



## Supporting Implementation of **Maritime Spatial Planning** in the **Celtic Seas**

**Component: C1.2.4: Case studies on approaches to MSP**

**CS-3 Planning across borders:** Case Study of the Solway Firth

**Deliverable 12:** Report on approaches to cross-border cooperation, including stakeholder engagement mechanisms

**Sub-component: D 12.3:** Report on Sectoral Interactions around the Solway Firth in relation to marine planning



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## Acronyms

**AONB:** Area of Outstanding Natural Beauty  
**CCC:** Cumbria County Council (England)  
**EA:** Environment Agency  
**EMS:** European Marine Site (UK)  
**EU:** European Union  
**GES:** “Good Environmental Status”  
**IFCA:** Inshore Fisheries Conservation Authority  
**INNS:** Invasive Non-Native Species  
**LDP:** Local Development Plan  
**MCZ:** Marine Conservation Zone  
**MMO:** Marine Management Organisation (UK)  
**MPP:** Marine Planning Partnerships  
**MPS 2011:** UK Marine Policy Statement 2011  
**MSA 2010:** Marine (Scotland) Act 2010  
**MSFD:** Marine Strategy Framework Directive  
**MSP:** Maritime Spatial Planning  
**NGO:** Non-Governmental Organisation  
**NM:** Nautical miles  
**NNR:** National Nature Reserve  
**NWIFCA:** North West Inshore Fisheries Conservation Authority  
**RBM:** River Basin Management  
**RIFG:** Regional Inshore Fishery Group  
**RMP:** Regional Marine Plan  
**RNLI:** Royal National Lifeboat Institution  
**RSPB:** Royal Society for the Protection of Birds  
**RYA:** Royal Yachting Association  
**SAC:** Special Area of Conservation  
**SEPA:** Scottish Environmental Protection Agency  
**SFP:** Solway Firth Partnership  
**SIMCelt:** Supporting Implementation of Maritime Spatial Planning in the Celtic Seas  
**SNMP:** Scottish National Marine Plan  
**SPA:** Special Protection Area  
**SSMEI:** Scottish Sustainable Marine Environment Initiative  
**SSWA:** South Solway Wildfowlers Association  
**WFD:** Water Framework Directive

**DISCLAIMER:**

The information, from both surveys, should be treated as 'best-available' data. It is not comprehensive in scope and only reflects views of those who responded. It should not be considered as being representative of views across each sector as a whole but can be used to give an indication of the perceptions of interactions between sectors and activities. Both surveys have provided valuable feedback from stakeholders around the Solway Firth and this information forms a unique database over a five-year period, which contributes to the work of better understanding the issues involved in transboundary marine planning.

**Key Findings from the Sectoral Interactions survey in the Solway Firth<sup>1</sup>**

**1: The Solway Firth is a busy marine environment with 79 key sectors**

**2: The majority of interactions between sectors were found to be neutral (58%)**

**3: More sectors were expanding than declining in the Solway Firth**

**4: Availability of funds, environmental legislation and customer needs most frequently drove sectoral change**

**5: Existing conflict management mechanisms should be considered when marine planning**

**6: There is prolonged interest in tidal energy but no proposal has moved forward**

**7: For an Ecosystems Approach, adjoining marine plans should be balanced in geographic scale**

**8: Five years was considered too short to repeat sectoral surveys**

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<sup>1</sup> In no particular order



## 1. Introduction

The SIMCelt Project (Supporting Implementation of Maritime Spatial Planning in the Celtic Seas) is a cross-border project funded by the European Commission (Figure 1) aiming to examine cross-border and transboundary issues connected to marine planning within a European context. The project is a collaboration analysing marine planning in the context of the Celtic Seas: England, Scotland, Northern Ireland, Ireland and France.

