitats in SACs in the Benwee Head to Slyne Head region. Shaded rows indicate no fishing activity in the MCT

Site name	COs	QI/SCI	MCT	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Trap - Nephrops	Trap - whelk	Dredge - scallop	Dredge oyster	Dredge - seed mussel	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Trammel netting bait	Beam trawl - demersal	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines
Achill Head	Published	Large shallow inlets and bays [1160]	Intertidal fine sand community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Achill Head	Published	Large shallow inlets and bays [1160]	Mobile sub-tidal sand with G. Spinifer community	Yes	4	0	0	0	0	0	0	0	0	0	0	0	1	61	4	0	1	1	0	0	0
Achill Head	Published	Large shallow inlets and bays [1160]	Sub-tidal sand with B. Elegans and polychaetes community complex	Yes	23	0	0	0	0	0	0	0	0	0	0	0	1	73	23	0	1	1	0	0	0
Achill Head	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Achill Head	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	2	0	0	0	0	0	0	0	0	0	0	0	1	25	2	0	1	1	0	0	0
Achill Head	Published	Large shallow inlets and bays [1160]	Sub-tidal reef community	Yes	57	0	0	0	0	0	0	0	0	0	0	0	1	54	57	0	1	1	0	0	0
Achill Head	Published	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Achill Head	Published	Reefs [1170]	Laminaria-dominated community	Yes	2	0	0	0	0	0	0	0	0	0	0	0	1	25	2	0	1	1	0	0	0

Achill Head	Published	Reefs [1170]	Sub-tidal reef community	Yes	57	0	0	0	0	0	0	0	0	0	0	0	1	54	57	0	1	1	0	0	0
Broadhaven Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment to sandy mud with Pygospio elegans community complex	Yes	0	0	0	0	0	0	0	0	0	1	1	25	0	0	0	0	0	0	0	25	0
Broadhaven Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10	10	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Coarse sediment to sandy mud with Pygospio elegans community complex	Yes	0	0	0	6	0	0	6	0	0	7	0	22	0	0	0	0	0	0	25	22	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Sand with Angulus tenuis community complex	Yes	0	0	0	24	0	0	25	0	0	0	0	4	0	0	0	0	0	0	0	4	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Sand to coarse sediment with crustaceans and Polyophthalmus pictus community complex	Yes	0	0	0	25	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Subtidal sand with polychaetes community complex	Yes	49	69	0	5	0	0	5	0	0	1	12	0	68	0	0	0	0	0	0	0	54
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes	0	0	0	10	0	0	10	0	0	6	0	0	0	0	0	0	0	0	0	0	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Shingle	Yes	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7	0
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Fucoid-dominated reef community complex	Yes	5	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Subtidal reef community complex	Yes	47	16	0	0	0	0	0	0	0	0	23	0	13	0	0	0	0	0	0	0	3

Broadhaven Bay	Published	Reefs [1170]	Fucoid-dominated reef community complex	Yes	5	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	2	1
Broadhaven Bay	Published	Reefs [1170]	Subtidal reef community complex	Yes	45	15	0	0	0	0	0	0	0	0	23	0	12	0	0	0	0	0	0	0	3
Clew Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL SANDY MUD WITH TUBIFICOIDES BENEDII AND PYGOSPIO ELEGANS community complex	Yes	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	4	0
Clew Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sand dominated by Nephthys	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	0	0	0	87	0	0	54	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	0	0	0	34	0	0	63	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	SANDY MUD WITH POLYCHAETES AND BIVALVES COMMUNITY COMPLEX	Yes	12	12	0	33	6	0	42	1	0	0	0	0	0	0	12	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Fine sand dominated by Nephtys cirrosa community complex	Yes	0	0	0	36	0	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Shingle	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Reef	Yes	55	55	0	86	36	0	90	1	0	0	0	0	0	0	55	0	0	0	0	0	0
Duvillaun Islands	Pending	Reefs [1170]		Yes	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Kingstown Bay	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	100	78	0	99	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
Kingstown Bay	Published	Large shallow inlets and bays [1160]	MAËRL DOMINATED COMMUNITY	Yes	100	97	0	98	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
Kingstown Bay	Published	Large shallow inlets and bays [1160]	SUBTIDAL SAND WITH AMPHIPODS AND POLYCHAETES COMMUNITY	Yes	100	88	0	93	0	0	0	0	0	0	0	0	0	33	100	0	0	0	0	0	0
Kingstown Bay	Published	Large shallow inlets and bays [1160]	MUD WITH ARENICOLA MARINA AND ANEMONES COMMUNITY	Yes	100	85	0	93	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
Kingstown Bay	Published	Large shallow inlets and bays [1160]	INTERTIDAL SEDIMENT COMMUNITY COMPLEX	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kingstown Bay	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mobile sand with Bathyporeia guilliamsoniana community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis and Pygospio elegans community complex	Yes	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Sand with Angulus tenuis and Pygospio elegans community complex	Yes	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Sand with Gastrosaccus spinifer community complex	Yes	0	0	0	75	0	75	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Fine sand with Angulus fabula community complex	Yes	0	0	0	22	0	22	22	4	0	0	0	0	0	0	0	0	0	0	0	0	0

Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Serpula vermicularis-dominated community complex	Yes	0	0	0	10	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Sheltered subtidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	0	0	0	11	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Shingle	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Serpula vermicularis-dominated community complex	Yes	0	0	0	9	0	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Sheltered subtidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	1	0	0	11	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd Islands	Published	Reefs [1170]	Exposed intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Slyne Hd Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	81	89	0	0	0	0	0	0	0	0	0	0	0	73	81	0	0	0	0	0	0
Slyne Hd Islands	Published	Reefs [1170]	Exposed subtidal reef with echinoderms and encrusting algae community	Yes	86	94	0	0	0	0	0	0	0	0	0	0	0	92	86	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Intertidal sand with Enchytraeidae community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Mobile intertidal sand with polychaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	2	99	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Maërl-dominated community complex	Yes	0	99	0	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Subtidal sand with polychaetes and bivalves community complex	Yes	92	99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Subtidal sand with Kurtiella bidentata community complex	Yes	51	99	0	73	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	33	99	0	39	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slyne Hd penninsula	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	33	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Clew Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SANDY MUD WITH POLYCHAETES AND BIVALVES COMMUNITY COMPLEX	Yes	0	0	0	3	0	0	6	1	0	0	0	2	0	0	0	0	0	0	0	2	0

Table 17. Consequence and likelihood scores for risk assessment of QI fishery interactions in Benwee Head to Slyne Head region. Fisheries which do not occur and QIs where no fishery occurs have been deleted (compare with Table 16)

Site name	COs	Qualifying Interest	Marine Community Type	Fishing current	Trap - lobster	Trap - crab	Trap - shrimp	Trap - Nephrops	Trap - whelk	Dredge - scallop	Dredge oyster	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Tramme netting bait	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and lines
Achill Head	Published	Large shallow inlets and bays [1160]	Mobile sub-tidal sand with G. Spinifer community	Yes	4										3	3	4	9	4			
Achill Head	Published	Large shallow inlets and bays [1160]	Sub-tidal sand with B. Elegans and polychaetes community complex	Yes	3										3	3	3	9	4			
Achill Head	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9										3	3	9	9	4			
Achill Head	Published	Large shallow inlets and bays [1160]	Sub-tidal reef community	Yes	9										3	3	9	9	4			
Achill Head	Published	Reefs [1170]	Laminaria-dominated community	Yes	9										3	3	9	9	4			
Achill Head	Published	Reefs [1170]	Sub-tidal reef community	Yes	9										3	3	9	9	4			
Broadhaven Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment to sandy mud with Pygospio elegans community complex	Yes								16	9	16						4	12	

Broadhaven Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis community complex	Yes										16						4	12	
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Coarse sediment to sandy mud with Pygospio elegans community complex	Yes			4			12		16		16							12	
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Sand with Angulus tenuis community complex	Yes			4			12				16							12	
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Sand to coarse sediment with crustaceans and Polyophthalmus pictus community complex	Yes			4			12												
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Subtidal sand with polychaetes community complex	Yes	4	4	4			12		16	9		4							4
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes			12			20		20										
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Shingle	Yes										4							4	
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Fucoid-dominated reef community complex	Yes	9	9								4	9						4	4
Broadhaven Bay	Published	Large shallow inlets and bays [1160]	Subtidal reef community complex	Yes	9	9							6		9							4
Broadhaven Bay	Published	Reefs [1170]	Fucoid-dominated reef community complex	Yes	9									4	9						4	4
Broadhaven Bay	Published	Reefs [1170]	Subtidal reef community complex	Yes	9	9							6		9							4
Clew Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL SANDY MUD WITH TUBIFICOIDES BENEDII AND PYGOSPIO ELEGANS community complex	Yes							6			16							12	
Clew Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SANDY MUD WITH POLYCHAETES AND BIVALVES COMMUNITY COMPLEX	Yes						12	6			16							12	
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes			12			16	16											

Clew Bay complex	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes			16			20	20											
Clew Bay complex	Published	Large shallow inlets and bays [1160]	SANDY MUD WITH POLYCHAETES AND BIVALVES COMMUNITY COMPLEX	Yes	4	4	3	3		12	6						4					
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Fine sand dominated by Nephtys cirrosa community complex	Yes			3			12												
Clew Bay complex	Published	Large shallow inlets and bays [1160]	Reef fauna	Yes	9	9	9	4		16	8						9					
Duvillaun Islands	Pending	Reefs [1170]		Yes	9	9											9					
Kingstown Bay	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	12	12	12										12					
Kingstown Bay	Published	Large shallow inlets and bays [1160]	MAËRL DOMINATED COMMUNITY	Yes	16	16	16										16					
Kingstown Bay	Published	Large shallow inlets and bays [1160]	SUBTIDAL SAND WITH AMPHIPODS AND POLYCHAETES COMMUNITY	Yes	4	4	4									3	4					
Kingstown Bay	Published	Large shallow inlets and bays [1160]	MUD WITH ARENICOLA MARINA AND ANEMONES COMMUNITY	Yes	4	4	4										4					
Mullet/Blacksod Bay complex	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Angulus tenuis and Pygospio elegans community complex	Yes							4											
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Sand with Angulus tenuis and Pygospio elegans community complex	Yes							4											
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Sand with Gastrosaccus spinifer community complex	Yes			4		4	12												
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Fine sand with Angulus fabula community complex	Yes			4		4	12	4											
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Zostera-dominated community	Yes							20											
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Serpula vermicularis-dominated community complex	Yes			12		12	20												

Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes							16												
Mullet/Blacksod Bay complex	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes			9		9	16													
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Serpula vermicularis-dominated community complex	Yes			12		12	20													
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Intertidal reef community complex	Yes							16												
Mullet/Blacksod Bay complex	Published	Reefs [1170]	Laminaria-dominated community complex	Yes			9		9	16													
Slyne Hd Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9										3	9						
Slyne Hd Islands	Published	Reefs [1170]	Exposed subtidal reef with echinoderms and encrusting algae community	Yes	9	9										3	9						
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	12	12	12																
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Maërl-dominated community complex	Yes	16	16	16																
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Subtidal sand with polychaetes and bivalves community complex	Yes	4	4	4																
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Subtidal sand with Kurtiella bidentata community complex	Yes	4	4	4									4							
Slyne Hd penninsula	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	9	9	9									9							
Slyne Hd penninsula	Published	Reefs [1170]	Laminaria-dominated community complex		9		9																

13.1.3 Slyne Head to Loop Head

- There were 1092 possible fishery marine QI/MCT interactions in the Slyne Hd. to Loop Hd. Region.
- 910 possible fishery – marine QI/MCT interactions in the fishery-habitats matrix for this region did not occur and were therefore not assessed further.
- 182 fishery – marine QI/MCT interactions, involving 13 fishing metiers were recorded. Presence/absence and overlaps between fisheries and MCTs are in Table 18. Risk scores for these interactions are in Table 19. The risk profile is summarized in Figure 123.

13.1.3.1 Dredge fisheries for scallop, oyster, razor clam and surf clam

- Dredge fisheries for native oyster overlap with Maerl (8%) and *Zostera* (10%) in inner Galway Bay and pose a high risk to these habitats. This fishery also overlaps with 1% of sub-tidal shallow sponge dominated reef community complex.
- Dredge fisheries for surf clam occurs in inner Galway Bay north of Eddy Is. but overlaps with less than 1% of the sandy mud to mixed sediment community complex. It may occur close to *Zostera* beds. Dredge fishing for oyster occurs on an additional 4% while razor clam fishing potentially (not active) occurs on 2% of this community
- Dredging for oyster and scallop occurs in Zostera and Maerl in Kilkerian Bay and in other reef type habitats. Although not currently active razor clam and surf clam fishing may occur in outer Kilkieran Bay. Extraction and sediment disturbance caused by these fisheries leads to changes in species composition of the habitat. The footprint of the fishery in sedimentary habitats in Kilkieran Bay is, however, likely to small.
- Dredging for scallop may occur on reef habitat east of Inismore within the SAC.
- **Dredging is incompatible with maintenance of Maerl, Seagrass and reef communities in Galway Bay, Kilkieran Bay and Inismor.**

13.1.3.2 Pot fishing for crab and lobster

- Pressure from pot fisheries arises from the physical abrasion caused by pots and ropes and the shallow disturbance effect of anchors on reef and edge of reef habitats (ABPMer 2012. Reefs report. Annex F, Table VIII.14 and p.84).
- Pot fisheries for lobster, crab and shrimp overlap with over 50% of maerl and 65% of *Zostera* in inner Galway Bay.

- These fisheries overlap with reef qualifying interest or marine communities in BlackHd. Poulsallagh Complex, Carrowmore Dunes, Carrowmore Point to Spanish Point and Islands in the Galway Bay complex, in Inisoir, Inismaan and Inismor, Kilkee reefs and Kilkieran Bay. In Galway the overlap is mainly with Laminaria dominated communities and shallow sponge dominated communities. Potting for lobster will usually occur on or at the edge of reef habitat
- Pot fishing is intensive in some sites such as Galway Bay and Carrowmore Pt to Spanish Point, Kilkieran Bay.
- Although pot fisheries are unlikely to pose an immediate threat to the favourable conservation status of reef and associated marine communities when the fishing is intensity and frequent more sensitive species in the communities could possibly be impacted.
    - **Maerl is highly sensitive to physical disturbance. Incremental habitat damage may accumulate as recovery of maerl from physical disturbance and abrasion is very slow. The degree to which pots may cause such damage is not clear. The highest impact is expected from anchors (small footprint) with lesser impact from the pot (depending on the weight of the pot) and lesser still from ropes associated with the pots.**
    - **Seagrass quality may be reduced by potting activity.**
    - **Potting on sub-tidal reef qualifying interests and reef communities may have non-impacting, non-cumulative impacting or cumulative impacting effects on these communities depending on the intensity of the activity and the level of natural disturbance to which the reef is exposed.**

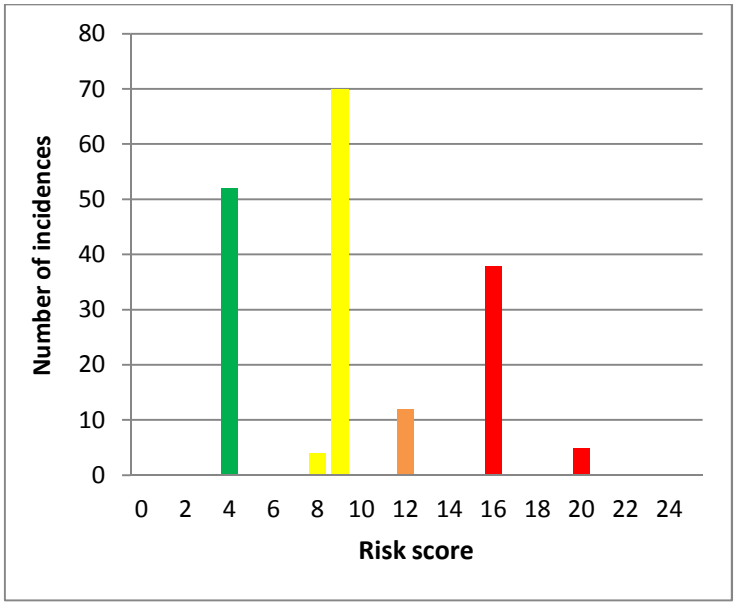

Figure 123. Risk profile for fisheries habitat interactions in the Slyne Head to Loop Head region. Colours refer to the level of risk as outlined in Table 12.

Table 18. Presence / absence and spatial overlaps (where COs for MCTs are published) of fisheries and habitats in SACs in the Slyne Head to Loop Head region

Site name	COs	QI code	QI/SCI	MCT	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Trap - Nephrops	Trap - whelk	Dredge - scallop	Dredge oyster	Dredge - seed mussel	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Trammel netting bait	Beam trawl - demersal	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines
Black Hd Poulsallagh Complex	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Black Hd Poulsallagh Complex	Published	1170	Reefs [1170]	Laminaria dominated community complex	Yes	45	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0
Carrowmore Dunes	Published	1170	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carrowmore Dunes	Published	1170	Reefs [1170]	Laminaria-dominated community complex	Yes	29	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	5	0	0	0	0
Carrowmore Point to Spanish Point and Islands	Published	1170	Reefs [1170]	Intertidal reef community complex	No	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carrowmore Point to Spanish Point and Islands	Published	1170	Reefs [1170]	Laminaria-dominated community complex	Yes	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
Galway Bay complex	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sandy mud community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galway Bay complex	Published	1140	Mudflats and sandflats not covered by seawater at low	Intertidal sand community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			tide [1140]																							
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Intertidal sandy mud community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Intertidal sand community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	47	0	28	51	0	0	0	8	0	0	0	0	0	0	47	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	65	0	64	0	0	0	0	10	0	0	0	0	0	0	65	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Fine to medium sand with bivalves community complex	Yes	72	0	44	41	0	0	0	0	0	0	0	0	0	0	72	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Sandy mud to mixed sediment community complex	Yes	65	0	35	60	0	0	0	4	0	2	0.6	0	0	0	65	0	3	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Mixed sediment dominated by Mytilidae community complex	Yes	11	0	7	35	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Shingle	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Fucoid-dominated community complex	Yes	2	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	75	0	58	65	0	0	0	0	0	0	0	0	0	0	75	0	1	0	0	0	0
Galway Bay complex	Published	1160	Large shallow inlets and bays [1160]	Shallow sponge-dominated reef community complex	Yes	73	0	36	66	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	0
Galway Bay complex	Published	1170	Reefs [1170]	Mytilus-dominated reef community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Galway Bay complex	Published	1170	Reefs [1170]	Fucoid-dominated community complex	Yes	2	0	1	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
Galway Bay complex	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	75	0	53	67	0	0	0	0	0	0	0	0	0	0	75	0	1	0	0	0	0
Galway Bay complex	Published	1170	Reefs [1170]	Shallow sponge-dominated reef community complex	Yes	71	0	33	66	0	0	0	1	0	0	0	0	0	0	71	0	1	0	0	0	0
Inismaan Island	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	76	0	0	0	0	0	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0
Inismore Island	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Inismore Island	Published	1170	Reefs [1170]	Subtidal reef community complex	Yes	34	9	0	0	0	0	8	0	0	0	0	0	0	28	34	0	20	0	0	0	99
Inismore Island	Published	1170	Reefs [1170]	Laminaria-dominated community complex	Yes	72	0	0	0	0	0	5	0	0	0	0	0	0	45	72	0	0	0	0	0	99
Inisoir Island	Published	1170	Reefs [1170]	Exposed inter tidal reef community complex	Yes	82	0	0	0	0	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	87
Kilkee reefs	Published	1160	Large shallow inlets and bays [1160]	Sediment community complex	Yes	84	0	0	0	0	0	0	0	0	0	0	0	0	0	84	0	1	0	0	0	0
Kilkee reefs	Published	1160	Large shallow inlets and bays [1160]	Exposed intertidal reef community complex	Yes	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kilkee reefs	Published	1160	Large shallow inlets and bays [1160]	Exposed subtidal reef community complex	Yes	55	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0
Kilkee reefs	Published	1170	Reefs [1170]	Exposed intertidal reef community complex	Yes	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Kilkee reefs	Published	1170	Reefs [1170]	Exposed subtidal reef community complex	Yes	63	2	0	0	0	0	0	0	0	0	0	0	0	0	63	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with polychaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	67	0	0	82	0	0	4	5	0	0	0	0	0	0	67	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community complex	Yes	65	0	0	91	0	0	22	6	0	0	0	0	0	0	65	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community complex / Zostera-dominated community complex	Yes	75	0	0	94	0	0	9	7	0	0	0	0	0	0	75	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Pachycerianthus multiplicatus-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Intertidal sand with polychaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Mixed sediment dominated by polychaetes community complex	Yes	57	0	0	72	0	0	3	2	0	2	3	0	0	10	57	0	0	0	0	0	2
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Sand with nemerteans and crustaceans community complex	Yes	76	0	0	81	0	0	0	0	0	0	1	0	0	0	76	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Deep water sand dominated by bivalves and polychaetes community complex	Yes	69	0	0	10	0	0	4	0	0	0	0	0	0	0	69	0	97	0	0	0	67
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Subtidal sponge and ascidian community complex	Yes	71	0	0	94	0	0	31	1	0	0	0	0	0	0	71	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Deep water faunal crust and sponge community complex	Yes	75	0	0	8	0	0	1	0	0	0	0	0	0	33	75	0	66	0	0	0	47
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Exposed to moderately exposed subtidal reef community complex	Yes	0	0	0	52	0	0	4	0	0	0	0	0	0	43	0	0	37	0	0	0	27
Kilkieran Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	64	0	0	68	0	0	2	1	0	1	1	0	0	22	64	0	3	0	0	0	6
Kilkieran Bay and Islands	Published	1170	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kilkieran Bay and Islands	Published	1170	Reefs [1170]	Subtidal sponge and ascidian community complex	Yes	70	0	0	0	0	0	31	1	0	0	0	0	0	0	70	0	0	0	0	0	0

Kilkieran Bay and Islands	Published	1170	Reefs [1170]	Deep water faunal crust and sponge community complex	Yes	75	0	0	8	0	0	1	0	0	0	0	0	0	32	75	0	66	0	0	0	47
Kilkieran Bay and Islands	Published	1170	Reefs [1170]	Exposed to moderately exposed subtidal reef community complex	Yes	96	0	0	52	0	0	3	0	0	0	0	0	0	42	96	0	36	0	0	0	27
Kilkieran Bay and Islands	Published	1170	Reefs [1170]	Laminaria-dominated community complex	Yes	63	0	0	0	0	0	5	1	0	0	1	0	0	21	63	0	3	0	0	0	6

Table 19. Consequence and likelihood scores for risk assessment of QI fishery interactions in Slyne Hd to Loop Hd. Fisheries which do not occur and QIs where no fishery occurs have been deleted (compare with Table 18)

Site name	COs	Qualifying interest	Marine Community Type	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Dredge - scallop	Dredge oyster	Dredge - razor clam	Dredge surf clam	Tangle net crayfish	Trammel netting bait	Otter trawl - demersal	Hand gathering winkles	Hooks and Lines
Black Hd Poulsallagh Complex	Published	Reefs [1170]	Intertidal reef community complex	Yes	9									9			
Black Hd Poulsallagh Complex	Published	Reefs [1170]	Laminaria dominated community complex	Yes	9									9			
Carrowmore Dunes	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9									9			
Carrowmore Point to Spanish Point and Islands	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9									9	16		
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	16		16	16		20				16			

Galway Bay complex	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	12		12			16				12			
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Fine to medium sand with bivalves community complex	Yes	4		4	4						4			
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Sandy mud to mixed sediment community complex	Yes	4		4	4		8	8	8		4	4		
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Mixed sediment dominated by Mytilidae community complex	Yes	4		4	4						4			
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Fucoid-dominated community complex	Yes	4		4	4						4		9	
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9		9	9						9	4		
Galway Bay complex	Published	Large shallow inlets and bays [1160]	Shallow sponge-dominated reef community complex	Yes	9		9	9						9			
Galway Bay complex	Published	Reefs [1170]	Fucoid-dominated community complex	Yes	4		4	4						4		9	
Galway Bay complex	Published	Reefs [1170]	Laminaria-dominated community	Yes	9		9	9						9	4		
Galway Bay complex	Published	Reefs [1170]	Shallow sponge-dominated reef community complex	Yes	9		9	9		12				9	4		
Inismaan Island	Published	Reefs [1170]	Intertidal reef community complex	Yes	9									9			
Inismore Island	Published	Reefs [1170]	Intertidal reef community complex	Yes													4
Inismore Island	Published	Reefs [1170]	Subtidal reef community complex	Yes	9	9			16				9	9	16		4
Inismore Island	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9				16				9	9			4
Inisoir Island	Published	Reefs [1170]	Exposed inter tidal reef community complex	Yes	9									9			
Kilkee reefs	Published	Large shallow inlets and bays [1160]	Sediment community complex	Yes	4									4	4		

Kilkee reefs	Published	Large shallow inlets and bays [1160]	Exposed intertidal reef community complex	Yes	4									4			
Kilkee reefs	Published	Large shallow inlets and bays [1160]	Exposed subtidal reef community complex	Yes	9	9								9			
Kilkee reefs	Published	Reefs [1170]	Exposed intertidal reef community complex	Yes	4									4			
Kilkee reefs	Published	Reefs [1170]	Exposed subtidal reef community complex	Yes	9									9			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	12			12	16	16				12			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Maërl-dominated community complex	Yes	16			16	20	20				16			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Maërl-dominated community complex / Zostera-dominated community complex	Yes	16			16	20	20				16			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Mixed sediment dominated by polychaetes community complex	Yes	4			4	9	8		12	4	4			4
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Sand with nemerteans and crustaceans community complex	Yes	4			4				12		4			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Deep water sand dominated by bivalves and polychaetes community complex	Yes	4			4	9					4	12		4
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes						16							
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Subtidal sponge and ascidian community complex	Yes	9			9	16	16				9			
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Deep water faunal crust and sponge community complex	Yes	9			9	16				9	9	16		4
Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Exposed to moderately exposed subtidal reef community complex	Yes				9	16				9		16		4

Kilkieran Bay and Islands	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community complex	Yes	9			9	16	16	16	12	9	9	16		4
Kilkieran Bay and Islands	Published	Reefs [1170]	Subtidal sponge and ascidian community complex	Yes	9				16	16				9			
Kilkieran Bay and Islands	Published	Reefs [1170]	Deep water faunal crust and sponge community complex	Yes	9			9	16				9	9	16		4
Kilkieran Bay and Islands	Published	Reefs [1170]	Exposed to moderately exposed subtidal reef community complex	Yes	9			9	16				9	9	16		4
Kilkieran Bay and Islands	Published	Reefs [1170]	Laminaria-dominated community complex	Yes	9				16	16	16	12	9	9	16		4

13.1.4 Loop Head to Reen Point

- There were 2183 possible fishery marine QI/MCT interactions in the Loop Hd. to Reen Pt region
- 1762 possible fishery – marine QI/MCT interactions in the fishery-habitats matrix for this region did not occur and were therefore not assessed further.
- 421 fishery – marine QI/MCT interactions, involving 17 fishing metiers were recorded in the Loop Head to Reen Point region. Presence/absence and overlaps between fisheries and MCTs are in Table 20. Risk scores for these interactions are in Table 21. The risk profile is summarized in Figure 124.