Marine Plan implementation requires formal agreements that reflect accountabilities across the administrative bodies to ensure horizontal integration.<sup>2</sup> The Celtic Seas are unique and need a bespoke method of interpreting and implementing maritime spatial planning (MSP). The Solway will be examined as a case study on Planning Across Borders due to its uniqueness as a single marine ecosystem with Scottish and English national boundaries running laterally through the middle. The Solway also has a third boundary at 12nm with Northern Ireland and the offshore waters of the Isle of Man, therefore, there are multiple challenges in ensuring different marine planning legislation delivers for the different national objectives as well as for overarching UK and EU Directives. The ecosystem itself does not recognise these jurisdictional boundaries and is subject to interactions from different pieces of marine legislation and national priorities. To help encourage fair development, each set of national objectives must not also adversely affect the pursuit and achievement of another. This is the first step towards an Ecosystems Based Approach to planning.

The [United Nations Sustainable Development Goal 14](#) is to “*Conserve and sustainably use the oceans, seas and marine resources.*”<sup>3</sup> To achieve this target requires the urgent implementation of Ecosystem-Based regional marine planning that can provide the necessary level of spatial detail for sustainable management. Within the EU, MSP is supposed to apply the Ecosystem Based Approach to secure that the collective pressures of marine activities are kept within levels compatible with the achievement of ‘Good Environmental Status’ (GES) by 2020 in the [Marine Strategy Framework Directive](#) (MSFD), as this covers 11 million km<sup>2</sup> across Europe. Marine Plan implementation requires formal agreements that reflect accountabilities across the administrative bodies to ensure horizontal integration for the European marine area.<sup>4</sup>

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<sup>2</sup> Cormier et al (2015)

<sup>3</sup> UN Sustainable Development Goals 2015

<sup>4</sup> Cormier (2015)

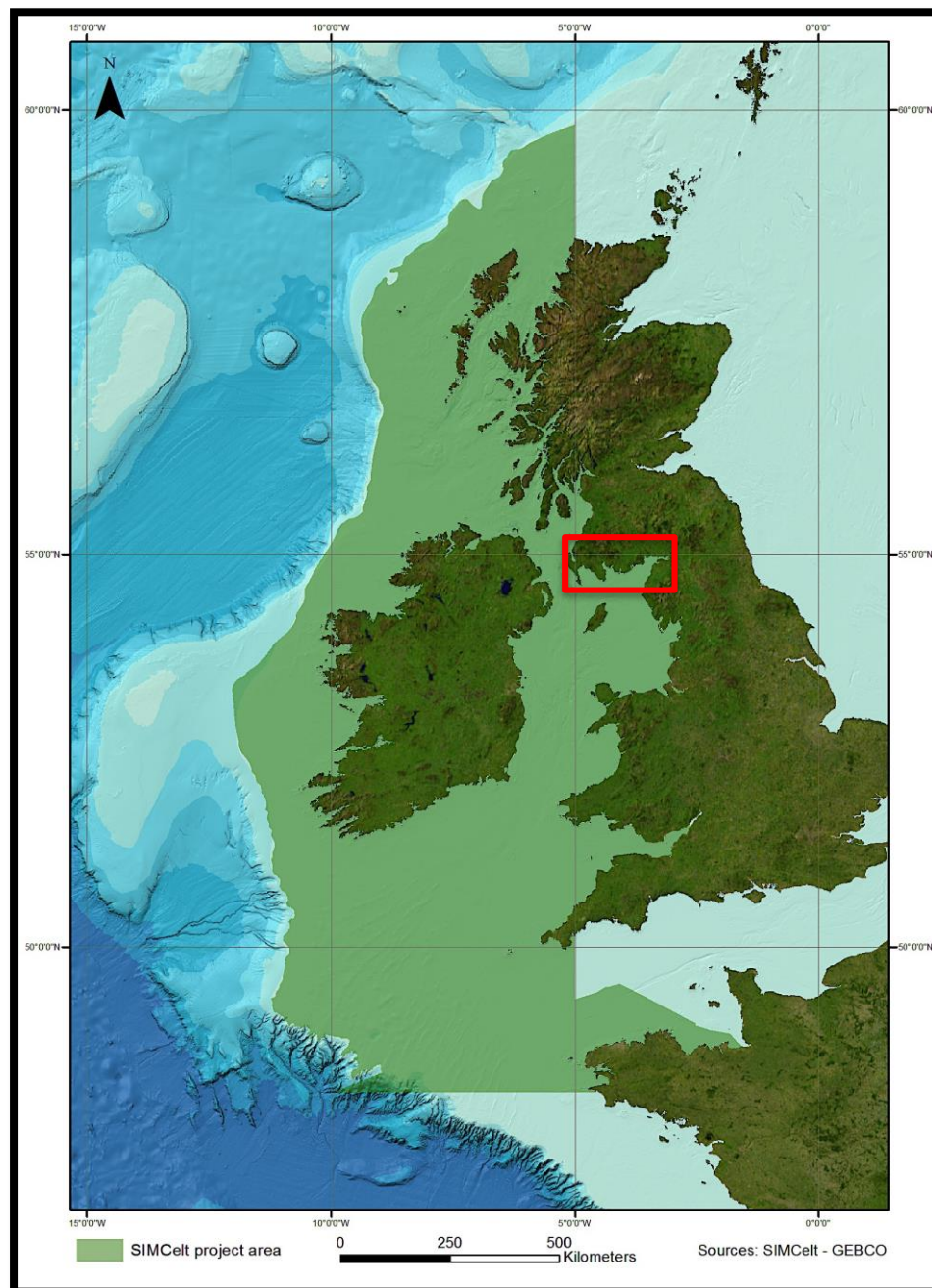
This report on interactions around the Solway Firth is one of a series of documents as part of a Planning Across Borders case study for the wider SIMCelt project. This series provides information on different aspects of marine planning for a cross border ecosystem. The Solway Firth experiences a complex governance structure, with English and Scottish jurisdictions bisecting the estuary and both countries taking different approaches to marine planning (See Appendix III). For further information on the governance structure of the Solway Firth, refer to the SIMCelt document: *'Initial comparison of requirements and differences of UK primary legislation pertinent to marine planning.'*

The Solway Firth is a highly complex area geographically, economically, socially, and environmentally. There are a number of sectors, several of which<sup>5</sup> are hugely important to the local economy, on both sides of the border. The area is a historic gateway to England, Scotland, the Isle of Man, Northern Ireland and the Republic of Ireland, through its ports, harbours and shipping lanes.

The current report provides a unique five-year insight into the interactions of different sectors around the Solway Firth between 2011 and 2017. The results of these interactions are compared between 2011 and 2017 and then discussed creating a snapshot in time of complexities of a cross border ecosystem. The report then considers reasons why such interactions occur, and the implications on marine plans for the area.

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<sup>5</sup> For example, fishing, tourism and recreation



**Figure 1:** The SIMCelt study area with the red polygon indicating the Solway Firth<sup>6</sup>

<sup>6</sup> SHOM (2017)

### Sectoral Interactions

The sectoral interactions work was first undertaken in 2011 by the Solway Firth Partnership (SFP) to gather information about activities in the local area. It was intended to provide a snapshot of the activities within the area and with a focus on capturing the perceptions of interactions as a precursor to marine planning. In the marine environment, multiple human activities can potentially occur at the same geographical location, separated in space or time.

The 2011 study was repeated in 2016-2017, as part of the Solway Firth Planning Across Borders case study for the SIMCelt project.

In the intervening period, Marine Scotland published a National Marine Plan for Scotland that covered the Scottish territorial waters in the northern part of the Solway Firth, and the English Marine Management Organisation (MMO) started to develop Marine Plans, including those for the inshore and offshore areas of the English North West Marine Area, which included the southern part of the Solway Firth estuary. These marine plans fulfil the requirements of the Marine Acts in England and Scotland<sup>7</sup> to support sustainable use of our seas and coasts through an integrated approach to management and governance.