13.1.4.1 Dredge fisheries for cockle, clam, oyster and scallop

- Razor clam and cockle beds may occur in intertidal mud and sand flats in Barley Cove to Ballyrisode Pt SAC. They are not currently fished, no surveys of their distribution have been undertaken and the site is not a classified production area for these species. It is likely that the razor clam bed occurs in sub-tidal waters seawards of the mud and sand flat habitat but could overlap with it. The risk posed by unrestricted dredge fisheries for these species to mud and sand flats is high
- Fisheries for seed mussels and of half grown mussel occur in Castlemaine Harbour. These activities were subject to AA in 2011, are currently regulated and do not pose a significant risk to habitats in the site.
- Dredging for surf clams may occur in sedimentary habitats in Kenmare River. They are not currently fished, no surveys of their distribution have been undertaken and the site is not a classified production area for this species. The risk posed to sedimentary habitats from a surf clam fishery is low. Although the spatial analysis shows an overlap with reef habitat this is unlikely to occur as the target species does not occur on reef
- Dredge fisheries for oyster occurs in Tralee Bay and Maharees peninsula SAC. The fishery occurs mainly east of Fenit from Oct-Dec and less frequently in the Maharees area. This fishery probably leads to seasonal changes in characterizing species of sedimentary communities. The target species (*Ostrea edulis*) is an important component species of sedimentary habitats which provides shell habitat for other

species. Severe depletion of oyster would represent a persistent and cumulative change in the associated marine community. The fishery is unlikely to occur on reef.

- Scallop fishing
    - Blasket Is SAC: Scallop fishing in reef marine communities occurs in the Blasket Is SAC and poses a significant risk to these habitats. The fishery is unrestricted.
    - Roaringwater Bay SAC: Risk assessment for this site was completed in 2013. Mitigations are currently (Jan 2014) being developed. The fishery ocverlaps with sensitive habitats *Zostera* and *Maerl* and poses a high risk to these habitats. The risk to sedimentary habitats and Laminaria and subtidal reef below 20m depends on the intensity and frequency of the activity.
    - Valentia Hbr/Portmagee Channel: A significant fishery for scallops has historically occurred in Valentia Hbr. The stock is currently depleted and fishing activity is lower than previously. The fishery potentially overlaps sensitive habitats *Zostera, Maerl* and *Edwardsia delapiae* associated communities and poses a high risk to them. Risks are lower for sedimentary communities especially given the currently low level of activity.
- **Uncontrolled fishing for cockles poses a risk to community structure and function in marine sedimentary communities**
- **Dredging for oysters in Tralee Bay may change community structure and function in marine communities**
- **Fishing for scallops on Zostera, Maerl and Edwardsia delapiae communities is incompatible with maintaining structure and function in these communities. Scallop fishing also poses a high risk to reef marine communities.**

13.1.4.2 Pot fishing for crab, lobster and shrimp

- Pot fishing for crab and lobster occurs in Ballinskelligs Bay, Blasket Is., Kenmare River, Lower River Shannon, Roaringwater Bay, Tralee Bay and Valentia Hbr SACs.
- The fishery overlaps with sedimentary, reef and biogenic reef habitats.
- Highest risks occur in Zostera and Maerl habitats in Kenmare River, Roaringwater Bay and Valentia (shrimp only). Risk assessment for Roaringwater Bay was completed in 2013. Mitigations are currently (Jan 2014) being developed
- Risks to reef habitat in the Blasket Is, Kenmare River (rare *Pachycerianthus multiplicatus* community), Kerry hd shoal (a rare Axinellid sponge community and

other rare sponges, bryozoans and ascidians occur in the site), Lower River Shannon, Roaringwater Bay, Tralee Bay and Valentia Hbr depend on the intensity and frequency of potting activity. The footprint of the fishery is probably lowest in the Valentia Hbr and Kerry Hd shoal. The latter site is more offshore and less accessible to lobster potting. Spatial overlap with reef is probably lower in reef communities in Valentia and Shannon (shrimp) than in other areas.

- Risks to sedimentary habitats are low and insignificant
- Potting for *Nephrops* occurs in Kenmare River and poses no significant risk to the sedimentary community on which it occurs.
- **Potting on sub-tidal reef qualifying interests and reef communities may have non-impacting, non-cumulative impacting or cumulative impacting effects on these communities depending on the intensity of the activity and the level of natural disturbance to which the reef is exposed.**

13.1.4.3 Gill netting, tangle netting and trammel netting

- Gill netting and tangle netting do not pose any significant risk to habitats in the Loop Hd to Reen Pt area. Although there is some contact with reef habitat the footprint of this fishery in reef communities in SAC habitats in the area is likely to be low.
- Trammel netting for bait may represent a higher risk but this depends on the proportion of the potting fleet which use trammels. In the assessment the risk to habitats is regarded as the same as that posed by potting. The habitat effects would arise from net anchors and abrasion effects of the footrope and entangling of epifauna or algae. In reality it is likely that only a small proportion of lobster and crab fishermen use trammels.
- **The risk posed by set netting to reefs depends on the intensity and frequency of the activity. Some change in species structure and function may occur. This may have non-impacting, non-cumulative impacting or cumulative impacting effects on these communities depending on the intensity of the activity and the level of natural disturbance to which the reef is exposed.**

13.1.4.4 Bottom trawling

- Bottom trawling occurs mainly in Kenmare River, Blasket Is. and Roaringwater Bay SACs.

- VMS data indicates possibly no trawling activity in Kerry Hd. Shoal. The rare communities and species in this site are sensitive to fishing gears which cause surface abrasion and disturbance.
- Bottom trawling in Kenmare Bay occurs mainly in the outer part of the site in the muddy fine sand community complex. Fishing in the eastern part of the site by vessels >15m is close to zero. It also occurs on medium fine sand. Annual VMS effort for vessels >15m, between 2006-2014 in the site was approximately 350 hrs. The distribution of VMS points indicates that over 15% of the muddy fine sand community is fished. Fishing occurs in all months of the year
- Muddy fine sand communities, particularly suspension feeders and crustaceans, are sensitive to fishing pressure from trawls but this depends on intensity of the fishing pressure. The community is not sensitive to low levels of trawling (a single pass for instance). Recovery time is prolonged compared to coarser substrates due to the fact that such habitats are mediated by a combination of biological, chemical and physical processes compared to coarse substrates which are dominated by physical processes (ABPMer 2013. Muddy sands. Appendix F). Recovery times from impacts may take years.
- The intensity of trawling by vessels over 15m in length in outer Kenmare River could be classed as medium (using scales provided by the Beaumaris approach to sensitivity assessment, ABPMer 2012. Muddy sands. Appendix F, p. 71) and some of the habitat probably experiences more than a single pass of the gear per annum. Activity by vessels under 15m is unquantified. The community therefore may be impacted. Impact would increase if fishing effort escalated.
- In Kenmare the anthozoan *Virgularia mirabilis* occurs in the muddy fine sand community but is unlikely to be affected by trawling as it occurs in the inner Bay.
- Risks to reef have been scored as low based on the distribution of VMS points. However, activity by vessels less than 15m which may operate more in the inner Bay is unquantified.
- Bottom trawling in the Blasket Is. SAC amounted to approximately 130 VMS hrs per annum between 2006-2014. Vessels 12-15m in length also fish the area (VMS data 2014). This activity poses a risk to reef marine communities.
- Bottom trawling in Roaringwater Bay by vessel over 15m in length was approximately 100 VMS hrs per year between 2006-2012. Almost all of this activity occurs in muddy sand communities. Questionnaire data, which is coarser in

resolution, suggests a broader distribution of trawling activity but also mainly on muddy sands. The sensitivity of the community to bottom trawling is similar to that discussed above for Kenmare River.

– **Bottom trawling on muddy fine sands in Kenmare River may be such that cumulative effects on marine communities may occur. Bottom trawling in Roaringwater Bay is less intense but similar effects are possible.**

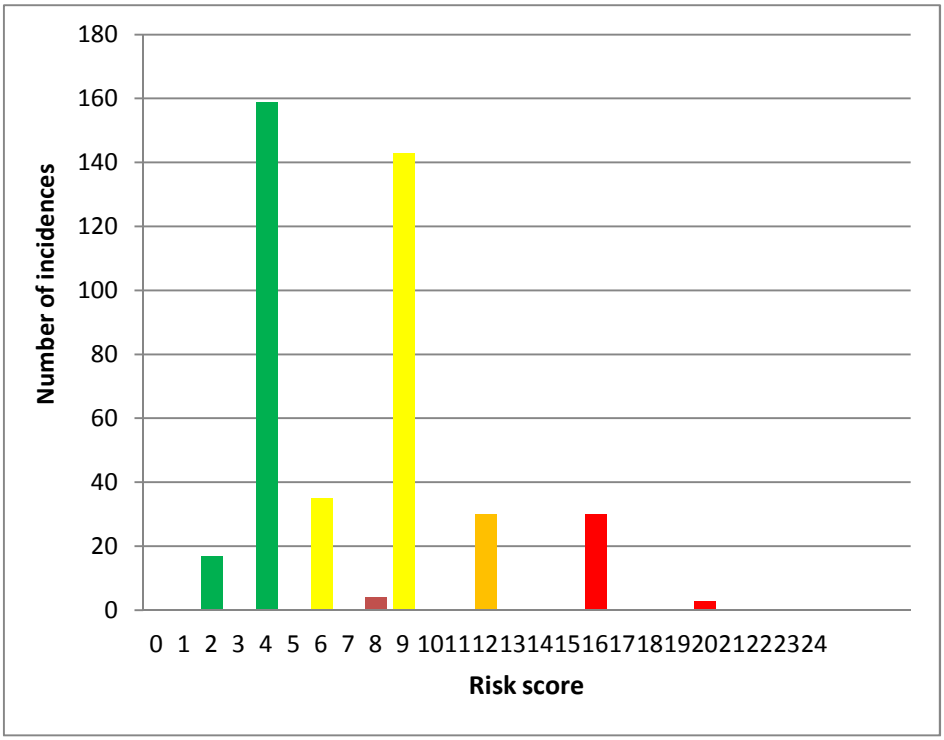

Figure 124. Risk profile for fisheries habitat interactions in the Loop Head to Reen Pt region. Colours refer to the level of risk as outlined in Table 12.

Table 20. Presence / absence and spatial overlaps (where COs for MCTs are published) of fisheries and habitats in SACs in the Loop Head Reen Point region. Shaded rows indicate no fishing activity in the QI/MCT.

Site name	COs	QI code	QI/SCI	MCT	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Trap - Nephrops	Trap - whelk	Dredge - scallop	Dredge oyster	Dredge - seed mussel	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Trammel netting bait	Beam trawl - demersal	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines
Barley Cove to Ballyrisode Pt	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with E. Pulchra community complex	No	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0
Barley Cove to Ballyrisode Pt	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment with T.benedii community	No	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0
Blasket Islands	Published	1170	Reefs [1170]	Reef with faunal turf and echinoderms community complex	Yes	77	77	0	0	0	0	1	0	0	0	0	0	0	53	77	0	1	0	0	0	29
Blasket Islands	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	92	92	0	0	0	0	1	0	0	0	0	0	0	62	92	0	0	0	0	0	0
Castlemaine Harbour SAC	Published	1130	Estuaries [1130]	MIXED SEDIMENT COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Castlemaine Harbour SAC	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL MUDDY FINE SAND COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0

Castlemaine Harbour SAC	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL SAND WITH NEPHTYS CIRROSA COMMUNITY	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Castlemaine Harbour SAC	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	FINE TO MUDDY FINE SAND WITH POLYCHAETES COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
Castlemaine Harbour SAC	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Intertidal mobile sand community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Co-occurrence Zostera and maerl community complex	Yes	100	100	0	100	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	95	95	0	98	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Pachycerianthus multiplicatus community	Yes	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Muddy fine sands dominated by polychaetes and Amphiura filiformis community complex	Yes	20	20	0	17	1	0	1	0	0	0	0	0	1	14	20	0	1	1	0	0	33

Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Fine to medium sand with crustaceans and polychaetes community complex	Yes	55	55	0	28	2	0	9	0	0	0	0	0	1	0	55	0	1	1	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Coarse sediment dominated by polychaetes community complex	Yes	36	36	0	7	0	0	6	0	0	0	0	0	1	18	36	0	1	1	0	0	2
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Shingle	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	34	34	0	30	1	0	0	0	0	0	0	0	1	3	34	0	1	1	0	0	0
Kenmare River	Published	1160	Large shallow inlets and bays [1160]	Subtidal reef with echinoderms and faunal turf community complex	Yes	30	30	0	11	0	0	6	0	0	0	0	0	1	12	30	0	1	1	0	0	1
Kenmare River	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Kenmare River	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	38	38	0	35	1	0	0	0	0	0	0	0	1	2	38	0	1	1	0	0	0
Kenmare River	Published	1170	Reefs [1170]	Subtidal reef with echinoderms and faunal turf community complex	Yes	37	37	0	12	0	0	0	0	0	0	0	0	1	12	37	0	1	1	0	0	1
Kerry Hd shoal	Published	1170	Reefs [1170]	Exposed subtidal reef community complex	Yes	95	95	0	0	0	0	0	0	0	0	0	0	41	26	95	0	1	1	0	0	100
Lower River Shannon	Published	1110	Sandbanks which are slightly covered by sea water all the	Subtidal sand to mixed sediment with Nephtys spp. community	Yes	100	100	0	29	0	0	0	0	0	0	0	0	1	0	100	0	0	1	0	0	0

			time [1110]	complex																						
Lower River Shannon	Published	1130	Estuaries [1130]	Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Estuarine subtidal muddy sand to mixed sediment with gammarids community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Subtidal sand to mixed sediment with Nucula nucleus community complex	Yes	2	2	0	9	0	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Subtidal sand to mixed sediment with Nephtys spp. community complex	Yes	1	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Faunal turf-dominated subtidal reef community	Yes	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Anemone-dominated subtidal reef community	Yes	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1130	Estuaries [1130]	Laminaria-dominated community	Yes	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
Lower River Shannon	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with Scolelepis squamata and Pontocrates spp. community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1140	Mudflats and sandflats not covered by seawater at low	Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			tide [1140]	community complex																					
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Intertidal sand with Scolelepis squamata and Pontocrates spp. community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Subtidal sand to mixed sediment with Nucula nucleus community complex	Yes	20	20	0	3	0	0	0	0	0	0	0	0	0	0	20	0	0	1	0	0	1
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Subtidal sand to mixed sediment with Nephtys spp. community complex	Yes	72	72	0	11	0	0	0	0	0	0	0	0	1	9	72	0	0	1	0	0	36
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Fucoid-dominated intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Mixed subtidal reef community complex	Yes	37	37	0	0	0	0	0	0	0	0	0	0	1	1	37	0	0	1	0	0	21
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Faunal turf-dominated subtidal reef community	Yes	23	23	0	2	0	0	0	0	0	0	0	0	1	9	23	0	0	1	0	0	35
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Anemone-dominated subtidal reef community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	69	69	0	17	0	0	0	0	0	0	0	0	1	1	69	0	0	1	0	0	0
Lower River Shannon	Published	1170	Reefs [1170]	Fucoid-dominated intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Lower River Shannon	Published	1170	Reefs [1170]	Mixed subtidal reef community complex	Yes	42	42	0	1	0	0	0	0	0	0	0	0	1	1	42	0	0	1	0	0	21
Lower River Shannon	Published	1170	Reefs [1170]	Faunal turf-dominated subtidal reef community	Yes	21	21	0	2	0	0	0	0	0	0	0	0	1	9	21	0	0	1	0	0	31
Lower River Shannon	Published	1170	Reefs [1170]	Anemone-dominated subtidal reef community	Yes	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower River Shannon	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	87	87	0	17	0	0	0	0	0	0	0	0	1	1	87	0	0	1	0	0	0
Magharee Is	Published	1170	Reefs [1170]	Subtidal reef community complex	Yes	99	99	0	0	0	0	0	0	0	0	0	0	0	4	99	0	0	0	0	0	0
Magharee Is	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	82	82	0	0	0	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	0
Magharee Is	Published	1170	Reefs [1170]	Laminaria dominated community complex	Yes	99	99	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0
Roaringwater Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	34	34	0	92	0	0	79	0	0	19	0	0	0	0	34	0	0	0	0	0	0
Roaringwater Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	9	9	0	92	0	0	92	0	0	0	0	0	0	0	9	0	0	0	0	0	0
Roaringwater Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	MUDDY SAND WITH BIVALVES AND POLYCHAETES COMMUNITY COMPLEX	Yes	89	89	0	79	0	0	5	0	0	3	0	0	1	1	89	0	84	1	0	0	2
Roaringwater Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	MIXED SEDIMENT COMMUNITY COMPLEX	Yes	69	69	0	73	0	0	22	0	0	1	0	0	2	3	69	0	53	1	0	0	10
Roaringwater Bay and Islands	Published	1160	Large shallow inlets and bays [1160]	SHALLOW SAND/MUD COMMUNITY COMPLEX	Yes	30	30	0	63	0	0	18	0	0	17	0	0	1	0	30	0	5	1	0	0	8

Roaringwater Bay and Islands	Published	1170	Reefs [1170]	Exposed to moderately exposed intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roaringwater Bay and Islands	Published	1170	Reefs [1170]	EXPOSED TO MODERATELY EXPOSED SUBTIDAL REEF BELOW 20M COMMUNITY COMPLEX	Yes	92	92	0	84	0	0	21	0	0	0	0	0	18	14	92	0	43	1	0	0	27
Roaringwater Bay and Islands	Published	1170	Reefs [1170]	SHELTERED REEF COMMUNITY COMPLEX	Yes	36	36	0	32	0	0	21	0	0	0	0	0	0	0	36	0	0	0	0	0	0
Roaringwater Bay and Islands	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	58	58	0	57	0	0	14	0	0	0	0	0	3	4	58	0	19	1	0	0	15
Tralee Bay and Magharees Peninsula	Published	1130	Estuaries [1130]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	95	95	0	0	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1130	Estuaries [1130]	Mixed sediment with crustaceans, bivalves and polychaetes community complex	Yes	90	90	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1130	Estuaries [1130]	Zostera-dominated community complex	Yes	90	90	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1130	Estuaries [1130]	Mytilus-dominated community	Yes	100	100	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1130	Estuaries [1130]	Intertidal reef community complex	Yes	89	89	0	0	0	0	0	0	0	0	0	0	0	0	89	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	68	68	0	2	0	0	0	1	0	0	0	0	0	0	68	0	0	0	0	0	0

Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Nephtys cirrosa community complex	Yes	52	52	0	0	0	0	0	0	0	0	0	0	0	0	52	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera-dominated community complex	Yes	95	94	0	0	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilus-dominated community	Yes	99	99	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Sabellaria-dominated community complex	Yes	34	34	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Ostrea edulis-dominated community	Yes	71	71	0	100	0	0	0	100	0	0	0	0	0	0	71	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	63	63	0	2	0	0	0	1	0	0	0	0	0	0	63	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Sand with Nephtys cirrosa community complex	Yes	87	87	0	4	0	0	0	1	0	0	0	0	0	0	87	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Mixed sediment with crustaceans, bivalves and polychaetes community complex	Yes	99	99	0	3	0	0	0	12	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	95	95	0	0	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0

Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Mytilus-dominated community	Yes	99	99	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Sabellaria-dominated community complex	Yes	34	34	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Ostrea edulis-dominated community	Yes	99	99	0	59	0	0	0	94	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	57	57	0	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Subtidal reef community complex	Yes	99	99	0	1	0	0	0	1	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated reef community complex	Yes	98	98	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1170	Reefs [1170]	Mytilus-dominated community	Yes	99	99	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1170	Reefs [1170]	Sabellaria-dominated community complex	Yes	34	34	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1170	Reefs [1170]	Intertidal reef community complex	Yes	60	60	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1170	Reefs [1170]	Subtidal reef community complex	Yes	99	99	0	1	0	0	0	1	0	0	0	0	0	0	99	0	0	0	0	0	0
Tralee Bay and Magharees Peninsula	Published	1170	Reefs [1170]	Laminaria-dominated reef community complex	Yes	98	98	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	0	0

Valentia Hbr/Portmagee Channel	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with nematodes and polychaetes community complex	Yes	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1140	Mudflats and sandflats not covered by seawater at low tide [1140]	Medium to fine sand with Nephtys cirrosa and Spiophanes bombyx community complex	Yes	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Intertidal sand with nematodes and polychaetes community complex	Yes	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Medium to fine sand with Nephtys cirrosa and Spiophanes bombyx community complex	Yes	10	10	0	78	0	0	10	0	0	0	0	0	0	6	10	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	0	0	0	94	0	0	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	0	0	0	83	0	0	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Edwardsia delapiae associated community	Yes	0	0	0	99	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Coarse sediment with Pisione remota community complex	Yes	61	61	0	25	0	0	8	0	0	0	0	0	0	0	61	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Sandy mud to mixed sediment with Melinna palmata community complex	Yes	0	0	0	96	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Mixed sediment with Chaetozone gibber community complex	Yes	0	0	0	97	0	0	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Fucoid-dominated intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	5	5	0	85	0	0	23	0	0	0	0	0	0	1	5	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Echinoderm-dominated reef community complex	Yes	25	25	0	68	0	0	0	0	0	0	0	0	0	27	25	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1160	Large shallow inlets and bays [1160]	Maerl/Zostera dominated community	Yes	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1170	Reefs [1170]	Fucoid-dominated intertidal reef community complex	Yes	0	0	0	50	0	0	34	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Valentia Hbr/Portmagee Channel	Published	1170	Reefs [1170]	Laminaria-dominated community	Yes	5	5	0	85	0	0	23	0	0	0	0	0	0	0	5	0	0	0	0	0	0
Valentia Hbr/Portmagee Channel	Published	1170	Reefs [1170]	Echinoderm-dominated reef community complex	Yes	25	25	0	68	0	0	0	0	0	0	0	0	0	27	25	0	0	0	0	0	0

Table 21. Consequence and likelihood scores for risk assessment of QI fishery interactions in Loop Head to Reen Pt. Fisheries which do not occur and QIs where no fishery occurs have been deleted (compare with Table 20)

Site name	COs	Qualifying interest	Marine Community Type	Fishing current	Trap - lobster	Trap - crab	Trap - shrimp	Trap - Nephrops	Dredge - scallop	Dredge oyster	Dredge - seed mussel	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Trammel netting bait	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines
Barley Cove to Ballyrisode Pt	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with E. Pulchra community complex	Yes										12							12	
Barley Cove to Ballyrisode Pt	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment with T.benedii community	Yes								16		12							12	
Blasket Islands	Published	Reefs [1170]	Reef with faunal turf and echinoderms community complex	Yes	9	9			16							9	9	12				2
Blasket Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9			16							9	9					
Castlemaine Harbour SAC	Published	Estuaries [1130]	MIXED SEDIMENT COMMUNITY COMPLEX	Yes							6											
Castlemaine Harbour SAC	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL MUDDY FINE SAND COMMUNITY COMPLEX	Yes							6											
Castlemaine Harbour SAC	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	FINE TO MUDDY FINE SAND WITH POLYCHAETES COMMUNITY COMPLEX	Yes							6											
Kenmare River	Published	Large shallow inlets and bays [1160]	Co-occurrence Zostera and maerl community complex	Yes	16	16	16										16					
Kenmare River	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes			12															

Kenmare River	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	16	16	16										16					
Kenmare River	Published	Large shallow inlets and bays [1160]	Pachycerianthus multiplicatus community	Yes			9															
Kenmare River	Published	Large shallow inlets and bays [1160]	Muddy fine sands dominated by polychaetes and Amphiura filiformis community complex	Yes	4	4	4	4					6		4	4	4	12	4			2
Kenmare River	Published	Large shallow inlets and bays [1160]	Fine to medium sand with crustaceans and polychaetes community complex	Yes	4	4	4	4					6		4		4	12	4			
Kenmare River	Published	Large shallow inlets and bays [1160]	Coarse sediment dominated by polychaetes community complex	Yes	4	4	4						6		4	4	4	12	4			2
Kenmare River	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes																6		
Kenmare River	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9	9	9	9							4	4	9	4	4			
Kenmare River	Published	Large shallow inlets and bays [1160]	Subtidal reef with echinoderms and faunal turf community complex	Yes	9	9	9		8						4	4	9	4	4			2
Kenmare River	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9	9	9							4	4	9	4	4			
Kenmare River	Published	Reefs [1170]	Subtidal reef with echinoderms and faunal turf community complex	Yes	9	9	9								4	4	9	4	4			2
Kenmare River	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes																6		
Kerry Hd shoal	Published	Reefs [1170]	Exposed subtidal reef community complex	Yes	9	9									6	6	9	16	4			2
Lower River Shannon	Published	Sandbanks which are slightly covered by sea water all the time [1110]	Subtidal sand to mixed sediment with Nephtys spp. community complex	Yes	4	4	4								4		4		4			
Lower River Shannon	Published	Estuaries [1130]	Subtidal sand to mixed sediment with Nucula nucleus community complex	Yes	4	4	4								4		4		4			