In the 2011 study, the Solway Firth Partnership (SFP) identified key marine sectors with activity on the Solway Firth that were expected to have an interest in marine planning. Relevant bodies were invited to give their views on the interactions between their activities and others in the area to identify where there might be positive or negative interactions. The SFP contacted representatives within central government agencies, major Non-Governmental Organisations (NGOs), individual businesses, sports clubs and local authority departments, who could combine local knowledge of the study area with strategic understanding of current marine issues and associated regulatory and management regimes. In 2016, this contacts database was updated to reflect changes in personnel and to include any new sectors operating in the Solway Firth. On both occasions, in order to complete the Sectoral Interactions Matrix, the (sub) sectoral representatives were provided with a set of explanatory notes, a background questionnaire and a customised blank matrix (Appendix 1).

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<sup>7</sup> The UK Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010

The original Solway Firth Matrix (Figure 2) was based on the template developed by the [Scottish Sustainable Marine Environment Initiative](#) (SSMEI) for the Clyde.<sup>8</sup> It was populated by the information provided by the sub-sector representatives on the nature and significance to their sector of interactions with other sectors. Respondents were able to choose between Neutral, Positive, Competition, Conflict and Incompatible to reflect their perceptions (Table 1). Each colour-coded cell represents the interaction between the (sub)sectors/activities represented by the intersecting rows and columns. Blank cells indicate that no response was given.

During the course of both assessments, fifteen key maritime and coastal sectors (covering 79 sub sectors) were identified and interviewed. The responses provided a snapshot in time of how key marine and coastal activities around the Solway Firth viewed their interactions with other sectors. The results obtained will be discussed in the following chapters.

Solway Firth Sectoral Interactions Matrix		Renewable Energy			Subsea cables and pipelines		
Natural Heritage Management	Intertidal environment/communities	conflict	conflict	incompatible	neutral	neutral	neutral
	Seabed environment/communities						
	Breeding and wintering birds	conflict	conflict	incompatible	neutral	neutral	neutral
	Other mobile/migratory species	conflict	conflict	conflict	conflict	conflict	conflict
	Management of coastal habitats	competition	competition	conflict	competition	competition	competition

Figure 2: Section of the Sectoral Interactions matrix

Table 1: Options for response

Option	Definition
<b>Competition</b>	Where there is sustainable competition for access to the same resources or areas between the other (sub) sector and your (sub)sector
<b>Conflict</b>	Where conflict arises as a consequence of unmanaged competition between the other (sub) sector and your (sub)sector
<b>Incompatible</b>	Where there is a fundamental and unmanageable incompatibility between the activity of the other (sub) sector and your (sub)sector
<b>Neutral</b>	Where the activity of the other (sub) sector has no positive or negative influence on your (sub)sector
<b>Positive</b>	Where the activity of the other (sub) sector has a positive influence on your (sub)sector
	Blank cells indicate no response

<sup>8</sup> A Sectoral Interactions Matrix (SIM) was an approach piloted by the Clyde SSMEI project (2006-10). The study formed a key element of the work to develop a spatial marine plan for the area and was based on strategic environmental assessment techniques to identify sectors and activities and to classify their perceived interactions, both positive and negative. Marine Scotland requested the Scottish Local Coastal Partnerships (including the Solway Firth Partnership) to carry out similar work for their areas. This activity, carried out during 2010-12, had the aim of collecting broad scale data on the nature, extent, intensity and compatibility of interactions amongst key sectors and activities at sites around the Scottish coastline.

## 2. Comparison of 2011 and 2017 Sectoral Interactions studies

The Solway Firth Partnership first conducted sectoral interactions work in 2011, and this information was referenced when repeating the study in 2016-2017 as part of the SIMCelt project. This was done to detect any changes in key marine sectors around the Solway Firth over the intervening five years or since the introduction of the [Scottish National Marine Plan 2015](#) and the start of the [North West marine planning process](#) in England.

### Methodology

#### 2011

In 2011, the approach used to gather information for the sectoral interactions study was informed by a concept, based on techniques used in strategic environmental assessment, whereby information on the nature of interactions between activities and interests within the Solway Firth could be visualised in the form of a colour coded matrix (Figure 2). Each colour-coded cell represents the interaction between the (sub)sectors<sup>9</sup>/activities represented by the intersecting rows and columns.

The (sub)sectoral representatives were e-mailed Excel workbooks, comprising a set of instructions, a background questionnaire and a customised blank matrix. Examples of these documents are in Appendix 1. The background questionnaire provided information on organisations and the respondent's role within these bodies. This provided a structured and time-effective means for respondents to provide information on the nature and significance to their sector of interactions with other sectors. Matrix respondents were invited to participate in a follow-up meeting to enable the project team to develop a greater understanding of the nature, intensity and spatial dimensions of interactions and to explore marine management issues arising from these. In some instances, the phases were combined, with the matrix being completed in the course of a meeting.

In meetings, spatial information was also sought where appropriate, with respondents being asked to annotate A0 size Admiralty charts of the study area. These spatial maps were then sent to evidence teams at Marine Scotland and the MMO for digitalisation. The second part of the meeting typically focused on the respondent's interpretation of the matrix, to gain further elaboration of comments (for example, to gauge actual levels of competition or conflict or to gain understanding of existing conflict resolution mechanisms). Any potential misunderstandings

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<sup>9</sup> For the purposes of the interactions study, each main sector was subdivided into a variable number of subsectors or activities that might potentially interact with others within the Solway Firth. For example, Renewable Energy was split into the sub sectors offshore wind, wave and tidal. The project team identified subsectors in 2011.

of the predefined cell options were also discussed. Comments relating directly to the characterisation of interactions in the matrix were added to the matrix comments column.<sup>10</sup>

### **2016-2017**

In the period 2016-2017, the methodology was broadly similar to 2011. The majority of respondents initially contacted preferred to talk over the phone or email, as they were already aware of the survey from 2011. Several respondents deemed their 2011 responses still valid for use and made minor or no changes to their workbooks. The maps originally used in 2011 were too large to be scanned in and so could not be emailed to respondents to see if their spatial data was still valid. The best available spatial data from 2011 was used instead, represented by the [National Marine Plan interactive](#) (NMPi) and [Marine Evidence Base maps](#).

Some *ad hoc* in person interviews were conducted for example, chance encounters with fishers at the docks, and respondents who did not have time for mapping. Notes were taken for each meeting. Descriptions of spatial activity in written or verbal communication were varied. Some sectors were specific as they had a defined jurisdiction, such as the North West Inshore Fisheries Conservation Authority (NWIFCA), or frequent routes, such as the Solway Yacht Club. However, other sectors defined their activity as ‘the whole Solway’ and others did not respond to that question. As such, spatial data was limited between sectors and could not accurately be compared between 2011 and 2016-2017.

### **2011 results**

In 2011, the sectoral work identified the ubiquity of key activities taking place around the Solway Firth stretch of coastline, in both Scotland and England. Fifteen overarching sectors<sup>11</sup> and 79 subsectors were identified. The survey captured participants views on both sides of the border and found that there were 2,515 interactions recorded between the sectors interviewed in the Solway Firth, ranging from: Neutral, Positive, Competition, Conflict, and Incompatible. The majority of interactions were perceived as neutral (59% of all interactions) (Figure 3), which was consistent with the results of another study conducted in the Firth of Clyde<sup>12</sup> The full statistical breakdown of responses: Neutral 1439, Positive 472, Competition 224, Conflict 268, and Incompatible 34.