Lower River Shannon	Published	Estuaries [1130]	Subtidal sand to mixed sediment with Nephtys spp. community complex	Yes	4	4	4								4		4		4			
Lower River Shannon	Published	Estuaries [1130]	Faunal turf-dominated subtidal reef community	Yes											4				4			
Lower River Shannon	Published	Estuaries [1130]	Anemone-dominated subtidal reef community	Yes			6															
Lower River Shannon	Published	Estuaries [1130]	Laminaria-dominated community	Yes											4				4			
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Subtidal sand to mixed sediment with Nucula nucleus community complex	Yes	4	4	4										4		4			2
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Subtidal sand to mixed sediment with Nephtys spp. community complex	Yes	4	4	4								4	4	4		4			2
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Mixed subtidal reef community complex	Yes	9	9									4	4	9		4			2
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Faunal turf-dominated subtidal reef community	Yes	9	9	6								4	4	9		4			2
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Fucoid-dominated intertidal reef community complex	Yes																9		
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Anemone-dominated subtidal reef community	Yes			6															
Lower River Shannon	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9	9	9								4	4	9		4			
Lower River Shannon	Published	Reefs [1170]	Mixed subtidal reef community complex	Yes	6	6	6								4	4	6		4			2
Lower River Shannon	Published	Reefs [1170]	Faunal turf-dominated subtidal reef community	Yes	9	9	6								4	4	9		4			2
Lower River Shannon	Published	Reefs [1170]	Anemone-dominated subtidal reef community	Yes			6															
Lower River Shannon	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9	9								4	4	9		4			

Lower River Shannon	Published	Reefs [1170]	Fucoid-dominated intertidal reef community complex	Yes																9		
Magharee Is	Published	Reefs [1170]	Subtidal reef community complex	Yes	9	9										9	9					
Magharee Is	Published	Reefs [1170]	Laminaria dominated community complex	Yes	9	9											9					
Roaringwater Bay and Islands	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes	12	12	12		16			16					12					
Roaringwater Bay and Islands	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes	16	16	16		20								16					
Roaringwater Bay and Islands	Published	Large shallow inlets and bays [1160]	MUDDY SAND WITH BIVALVES AND POLYCHAETES COMMUNITY COMPLEX	Yes	4	4	4		6			8			4	4	4	12	4			2
Roaringwater Bay and Islands	Published	Large shallow inlets and bays [1160]	MIXED SEDIMENT COMMUNITY COMPLEX	Yes	4	4	4		12			8			4	4	4	12	4			2
Roaringwater Bay and Islands	Published	Large shallow inlets and bays [1160]	SHALLOW SAND/MUD COMMUNITY COMPLEX	Yes	4	4	4		12			12			4		4	6	4			2
Roaringwater Bay and Islands	Published	Reefs [1170]	EXPOSED TO MODERATELY EXPOSED SUBTIDAL REEF BELOW 20M COMMUNITY COMPLEX	Yes	9	9	9		16						4	4	9	12	4			2
Roaringwater Bay and Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9	9		16						4	4	9	12	4			2
Roaringwater Bay and Islands	Published	Reefs [1170]	Sheltered reef community complex	Yes	9	9	9		16								9					
Tralee Bay and Magharees Peninsula	Published	Estuaries [1130]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	4	4											4					
Tralee Bay and Magharees Peninsula	Published	Estuaries [1130]	Mixed sediment with crustaceans, bivalves and polychaetes community complex	Yes	4	4											4					
Tralee Bay and Magharees Peninsula	Published	Estuaries [1130]	Zostera-dominated community complex	Yes	9	9											9					

Tralee Bay and Magharees Peninsula	Published	Estuaries [1130]	Mytilus-dominated community	Yes	9	9										9						
Tralee Bay and Magharees Peninsula	Published	Estuaries [1130]	Intertidal reef community complex	Yes	9	9										9						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	4	4				6						4						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with Nephtys cirrosa community complex	Yes	4	4										4						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera-dominated community complex	Yes	12	12										12						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilus-dominated community	Yes	9	9										9						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sabellaria-dominated community complex	Yes	9	9										9						
Tralee Bay and Magharees Peninsula	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Ostrea edulis-dominated community	Yes	9	9	9			16						9						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Sand to sandy mud with polychaetes and bivalves community complex	Yes	4	4	4			6						4						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Sand with Nephtys cirrosa community complex	Yes	4	4	4			6						4						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Mixed sediment with crustaceans, bivalves and polychaetes community complex	Yes	4	4	4			6						4						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Zostera-dominated community complex	Yes	12	12										12						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Mytilus-dominated community	Yes	9	9										9						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Sabellaria-dominated community complex	Yes	9	9										9						

Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Ostrea edulis-dominated community	Yes	9	9	9			16							9						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	9	9											9						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Subtidal reef community complex	Yes	9	9	9			9							9						
Tralee Bay and Magharees Peninsula	Published	Large shallow inlets and bays [1160]	Laminaria-dominated reef community complex	Yes	9	9											9						
Tralee Bay and Magharees Peninsula	Published	Reefs [1170]	Mytilus-dominated community	Yes	9	9											9						
Tralee Bay and Magharees Peninsula	Published	Reefs [1170]	Sabellaria-dominated community complex	Yes	9	9											9						
Tralee Bay and Magharees Peninsula	Published	Reefs [1170]	Intertidal reef community complex	Yes	9	9											9						
Tralee Bay and Magharees Peninsula	Published	Reefs [1170]	Subtidal reef community complex	Yes	9	9	9			9							9						
Tralee Bay and Magharees Peninsula	Published	Reefs [1170]	Laminaria-dominated reef community complex	Yes	9	9											9						
Valentia Hbr/Portmagee Channel	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand with nematodes and polychaetes community complex	Yes			4																
Valentia Hbr/Portmagee Channel	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Medium to fine sand with Nephtys cirrosa and Spiophanes bombyx community complex	Yes			4																
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Intertidal sand with nematodes and polychaetes community complex	Yes			4																
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Medium to fine sand with Nephtys cirrosa and Spiophanes bombyx community complex	Yes	4	4	4		9							4	4						
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Maërl-dominated community	Yes			16		20														

Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Zostera dominated community	Yes			12		16															
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Edwardsia delapiae associated community	Yes			12		16															
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Coarse sediment with Pisione remota community complex	Yes	4	4	4		8									4						
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Sandy mud to mixed sediment with Melinna palmata community complex	Yes			4		12															
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Mixed sediment with Chaetozone gibber community complex	Yes			4		12															
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Fucoid-dominated intertidal reef community complex	Yes																		6		
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	6	6	9		16							6	6							
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Echinoderm-dominated reef community complex	Yes	9	9	9									9	9							
Valentia Hbr/Portmagee Channel	Published	Large shallow inlets and bays [1160]	Maerl/Zostera dominated community	Yes			16		20															
Valentia Hbr/Portmagee Channel	Published	Reefs [1170]	Fucoid-dominated intertidal reef community complex	Yes			9															6		
Valentia Hbr/Portmagee Channel	Published	Reefs [1170]	Laminaria-dominated community	Yes	6	6	9		16								6							
Valentia Hbr/Portmagee Channel	Published	Reefs [1170]	Echinoderm-dominated reef community complex	Yes	9	9	9									9	9							
Roaringwater Bay and Islands	Published	Reefs [1170]	Sheltered reef community	Yes	9	9	9		16								9							

13.1.5 Reen Point to Carnsore Point

- There were 1430 possible fishery marine QI/MCT interactions in the Reen Pt to Carnsore Pt region
- 1297 possible fishery – marine QI/MCT interactions in the fishery-habitats matrix for this region did not occur and were therefore not assessed further.
- 133 fishery – marine QI/MCT interactions, involving 15 fishing metiers were recorded in the Reen Point to Carnsore Point region. Presence/absence and overlaps between fisheries and MCTs are in Table 22. Risk scores for these interactions are in Table 23. The risk profile is summarized in Figure 125.

13.1.5.1 Dredge fisheries for cockle, clam, scallop and mussel

- Dredge fishing for scallop occurs mainly in offshore waters in the north east Celtic Sea south of Waterford and Wexford. Vessels are over 15m in length and tow between 16 and 32 dredges depending on vessel size. The fishery extends inshore and overlaps with the southern portions of Saltees Is. and Hook Hd. SACs.
- The fishery occurs on sand and gravel substrates (deep coarse sediments) but also extends to the edges of the echinoderm and sponge dominated community complex in the Saltee Is. and Hook Hd. SACs.
- The fishery is intensive (>630hrs per 3km 2006-2012) on the coarse sediment with Pisidia longicornis and epibenthic fauna community complex at Hook Hd. *Pisidia* has a moderate sensitivity to abrasion and physical disturbance (www.marlin.ac.uk)
- Scallop fishing rarely occurs in the Carnsore Pt. SAC. Some activity is recorded at the southern and northern edges of the site close to the exposed sub-tidal reef dominated by a faunal community complex.
- Razor clam beds may occur in Bannow Bay, Hook Hd, River Barrow and Nore, Saltee Is and Tramore Dunes and Backstrand SACs. No surveys to identify the extent of these beds have been undertaken. No fisheries for razor clams occur in any of these sites and these areas are not classified for the production of razor clams. Spatial overlaps with marine communities is low in all sites except in Bannow Bay where there is substantial overlap between the putative distribution of the clam bed and intertidal sand and *Zostera* dominated communities. Razor clam fishing poses a high

risk to *Zostera* and to sedimentary communities where the fishery footprint is substantial.

- Cockle stocks may occur in Ballymacoda, Bannow Bay and Courtmachserry Estuary. No surveys have been undertaken. A significant stock of cockles (>2000 tonnes) occurs in Tramore Backstrand. Annual surveys were completed in Tramore in 2010-2012. No cockle fisheries currently occur in these sites and these areas are not classified for production of cockles.
- Cockle stocks occur in intertidal muddy sands. The cockle bed in Bannow Bay may overlap with Zostera.
- The immediate effects of cockle suction dredging on intertidal sedimentary communities is severe. Recovery depends on sediment stability, currents and exposure to wave action relative to the scale of the impact (ABPMer 2012. Muddy Sands. Appendix F).
- Surf clam fishing occurs in the Barrow and Nore SAC. GIS analysis of expert opinion data indicates overlaps with fine sand to muddy fine sand, fine sand, muddy estuarine and *Sabellaria alveolata* communities. Survey data and the distribution of fishing in 2010-2013 indicates there is no overlap with *Sabellaria*. The fishery occurs over a number of weeks in Spring under a voluntary quota based on survey.
- Seed mussel or mussel beds occur in Youghal Bay, Ballycotton Bay and in the estuary of the Blackwater. There is significant overlap between potential mussel fisheries (if these fisheries were opened) and MCTs in the Blackwater estuary.
- **Scallop fishing on reef dominated communities poses a high risk to these communities. The risk to coarse sediment communities with epibenthos is lower but this depends on the intensity and frequency of the disturbance.**
- **Any development of razor clam fishing or cockle fishing in sedimentary communities in SACs in the Reen Pt to Carnsore Pt region should be balanced with the capacity of these communities to recover from impacts caused by the fishery. These fisheries are incompatible with maintenance of FCS for *Zostera* in Bannow Bay.**
- **Any development of a mussel fishery in the Blackwater estuary should avoid Zostera. As mussel is listed as a marine community type in the Blackwater the fishery will lead to seasonal change in structure and function of this habitat. However, cumulative effects are unlikely given that mussel beds would need to**

recover between fishing events. Other sedimentary habitats may be disturbed although the fishing method is not as invasive as other types of dredges.

13.1.5.2 Pot fishing for crab, lobster and shrimp

- Pot fisheries for crab and lobster occur in sedimentary and reef habitats in Carnsore Pt, Hook Hd and Saltees Is SAC. Approximately 35 vessels fish in this area.
- Potting intensity is probably lowest at Carnsore Pt.
- The fishery overlaps with echinoderms and sponges marine community complex and *Laminaria* dominated community and with the coarse sediments with Pisidia community.
- **Non cumulative seasonal changes in echinoderms and sponges marine communities is possible depending on the intensity of potting activity.**

13.1.5.3 Bottom otter trawling and beam trawling

- Bottom otter trawling only occurs to any significant extent in Hook Hd. SAC. Here the fishery overlaps with the coarse sediment and echinoderm and sponge dominated community. Some reported activity may represent steaming to port (Dunmore East) rather than fishing.
- Beam trawling occurs in Hook Hd, Saltee Is. and Carnsore Pt SACs. The activity is less intensive in Hook Hd. than otter trawling. A cluster of activity is reported west and north-west of Saltees. Some of this may be steaming to port (Kilmore Quay) activity rather than fishing
- **Bottom otter trawling and beam trawling may pose significant risks to echinoderm and sponge dominated communities. Coarse sediment communities with epifauna are also at risk.**

13.1.5.4 Gill netting and trammel netting

- Gill netting for cod in Hook Hd SAC occurs mainly during Spring. The fishery overlaps the echinoderm and sponge dominated community. Anchors and foot ropes may affect emergent epifauna and encrusting epifauna
- Trammel netting for bait may occur in the same areas as pot fishing for lobsters i.e. Carnsore, Saltees and Hook Hd SACs. The level of activity is unknown.
- The intensity of fishing activity for cod and trammel netting for bait (likely to be a small sub-set of potters fishing in the area) is unlikely to cause non-cumulative seasonal changes in epifauna.

13.1.5.5 Mid-water trawling

– Mid water trawling for sprat and herring occurs in Hook Hd SAC. This fishery occurs in autumn and winter. There are no risks to habitats.

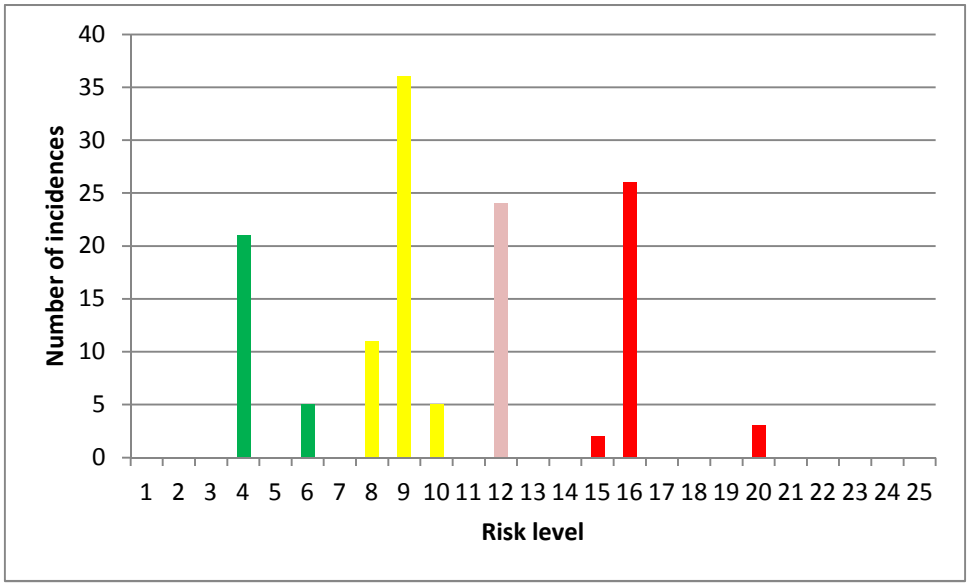

Figure 125. Risk profile for fisheries habitat interactions in the Reen Pt to Carnsore Pt region

Table 22. Presence / absence and spatial overlaps (where COs for MCTs are published) of fisheries and habitats in SACs in the Reen Point to Carnsore Pt region

Site name	COs	QI/SCI	MCT	Fishing current	Trap - lobster	Trap - crab	Trap-velvet crab	Trap - shrimp	Trap - Nephrops	Trap - whelk	Dredge - scallop	Dredge oyster	Dredge - seed mussel	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Tangle net crayfish	Trammel netting bait	Beam trawl - demersal	Otter trawl - demersal	Mid-water trawl	Hand gathering winkles	Hand gathering cockles	Hooks and Lines	Dredge mussel
Ballymacoda (Clonpriest and Pillmore)	Published	Estuaries [1130]	Sandy mud with Hediste diversicolor and Tubificoides benedii community	No	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Ballymacoda (Clonpriest and Pillmore)	Published	Estuaries [1130]	Sand with polychaetes and bivalves community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballymacoda (Clonpriest and Pillmore)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sandy mud with Hediste diversicolor and Tubificoides benedii community	No	0	0	0	0	0	0	0	0	0	0	0	77	0	0	0	0	0	0	0	77	0	0
Ballymacoda (Clonpriest and Pillmore)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with polychaetes and bivalves community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand dominated by polychaetes community complex	No	0	0	0	0	0	0	0	0	0	34	0	51	0	0	0	0	0	0	0	51	0	0
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	77	0	91	0	0	0	0	0	0	0	91	0	0

Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Barnea candida community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sands with Pygospio elegans and Corophium volutator community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	13	0	0
Bannow Bay	Published	Estuaries [1130]	Fine sands with Pygospio elegans and Corophium volutator community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bannow Bay	Published	Estuaries [1130]	River	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carnsore Pt	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	INTERTIDAL SAND DOMINATED BY POLYCHAETES AND CRUSTACEA COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carnsore Pt	Published	Reefs [1170]	SHELTERED TO MODERATELY EXPOSED INTERTIDAL REEF COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carnsore Pt	Published	Reefs [1170]	EXPOSED SUBTIDAL REEF DOMINATED BY A FAUNAL COMMUNITY COMPLEX	Yes	41	41	0	0	0	0	1	0	0	0	0	0	0	0	0	41	1	0	0	0	0	0	0
Carnsore Pt	Published	Reefs [1170]	Laminaria-dominated community	Yes	36	36	0	0	0	0	1	0	0	0	0	0	0	0	0	36	1	0	0	0	0	0	0
Courtmacsharry Estuary	Published	Estuaries [1130]	Sandy mud to mixed sediments with T. Benedii and H. Diversicolor community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Courtmacsharry Estuary	Published	Estuaries [1130]	Sand to mixed sediments with oligochaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0
Courtmacsharry Estuary	Published	Estuaries [1130]	Sand with N. Cirrosa community complex	No	0	0	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	0	0	71	0	0
Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sandy mud to mixed sediments with T. Benedii and H. Diversicolor community complex	No	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0
Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand to mixed sediments with oligochaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0
Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with N. Cirrosa community complex	No	0	0	0	0	0	0	0	0	0	0	0	63	0	0	0	0	0	0	0	63	0	0
Hook Head	Published	Large shallow inlets and bays [1160]	Sand with Chaetozone christiei and Tellina sp. community	Yes	57	57	0	68	0	0	0	0	0	0	0	0	0	0	56	0	0	38	0	0	0	0
Hook Head	Published	Large shallow inlets and bays [1160]	Coarse sediment with Pisidia longicornis and epibenthic fauna community complex	Yes	84	84	0	9	0	0	66	0	0	4	65	0	0	0	83	1	1	81	0	0	0	0
Hook Head	Published	Large shallow inlets and bays [1160]	Echinoderm and sponge dominated community complex	Yes	100	100	0	12	0	0	38	0	0	0	37	0	0	0	100	1	1	99	0	0	0	0
Hook Head	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	69	69	0	4	0	0	1	0	0	0	1	0	0	0	69	0	0	54	0	0	0	0
Hook Head	Published	Reefs [1170]	Exposed to moderately exposed intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Hook Head	Published	Reefs [1170]	Echinoderm and sponge dominated community complex	Yes	100	100	0	2	0	0	49	0	0	0	48	0	36	0	100	1	1	87	0	0	0	0
Hook Head	Published	Reefs [1170]	Laminaria-dominated community	Yes	74	74	0	12	0	0	1	0	0	0	1	0	9	0	74	0	0	60	0	0	0	0
River Barrow and River Nore	Published	Estuaries [1130]	Fine sand with Fabulina fabula community	Yes	0	0	0	0	0	6	0	0	0	10	0	8	0	0	0	0	0	13	0	0	0	0
River Barrow and River Nore	Published	Estuaries [1130]	Muddy estuarine community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
River Barrow and River Nore	Published	Estuaries [1130]	Sabellaria alveolata reef	Yes	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0
River Barrow and River Nore	Published	Estuaries [1130]	Sand to Muddy fine sand community complex	Yes	0	0	0	0	0	17	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0
River Barrow and River Nore	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	MUDDY ESTUARINE COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
River Barrow and River Nore	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND TO MUDDY FINE SAND COMMUNITY COMPLEX	Yes	0	0	0	0	0	0	0	0	0	1	0	68	0	0	0	0	0	0	0	0	0	0
Saltee Islands	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand to muddy sand dominated by polychaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saltee Islands	Published	Large shallow inlets and bays [1160]	Coarse sediment with Pomatoceros spp. and Pisidia longicornis community	Yes	80	80	0	0	0	0	1	0	0	1	0	0	0	0	80	1	0	0	0	0	0	0

Saltee Islands	Published	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saltee Islands	Published	Reefs [1170]	Subtidal reef dominated by echinoderms and sponges community complex	Yes	60	60	0	0	0	0	1	0	0	0	1	0	0	0	60	1	0	0	0	0	0	0	0	0
Saltee Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	48	48	0	0	0	0	1	0	0	0	8	0	0	0	48	0	0	0	0	0	0	0	0	0
Tramore Dunes and Backstrand	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal fine sand with Bathyporeia spilosa and Nephtys cirrosa community	No	0	0	0	0	0	0	0	0	0	3	0	61	0	0	0	0	0	0	0	0	60	0	0	0
Tramore Dunes and Backstrand	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal muddy sand with Pygospio elegans and Tubificoides benedii community complex	No	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	55	0	0	0
Tramore Dunes and Backstrand	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Intertidal estuarine sandy mud community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Subtidal estuarine fine sand with Bathyporeia spp. community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Sand and mixed sediment with polychaetes and crustaceans community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Coarse sediment community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58

Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Mytilus edulis-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal estuarine sandy mud community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand and mixed sediment with polychaetes and crustaceans community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Coarse sediment community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilus edulis-dominated community	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Great Is Channel	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mixed sediment to sandy mud with Polychaetes and Oligochaetes community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clonakilty Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand to sandy mud with T. Benedi and Peringia ulvae ommunity complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Intertidal reef community complex	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Muds to mixed sediments with polychaetes, bivalves and oligochaetes community complex	Yes	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Sub-tidal reef community complex	Yes	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Zostera community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Reefs [1170]	Intertidal reef community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Reefs [1170]	Sub-tidal reef community complex	Yes	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Lough Hyne and Environs	Published	Reefs [1170]	Laminaria-dominated community	Yes	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Ballyteigue Burrow	Published	Estuaries [1130]	Mixed sediment to sand with nematodes and T. Benedii community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballyteigue Burrow	Published	Estuaries [1130]	Sand with crustaceans and N. Hombergii community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ballyteigue Burrow	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mixed sediment to sand with nematodes and T. Benedii community complex	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 23. Consequence and likelihood scores for risk assessment of QI fishery interactions in Reen Pt to Carnsore Pt. Fisheries which do not occur and QIs where no fishery occurs have been deleted (compare with Table 22)

Site name	COs	Qualifying interest	Marine Community Type	Fishing current	Trap - lobster	Trap - crab	Trap - shrimp	Trap - whelk	Dredge - scallop	Dredge - razor clam	Dredge surf clam	Dredge cockle	Gill net	Trammel netting bait	Beam trawl - demersal	Otter trawl - demersal	Mid-water trawl	Hand gathering cockles	Dredge mussel
Ballymacoda (Clonpriest and Pillmore)	Published	Estuaries [1130]	Sandy mud with Hediste diversicolor and Tubificoides benedii community	No								16						12	
Ballymacoda (Clonpriest and Pillmore)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sandy mud with Hediste diversicolor and Tubificoides benedii community	No								16						12	
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal sand dominated by polychaetes community complex	No						16		16						12	
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No						20		20						12	
Bannow Bay	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Fine sands with Pygospio elegans and Corophium volutator community complex	No								16						12	
Carnsore Pt	Published	Reefs [1170]	EXPOSED SUBTIDAL REEF DOMINATED BY A FAUNAL COMMUNITY COMPLEX	Yes	9	9			8					9	16				
Carnsore Pt	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9			8					9	16				
Courtmacsharry Estuary	Published	Estuaries [1130]	Sand to mixed sediments with oligochaetes community complex	Yes								16						12	
Courtmacsharry Estuary	Published	Estuaries [1130]	Sand with N. Cirrosa community complex	Yes								16						12	

Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sandy mud to mixed sediments with T. Benedii and H. Diversicolor community complex	Yes								16						12		
Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand to mixed sediments with oligochaetes community complex	Yes								16						12		
Courtmacsharry Estuary	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Sand with N. Cirrosa community complex	Yes								16						12		
Hook Head	Published	Large shallow inlets and bays [1160]	Sand with Chaetozone christiei and Tellina sp. community	Yes	4	4	4							4			4			
Hook Head	Published	Large shallow inlets and bays [1160]	Coarse sediment with Pisidia longicornis and epibenthic fauna community complex	Yes	4	4	4		12	10	9			4	12	12	4			
Hook Head	Published	Large shallow inlets and bays [1160]	Echinoderm and sponge dominated community complex	Yes	9	9	6		16		16			9	16	16	4			
Hook Head	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9	9	6		8		8			9			4			
Hook Head	Published	Reefs [1170]	Echinoderm and sponge dominated community complex	Yes	9	9	6		16		16		9	9	16	16	4			
Hook Head	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9	6		8		8		9	9			4			
River Barrow and River Nore	Published	Estuaries [1130]	Fine sand with Fabulina fabula community	Yes				4		10		12					4			
River Barrow and River Nore	Published	Estuaries [1130]	Muddy estuarine community complex	Yes								12								
River Barrow and River Nore	Published	Estuaries [1130]	Sabellaria alveolata reef	Yes							20									

River Barrow and River Nore	Published	Estuaries [1130]	Sand to Muddy fine sand community complex	Yes				4				12								
River Barrow and River Nore	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	MUDDY ESTUARINE COMMUNITY COMPLEX	Yes								12								
River Barrow and River Nore	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	SAND TO MUDDY FINE SAND COMMUNITY COMPLEX	Yes						10		12								
Saltee Islands	Published	Large shallow inlets and bays [1160]	Coarse sediment with Pomatoceros spp. and Pisidia longicornis community	Yes	4	4			6	10				4	12					
Saltee Islands	Published	Reefs [1170]	Subtidal reef dominated by echinoderms and sponges community complex	Yes	9	9			16		8			9	16					
Saltee Islands	Published	Reefs [1170]	Laminaria-dominated community	Yes	9	9			8		8			9						
Tramore Dunes and Backstrand	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal fine sand with Bathyporeia spilosa and Nephtys cirrosa community	No						10		16							12	
Tramore Dunes and Backstrand	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal muddy sand with Pygospio elegans and Tubificoides benedii community complex	No								16							12	
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Intertidal estuarine sandy mud community complex	No																8
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Subtidal estuarine fine sand with Bathyporeia spp. community complex	No																12
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Sand and mixed sediment with polychaetes and crustaceans community complex	No																12
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Coarse sediment community complex	No																12
Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Zostera dominated community	No																16

Blackwater River (Cork/Waterford)	Published	Estuaries [1130]	Mytilus edulis-dominated community	No																15
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Intertidal estuarine sandy mud community complex	No																8
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Zostera dominated community	No																16
Blackwater River (Cork/Waterford)	Published	Mudflats and sandflats not covered by seawater at low tide [1140]	Mytilus edulis-dominated community	No																15
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Laminaria-dominated community	Yes	9										9					
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Muds to mixed sediments with polychaetes, bivalves and oligochaetes community complex	Yes	4										9					
Lough Hyne and Environs	Published	Large shallow inlets and bays [1160]	Sub-tidal reef community complex	Yes	9										9					
Lough Hyne and Environs	Published	Reefs [1170]	Sub-tidal reef community complex	Yes	9										9					
Lough Hyne and Environs	Published	Reefs [1170]	Laminaria-dominated community	Yes	9										9					

13.2 Species (Annex II and IV Habs Directive)

13.2.1 Grey seal

13.2.1.1 Designated sites and Conservation objectives

Grey seals are listed in Annex II of the Habitats Directive. Although the species is wide ranging in the marine environment the Directive requires Members States to establish Special Areas of Conservation to protect them. Grey seal use specific sites for breeding, moulting and resting and have some degree of fidelity to these areas while also undertaking large scale migrations and foraging movements in open water. In Irelands south, west and north-west coasts 9 sites are designated for Grey Seal (Table 24, Figure 126). Conservation objectives for grey seal have been published for 8 sites.

The conservation objectives for grey seal have explicit targets

1. The species range within the site should not be restricted by artificial barriers
2. Breeding sites should be conserved in natural condition
3. Moult haul-out sites should be conserved in natural condition
4. Resting haul-out sites should be conserved in natural condition
5. Human activities should occur at levels that do not adversely affect the grey seal population at the site
6. The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually (Roaringwater Bay, Saltee Is)

Table 24. SACs designated for Grey seal excluding the Irish Sea. The status of COs is shown

Site code	Geographic area	Site name	COs
147	Benwee to Quiqleys Pt	Horn Head and Rinclevan	Published
190	Benwee to Quiqleys Pt	Slieve Tooey/Tormore Island/Loughros Beg Bay	Pending
2172	Loop to Reen Point	Blasket Islands	Published
101	Loop to Reen Point	Roaringwater Bay and Islands	Published
707	Reen point to Carnsore	Saltee Islands	Published
495	Slyne to Benwee	Duvillaun Islands	Published
278	Slyne to Benwee	Inisboffin and Inishark	Pubished
328	Slyne to Benwee	Slyne Hd Islands	Published
507	Slyne to Benwee	Iniskea Islands	Published

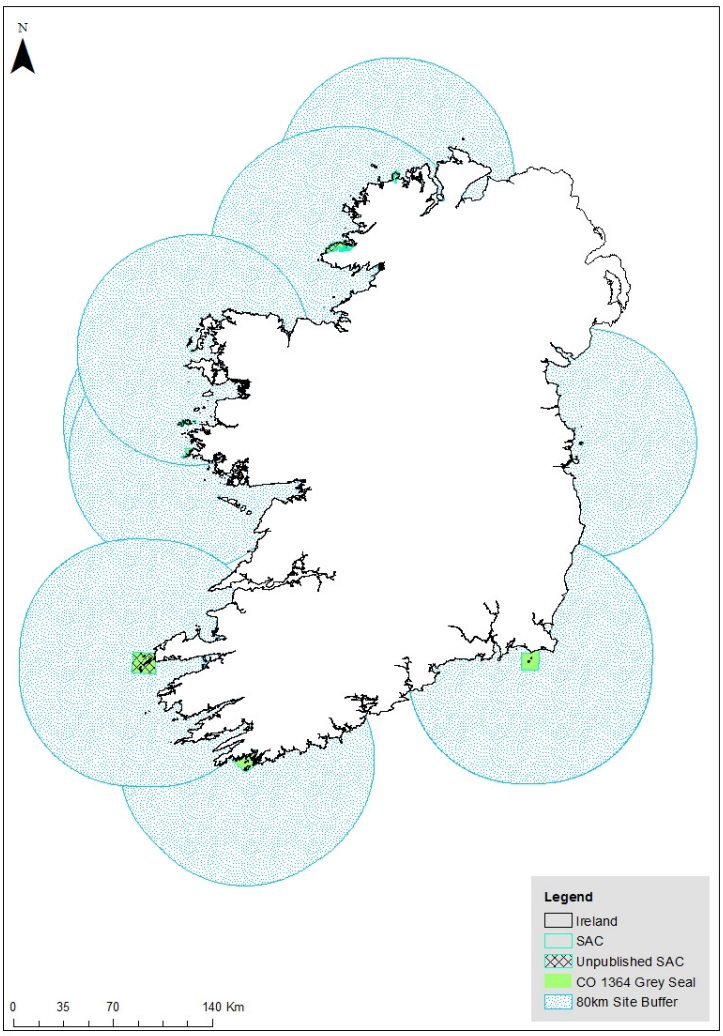

Figure 126. Designated sites for Grey Seal categorised according to whether COs are published or not. Foraging buffer zones of 80km around each designated site are shown.

13.2.1.2 Distribution, habitat use and site fidelity

Grey seals in Ireland occur on remote haul out sites including rocky coasts, beaches, uninhabited islands and seacaves. However, the species can be found on almost all coasts of Ireland although this is less likely on the east coast where the distribution is patchier and probably inversely related to human population density and disturbance. The number of grey seals present at Irish colonies varies with season, the annual peaks occurring during breeding and moult periods. While seasonal patterns in site use can be consistent between years, terrestrial habitats used during the moult and summer in Ireland may not always be used for breeding (Kiely 1998, Kiely *et al*. 2000). Recognised moult haul out sites are therefore more numerous than recognised breeding haul out sites.

There is evidence for separate breeding stocks of Grey seals in the UK and Baltic. This is shown from genetic studies of seals at breeding sites (Allen *et al*. 1995). However, grey seal colonies are not spatially isolated year-round (McConnell *et al*. 1992, Thompson *et al*. 1996) and there is regular movement of seals between haul-out sites. The most recent information on the marine distribution of grey seals in Irish waters is limited to data provided by GSM/GPS loggers attached to a small number of individuals in southwest Ireland in 2009 (Cronin *unpublished*). Four of eight tagged seals travelled between southwest Ireland and western Scotland, with some making repeat trips. The majority of time spent at sea was concentrated to the west of Ireland and in the locality of haulout locations along the west coast of Ireland and Scotland (Figure 127). The mean distance travelled away from the haul-out site by tagged seals was 51km, but there was a large variation between individuals. The mean foraging trip duration was 40 hours and some trips lasted several days, the longest being over 15 days (Cronin *et al* 2013). In the North Sea (McDonnell *et al* 2009) patterns of movement include a high percentage of time spent at or near haul-out sites, short trips to local offshore areas, diving to the seabed and large-scale geographical travel. Habitat use intensity maps show this pattern in both the south west coast of Ireland and in Scotland (Figure 127, Figure 128). Habitat use, therefore, is concentrated at and in the vicinity of (<80km) haul out sites. The main interactions with fisheries, therefore, are expected to occur within this area.

If there are separate breeding stocks then, irrespective of the degree of non-breeding interactions and movement between sites such isolated breeding stocks will be more vulnerable to human pressures and impacts than if the there was a single panmictic breeding population. There is a higher risk that isolated or closed breeding populations will decline below minimum viable population size if significant mortality occurs. The degree of genetic isolation between grey seal breeding colonies in Ireland is unknown.

Limited movement of breeding animals between sites in the Inner Hebrides, Outer Hebrides, Orkney and North Sea has been shown by a spatially-explicit model used to estimate the British grey seal population from geographically structured pup production estimates (SCOS, 2009); http://www.scotland.gov.uk/Publications/2011/03/04165857/72. This finding is further supported by recent results from other grey seal population models that indicate an absence of large scale redistribution of breeding females between regions again implying a high degree of philopatry or fidelity to natal sites (SCOS, 2009). Pomeroy *et al* (2006) demonstrate philopatry at site level and at finer spatial scale within sites which suggested kin clustering and recognition.

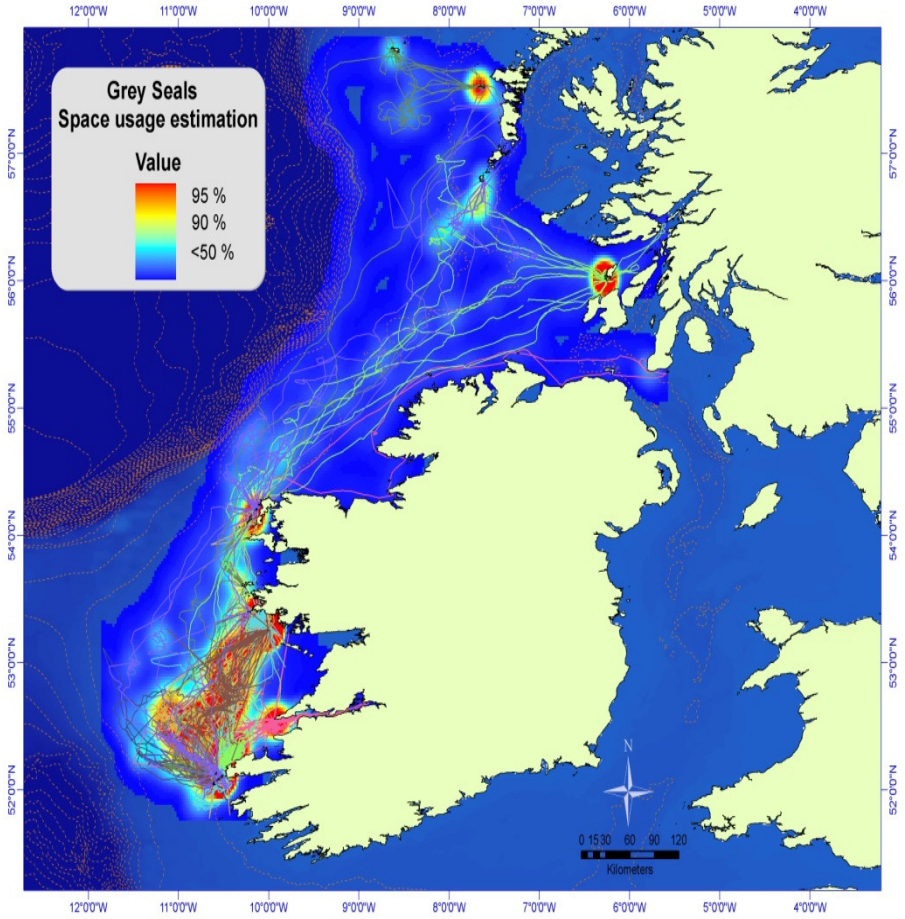

Figure 127. Foraging tracks and space use of 8 grey seals tagged in southwest Ireland 2009 (source: Cronin *et al*)

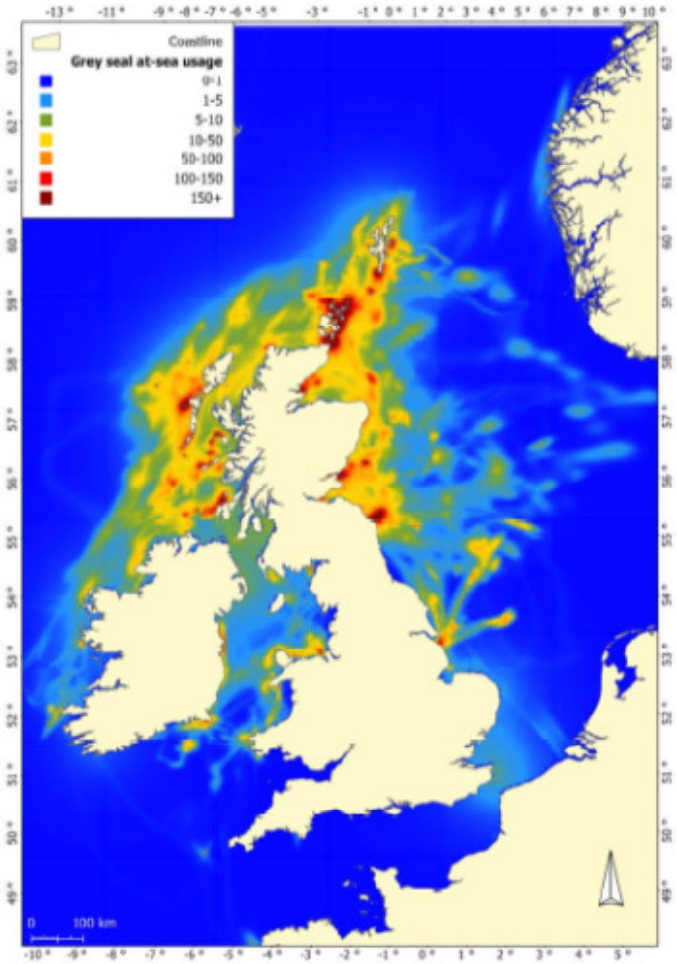

Figure 128. Estimated grey seal habitat usage (haul out and marine) around the UK (source: SCOS 2012).

13.2.1.3 Diet

Grey seals have a wide range of prey preferences with a strong emphasis on demersal fish species (e.g. whiting *Merlangius merlangus*, *Trisopterus* species, flatfish), ling (*Molva molva*), sandeels (*Ammodytidae*) and cephalopods. Depredation studies indicate that species of commercial value such as cod (*Gadus morua*), monkfish (*Lophius piscatorius, L. budegassa*), hake (*Merluccius merluccius*), herring (*Clupea harengus*) and Atlantic salmon (*Salmo salar*) are also taken by grey seals (Cosgrove *et al* 2013, Cronin *et al* 2014).

There may be significant differences in foraging strategy and diet in male and female grey seals. Females select fewer and higher quality prey types in Spring than males for instance (Beck *et al*. 2007). Body size differences between male and female and nutritional requirements of female seals, especially after the breeding season, may explain the different foraging strategies of male and female seals.

Per capita prey consumption is estimated at 4.7 $kg.d^{-1}$ (1.72 $tonnes.yr^{-1}$) (Hammond and Harris 2006).

13.2.1.4 Population size and trends

Grey seal populations in Ireland are thought to be increasing. Although there are no long term reliable population estimates various studies and in particular the national surveys undertaken from 2005 onwards points to significant increases in grey seal populations in recent years and possibly since the 1980s:

- *Lockley 1966. Population of 2500 grey seals of all ages*
- *Summers 1983. Population of 2000-2500 grey seals of all ages*
- *OCadhla and Mackey 2002. Studies carried out between 1995 and 2000 facilitated a revision of the Irish minimum population estimate to over 4,000 grey seals*
- O'Cadhla and Strong 2007. 5343 grey seals observed at haul out locations. 35% of the population occurred at Iniskea Islands.
- O'Cadhla *et al* 2008. Grey seal population estimate for 2005 of 5,509-7,083 seals of all ages
- O'Cadhla *et al* 2013. Grey seal population at 7 main breeding areas estimated at 7284-9365

Although the grey seal population in Ireland has been increasing in recent years the population is small compared to the UK population (approx. 120,000, increased by 6% per annum during 1990s) despite the availability of good habitat on Irish coasts (O'Cadhla *et al*. 2013).

There are some regional differences in population changes between the national surveys of 2005 and 2011-2012. Although most areas have shown significant increases in seal numbers data for south west Donegal and Saltees Islands shows that the populations in these areas have not increased (Table 25).

Table 25. Comparison of numbers of Grey Seal in SACs are areas in proximity to SACs in 2003 and 2011-2012 (from Duck and Morris 2013a,b). Count sectors from Duck and Morris (2013) are coastal areas and do not correspond to SAC boundaries and numbers do not represent population estimates. * Sturrall to Maghera and not strictly SAC 190, **north Galway Islands and not only SAC 278

		Duck and Morris (2013)	O'Cadhla *et al*. (2008)	O'Cadhla *et al*. (2013)

Site code	Site name	Count sectors	Index 2003	Index 2011	2005 survey	2012 survey
147	Horn Head and Rinclevan	4(6)	0	5		
190	Slieve Tooey/Tormore Island/Loughros Beg Bay	4(12)	17	5	795 – 1022*	844-1085*
2172	Blasket Islands	11(4-7)	31	142	648-833	1099-1413
101	Roaringwater Bay and Islands	12(4,5)	55	169		
707	Saltee Islands	14(3)	61	95	571 – 734	529-680
495	Duvillaun Islands	7(7-9)	0	0		
278	Inisboffin and Inishark	8(1)	0	1	823 – 1058**	1456-1872
328	Slyne Hd Islands	8(3)	36	85	238-306	364-468
507	Iniskea Islands	7(6,7)	0	0	1351-1737	1842-2367

13.2.1.4.1 Life history parameters and population growth

There are life history constraints on the rate at which a seal population can grow; each female seal can have a maximum of 1 pup per year (fertility = 1.0) although the actual fertility rate is usually lower at 0.9 and declines with age. Mean age at which females first give birth is 5.5 years, adult survival rate, in the absence of significant human induced mortality, is 0.935, the survival rate from birth to weaning is highly variable and could range from 0.49-0.9 (Hall *et al*. 2001 suggest 0.62) and survival from weaning to age 4 is 0.82 (see Harding *et al* 2007 for discussion on life history characteristics and their variability). Analysis of populations trends, based on these life history constraints, indicate that the maximum population growth rate is probably 10% per annum (and then only if fertility rate is at least 0.95). In the UK pup production increased at 6% per annum during the 1980s-1990s although in recent years this rate has declined to 1.1%. The difference between 2005 and 2012 population estimates in Ireland suggests an increase of 4.07% per annum; assuming annual pup production and population growth rate is constant. The Baltic population has increased by 7.5% in recent years (Harding *et al*. 2007) (Figure 129).

Environmental conditions can affect the population growth rate; severe weather can lead to higher pup mortality, contaminants such as PCBs can reduce fertility rate, as in the Baltic, and

food shortage could be expected also to reduce fertility and pup survival by reducing the nutritional condition of breeding females. Food shortage could be brought about by decline in fish biomass although there is no evidence of this. The fishing industry also provides a food subsidy to seals. This could potentially increase female fertility, female condition and transfer of maternal resources to pups and result in increased pup survival (Hall *et al*. 2001). However, grey seals feed mainly on non-commercial species of fish or on undersized fish of commercial species and there appears to be no significant direct competition, therefore, between fisheries and seals (Dave Reid pers.comm.). Although set net fisheries provide energy efficient access to prey the level of subsidy that this provides to the grey seal population generally, and whether this could be translated into increased pup survival in the population, is unknown.

The highest variability, and the most significant uncertainty in forecasting population growth, is in the survival rate of pre-weaned pups and to a lesser extent survival during the post-weaning period. Both pup production and pup survival varies annually leading to unstable population growth rates (Hammill *et al* 1998). Single year estimates or infrequent population estimates may therefore not be reliable estimates of underlying trends in population growth rate.

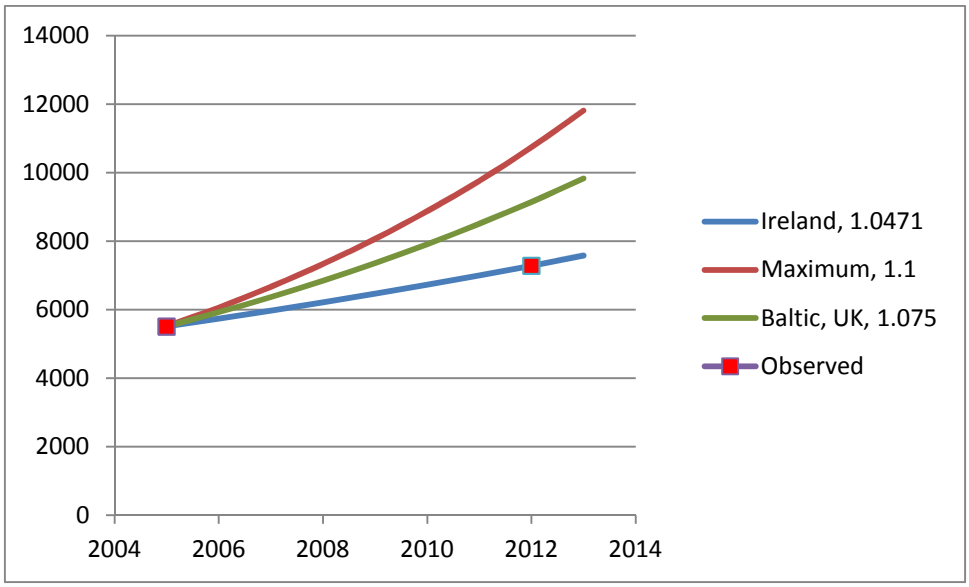

Figure 129. Examples of density independent population growth rates of seals from a starting population of 5509 estimated in Ireland in 2005. The maximum population growth rate, constrained by life history parameters, is 10% (λ = 1.1). Observed increases are usually below this because there is some additional mortality in the population, usually in the pup population, or fertility may be lower than maximum etc. In the Baltic and UK the population increase during 19802 and 1990s is 1.075 although the UK rate has declined in recent years. In Ireland, taking the

2005 and 2012 population estimates, and assuming annual growth rate is constant, indicates a growth rate of 1.0471. These projections assume that the long term population growth rate (λ) is known and stable.

13.2.1.5 Pressures on grey seals from fisheries

Pressures on grey seals posed by fishing include potential for by-catch, disturbance of haul out and breeding sites and depletion of key prey species. These pressures have the potential to negatively impact the conservation targets through capturing seals, altering the population size and age composition, reducing the habitat quality within the foraging range of seals using particular haul out sites through fisheries outtake and indirectly modifying the haul out sites through human disturbance.

13.2.1.5.1 Disturbance

The sensitivity of grey seals to human disturbance has not been studied in Ireland. Human disturbance pressure at haul out sites is likely to originate from walkers or boats approaching or passing close to haul out locations. As the majority of haul out sites are in remote locations the main souce of disturbance at these sites in Ireland is likely to originate form fishing vessels, sailing vessels, kayaks or other recreational marine vehicles. Senstivity varies according to the type of interaction. Lewis (2006) studied seal behavior at a haul out in Wales which was subjected to marine vessel traffic varying from 0-34 vessels per 3 hrs and which either approached the haul out slowly, rapidly (causing a wake), stopped to observe seals or approached the haul out erratically. Seals either showed no change in behavior, short term change and reversion to pre-disturbed behavior or permanently modified behavior in response to vessels. Vessels which approached the haul out location erratically or which stopped and re-started engines illicited the most significant changes in behavior. Modified behavior occurred when vessels were within 30 and 300m of the haul out. Increased intensity of disturbance (number of vessels/humans, frequency of disturbance) can induce an escape-response whereby seals flee the immediate area. Vessels which passed the haul out location without changing direction or speed had the lowest disturbance effect. Behavioural responses to disturbing vessels show a degree of tolerance rather than habituation i.e. the behavioural response is proportional to the perceived degree of danger.

13.2.1.5.2 Prey depletion

The diet of grey seals is diverse but dominated by demseral fish and small pelagic (herring and sprat) fish. Recent modelling work (Dave Reid pers.comm.) has shown that there is unlikely to be signficiant resource competition between fisheries and seals for 3 main reasons;

a large proportion of seal diet is of non commercial species, seals consume undersized fish of commercial species which are in any case subject to high natural mortality and the proportion of overall fish mortality accounted for by seals is small relative to fishing mortality. Fisheries may also lead to increased access to prey; depradation activity in static net fisheries is known to provide a significant food subsidy to seals (Cosgrove *et al*. 2013). Also removal of large predatory fish from the ecosystem, by fisheries, may increase the biomass and availability of forage fish such as sand eel, sprat and herring which are important prey species for grey seal (Hammond and Harris 2006).