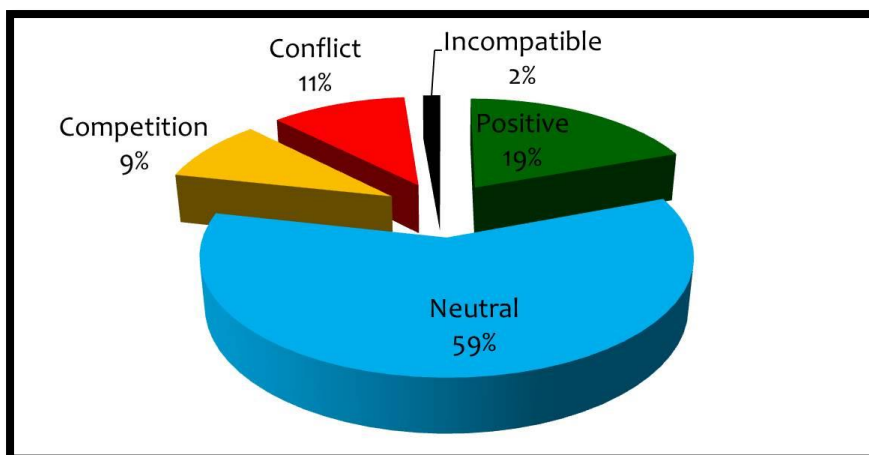
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<sup>10</sup> Comments were then retained in the interests of repeating the study at a later date.

<sup>11</sup> Renewable energy, subsea cables and pipelines, inshore fisheries, shellfish aquaculture, shipping and transport, ports and harbours, maritime safety, recreation and tourism, naval defence, natural heritage management, landscape and seascape management, environmental quality management, historic/cultural heritage management, coastal development and waste management.

<sup>12</sup> See <http://www.clydemarineplan.scot/wp-content/uploads/2016/06/Sectoral-interactions-in-the-Firth-of-Clyde.pdf>





**Figure 3:** Analysis of responses in 2011

Below are key points on how sectors were perceived by other sectors, from the 2011 report:

- **Key sectors perceived by respondents as a positive interaction with their sector of interest**
  - HM Coastguard 66% Positive
  - Lifeboat Service 55% Positive
  - Ecotourism 50% Positive
  - Wildlife watching 50% Positive
  - Defence restricted areas 11% Positive
  - Offshore wind 6% Positive
  - Fixed netting 2% Positive
  - Munitions dumps 2% Positive
  - Offshore tidal 2% Positive
  - Offshore wave 2% Positive
  - Personal watercraft 2% Positive
  
- **Key sectors perceived by respondents as a neutral interaction with their sector of interest**
  - Haaf netting<sup>13</sup> 100% Neutral
  - Intertidal cockling by hand/tractor 100% Neutral
  - Other intertidal and coastal shellfisheries 100% Neutral
  - Fixed netting 98% Neutral
  - Munitions dumps 68% Neutral
  - Defence restricted areas 66% Neutral

<sup>13</sup> Also known as 'heave netting'. A net is mounted on a rectangular frame usually 18 feet long by 5 feet high, supported by three legs and carried out by a fisher into the flood or ebb of the tide to catch fish, usually salmon and sea trout.



- Personal watercraft 54% Neutral
  - Ecotourism 50% Neutral
  - Wildlife watching, 50% Neutral
  - Shellfish aquaculture 46% Neutral
  - Lifeboat Service 45% Neutral
  - Scallop dredge 40% Neutral
  - HM Coastguard 34% Neutral
  - Offshore tidal 25% Neutral
  - Offshore wave 23% Neutral
  - Offshore wind 23% Neutral
- **Key sectors perceived by respondents as a incompatible interaction with their sector of interest**
    - Shellfish aquaculture 13% Incompatible
    - Munitions dumps 12% Incompatible
    - Defence restricted areas 11% Incompatible
    - Offshore tidal 2% Incompatible
    - Offshore wave 2% Incompatible
    - Offshore wind 4% Incompatible
- **Key sectors perceived by respondents as in conflict with their sector of interest**
    - Personal watercraft 28% Conflict
    - Offshore tidal 21% Conflict
    - Offshore wave 21% Conflict
    - Offshore wind 21% Conflict
    - Munitions dumps 16% Conflict
    - Defence restricted areas 7% Conflict
    - Shellfish aquaculture 2% Conflict
- **Key sectors perceived by respondents as in competition with their sector of interest**
    - Offshore wave 52% Competition
    - Offshore tidal 50% Competition
    - Offshore wind 46% Competition
    - Shellfish aquaculture 39% Competition
    - Scallop dredge 35% Competition
    - Personal watercraft 16% Competition