13.2.1.5.3 By-catch

Grey seals are known to be captured in certain fisheries. By-catch occurs in set net fisheries including tangle net, gill net and trammel nets (Cosgrove *et al* 2013, BIM 1997). Grey seals can also be caught in pelagic trawls (Morizur *et al* 1997). Catch rates, reported in Morizur (1999), of grey seal in the Celtic Sea herring fishery were 0.0513 seals per tow and 0.0396 seals per hour of tow. However, these rates were calculated from by-catch of just 4 seals. Seals captured in static nets appear to be mainly juveniles (BIM 1997). Twelve percent and 1.6% of juvenile seals, tagged on the west coast, were subsequently reported captured in tangle nets on the west coast in 1997 and 1999 respectively (BIM 2001). This by-catch profile may be biased downwards if seals, particularly adult seals, are lost from nets during hauling (Kiely *et al.*. 2000). The risk of capture of seals in static nets, including tangle and gill nets, was regarded as high by Evans and Hinter (2010). Cosgrove *et al* (2013), however, provide more detailed analysis of the likelihood of seal capture in different set net fisheries in relation to net configuration, mesh size, season, depth, soak time, catch of the target species and the fishing process. Some important findings of this study include

- No by-catch was recorded in gill nets targeting hake and pollack in the eastern Celtic Sea
- Grey seal by catch was modeled at 7.65 times higher in 320mm tangle net mesh compared to 270mm mesh.
- By-catch in a bottom set trammel net fishery in deeper water off Clare was much lower than in a shallow water tangle net fishery off Mayo
- Seals captured in set net fisheries are mainly juveniles
- By-catch was positively correlated with monkfish catch; seals depradate monkfish from tangle nets and are therefore possibly more likely to be entangled

- Although seal by-catch is also positively correlated to crayfish catch no depradation of crayfish was observed.
- By-catch was not related to net soak time
- There is significant geographic variability in the likelihood of seal capture in similar type nets.
    - 1.53 seals per fishing day off Mayo (Cosgrove *et al* 2013)
    - 0.36 seals per fishing day off south coast (unpublished observer data)

13.2.1.6 Risk assessment

Risk scores disaggregated to pressures for each site are in Table 28.

13.2.1.6.1 Horn head and Rinclevan

There are no estimates of the Grey seal population in Horn Head Rinclevan area

- Lobster and crab fishing and possible associated trammel net fishing for bait, occurs in and north of Horn Head SAC.
- A small amount of pelagic trawling for herring is reported east of the SAC and a more significant fishery for herring and horse mackerel occurs in winter some 20-40km north and north west of the SAC
- A limited tangle net fishery for crayfish occurs approximately 30km to the west of the site

Given that only pot fishing for lobster occurs in the site and there is a low level of fishing activity in waters just north of the site it is unlikely that there is an significant effect to individual seals or to the population of seals within or in proximity to Horn Hd and Rinclevan SAC. Foraging grounds for grey seal at the site are not described. If seals from the site forage 30km to the north then there is some potential interaction with the winter herring fishery including a possible by-catch of individual seals and reduced availability of prey.

13.2.1.6.2 Slieve Tooey/Tormore Island/Loughros Beg Bay

The Grey seal population at Slieve Tooey/Tormore Is/Loughros Beg Bay SAC and in the surrounding coastal area has increased slightly from a range of 795-1022 in 2005 to 844-1085 in 2011

- Significant pelagic fisheries for Herring occur west of the area well within the range of Grey seal foraging from the area
- Tangle netting occurs approximately 20km to the north of the site

- Lobster and crab fishing, with possible associated trammel net fishing, occurs along the coast in the area. Some disturbance could occur but it is unlikely.
- Cockle beds may occur in the SAC and to the east of the site. Opening these fisheries could lead to disturbance of seals at haul out locations. These stocks are not currently fished.

Tangle netting, within the foraging range of Grey Seals, from the site poses a risk of by-catch of individuals. There is no by-catch data for this area. Here, given that the tangle net fishery is approx 20km from the site the spatial overlap of the fishery and the marine habitat used by seals may be lower than at other sites where by-catch has been shown to be significant.

13.2.1.6.3 Blasket Islands

The Grey seal population at the Blaskets has increased from a range of 648-833 in 2005 to 1099-1433 in 2011. Data in Duck and Morris (2013) also suggest an increase in this population.

- A tangle net fishery targeting crayfish occurs within and surrounding the Blasket Island SAC and also to the north west towards Tralee Bay and south and west of Dingle Bay
- Gill net fishing by vessel over 15m (VMS data) occurs in deeper water to the west, targeting hake and also in outer Dingle Bay south of the SAC.
- A pelagic fishery for herring and sprat occurs in outer Dingle Bay south of the Blaskets.
- Demersal trawling occurs in outer Dingle Bay and in deeper water to the west.
- Scallop dredging occurs within the SAC
- Lobster and crab fishing, and possible associated use of trammel nets for bait, occurs in the SAC.

There is a diverse range of fishing activities within and surrounding the Blasket Islands SAC. The levels of activity are high relative to some other sites designated for Grey seals. The tangle net fishery poses the highest risk of by-catch given its proximity to the seal colony and possible haul out sites. The deep water gill net fishery to the west is unlikely to pose a risk of by-catch as shown by Cosgrove *et al*. (2013). Pelagic and demersal fisheries to the south of the SAC may reduce prey availability to seals although this is highly unlikely to have a population level effect.

13.2.1.6.4 Roaringwater Bay and Islands

Roaringwater Bay (RWBay) was not surveyed in completely in 2005 and not at all in 2011. Indication of population change in Callum and Duck (2013) suggest a substantial increase in Grey seal numbers at the site between 2003 and 2011.

- A tangle net fishery targeting crayfish occurs in outer RWBay and in waters between west Cork and Mizen Head
- Fishing for sprat and herring occasionally occurs in the site but most pelagic effort occurs between 20-50km to the south
- Demersal trawling occurs in sedimentary habitats in the north west of the site and particularly east of Cape Clear.
- There are intensive fisheries for shrimp and lobster in RWBay some of which is close to haul out sites
- Scallop dredging occurs in the Bay.

Although the tangle net fishery poses a risk of by-catch to grey seal (Cosgrove *et al* 2013) existing data on by-catch in the tangle net fishery in RWBay (13 observer days) has failed to show any by-catch. During 2013 east of Roaringewater towards Crosshaven 3 grey seals were observed as by-catch in 13 vessel observer days. To the west of RWBay, in water offshore of Castletownbere, 4 seals were caught in tangle/trammel nets during 6 observation days. By-catch rate averaged 0.36 seals per vessel fishing day i.e. about 1 seal every 3 fishing days.

13.2.1.6.5 Saltee Islands

The Grey seal population at the Saltee Islands declined slightly from a range of 571-734 in 2005 to 529-680 in 2011. Indications in Duck and Morris (2013) however suggest an increase.

- Lobster and crab fishing, and possible associated use of trammel nets for bait, occurs in and surrounding the SAC
- A gill net fishery for cod occurs in spring to the east of the SAC
- A pelagic trawl fishery for herring occurs east of the SAC
- There is intensive dredging for scallop, and otter trawling and bream trawling for demersal fish in the Celtic Sea and in the southern part of the SAC.

The gill net fishery for cod poses a risk of by-catch of Grey Seal. However, MI observer data indicates no Grey Seal by-catch in 8 fishing trips observed in 2011 and 3 trips in 2013. One Harbour Seal was observed in by-catch in 3 trips in 2013. By-catch is possible in the herring fishery to the east of the SAC; Berrow *et al* (1998) recorded the capture of 4 Grey seals in the

fishery close to Saltee Islands SAC. However, observer data for 2012 in the offshore herring fishery found zero by-catch.

13.2.1.6.6 Duvillaun Is and Iniskea Is.

There are no comparative estimates of seal numbers at Duvillaun Is. This colony is likely to be part of the Iniskea Island group. The Iniskea Is. colony increased from a range of 1351-1737 to 1842-2367 between 2005 and 2012 respectively.

- There is a tangle net fishery west and south of the SACs
- No extensive pelagic or demersal trawling occurs within or in proximity to the sites
- Shrimp and lobster potting occurs close to the sites

BIM (1997) and more recently Cosgrove (2013) report significant by-catch of Grey seal in set net fisheries in this area. Extrapolated annual by-catch for 1 vessel was 187 Grey Seals. A total of 55 Grey seals were observed in 36 days fishing with this vessel in the area. 88% of seals in the by-catch were juveniles.

13.2.1.6.7 Inisbofin and Inishark

The Inisbofin and Inishark colony increased from a range of 823-1058 to 1456-1872 seals between 2005 and 2011.

- There is a tangle net fishery to the north, south and west of the SAC
- Demersal trawling by vessels under 15m occurs east of the site.
- Lobster and crab fishing occurs through the area

Although no observer data on by-catch exists for the area the proximity of tangle netting to the site suggests that the risk to seals in the area may be similar to that for the Iniskeas and Duvillaun.

13.2.1.6.8 Slyne Head Islands

The Slyne Head Islands colony increased from a range of 238-306 to 364-468 seals between 2005 and 2011.

- There is a tangle net fishery to the north and south of the SAC
- Very low levels of fishing with demersal trawls and gill nets occur in the area
- Potting for lobster and crab occur through the area

Although no observer data on by-catch exists for the area the proximity of tangle netting to the site suggests that the risk to seals in the area may be similar to that for the Iniskeas, Duvillaun, Inisbofin and Inishark.

13.2.1.7 Summary risk assessment for Grey seal

- Population estimates in 2005 and 2012 and anecdotal information on the rate of encounter between seals and fishing vessels all indicate that the number of Grey Seals in Irish waters and at breeding and haul out colonies is increasing. The population is estimated to be between approximately 7000-9000.
- The populations may be regionally or locally structured with separate breeding populations. The conservation objectives requires the maintenance of populations at individual sites designated for the species.
- Observations on fishing vessels show that the prevalence of by-catch of grey seals is highest in large mesh tangle nets targeting hake and pollack. In some areas west of Mayo by-catch rates can be 1.53 seals per day. Off the south coast observer data suggests that by-catch rates are approximately 0.36 seals per day. Risk of by-catch, therefore, varies geographically.
- Effort data by set net vessels is incomplete and the estimated by-catch per trip for these vessels are also imprecise because of inter-trip variability in catch rates; typically the data are zero inflated with incidental high catch rates. There are 12 vessels using tangle nets west of Galway and Mayo. In the south west coast 42 vessels fished tangle nets in 2007. Effort in the set net fishery is unrestricted.
- Given the between metier, geographic and seasonal variability in observed by-catch rates and the proportion of fishing trips that are covered by observers raising the observed by-catch rates to fleet level can only provide crude (imprecise) indications of total by-catch. Nevertheless the data is sufficient to indicate that total by-catch probably amounts to some hundreds of seals per annum. For instance if the 54 vessels fishing with tangle nets fish for say 50 days (some are known to fish 120 days) and if the lower by-catch rate of 0.36 seals per day, observed in 2013 off the south coast, is applied generally then the total annual by-catch, in set net fisheries, is 972 seals. There is a small by-catch risk in other fleets in addition to this.
- The grey seal by-catch in set net fisheries is 88% juvenile (Cosgrove *et al* 2013). Harding *et al* (2007) estimate that the importance, to long term population growth, of a juvenile seal is approximately 0.42 times the value of an adult female, because juveniles suffer

higher natural mortality rates. The possible catch of 972 seals, 88% of which are juvenile, is, therefore, equivalent to catching 476 adult seals. This equivalence depends on the age distribution of the juvenile by catch as natural survival rates, and future reproductive value, will vary with age of juvenile.

- The life history parameters for Grey Seal indicate that the intrinsic rate of population increase, under density independant conditions, is approximately 10% per annum.
- **Given the above it is clear that although grey seal populations are increasing they are exposed to significant risk from by-catch pressure. Given the level of by-catch, the relatively small current population, site philopatry and possibly resulting genetic structuring in the population and relatively low intrinsic potential rate of population growth of seals this by-catch may represent an adverse population effect, relative to Target 5 of the conservation objective (although Target 5 requires interpretation). The rationale for this conclusion is:**

    - It is biologically improbable for a closed population of 7-9000 seals to sustain a by-catch of over 476 'adult seal equivalents' (or approx 972 juveniles) in the long term. In fact the observed population increase is difficult to explain if the by-catch is as suggested above and if the population is closed to immigration.
    - Harding *et al* (2007) also clearly show that under plausible combinations of life history parameters that the risk of quasi-extinction (to a given population limit) is high for populations of similar size to those in Ireland. This risk is very sensitive to variations in the mean population growth rate (which is unknown in Ireland); risk increases with increased variability in growth.
    - The effect of a given by-catch on the long term trajectory of the seal population depends on variability in the life history parameters (Hall *et al* 2003). Any changes in adult survival rates in particular and fertility rates will expose the population to increased risk. It is difficult to detect changes in these rates. So changes in life history parameters or increased variability in these parameters in combination with high by-catch would expose the population to further risk.
    - As shown by Harding *et al* (2007) hunting levels that are in proportion to population size pose a much higher risk to seal populations than hunting a fixed number. The by-catch in the tangle net and other fisheries is likely to be in proportion to the population size rather than a fixed number as encounter rates with fishing gear are expected to change in proportion to population size. An

annual take of more than 5% of the adult population represents a high risk of population decline (Harding *et al* 2007).

- Fishing effort, using gears which are responsible for the majority of by-catch, is unrestricted.
- High incidental by-catch relatively close to some haul out or breeding colonies may have serious consequences for long term stability of those breeding colonies if the individuals in the by catch are from those colonies and if there are separate breeding populations showing strong site philopatry.

– Nevertheless the Grey Seal population in Ireland is acknowledged to have increased in recent years despite the significant by-catch. Any number of factors could explain this apparent inconsistency
  - Irish seal population life history parameters allows for a higher rate of population increase than seals in UK or Baltic. This is highly unlikely unless perhaps pup survival is much higher than in other areas for instance
  - The estimated increases in seal populations are incorrect and the population is not increasing. There are only 2 pup production estimates and as pup production is known to vary significantly between years the two estimates may not reflect any underlying trend in seal numbers and a number of annual estimates fo pup production would be required to show that trend (Cronin and O'Cadhla unplublished). However, although there is no population trend data the two estimates, combined with anecdotal observations and increased interaction of seals with the fishing industry, does suggest that the population has increased.
  - The by-catch is overestimated. It is possible that the annual total by-catch is much less than 476 adult seal equivalents or 972 juvenile seals. The data shows high variability is by-catch depending on location, time of year and gear type. However, by catch would need to be less than approximately 400 juveniles to allow for the observed population increase. This is a significant uncertainty here which cannot be resolved without better data on total by-catch in the set net fleet.
  - The population is subvented by inward migration. Although there are mark recapture data showing movement of seals between Scotland and Ireland the current understanding of seal breeding biology is that they show strong fidelity to their natal sites and that inward breeding migration is unlikely. However, inward foraging migration, most likely from the west of Scotland or France, probably does occur (as

shown by the tagging data) and some of the by-catch could be of these foraging seals. However, this is unlikely given that the majority of seals in by-catch are juvenile and juveniles are less likely to undertake long distance foraging movements. *Note: if the seal population is being subvented by inward migration then the risk scores under the risk framework being used here would be higher than shown in Table 27.*

Table 26. Consequence * likelihood scores for risk assessment of the impacts of fisheries on Grey Seal at 10 sites designated for the species. Scores are disaggregated to 3 pressure categories; by-catch, prey depletion and disturbance at haul out sites.

		Tangle / Trammel net			Gill net			Trammel (bait) net			Pelagic trawl			Demersal trawl			Pots			Dredges		
Site code	**Site name**	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance
147	Horn Head and Rinclevan	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=1*2	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=0*4	=0*4	=0*4
190	Slieve Tooey/Tormore Island/Loughros Beg Bay	=2*4	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=2*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=2*3	=0*4	=0*4	=0*4
2172	Blasket Islands	=2*5	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=2*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=2*3	=1*3	=1*3	=2*3
101	Roaringwater Bay and Islands	=2*5	=1*3	=1*3	=2*2	=1*3	=1*3	=2*2	=1*3	=2*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=2*3	=1*3	=1*3	=2*3
707	Saltee Islands	=0*4	=0*4	=0*4	=2*2	=1*3	=1*3	=2*2	=1*3	=1*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3
495	Duvillaun Islands	=2*5	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=1*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3
278	Inisboffin and Inishark	=2*5	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=1*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=0*4	=0*4	=0*4
328	Slyne Hd Islands	=2*5	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=1*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=0*4	=0*4	=0*4
507	Iniskea Islands	=2*5	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*3	=1*3	=2*3	=1*3	=1*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3

13.2.2 Harbour seal

13.2.2.1 Designated sites and Conservation objectives

Harbour seals are listed in Annex II of the Habitats Directive. Although the species is wide ranging in the marine environment the Directive requires Members States to establish Special Areas of Conservation to protect them. Harbour seal use specific sites for breeding, moulting and resting and have some degree of fidelity to these areas while also undertaking migrations and foraging movements in open water outside of the sites for which they are designated. In Ireland's west, south west and north-west coasts 11 sites are designated for Harbour Seal (Table 27,Figure 130). Conservation objectives for Harbour seal have been published for 10 sites.

The conservation objectives for Harbour seal have explicit targets

1. The species range within the site should not be restricted by artificial barriers
2. Breeding sites should be conserved in natural condition
3. Moult haul-out sites should be conserved in natural condition
4. Resting haul-out sites should be conserved in natural condition
5. Human activities should occur at levels that do not adversely affect the Harbour seal population at the site

Table 27. SACs designated for Harbour seal excluding the Irish Sea. Status of the COs is shown

Site code	Region	Site name	COs
622	Benwee to Quiqleys Pt	Ballysadare Bay	Published
627	Benwee to Quiqleys Pt	Cummeen Strand/Drumcliff Bay (Sligo Bay)	Published
133	Benwee to Quiqleys Pt	Donegal Bay (Murvagh)	Published
458	Benwee to Quiqleys Pt	Killala Bay/Moy Estuary	Published
2283	Benwee to Quiqleys Pt	Rutland Island and Sound	Published
197	Benwee to Quiqleys Pt	West of Ardara/Maas Road	Pending
90	Loop to Reen Point	Glengariff Hbr and Woodland	Published
2158	Loop to Reen Point	Kenmare River	Published
1482	Slyne to Benwee	Clew Bay complex	Published
268	Slyne to Loop	Galway Bay complex	Published
2111	Slyne to Loop	Kilkieran Bay and Islands	Published

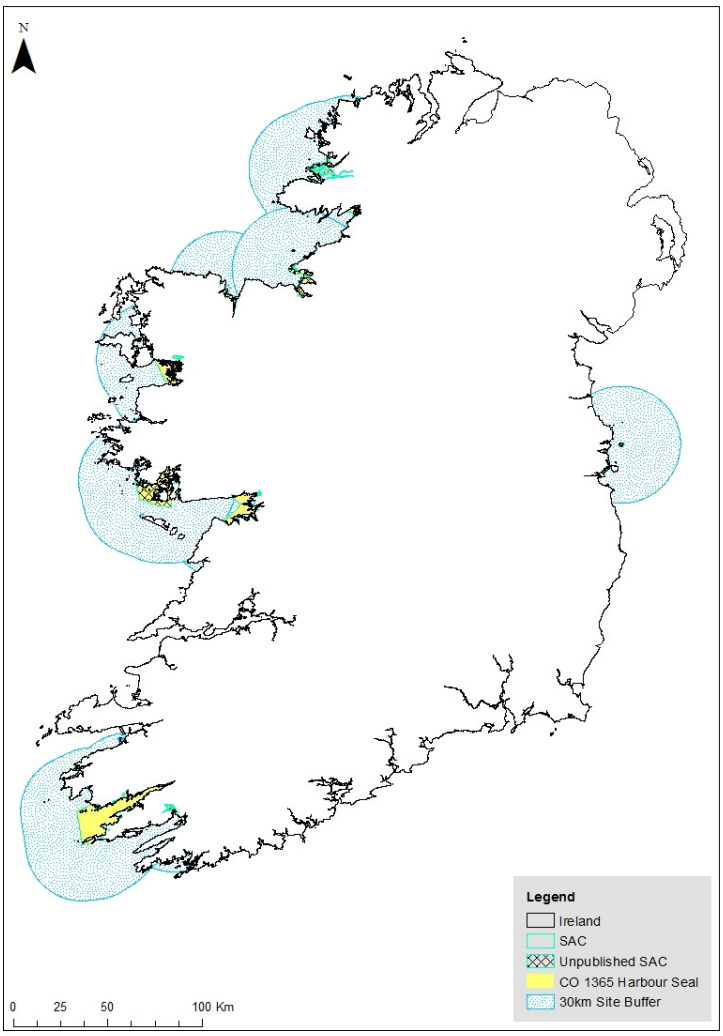

Figure 130. Designated sites for Harbour Seal categorised according to whether COs are published or not. Foraging buffer zones of 30km around each designated site are shown.

13.2.2.2 Distribution, habitat use and site fidelity

Harbour seals haul out in sheltered waters, typically on sandbanks and in estuaries, but also in rocky areas and may swim upstream into freshwater. They undertake smaller scale foraging movements (30km from the haul out site) and migrations than grey seal. Pups remain in their natal area after weaning (Wilson *et al*. 2003, Cronin *et al*. 2008). Space use maps for Harbour seals tagged in Kenmare River shows very limited movement outside of Kenmare River SAC (Figure 170). Habitat use maps for UK and Ireland also show more discrete distributions than for Grey seal (Figure 171).

In the Moray Firth, repeat sightings of adult branded seals have shown that at least some individuals remain faithful to a single haul out site, or small group of sites both during the

breeding season and in successive years (H Corpe and PM Thompson unpublished data, cited by Corpe, 1996). On the west coast of Sweden, Härkönen and Harding's (2001) study showed all of the branded adult females returned to within 7km of their natal site. Males, in contrast, showed an increased rate of dispersal from their natal site from the age of two, yet appeared to remain within approximately 50km of their natal site.

Populations in designated sites separated by distances of over 30km may have limited connectivity. Also interactions between fisheries and Harbour seals are more likely to occur within designated sites or at least within 50km of haul out sites.

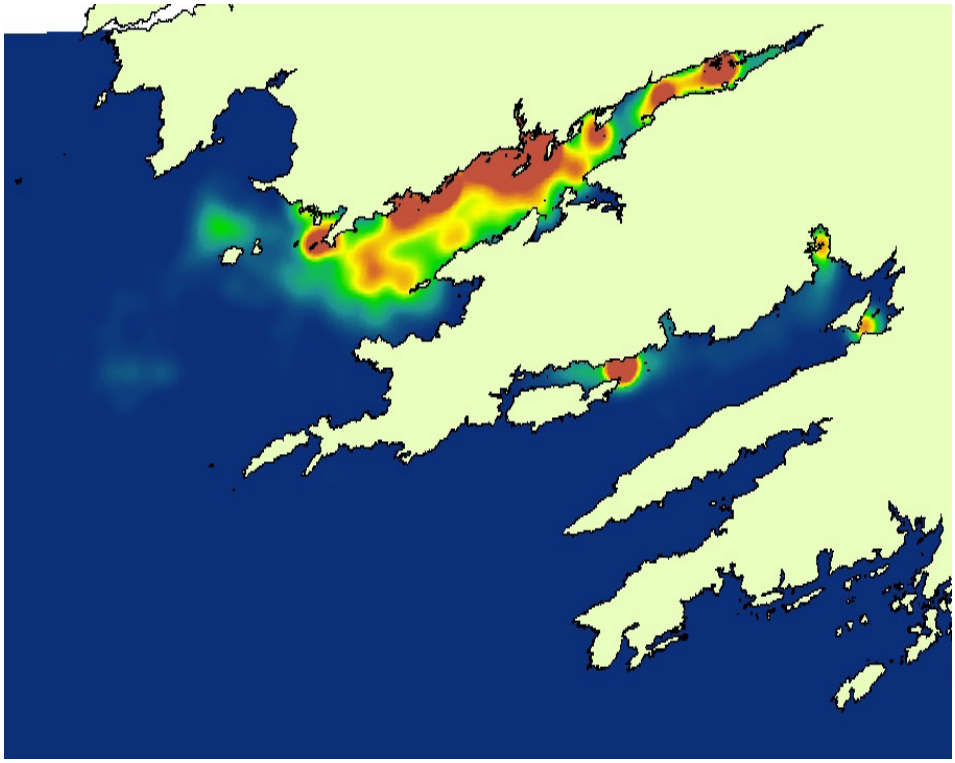

Figure 170. Space use maps for tagged Harbour seals in Kenmare river (source: Cronin *et al.* 2008)

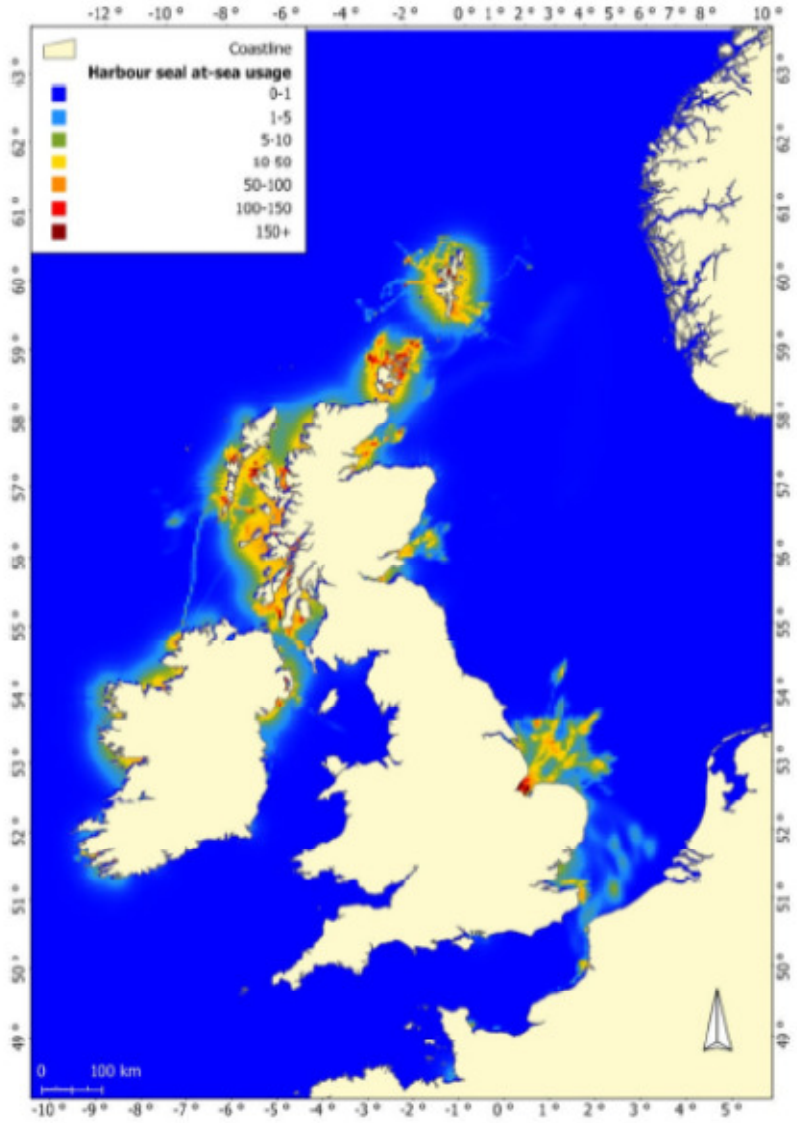

Figure 171. Estimated harbour seal habitat usage (haul out and marine) around the UK (source: SCOS 2012).

13.2.2.3 Diet

Harbour seals are opportunistic feeders and take a wide variety of prey including sandeels, gadoids, herring and sprat, flatfish, octopus and squid. *Trisopterus* spp., sandeel, dragonet and sole were found to be common in the diet of seals off the south west coast of Ireland by Cronin *et al*. (2008). Diet varies seasonally and from region to region. Because of their smaller size, harbour seals eat less food than grey seals; 3-5 kg per seal.day^{-1} depending on the prey species.

13.2.2.4 Population size and trends

Harbour seal populations in Ireland are thought to be increasing. Although there are no long term reliable population estimates various studies and in particular the national surveys undertaken from 1980 onwards points to significant increases in grey seal populations in recent years and possibly since the 1980s:

- Lockley 1996: 1000 seals
- Summers *et al*. 1980: minimum population of 1248 seals but up to 1500-2000.
- Cronin *et al* 2007: minimum population of 2905 seals counted in 2003
- Duck and Morris 2012: minimum population of 3489 seals in 2011-2102 (Table 28)

Although nationally the population of Harbour seals appears to have increased between 2003 and 2011 there are regional differences. From Galway north to Donegal the population increased from 1714 to 2293 seals (+33.8%). Within this region numbers of seals declined in Sligo Bay area and Killala/Moy estuary but increased elsewhere. From Galway south and in the Irish Sea Harbour seal numbers increased by 18.1% netweem 2003 and 2011-2012. However, numbers declined in Kenmare River area and increased slightly in Bantry Bay.

Table 28. Comparison of numbers of Harbour Seal in SACs and areas in proximity to SACs in 2003 and 2011-2012 (from Duck and Morris 2013a,b). Count sectors are coastal areas and do not correspond to SAC boundaries.

Site code	Site name	Count sectors (Duck and Morris 20131,b)	Census 2003	Census 2011
622	Ballysadare Bay	6(1-4)	376	309
627	Cummeen Strand/Drumcliff Bay (Sligo Bay)			
133	Donegal Bay (Murvagh)	4 (14)	150	190
458	Killala Bay/Moy Estuary	7(1), 6(4)	108	81
2283	Rutland Island and Sound	4(9-11)	310	333
197	West of Ardara/Maas Road	4(11), 4(12)	59	108
90	Glengariff Hbr and Woodland	12(2)	341	353
2158	Kenmare River	11(11), 11(9), 12(1)	413	390
1482	Clew Bay complex	7(13)	95	241
268	Galway Bay complex	8(8), 8(7), 9(1)	366*	470*
2111	Kilkieran Bay and Islands	8(6), 8(4)	182	471

13.2.2.5 Pressures to harbour seals from fisheries

13.2.2.5.1 Disturbance

Sources of potential disturbance include people and dogs (Allen *et al*., 1984; Brasseur & Fedak, 2003), recreational boaters (Johnson & Acevedo-Gutierrez, 2007; Lelli & Harris, 2001; Lewis & Mathews, 2000), commercial shipping (Jansen *et al*., 2006), industrial activity (Seuront & Prinzivalli, 2005) and aircraft (Perry *et al*., 2002). A harbor seal's response to disturbance may vary from an increase in alertness, movement towards the water, to actual entering into the water, i.e. flushing (Allen *et al*., 1984) and is typically governed by the location and nature of the disturbance activity. For example, kayaks often elicit a stronger response than power boats (Lewis & Mathews, 2000; Suryan & Harvey, 1999), and stationary boats have been shown to elicit a stronger response than boats moving along a predictable route (Johnson & Acevedo-Gutierrez, 2007). Furthermore, the mean distance at which seals are flushed into the water by small boats and people ranges between 80m and 530m, with some disturbances recorded at distances of over 1000m. In certain areas, these empirical studies have been used to inform management actions in marine protected areas, for example where a 1.5km buffer is set around harbor seal haul-out sites in the Dutch Wadden Sea to exclude recreational disturbance (Brasseur & Fedak, 2003)

13.2.2.5.2 Prey depletion

Harbour seal diet is diverse and includes clupeids and gadoids. Fisheries for these species may potentially lead to lower abundance and availability of prey to local harbour seal population. Fisheries within 30km of haul out sites for Harbour seal in particular may lead to reductions in prey availability although this depends on the behavior and distribution of the prey population. Widely distributed and migratory species such as sprat and herring may be less susceptible to local fisheries depletion than stocks which are non-migratory. However, in widely distributed stocks high fishing mortality, remote from haul out sites, might also eventually lead to reduced prey availability if biomass of these stocks becomes depleted. Herring is depleted in Area VI. Inshore fisheries for sprat occur close to some haul out sites. Low birth weight of Harbour Seal pups, presumably due to poor nutritional condition of mothers, was thought by Wilson *et al* (2003) to lead to hypothermia and mortality of pups in Dundrum Bay. Pup survival depends on weight gain during the early months post-weaning and before the onset of cold water conditions in winter (Harding *et al* 2005).

13.2.2.5.3 By-catch

Harbour seals are susceptible to capture in set net fisheries. Cosgrove *et al*. (2013) reported 10 Harbour seals in 320mm mesh tangle nets (8 seals) and 270mm trammel nets (2 seals) over 91 days observed at sea, 358 hauls and 1071km of mixed tangle net, gill net and trammel net gear.

13.2.2.6 Risk assessment

13.2.2.6.1 Glengariff Harbour and Woodland SAC

The Harbour seal population in Glengariff increased slightly from 341 to 353 between 2003 and 2011

- Tangle nets are used at the mouth of Bantry Bay within the foraging range of seals from Glengariff Harbour and Woodland SAC.
- Gill net use is reported by vessels over 15m in Bantry Bay within the foraging range of seals from Glengariff Harbour and Woodland SAC
- Pelagic trawling for sprat (with herring by-catch) occurs within the Glengariff Harbour and Woodlands SAC and in inner Bantry Bay.
- Demersal trawling occurs in inner Bantry Bay and in proximity to the SAC.
- Potting for shrimp occurs along the north shore of inner Bantry Bay and east towards Glengariff in proximity to the SAC

The pelagic fishery for sprat and pot fishing for shrimp may cause temporary disturbance at haul out locations although the haul out locations are not identified as COs are not published for this site. By-catch is possible in the gill net and pelagic fishery in inner Bantry Bay. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be low (Table 30). However, total by-catch of Harbour Seal in Bantry Bay is unknown.

13.2.2.6.2 Kenmare River SAC

The Harbour seal population in Kenmare declined slightly from 413 to 390 between 2003 and 2011

- Tangle nets are used at the mouth of Kenmare River within the foraging range of seals at the site.
- Gill net use is reported by vessels over 15m in Kenmare River within the foraging range of seals from Kenmare River

- Pelagic trawling for sprat (with herring by-catch) occurs in Kenmare River and east to the upper reaches of the Bay.
- Demersal trawling occurs in outer Kenmare River but within the Kenmare River SAC.
- Potting for shrimp occurs in inner Kenmare river while lobster and crab potting, with the possible use of trammel nets for bait, occurs along the south and north shores of the outer Bay.

By-catch risk is highest for gill net fishing and pelagic fishing in inner Kenmare River. There may be a by-catch in trammel nets. The pelagic fishery for sprat and pot fisheries may cause disturbance at haul out locations which are mainly in the inner Bay on north and south shores. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 30). However, total annual by-catch of Harbour Seal in Kenmare River is unknown.

13.2.2.6.3 Clew Bay

The Harbour seal population in Clew Bay increased from 95 to 241 between 2003 and 2011

- Tangle nets are used in mid and outer Clew Bay within the foraging range of seals at the site.
- Pelagic trawling for sprat occurs in outer Clew Bay.
- Demersal trawling occurs in outer Clew Bay.
- Potting for shrimp and lobster, with the possible use of trammel nets for bait, occurs in inner Clew Bay and may cause a degree of disturbance to haul out locations
- Dredging for oyster and scallop occur in shallow water in local areas of the inner Bay

There is a risk of by-catch in the tange net fishery although most of this activity is probably sufficiently remote from haul out sites to result in reduced risk. There is a low risk of by-catch in the pelagic sprat fishery. There is a risk of by-catch in trammel nets. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 30). However, total annual by-catch of Harbour Seal in Clew Bay is unknown.

13.2.2.6.4 Galway Bay

The Harbour seal population in Galway Bay increased from 366 to 470 between 2003 and 2011

- Pelagic trawling for sprat and herring occurs in Galway Bay but rarely within the SAC.
- Demersal trawling occurs in outer Galway Bay.
- Potting for shrimp and lobster, with the possible use of trammel nets for bait, occurs in inner Clew Bay and may cause a degree of disturbance to haul out locations
- Dredging for oyster occur in the south east corner of the Bay east of Eddy Island.

There is a low risk of by-catch in the sprat fishery. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 30). However, total annual by-catch of Harbour Seal in the Galway Bay area is unknown.

13.2.2.6.5 Kilkieran Bay and Islands

The Harbour seal population in Kilkieran Bay and Islands increased substantially from 182 to 471 between 2003 and 2011

- Tangle net fisheries for crayfish occur in deep water to the south of the SAC
- Gill net use is reported by vessels over 15m to the south and east of the SAC
- Pelagic trawling for sprat and herring occurs to the south and east of the SAC.
- Demersal trawling occurs in in deeper water south of the site.
- Potting for shrimp and lobster, with the possible use of trammel nets for bait, occurs in Kilkieran Bay.
- Dredging for oyster and scallop occur in the upper Bay.

Tangle net and gill net fishing south of the SAC may result in by-catch. The spatial overlap between Harbour Seals and this fishery is probably low however. By-catch risk in the pelagic fishery is low. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 29). However, total annual by-catch of Harbour Seal in the Kilkieran Bay and Islands area is unknown.

13.2.2.6.6 Rutland Island and sound

The Harbour seal population in Rutland Is and sound increased slightly from 310 to 333 between 2003 and 2011

- Tangle net fisheries for crayfish occur in deep water to the west of the SAC
- Potting for shrimp and lobster, with the possible use of trammel nets for bait, occurs in the SAC. Shrimp fishing may occur close to haul out sites.

- Demersal and pelagic trawling occurs to the west of the SAC but no significant activity occurs within 35km of the haul out sites

The tangle net fishery and pelagic fishery poses a risk of by-catch but these are remote from the site. Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 30). However, total annual by-catch of Harbour Seal in Rutland Is and Sound area is unknown.

13.2.2.6.7 West of Ardara/Maas road

The Harbour seal population in West of Ardara/Maas Rd SAC increased substantially from 59 to 108 between 2003 and 2011

- Tangle net fisheries for crayfish occur in deep water to the west of the SAC
- Potting for lobster and crab, with the possible use of trammel nets for bait, occurs west of the SAC.
- Demersal and pelagic trawling occurs to the west of the SAC but no significant activity occurs within 30km of the haul out sites

Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 30). However, total annual by-catch of Harbour Seal in West of Ardara/Mass road area is unknown.

13.2.2.6.8 Killala Bay/Moy Estuary

The Harbour seal population in Killala Bay/Moy Estuary SAC declined from 108 to 81 between 2003 and 2011

- Gill net fisheries for pollack occur to the north of the SAC
- Potting for lobster and crab, with the possible use of trammel nets for bait, occurs to the north of the SAC.
- Demersal and pelagic trawling occurs to the north and west of the SAC. Herring are targeted with pelagic trawls just outside and to the west of Killala Bay.

Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals. Although the population declined between 2003 and 2011 this is unlikely to be due to fishing as the level of fishing activity is significantly less than in other SACs designated for Harbour Seal and where seal numbers are increasing. Disturbance at haul out sites due to fishing is highly unlikely at this site has no commercial fisheries occur sufficiently close to cause disturbance. Prey depletion is unlikely although a seasonal herring fishery occurs to the

north and west. By-catch risk is lower than at other sites; no tangle net fisheries occur within 80km of the site.

13.2.2.6.9 Donegal Bay (Murvagh)

The Harbour seal population in Donegal Bay (Murvagh) SAC increased from 150 to 190 between 2003 and 2011

- There are no fisheries in the SAC.
- Gill net fisheries for pollack occur to the west of the SAC
- Potting for lobster and crab, with the possible use of trammel nets for bait, occurs to the west of the SAC.
- Pelagic trawling for sprat occurs to the west but in proximity to the SAC.

Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals but the risk to the population may be relatively low (Table 29). However, total annual by-catch of Harbour Seal in inner Donegal Bay is unknown.

13.2.2.6.10 Cumeen strand/Drumcliffe/Ballysadare (Sligo Bay), SACs 622 and 627

The Harbour seal population in Sligo Bay SACs descreased from 376 to 309 between 2003 and 2011

- There are no fisheries in the SAC other than potential dredge fisheries for cockle and clams. Openign of these fisheries could potentially cause disturbance to seal haul out sites.
- Gill net fisheries for pollack occur to the west of the SAC
- Potting for lobster and crab, with the possible use of trammel nets for bait, occurs to the west of the SAC.
- Pelagic trawling for sprat occurs in inner Donegal Bay.

Cumulative risk posed by fisheries may result in sub-lethal and lethal effects on individual seals. Although the population declined between 2003 and 2011 this is unlikely to be due to fishing as the level of fishing activity is significantly less than in other SACs designated for Harbour Seal and where seal numbers are increasing. Disturbance at haul out sites due to fishing is highly unlikely at this site has no commercial fisheries sufficiently close to it to cause disturbance. Prey depletion due to a seasonal herring and sprat fishery to the west in inner Donegal Bay may occur but is unlikely to lead to population depletion.

Table 29. Consequence * likelihood scores for risk assessment of the impacts of fisheries on Harbour seal at 10 sites designated for the species. Scores are disaggregated to 3 pressure categories; by-catch, prey depletion and disturbance at haul out sites.

		Tangle net			Gill net			Trammel net			Pelagic trawl			Demersal trawl			Pots			Dredges		
		By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance	By-catch	Prey depletion	Disturbance
Site code	**Site name**																					
627/ 622	Sligo Bay	=0*3	=0*3	=0*3	=2*3	=1*4	=1*1	=2*3	=1*4	=1*3	=2*3	=2*3	=0*3	=1*3	=1*3	=0*3	=1*3	=1*3	=1*3	=0*3	=0*3	=2*3
133	Donegal Bay (Murvagh)	=0*3	=0*3	=0*3	=2*3	=1*4	=1*1	=2*3	=1*4	=1*3	=2*3	=2*4	=0*3	=1*3	=1*3	=0*3	=1*3	=1*3	=1*3	=0*3	=0*3	=0*3
458	Killala Bay/Moy Estuary	=0*3	=0*3	=0*3	=2*3	=1*4	=1*1	=2*3	=1*4	=1*3	=2*3	=2*3	=0*3	=1*3	=1*3	=0*3	=1*3	=1*3	=1*3	=0*3	=0*3	=0*3
2283	Rutland Island and Sound	=2*3	=1*1	=1*1	=0*3	=0*3	=0*3	=2*3	=1*4	=2*2	=0*3	=0*3	=1*3	=0*3	=0*3	=0*3	=1*3	=1*3	=2*2	=0*3	=0*3	=0*3
197	West of Ardara/Maas Road	=2*3	=1*1	=1*1	=0*3	=0*3	=0*3	=2*3	=1*4	=2*2	=0*3	=0*3	=0*3	=0*3	=0*3	=0*3	=1*3	=1*3	=2*2	=0*3	=0*3	=0*3
90	Glengariff Hbr and Woodland	=2*2	=1*1	=1*1	=2*3	=1*4	=1*1	=2*3	=1*4	=2*2	=2*3	=2*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*1	=1*1	=1*1
2158	Kenmare River	=2*3	=1*1	=1*1	=2*3	=1*4	=1*1	=2*3	=1*4	=2*2	=2*3	=2*3	=2*2	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*1	=1*1	=1*1
1482	Clew Bay complex	=2*3	=1*1	=1*1	=2*3	=1*4	=1*1	=2*3	=1*4	=2*2	=1*3	=2*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*1	=1*1	=1*1
268	Galway Bay complex	=0*3	=0*3	=0*3	=0*3	=0*3	=0*3	=2*3	=1*4	=2*2	=1*3	=2*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*1	=1*1	=1*1
2111	Kilkieran Bay and Islands	=2*3	=1*1	=1*1	=2*3	=1*4	=1*1	=2*3	=1*4	=2*2	=1*3	=2*3	=1*3	=1*3	=1*3	=1*3	=1*3	=1*3	=2*2	=1*1	=1*1	=1*1

13.2.3 Summary risk assessment for Harbour seals

- Harbour Seal populations are increasing in Ireland. However, the populations of Harbour Seal are relatively small considering the available habitat.
- Seals are exposed to risk through interaction with commercial fisheries. These risks include the risk of bycatch, depletion of prey resources and human disturbance at haul out colonies.
    - The risk of by-catch of Harbour seal in fishing gear is lower than for Grey Seal. This is supported by the low numbers of Harbour Seal in by-catch compared to Grey Seal even when the lower population of Harbour Seal is taken into account.
    - Risk of by catch is highest in large mesh tangle net fisheries but this varies regionally. By-catch may also occur in other set net and pelagic trawl fisheries. Bottom trawl, beam trawl and dredge fisheries pose low or no risk of by-catch.
    - Pelagic and mixed demersal fisheries target species which are also preyed on by seals. Diet of Harbour Seal is diverse and there are regional, seasonal, ontogenetic and sex differences in prey composition. Much of the diet is of non commercial gadoids and other species but commercial gadoids and clupeids are important components of diet. Clupeids represent a better food source for harbour seal than Gadoids. Fisheries also provide a food subsidy to seals which depredate fish from set net fisheries in particular.
    - Disturbance at haul out colonies, particularly during the pupping season, may be caused by vessel and foot traffic on or close to colonies. Tolerance to this disturbance depends on the profile of the disturbance; speed of vessel, change in vessel speed, proximity to the colony and the frequency of the disturbance events.
    - Total by-catch of Harbour Seal in Irish fisheries is unknown. Theoretically, and consistent with observations to date, by-catch risk is related to the spatial overlap of habitat use by seals and fisheries. As marine habitat use by Harbour Seal is highest in waters close to haul out sites fisheries by-catch and effects of fisheries removal of prey species is also expected to be highest in such locations. Harbour Seal foraging range is probably 30km. Foraging distances will presumably be much shorter where prey is available close to

haul out sites. Overlap with set net fisheries in particular is low close to such sites as these fisheries tend to occur in deeper water. Trammel nets set for bait are however used in shallow water.

- The main risk identified above is from by-catch. There is no evidence that prey depletion is a significant issue although low stock biomass of Clupeids (Herring and Sprat) or fisheries for these species locally in some areas may reduce prey availability. Disturbance effects may occur at some sites but this is not quantified.
- **The likelihood of a population level effect due to by-catch on Harbour Seal is lower than for Grey Seal. However, as the population of Harbour Seal is lower its long term stability is more sensitive to mortality events such as by-catch and total by-catch is unknown.**

13.2.4 Harbour Porpoise

13.2.4.1 Designated sites and Conservation objectives

Harbour porpoise are listed in Annex II and IV of the Habitats Directive. Although the species is wide ranging in the marine environment the Directive requires Members States to establish Special Areas of Conservation to protect them and their listing in Annex IV confers strict protection on them. In Ireland's west south west and northwest coasts 2 sites are designated for Harbour Porpoise (Table 30, Figure 133). Conservation objectives for Harbour Porpoise have been published for 1 site.

The conservation objectives for Harbour Porpoise have explicit targets

1. The species range within the site should not be restricted by artificial barriers to site use
2. Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site

Table 30. Sites designated for Harbour Porpoise on Irish south and west coasts

Site code	Region	Site name	COs
2172	Loop to Reen Point	Blasket Islands	Published
101	Loop to Reen Point	Roaringwater Bay and Islands	Published

Reflecting the need for strict protection of Harbour Porpoinse DEHLG (2009) have published a conservation plan for Porpoise in Irish waters.

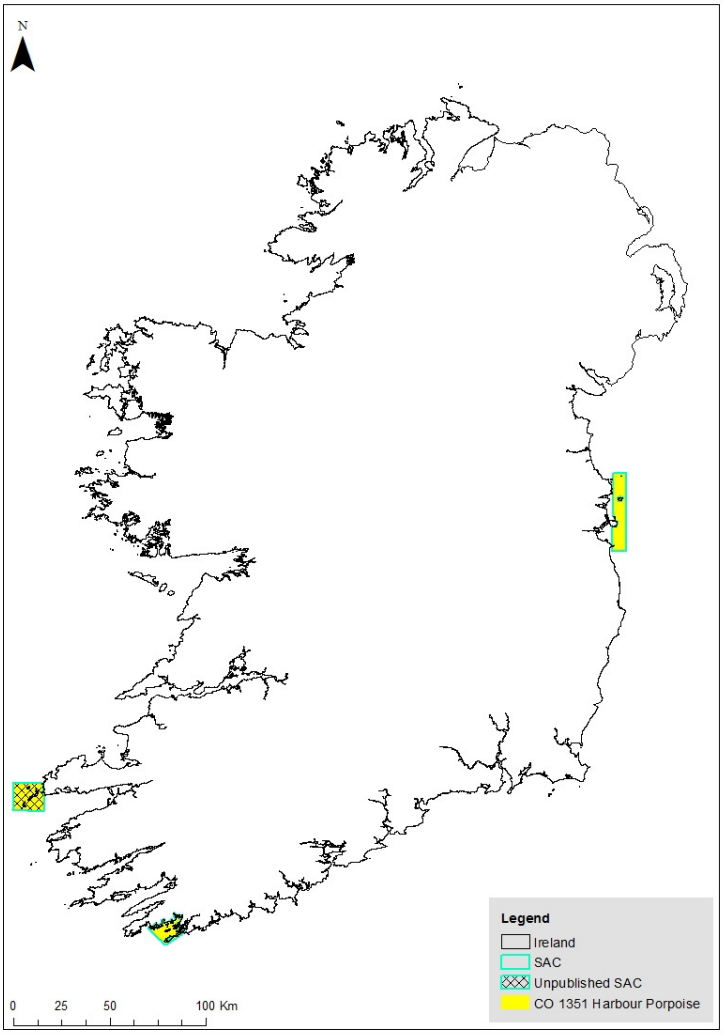

Figure 133. Designated sites for Harbour Porpoise categorised according to whether COs are published or not.

13.2.4.2 Distribution, habitat use and site fidelity

In Roaringwater Bay the entire SAC marine area is regarded as habitat for Harbour Porpoise. It is more common in the outer part of the Bay than in the upper Bay. Conservation objectives for the Blasket Islands have not been published but Berrow *et al* (2008) considers that all of the Blasket Is SAC is used by Harbour porpoise with tidal tream areas in the Blasket sound and reefs being favoured.

Johnston *et al.,* (2005) investigated the fine-scale distribution of harbour porpoises, using satellite telemetry and found that harbour porpoises can range over large areas (up to 11289

km ^{2}) but generally concentrated their movements in small focal regions often close to islands, headlands or restricted channels. Recent satellite-tracking data from Denmark have shown animals moving from northern Denmark to the northern North Sea and Shetland (Hammond *et al*., 2003).

13.2.4.3 Diet

Rogan and Berrow (1996) reported that 95% of prey items recovered from the stomachs of stranded and bycaught harbour porpoise were either gadoids or clupeids, with whiting, *Merlangius merlangus,* and poor cod, *T. minutus,* contributing most of the prey items. Sandeel may be important in some areas (Santos *et al*. 2004). Sandeel have higher energy content that gadoids (about twice that of whiting for instance) (Murray and Burt 1977). Individual prey items are generally less than 40cm and are, usually, between 10-30cm in length. Daily food consumption is estimated to be 3.5% of body weight or 1.23kg per day.

13.2.4.4 Population size and trends

In Roaringwater Bay survey data in 2008 indicated a population of harbour porpoise in RWBay of 159±95-689 (95% confidence limits), (NPWS 2011b). Harbour porpoise density in the outer part of the site is reported to be 0.72-2.7 animals.km^{-2}.

In the Blasket Islands survey data (Berrow *et al* 2008) indicate a population of 303±76 (CV=0.25: (5% Confident intervals 186-494). This is about 0.5% of the total Irish Harbour porpoise population. However there are indications of a strong seasonal increase in abundance from July through to September.

In Irish and European waters generally multi-annual surveillance programmes (Ó Cadhla *et al*., 2004; Berrow *et al*., 2010; Wall *et al*., 2012) indicate that harbour porpoises occur widely in Irish waters. European abundance estimates approximate to 385,600 animals (95%CL = 261,266-569,153; SCANS-II, 2008). The population in the Atlantic (excluding North Sea) may be 153,000 (ICES areas V-VIII). Approximately 80,000 Porpoise inhabit the Celtic Sea and just over 15,000 occur in the Irish Sea. Evidence from population estimation surveys carried out in Irish waters since 2005-07 indicates that the population is in a healthy state with comparatively high animal densities and good adult:calf ratios commonly recorded during the summer months (e.g., Berrow *et al*., 2007; Berrow *et al*., 2008a; Berrow *et al*., 2008b; Berrow *et al*., 2011). Comparison of SCANS 1 and SCANS II surveys suggest a stable overall population in northern Europe but a shift southwards and increased abundance in the Celtic Sea, English Channel and southern North Sea between 1994 and 2005.

Although widely distributed and wide ranging harbour porpoise within the NE Atlantic show population structuring as evidenced by mtDNA studies which show limited gene flow along European coasts (Tolley and Rosel 2006). Evans *et al* (2009) suggest sub-division of the North Atlantic into a number of sub-populations including a sub-population in the Celtic Sea (including Irish Sea and western Channel).

13.2.4.5 Pressures to porpoise from fisheries

13.2.4.5.1 Prey depletion

Porpoise feed on small fish including sandeels and juvenile gadoids and clupeids. Biomass of these stocks in coastal and continental shelf waters will determine prey availability to common porpoise. In RWBay and the Blasket Is habitat quality is related to the availability of suitable prey within the sites. High fishing effort and local depletion of stocks would in that case be contrary to the conservation objective targets. Depletion is more likely or possible for stocks that are locally distributed rather than migratory stocks such as herring, sprat and mackerel. Migrating pelagic stocks provide a seasonal and temporary pelagic subsidy into SACs designated for Harbour Porpoise. The relative importance of this subsidy versus local fish production in maintaining habitat quality within the sites is unknown.

13.2.4.5.2 By-catch

Harbour porpoise, together with short beaked common dolphin, seem to be the species most susceptible to capture in static gill nets (Evans and Hintner 2010). Juvenile porpoise seem more vulnerable than adults. By-catch rates of Harbour Porpoise in the Celtic Sea gill net fishery in 1994-1996 was 7.7 animals / 10^4 km.h of immersed net effort (Tregenza *et al.*. 1997) with a total estimated by-catch in the Celtic Sea of 2200 porpoise. More recently (references in Evans and Hunter 2010) the by-catch of Harbour Porpoise in the Irish and Celtic Sea gill net and tangle net fisheries was put at 498-1409 individuals. Cosgrove and Browne (unpublished) report a catch rate of 8.08 / 10^4km.hrs which is higher than Tregenza's estimate. Cosgrove and Browne (unpublished) indicate that the increase in by-catch in the peak period of March – June between their study and Tregenzas is proportional to the increase in population size of porpoise in the Celtic Seas between 1994 and 2005 (Hammond *et al.*. 2002, Hammond and MacLeod 2006). Estimated bycatch rates from the Celtic Sea eg. Tregenza *et al* (1997) may not be representative of inshore set net fisheries off the west coast of Ireland as porpoise are more abundant offshore. More recently Cosgrove *et al*. (2013) reported the capture of 3 harbour porpoise in 1071 km of gill, trammel and tangle net hauls on the west and south coasts of Ireland. This represents 1 porpoise per 357km of net hauled

which is lower than the 1 porpoise in 58km of net reported by Tregenza *et al*. (2007). No porpoises were detected from a further 55 observer days comprising 895 km of gear on board two set net vessels operating in the Kerry and broader south west area (pers. comm. Cosgrove). Furthermore no harbour porpoises were detected in 9 days of observations on board an inshore set net vessel from Dingle in 2013 as part of continued efforts by BIM to monitor fisheries interactions with protected species. No porpoises were observed as bycatch in 13 days of the Power *et al* (2007) study of tanglenet fisheries in the Kerry area. No by-catch of Porpoise in pelagic trawls has been reported in recent years (McCarthy *et al* 2011).

13.2.4.6 Risk assessment

13.2.4.6.1 Blasket Is

There are no estimates of trends in the number of Harbour Porpoise using the Blasket Is SAC. Considering the increased abundance of Porpoise in the Celtic Sea between 1994 and 2005 the number of porpoise using the RWBay site could be expected to have increased.

- A tangle net fishery targeting crayfish occurs within and surrounding the Blasket Island SAC and also to the north west towards Tralee Bay and south and west of Dingle Bay
- Gill net fishing by vessel over 15m (VMS data) occurs in deeper water to the west, targeting hake and also in outer Dingle Bay south of the SAC.
- A pelagic fishery for herring and sprat occurs in outer Dingle Bay south of the Blaskets.
- Demersal trawling occurs in outer Dingle Bay and in deeper water to the west.
- Scallop dredging occurs within the SAC
- Lobster and crab fishing, and possible associated use of trammel nets for bait, occurs in the SAC.

There is a diverse range of fishing activities within and surrounding the Blasket Islands SAC. It is unlikely that pelagic fish accumulate or shoal to any great extent within the Blasket Is SAC; the targeted fishing effort for these stocks is south of the site in outer Dingle Bay. Pelagic fishing in Dingle Bay and demersal trawling in the surrounding area may reduce prey availability in the area. Commercially targeted fish are however larger (and less abundant) than the size classes selected by porpoise. This size refuge, therefore, protects prey availability for Porpoise to some extent.

The tangle net fishery in the site and north and south of the site poses a by-catch risk to Porpoise. Power *et al*. (2007) reported the use of (or at least the ownership of) 176km of net off the Kerry coast suggesting a by-catch of 0.5-3 porpoise each time this gear is hauled (using by-catch rates from Cosgrove *et al* (2013) and Tregenza *et al*. (2007)). If the gear is hauled every seven days for 30 weeks (mainly summer period) then 15-90 Porpoise may be captured in the Kerry fishery annually. The total amount of gear being used however and the frequency of hauling in any year is variable and unknown. Approximately 300 porpoise have been counted during survey in the Blasket Is site. The PBR for this 'population' would be less than 5 animals and the population would need to be subvented by immigration to survive if by catch was higher than this in the site. Immigration into the site is of course highly likely to occur given the widely distributed population of porpoise in the Celtic Sea.

Tangle netting within and surrounding the Blasket Is SAC poses a significant risk to Porpoise in the site, population depletion is probable in the absence of immigration and contrary to target 2 of the conservation objectives.

13.2.4.6.2 Roaringwater Bay

There are no estimates of trends in the number of Harbour Porpoise using the Roaringwater Bay SAC. Considering the increased abundance of Porpoise in the Celtic Sea between 1994 and 2005 the number of porpoise using the RWBay site could be expected to have increased

- A tangle net fishery targeting crayfish occurs in outer RWBay and in waters between west Cork and Mizen Head
- Fishing for sprat and herring occasionally occurs in the site but most pelagic effort occurs between 20-50km to the south
- Demersal trawling occurs in sedimentary habitats in the north west of the site and particularly east of Cape Clear.
- There are intensive fisheries for shrimp and lobster in RWBay. There may be associated use of trammel nets
- Scallop dredging occurs in the Bay.

The tangle net fishery in the site south of the site poses a by-catch risk to Porpoise. The quantity of tangle net fishing gear within and in the region of RW Bay SAC is not completely known. Power *et al.*(2007) presented information on the quantity of tangle nets used by 6 vessels in the RWBay area in 2007. The total length of tangle net in use in the area at that time was approximately 38km. This would result in 0.1-0.6 Porpoise capture each time the gear was hauled (using by-catch rates from Cosgrove *et al* (2013)

and Tregenza *et al*. (2007) and possibly 3-18 porpoises over a 30 week season with a hauling frequency of once per week. However, observer data in this fishery has not detected any Porpoise by catch. Given the available data the fishery is unlikely to have population level effects on porpoise (Table 31).

Table 31. Consequence * likelihood scores for risk assessment of the impacts of fisheries on Harbour Porpoise at 2 sites designated for the species. Scores are disaggregated to 2 pressure categories; by-catch and prey depletion.

		Tangle net		Gill net		Trammel net		Pelagic trawl		Demersal trawl		Pots	
Site code	Site name	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion
2172	Blasket Is	=3*4	=1*4	=3*4	=1*4	=2*3	=1*4	=1*4	=1*4	=1*4	=1*4	=1*4	=1*4
101	Roaringwater Bay	=2*3	=1*4	=2*3	=1*4	=2*3	=1*4	=1*4	=1*4	=1*4	=1*4	=1*4	=1*4

13.2.5 Bottle nosed dolphin

13.2.5.1 Designated sites and Conservation objectives

Bottle nosed dolphin (BND) are listed in Annex II and IV of the Habitats Directive. Although the species is wide ranging in the marine environment the Directive requires Members States to establish Special Areas of Conservation to protect them and their listing in Annex IV confers strict protection on them. In Ireland's west south west and northwest coasts 3 sites are designated for BND (Figure 134). Conservation objectives for BND have been published for 1 site (Table 32, Figure 134).

The published conservation objectives for BND have explicit targets

1. Species range within the site should not be restricted by artificial barriers to site use
2. Critical areas, representing habitat used preferentially by bottlenose dolphin, should be conserved in a natural condition

3. Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site

Table 32. Sites designated for Bottle nose Dolphin on Irish south and west coasts

Site code	Region	Site name	COs
2165	Loop to Reen Point	Lower River Shannon	Published
2998(North)	Slyne to Benwee	West Connacht Coast_north	Pending
2998(South)	Slyne to Benwee	West Connacht Coast_south	Pending

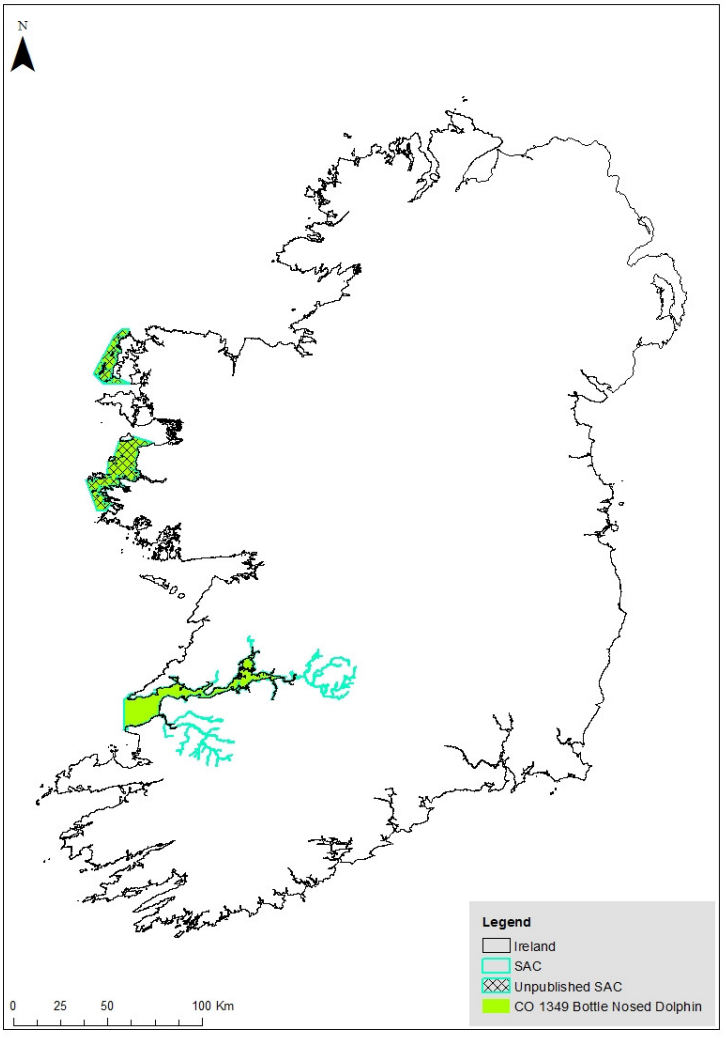

Figure 134. Designated sites for Bottle Nosed Dolphin categorised according to whether COs are published or not.

13.2.5.2 Distribution, habitat use and site fidelity

BND in the North Atlantic appear to consist of two forms; a coastal and an offshore form. The better known coastal form is locally common in the Irish Sea (particularly Cardigan Bay), off north east Scotland (particularly the inner Moray Firth), in smaller numbers in the Hebrides (west Scotland) off south west England, in the Shannon Estuary and off the mid west coast of Ireland and off the Cork coast. O'Brien *et al* (2009) report that BND on the Irish coast undertake extensive large scale movements ranging from 130-650km and that BND are generally highly mobile and transient. Studies in the North West Atlantic suggest that inshore and offshore populations are ecologically and genetically discrete (Hoelzel *et al*. 1998). Also, some populations, such as that in the Shannon Estuary, exist locally, have strong site fidelity and data indicates fine scale genetic structuring and distinctness of this population from surrounding coastal BND populations. Some BND from the Shannon Estuary also occur in Brandon Bay and Tralee Bay although critical habitat for the population is in two specific areas within the Shannon Estuary (NPWS 2012). The population of BND in west Connemara have lower site fidelity than that of the Shannon population and range widely along the west coast of Ireland (excluding the Shannon estuary) (Ingram *et al* 2010). Anderwald *et al* (2012) report seasonal and spatial segregation of BND and other cetaceans in Broadhaven Bay and supports the findings of Ingram *et al* (2009) and Oudejans *et al* (2010) that BND habitat in west Connacht SAC is primarily shallow water of less than 30m depth.

13.2.5.3 Diet

BND have highly flexible foraging tactics and local populations may develop original feeding tactics or techniques including beach hunting (Spitz *et al* 2006, Sargeant *et al* 2005). Diet varies by location presumably depending on prey availability but BND also show evidence of prey selection (Berens *et al* 2010). Pelagic and demersal fish, cephalopods and crustaceans all occur in the diet. BND have been described as a demersal feeder (references in Spitz *et al* 2006, Amir *et al* 2005). Resident BND in Doubtful Sound, New Zealand feed mainly on fish asscoaited with reef and have a low dependence on pelagic fish migrating in and out of the area (Lusseau and Wing 2006). In Scotland Santos *et al* (2001) reported that cod, saithe, whiting, haddock and salmon were the main species taken by BND. Sprat represented 0.2%, by weight, of the diet. In Spain, Santos *et al* (2007) reported that gadoids (50% by weight) and hake (28.8% by weight) were dominant prey species of BND. dosSantos *et al* (2007) reported eel, mullet, cuttlefish and octopus were taken by BND in the Sado estuary in Portugal. Resident BND in Saratosa Bay Florida are piscivorous but forage alone and on individual fish rather than schools of fish and feed on prey associated with seagrass habitat

(Barros and Wells 1998). BND may use passive listening to detect sound producing prey (Berens *et al* 2010). Daily food intake in captive BND is 2-4% of their body mass (155-225kg) per day (Kastlelein *et al* 2002). Accordingly, if there are up to 131 (Upper 95% CL from NPWS 2012) BND in the Shannon population then the annual food requirements, taking into account variation in adult body weight, is between 148-430 tonnes.

13.2.5.4 Population size and trends

Populations of BND off continental shelf waters of Ireland, UK, France and Spain in 2007 were estimated to be just over 19000 animals.

Comparable summer-autumn surveys of the Shannon Estuary BND population have been completed in 2000, 2003, 2007, 2008 and 2010. The 2010 survey provides an estimate of 107 ±12 individuals (95% Confidence Intervals: 83-131, Coefficient of Variation=0.12) and it concluded that the population trajectory has been relatively stable since estimation efforts began. The population is organised in social groups of 3-15 individuals although larger aggregations have been recorded (NPWS 2012).

In the west Connacht SAC (south) Ingram *et al*. (2009) estimate the population to be 171 (95% con int of 100-294). In west Connacht (North) the minimum population in 2008-2009 was 159 animals (Oudejans *et al*. 2010).

Isolated populations are at higher risk of depletion and extinction than larger open populations. Nicols *et al* (2007) show, through analysis of ancient DNA, that human exploitation probably led to the extinction of a local population of BND at Flixborough (Humber Estuary) over 100 years ago and that this population has not been replaced.

13.2.5.5 Pressures to bottle nosed dolphin from fisheries

13.2.5.5.1 Prey depletion

Bearzi *et al* (2006) suggested that BND is more resilient to widespread depletion of anchovy and sardine and other commercial stocks in the Ionian Sea, caused by fishing, that significantly reduced abundances (as estimated from encounter rates during survey) of common dolphin and swordfish. Resident populations of BND have a low dependence on pelagic subsidy i.e. pelagic fish migrating in and out of their habitat (Lusseau and Wing 2006). Depletion of resident stocks of fish may therefore be more relevant than depletion of migratory pelagic species to habitat quality for coastal resident populations of BND.

13.2.5.5.2 By-catch

BND attend and forage at fishing vessels (Morizur *et al* 1999) and can attend at small vessels which are setting or deploying nets or other gears in inshore water. By-catch of BND has been reported as zero in Irish pelagic fisheries in recent years (McCarthy *et al* 2011, Berrow 2012). By-catch may occur in set net fisheries although rates of by-catch appear to be low (0.29 animals per vessel using gill nets per year in Mediterranean, ICES 2010). No BND by catch occurred in 107km of tangle, trammel and gill nets observed by Cosgrove *et al* (2013) although they reported capture of grey seal, common dolphin, porpoise and minke whale. Although two decomposed carcasses observed in tangle nets fished off the Kerry coast in 2007 by Power *et al* (unpublished) were reported to be BND these were not confirmed as BND.

13.2.5.6 Risk assessment

13.2.5.6.1 Shannon estuary

The number of BND in the Shannon Estuary SAC is stable (NPWS 2012).

- There is a winter pelagic trawl fishery for sprat in the Shannon Estuary. This fishery occurs within critical habitat identified for BND in the Shannon Estuary. However landings are infrequent. Landings of sprat from ICES statistical rectangles 33E0 and 34E0, which encompasses the Shannon estuary, Tralee Bay, inner Dingle Bay and the Clare coast, between 2003 and 2012 varied from 0-160 tonnes annually. The fisheries exploitation rate on sprat is unknown.
- Tangle netting for crayfish and netting for turbot occurs to the west of the SAC outside of Tralee and Brandon Bays and west of Loop Head.
- Pot fishing for lobster, crab and shrimp occur in the Shannon Estuary and in deeper waters to the west
- There is no significant (none by vessel over 15m) demersal fishing in the SAC. There is a cluster of demersal fishing activity approximately 25km to the west of the site.

The infrequent sprat fishery, with landings of 0-160 tonnes per annum along the Clare and Kerry coasts is unlikely to significantly affect Shannon estuary BND. Local resident populations of BND do not rely on the food subsidy provided by immigration of pelagic fish, do not specialize in feeding on shoaling fish and take individual prey that are larger than sprat (16cm). Although there is no set net fishing within the SAC, or within critical habitat for BND in the SAC, BND from the Shannon population also occur to the west of the SAC in the Tralee Bay and Brandon Bay area. Here their distribution overlaps with the tangle net and gill

net fishery. Although by-catch of BND is less frequent than that of Porpoise or Common Dolphin the Shannon population is small and the potential biological removal (PBR) is probably 2 animals per year. No by-catch of BND has been observed in tangle nets to the west of the Shannon estuary in waters inhabited by Shannon estuary BND. The population is reported to be stable.

Given the current distribution of set net fishing, which does not overlap with Shannon BND habitat to any significant extent, it it unlikely that by-catch poses a risk to this population. Any change in the location of set net fishing which would increase the encounter rate between set nets and BND would increase the risk of population effects on this local discrete BND population (Table 34).

13.2.5.6.2 West Connacht

There are no time series to indicate any trends in the West Connacht SAC BND population. Densities of BND in the sites in 2008-2010 were higher than recorded in the Shannon Estuary.

- Tangle net fisheries occur in the SAC and to the west and in waters between the north (Mayo) and south (west Connemara) areas of the designation and in the path of movement of BND between these two areas
- Pelagic fishing for horse mackerel, mackerel and herring occurs in the north of the area off north west Mayo although in deeper water than preferred BND habitat but also in Broadhaven Bay
- Potting and associated trammel netting occurs in the SAC and throughout the area.
- Demersal trawling is not intensive in the area at least in shallow waters.

The preferred habitat of BND in west Connacht SAC is shallow water less than 30m in depth. There is little overlap therefore with pelagic fisheries. Prey depletion is not likely to be significant as BND do not rely on pelagic fish as a main source of food. Although BND have not been observed as by-catch in west coast set net fisheries in the latest study (Cosgrove *et al* 2013) these fisheries do pose a risk of by-catch. However, the population effects of individual capture are unlikely to be as significant as for Shannon because the west Connacht population has lower site fidelity and is part of the Irish coastal population. **There is a risk of individual by-catch which is unlikely to have population level effects** (Table 33).

Table 33. Consequence * likelihood scores for risk assessment of the impacts of fisheries on Bottle nose Dolphin at 2 sites designated for the species. Scores are disaggregated to 2 pressure categories; by-catch and prey depletion

		Tangle/Trammel net		Gill net		Trammel (bait) net		Pelagic trawl		Demersal trawl		Pots	
Site code	Site name	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion	By-catch	Prey depletion
2165	Shannon Estuary	=2*3	=2*2	=2*3	=2*2	=2*3	=2*2	=2*2	=1*2	=1*2	=1*2	=1*2	=1*2
2998 (North)	West Connacht coast	=2*3	=2*2	=2*3	=2*2	=2*3	=2*2	=2*2	=1*2	=1*2	=1*2	=1*2	=1*2
2998 (South)	West Connacht coast	=2*3	=2*2	=2*3	=2*2	=2*3	=2*2	=2*2	=1*2	=1*2	=1*2	=1*2	=1*2

13.2.6 Otter

13.2.6.1 Designated sites and Conservation objectives

Otter (*Lutra lutra*) is listed in Annex II of the Habitats Directive. Otter is common throughout freshwater systems in Ireland and also occurs in coastal marine habitats. In Ireland's west south west and northwest coasts 18 sites are designated for Otter (Table 35). Conservation objectives for Otter have been published for 10 sites (Table 34, Figure 135).

The conservation objectives for Otter in the marine environment have explicit targets

1. No significant decline in distribution
2. No significant decline in marine habitat
3. No significant decline in couching sites and holts
4. No significant decline in available fish biomass
5. No significant increase in barriers to connectivity

Table 34. Sites designated for Otter on Irish south and west coasts

Site code	Region	Site name	COs
1141	Benwee to Quiqleys Pt	Gweedore Bay and Islands	Published
2287	Benwee to Quiqleys Pt	Loughswilly	Published

2159	Benwee to Quiqleys Pt	Mulroy Bay	Published
2012	Benwee to Quiqleys Pt	North Inishowen Coast	Published
190	Benwee to Quiqleys Pt	Slieve Tooey/Tormore Island/Loughros Beg Bay	Pending
197	Benwee to Quiqleys Pt	West of Ardara/Maas Road	Pending
343	Loop to Reen Point	Castlemaine Harbour SAC	Published
90	Loop to Reen Point	Glengariff Hbr and Woodland	Published
2158	Loop to Reen Point	Kenmare River	Published
2165	Loop to Reen Point	Lower River Shannon	Published
101	Loop to Reen Point	Roaringwater Bay and Islands	Published
2070	Loop to Reen Point	Tralee Bay and Magharees Peninsula	Published
2170	Reen point to Carnsore	Blackwater River (Cork/Waterford)	Published
2162	Reen point to Carnsore	River Barrow and River Nore	Published
1482	Slyne to Benwee	Clew Bay complex	Published
470	Slyne to Benwee	Mullet/Blacksod Bay complex	Published
268	Slyne to Loop	Galway Bay complex	Published
2111	Slyne to Loop	Kilkieran Bay and Islands	Published

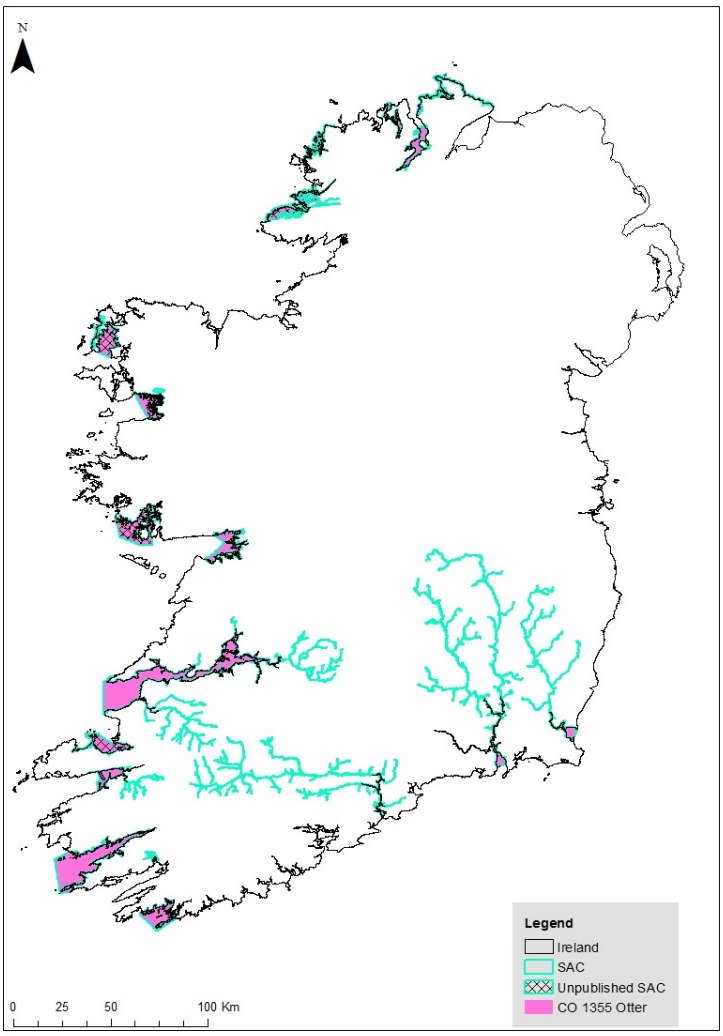

Figure 135. Designated sites for otter categorised according to whether COs are published or not.

13.2.6.2 Distribution, habitat use and site fidelity

Otter populations are specific to each designated site and movement between designated sites is not expected to occur given the home range and behavior of otter. Distribution of otter in the marine environment is limited to the coastal fringe seaward to 500m (NPWS 2012a).

Otters prefer to dive in waters 0-3m mainly and exceptionally down to 7m. Short and shallow dives are more efficient for searching and there is less heat loss (Nolet *et al* 1993).

13.2.6.3 Diet

Coastal otters feed on a variety of fish, crustaceans and other fauna. Wrasse, rockling, blennies, gobies are all important prey species. Sea urchin may be important in winter (Reid

et al 2013). Saithe and Pollack may be taken in winter in kelp forests.Seabirds are taken opportunistically at breeding colonies.

13.2.6.4 Population size and trends

In Ireland otter distribution and population size increased from the period 1981-1982 and 2010-2011. Densities are highest (0.16-0.20 otters km^2) in Connacht, intermediate (0.1-0.15) in south west Munster and Ulster and lowest (0.0-0.10) in the east, south east and mid west.

In the Roaringwater Bay Catchment surveys from 1980/81 to 2010/11 show a decline in otter incidence from 100.0% occurrence during the National Surveys in 1980/81 (n=7) to 50.0% during 2010/11(n=6). Due to sample sizes there was no significant difference between National Surveys (Table 13). Occurrence within Rapid Assessment Surveys in 2007 and 2009 declined by 12.6% but again there was no significant difference in occurrence.

13.2.6.5 Pressures to otters from fisheries

13.2.6.5.1 Disturbance

Otters are no sensitive to human disturbance (Chanin *et al* 2003). Otters have recolonised a number of towns and cities in the UK for instance. Human activity on river banks (walking, angling) does not lead to change in distribution or abandonment of holts. In coastal habitats human disturbance is likely to be of much lower intensity than in freshwater or close to built up areas.

13.2.6.5.2 Prey depletion

One of the conservation objective targets for otter is that no significant decline in fish biomass available to otter should occur within SACs designated for otter. Otters feed mainly on non-commercial reef fish species. Trammel netting for bait also targets these species. This could lead to reduction in prey availability.

13.2.6.5.3 By-catch

The distribution of otter in SACs could be reduced if individuals are captured in fishing gear. Given that populations of otter in SACs are likely to be low (considering the densities reported in national surveys) any by-catch may be unsustainable.

Generally the only risk posed by marine fisheries arises from the use of pots and trammel nets to catch lobsters and bait, respectively in shallow water reef habitat. Otters are known to be attracted to fish and crustaceans which are used as bait or caught in creels. There is documented evidence of otter mortality in creels (Twelves 1983, Jeffries *et al* 1984). A survey

of drowned otters in lobster creels off the Uists revealed that the majority drowned while foraging in depths of 2-5 m (maximum 16m) and that mortality increased with the incorporation of a parlour in the creels. Crab creels did not appear to pose such a threat as the gear was usually set on sandy seabed in deeper water, further offshore and therefore outside the favoured foraging area of otter.

13.2.6.6 Risk assessment

Risk is probably related to the intensity of the pot fishery in each of the sites. On that basis there may be some risk of by-catch in Roaringwater, Tralee Bay, Clew Bay, Galway Bay and Kilkieran Bay. The risk of otter capture is higher in parlour creels deployed in depths of 2-5m which is consistent with preferred dive depths of 1-3m. In the Irish lobster fishery gear deployment depth is almost universally greater than this depth and the vast majority of the gear does not employ a parlour. Trammel nets may be deployed in shallow reef habitat to collect bait for creels. This is usually also greater than 2-5m and outside of the depth range of diving otters.

Because of the intensity of pot fishing, unknown levels of associated use of trammel nets and documented accounts of mortality of otter in parlour creels in particular there is some likelihood of capture of individual otters. As creels and trammels are unlikely to be deployed within the preferred dive range of otters in the Irish lobster fishery the likelihood of capture is thought to be unlikely (Table 35)**.**

Table 35. SACs designated for otter, categorisation of potting (creels) intensity and associated risk of capture in pots and trammel nets (consequence*likelihood)

Site code	Site name	Potting intensity	Risk
1141	Gweedore Bay and Islands	Low	=1*3
2287	Loughswilly	Low	=1*3
2159	Mulroy Bay	Low	=1*3
2012	North Inishowen Coast	Moderate	=2*2
190	Slieve Tooey/Tormore Island/Loughros Beg Bay	Low	=1*3
197	West of Ardara/Maas Road	Moderate	=2*2
343	Castlemaine Harbour SAC	Low	=1*3
90	Glengariff Hbr and Woodland	None	=0*5
2158	Kenmare River	High	=2*2
2165	Lower River Shannon	Low	=1*3
101	Roaringwater Bay and Islands	High	=2*2

2070	Tralee Bay and Magharees Peninsula	High	=2*2
2170	Blackwater River (Cork/Waterford)	None	=0*5
2162	River Barrow and River Nore	None	=0*5
1482	Clew Bay complex	High	=2*2
470	Mullet/Blacksod Bay complex	Moderate	=2*2
268	Galway Bay complex	High	=2*2
2111	Kilkieran Bay and Islands	High	=2*2

13.2.7 Twaite shad

13.2.7.1 Designated sites and Conservation objectives

Twaite Shad is listed in Annex II of the Habitats Directive. In Ireland's west south west and northwest coasts 2 sites are designated for Twaite Shad (Table 37). Conservation objectives for Twaite Shad have been published for both sites (Table 36, Figure 136).

The conservation objectives for Twaite shad related to targets for freshwater rather than marine habitat and include

1. That 75% of river stem length be accessible from estuaries
2. That more than one age class is present
3. No decline in freshwater spawning habitat
4. Oxygen levels do not fall below 5mg.l^{-1}
5. Gravel beds are maintained devoid of fine material and filamentous algae and macrophyte

The age structure of Twaite Shad (Target 2 of the COs) could be affected if Shad are captured in the marine environment.

Table 36. Sites designated for Twaite Shad on Irish south and west coasts

Site code	Region	Site name	COs
2170	Reen point to Carnsore	Blackwater River (Cork/Waterford)	Published
2162	Reen point to Carnsore	River Barrow and River Nore	Published

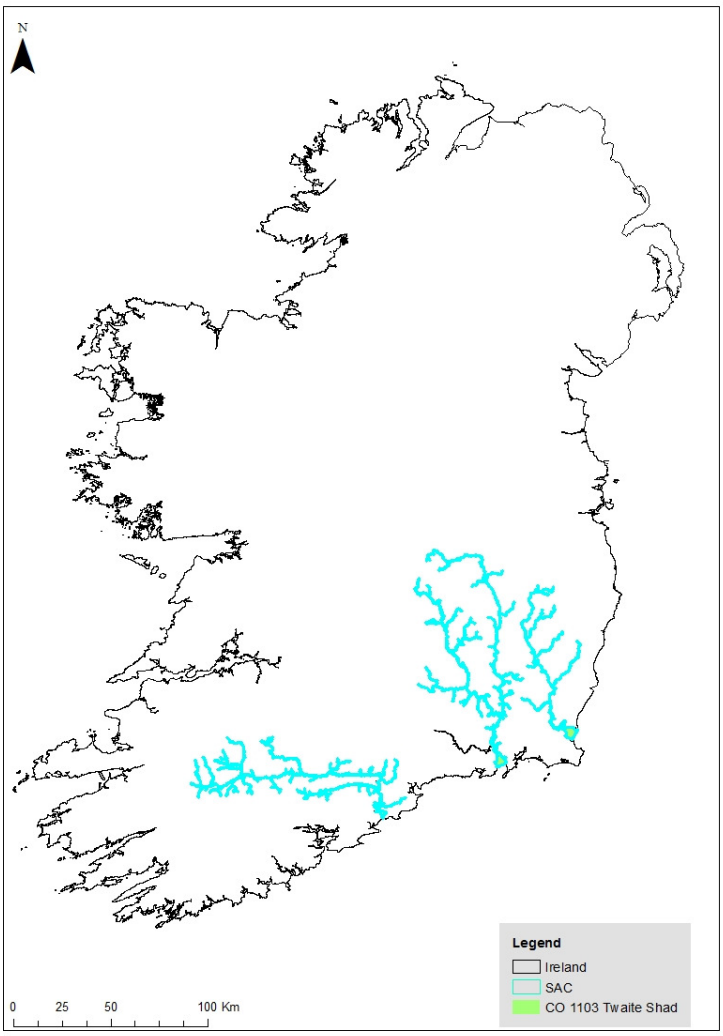

Figure 136. Designated sites for Twaite Shad categorised according to whether COs are published or not.

13.2.7.2 Distribution, habitat use and site fidelity

Twaite Shad are anadromous fish. Early life history is spent in freshwater. Fish then migrate to coastal marine waters and return to freshwater to spawn. Distribution in the marine is not well known but Shad are captured in coastal marine fisheries as by-catch.

Shad probably show a high degree of fidelity to natal rivers although this is not demonstrated in Irish populations.

13.2.7.3 Population size and trends

Populations of Twaite Shad are considered to have declined in recent years (King and Roche (2008). Spawning populations however continue to be present in the Blackwater River and

River Barrow and River Nore. Spawning populations of Twaite shad in Irish Rivers may only number in the hundreds of fish (J. King, IFI, pers. comm.) Article 17 assessments indicate that the conservation status of Twaite Shad is unfavourable, prospects are poor and the status of the species is inadequate-bad (NPWS 2013).

13.2.7.4 Pressures to Twaite Shad from fishing

The pressure from commercial marine fisheries is by-catch.

Incidental capture of shad occurs in marine trawl and gill net fisheries (Table 38) and probably more commonly in estuarine draft and snap net fisheries for salmon (King and Linnane 2004). Fish can and are released alive from snap and draft nets in estuaries (King and Linnane 2004).

13.2.7.5 Risk assessment

13.2.7.5.1 Blackwater River (Cork/Waterford)

- There are no marine fisheries within the site
- Potential dredge fisheries for cockle and clams could occur in shallow coastal waters south of the site
- There is a winter fishery for Herring in deeper water about 10km south of the site

13.2.7.5.2 River Barrow and River Nore

- There are existing and potential dredge fisheries for cockle and clams in the Waterford Estuary
- Winter fisheries for sprat and herring may occur in the estuary and south of the site
- Pot fisheries and associated trammel netting occurs south of the site
- Bottom set gill net fisheries occur south and west of the site mainly in the period Jan-Mar.
- Demersal fisheries occur south of the site
- Scallop fisheries occurs in offshore waters south of the site

The risk posed by fisheries to Twaite Shad occurs mainly outside the designated sites (except for salmon draft and snap nets) and the risk cannot, therefore, be linked to individual sites.

The main source of fisheries by-catch, leading to mortality of Shad in the marine environment is from bottom trawl and gill net fisheries and potentially from pelagic fisheries, other set net fisheries and salmon fisheries in Estuaries. A total of 56 Shad (species unidentified) were observed by MI discard observers on Irish vessels in these fisheries in ICES Area VII

between 1993 and 2012. 52 of the 56 fish were captured in sub-area VIIg (Celtic Sea). These fish may have originated from Irish Rivers although origin is unknown (Table 37). 41 of these fish occurred in a small number of gill net trips in 2009. This pattern of by-catch probably reflects shoaling behavior. Shad have not been observed in pelagic trawls but such by-catch is very difficult to detect in high volume pelagic catches. Trammel nets set for bait have the potential to catch shad. Shad are commonly taken in salmon draft and snap net fisheries. Although these fish can be released alive they may suffer scale loss due to contact with nets (King and Roche 2008). The survival rate of fish released from salmon snap and draft nets is unknown. Draft and snap net fisheries for salmon in the Blackwater and Barrow/Nore operate when there is a surplus production of salmon in these systems. The incidence of by-catch is probably highest in salmon draft and snap nets compared to other fisheries and such fish are also highly likely to be fish of Irish origin whereas fish caught in marine fisheries may originate from elsewhere.

The total by-catch of Shad in Celtic Sea commercial fisheries is unknown. Irish observer data reports 56 Shad where the sampling rate is 1% of all Irish commercial trips. UK, French and Spanish vessels also fish in the area. Effort in bottom trawl fisheries in the Celtic Sea has been stable between 99000-126000 VMS hrs per annum between 2006-2012. WGBYC (2012) report that shad by-catch in ICES Area VII and VIII in gill nets and mid-water trawls and to a lesser extent in Area IV. Most Shad by-catch occurs in coastal areas and it is likely that some by-catch occurs in all mobile trawl gears and static nets. The proportion of the Shad catch that is Twaite shad (as opposed to Allis shad) is unknown. Data from King and Roche (2008) suggests that the majority of Shad by-catch in Irish coastal waters is Allis shad. WGBYC (2012) also show that Twaite shad are captured in marine fisheries in the southern North Sea.

The total number of Twaite shad captured may be significant at the population level and have significant negative effects on spawning populations given that the total Shad population sizes are likely to be low and declining (Table 38)**. The effects may be highest in salmon draft and snap nets as this fishery is likely to encounter more Shad of Irish origin than other marine fisheries in the Celtic Sea.**

Table 37. Records of Shad (species unidentified) in Irish marine commercial fisheries in ICES area VII (source: MI discard sampling database)

Year	Gill net	Bottom trawl	Seine nets	Twin rig trawl	Twin rig trawl with escape grid	Total

1998		4				4
2001		1				1
2003		1				1
2005			2			2
2006				1		1
2007		1				1
2009	41			1	1	43
2010				2		2
2012				1		1
Total	41	7	2	5	1	56

Table 38. Consequence * likelihood scores for risk assessment of bycatch of Twaite shad marine fisheries.

Site code	Site name	Gill net	Trammel net	Pelagic trawl	Demersal trawl	Pots	Dredge	Salmon draft and snap
2170	Blackwater River (Cork/Waterford)	=4*3	=2*3	=3*3	=4*3	=1*4	=1*4	=4*4
2162	River Barrow and River Nore	=4*3	=2*3	=3*3	=4*3	=1*4	=1*4	=4*4

13.2.8 Salmon

13.2.8.1 Designated sites and Conservation objectives

1. Salmon is listed in Annex II of the Habitats Directive. In Ireland's west south west and northwest coasts 5 sites are designated for Salmon (Table 39, Figure 137). Conservation objectives for Salmon have been published for both sites.

The conservation objectives for Salmon have explicit targets related mainly to populations and habitat requirements in freshwater. The following targets could be affected by marine fisheries (including salmon fisheries)

2. The conservation limit for the number of spawning fish should be consistently exceeded. This is the spawning level that produces long term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship
3. There are also density or population targets for fry and outmigrating smolt abundance

Table 39. Sites designated for Salmon on Irish south and west coasts

Site code	Region	Site name	COs
197	Benwee to Quiqleys Pt	West of Ardara/Maas Road	Pending
343	Loop to Reen Point	Castlemaine Harbour SAC	Published
2165	Loop to Reen Point	Lower River Shannon	Published
2170	Reen point to Carnsore	Blackwater River (Cork/Waterford)	Published
2162	Reen point to Carnsore	River Barrow and River Nore	Published

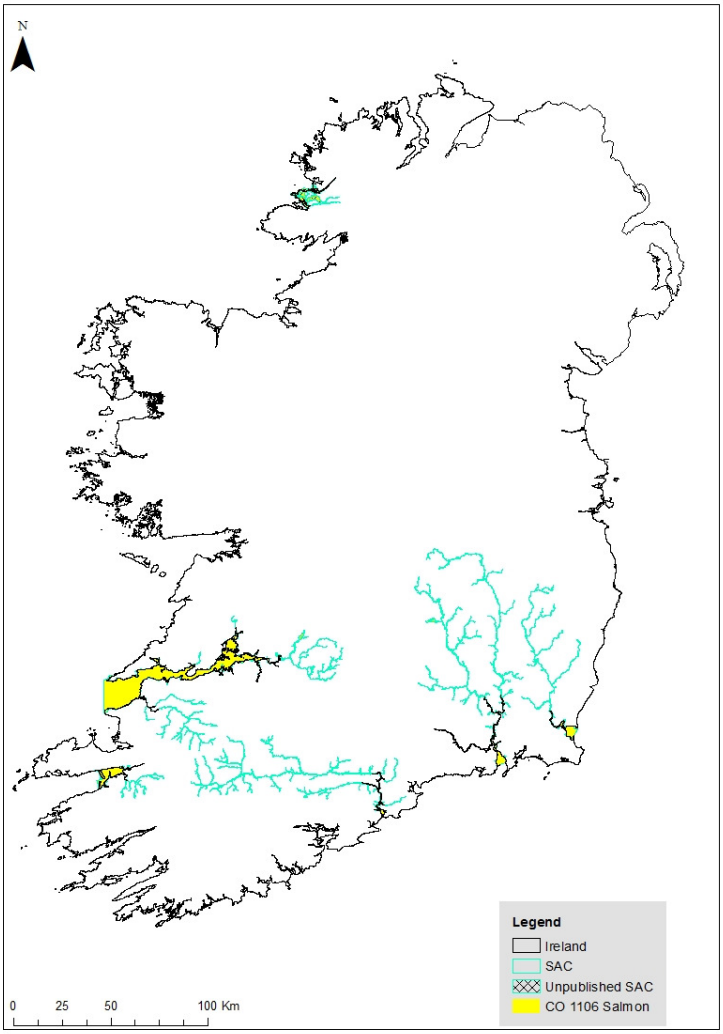

Figure 137. Designated sites for salmon categorised according to whether COs are published or not.

13.2.8.2 Distribution, habitat use and site fidelity

Salmon are anadromous fish spending their early life history in freshwater and migrating to sea as smolts. They do not spend significant time in coastal waters but migrate quickly to offshore feeding grounds in the north east Atlantic. Salmon show strong natal philopatry, returning to their birth rivers to spawn.

Although salmon is an Annex species of the Habitats Directive it is listed only for the freshwater phase of its life cycle. However, because salmon return to their natal rivers mortality in the marine environment can affect the status of populations in designated sites.

13.2.8.3 Population size and trends

Population size is estimated for each river annually by the Standing Scientific Committee for Salmon. Gernerally marine mortality on salmon has been increasing annually since the 1980s due probably to oceanographic and feeding conditions in the north east Atlantic. Marine mortality generally exceeds 95% in the first year at sea (i.e. smolt to grilse). However, the number of rivers closed to all forms of fishing has declined in recent years indicating some improvement generally in salmon stocks. In 2012 the Blackwater, Nore (but not Barrow), Laune and Maine (Castlemaine Harbour SAC) were open for some form of salmon fishing.

13.2.8.4 Pressures to salmon from fisheries

Pressure on salmon populations from marine fisheries arises as a result of planned targeted catch in directed salmon fisheries and, potentially, as unplanned by-catch in other marine fisheries. Directed fishing mortality on salmon has been reduced significantly since the closure of the marine drift net fishery in 2006. Fishing mortality now occurs only when there is a surplus production of fish available i.e. the conservation limit reference point for the particular stock is exceeded. As such targeted marine fisheries for salmon is managed such that it does not pose a risk to salmon spawning stocks.

By-catch in marine fisheries, which is unplanned, could reduce the number of spawning fish returning to rivers or intercept outwardly migrating smolts which would also subsequently reduce the number of fish returning to the coast and their natal rivers. By-catch could occur in spring on outwardly migrating smolts and in the summer on 1 sea winter fish returning from the open ocean.

13.2.8.5 Risk assessment

13.2.8.5.1 West of Ardara/Maas Road

- Tangle net fisheries for crayfish occur in deep water to the west of the SAC
- Potting for lobster and crab, with the possible use of trammel nets for bait, occurs west of the SAC.
- Demersal and pelagic trawling occurs to the west of the SAC but no significant activity occurs within 30km of the site

By-catch of outwardly migrating salmon smolts is unlikely to occur in the SAC or within 30km of the SAC. Trammel nets, which are used in shallow water in summer to collect bait for pots, could potentially capture individual salmon returning to rivers. The likelihood is low (Table 40).

13.2.8.5.2 Castlemaine Harbour SAC

There are no fisheries within Castlemaine Harbour SAC. Seed mussel fisheries occur in inner Dingle Bay and various trawl and net fisheries occur in the outer Bay some distance from the site. Fisheries pose no risk to salmon in Castlemaine SAC.

13.2.8.5.3 Lower River Shannon

- There is a winter pelagic trawl fishery for sprat in the Shannon Estuary. However landings are infrequent. There are few salmon (spring returning salmon) in coastal waters at this time of year.
- Tangle netting for crayfish and netting for turbot occurs to the west of the SAC outside of Tralee and Brandon Bays and west of Loop Head.
- Pot fishing for lobster, crab and shrimp occur in the Shannon Estuary and in deeper waters to the west
- There is no significant (none by vessel over 15m) demersal fishing in the SAC. There is a cluster of demersal fishing activity approximately 25km to the west of the site.

By-catch of outwardly migrating smolts ot returning salmon is unlikely given the fishery profile in the SAC.

13.2.8.5.4 Blackwater River (Cork/Waterford)

- There are no marine fisheries within the site
- Potential dredge fisheries for cockle and clams could occur in shallow coastal waters southof the site

- There is a winter fishery for Herring in deeper water about 10km south of the site

By-catch of outwardly migrating smolts ot returning salmon is unlikely given the fishery profile in the SAC.

13.2.8.5.5 River Barrow and River Nore

- There are existing and potential dredge fisheries for cockle and clams in the Waterford Estuary
- Winter fisheries for sprat and herring may occur in the estuary and south of the site
- Pot fisheries and associated trammel netting occurs south of the site
- Bottom set gill net fisheries occur south and west of the site mainly in the period Jan-Mar.
- Demersal fisheries occur south of the site
- Scallop fisheries occurs in offshore waters south of the site

By-catch of outwardly migrating smolts or returning salmon is unlikely given the fishery profile in the SAC and south of the SAC. There is a low risk of capture of individual grilse in the summer trammel (bait) net fishery.

Table 40. Consequence * likelihood scores for risk assessment of bycatch of Salmon in marine fisheries

Site code	Region	Site name	Risk
197	Benwee to Quiqleys Pt	West of Ardara/Maas Road	=1*4
343	Loop to Reen Point	Castlemaine Harbour SAC	=1*4
2165	Loop to Reen Point	Lower River Shannon	=1*4
2170	Reen point to Carnsore	Blackwater River (Cork/Waterford)	=1*4
2162	Reen point to Carnsore	River Barrow and River Nore	=1*4

13.2.9 Sea Lamprey

13.2.9.1 Designated sites and Conservation objectives

Sea Lamprey is listed in Annex II of the Habitats Directive. In Ireland's west south west and northwest coasts 5 sites are designated for Sea Lamprey (Table 42). Conservation objectives for Sea Lamprey have been published for all sites (Table 41, Figure 138).

The conservation objectives for Sea Lamprey have explicit targets all of which relate to the freshwater habitat and population.

Table 41. Sites designated for Sea Lamprey on Irish south and west coasts

Site code	Region	Site name	COs
343	Loop to Reen Point	Castlemaine Harbour SAC	Published
2165	Loop to Reen Point	Lower River Shannon	Published
2170	Reen point to Carnsore	Blackwater River (Cork/Waterford)	Published
2162	Reen point to Carnsore	River Barrow and River Nore	Published
627	Quigleys Pt to Benwee Hd	Cumeen Strand/Drumcliffe Bay (Sligo Bay)	Published

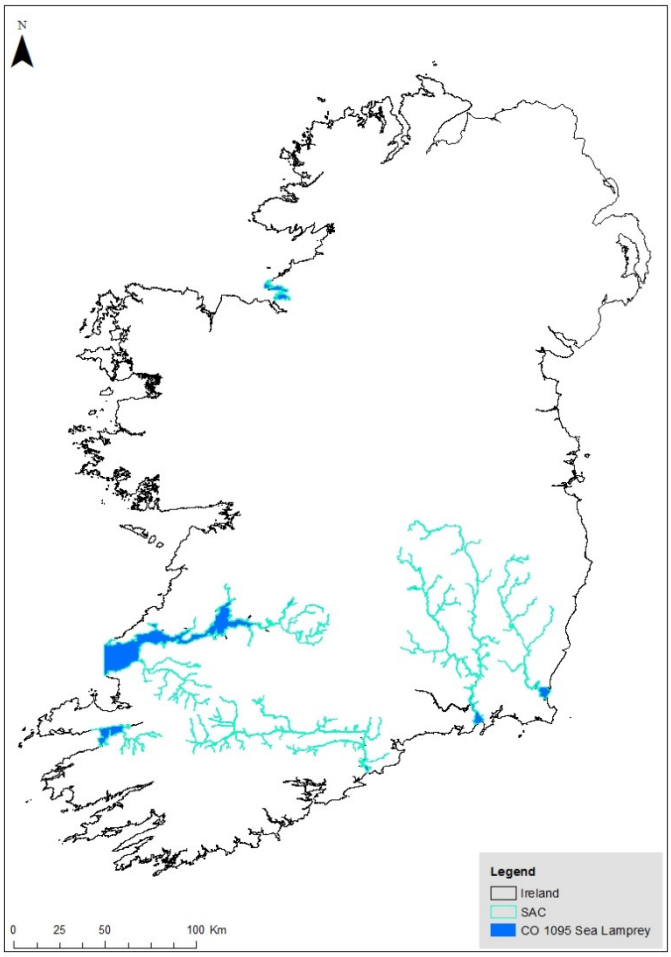

Figure 138. Designated sites for Sea Lamprey categorised according to whether COs are published or not

13.2.9.2 Distribution, habitat use and site fidelity

Little is known about the distribution and habitat of sea lamprey in the marine environment

13.2.9.3 Population size and trends

Sea lamprey in Ireland is declining and conservation status is unfavourable

13.2.9.4 Pressures to sea lamprey from fisheries

Marine fisheries do not pose a risk to the status of sea lamprey (http://jncc.defra.gov.uk/pdf/CSM_06species.pdf)

13.2.9.5 Risk assessment

No risk has been identified

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