- Defence restricted areas 5% Competition
- Munitions dumps 2% Competition

The 2011 survey found that for a neutral or positive interaction to take place, sectors had to fulfil at least one of a number of requirements:

- Operate at different times and/or spaces
- Require different resources
- Have complimentary activities
- Provide a beneficiary service

Only the volunteer lifeboat service and HM Coastguard viewed all other sectors as either a positive or neutral interaction. This is because they are maritime safety organisations that encourage and promote safe use of the sea. HM Coastguard provides regulations and guidance on maritime matters as an executive agency of UK Government. All sectors responding viewed the volunteer lifeboat service, HM Coastguard, fixed netting, other intertidal and shellfish fisheries, cockling (hand and tractor), haaf netting and wildlife watching as either a neutral or positive interaction. This is because these subsectors operated in different space and/or time or used different resources.

In 2011 the three main reasons perceived to cause incompatibility, conflict or competition between sectors were competition for space followed by time and resource (Table 2). The level of negative interaction appears to increase when restrictions are placed on access, either in a spatial or temporal context. For example, permanent features, such as a munitions dump, are incompatible with some inshore fisheries because that area and a surrounding buffer zone become constant no-go zones. Alternatively, on a busy summer's weekend, the sheer volume of recreational water sports participants can cause congestion at launching sites or between different surface activities. Table 2 also reveals how sectors do not always view their interactions equally, for example, wildfowling viewed inshore fisheries as a conflict (night cockling disturbed goose roosts), whereas inshore fisheries regarded wildfowling as neutral. This exercise was dependent upon an individual's perceptions, which may change, and are subjective based upon past experiences.

**Table 2:** Reason for competition, conflict or incompatibility between sectors in 2011<sup>14</sup>

Reason	Competition	Conflict	Incompatible
Same spatial requirements	<ul style="list-style-type: none"> <li>• <b>Shellfish aquaculture</b> with shipping and transport, recreational boating, natural heritage management</li> <li>• <b>Inshore fisheries</b> with coastal development, Shellfish aquaculture, natural heritage management, personal watercraft, ecotourism</li> <li>• <b>Landscape and seascape management</b> with offshore renewable energy, coastal development, waste management</li> <li>• <b>Natural heritage management</b> with offshore renewable energy, naval defence, recreation and tourism, coastal development</li> <li>• <b>Naval defence</b> with offshore renewable energy, coastal development, inshore fisheries</li> <li>• <b>Offshore renewable energy</b> with inshore fisheries</li> <li>• <b>Ports and harbours</b> internal competition, Shellfish aquaculture, sea angling, recreation and tourism, historic heritage management</li> <li>• <b>Recreation and tourism</b> internal, defence infrastructure, coastal development, natural heritage</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Historic management</b> with subsea cables and pipelines, offshore renewable energy, ecotourism, coastal development, piers and jetties, landscape, seascape management and Shellfish aquaculture</li> <li>• <b>Inshore fisheries</b> with offshore renewable energy, waste management</li> <li>• <b>Landscape and seascape management</b> with coastal development, ports and harbours and recreation, tourism</li> <li>• <b>Natural heritage management</b> with inshore fisheries, subsea cables and pipelines, shellfish aquaculture, shipping and transport, dredging, personal watercraft, coastal infrastructure, waste management</li> <li>• <b>Ports and harbours</b> with offshore renewable energy, naval defence, natural heritage management</li> <li>• <b>Recreational boating</b> with offshore renewable energy, shellfish aquaculture, other recreation and tourism, naval defence</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Shellfish aquaculture</b> with inshore (mobile) fisheries and waste management</li> <li>• <b>Inshore fisheries</b> with shellfish aquaculture, restricted areas, moorings and anchorages, breeding and wintering birds, marine monuments and archaeology</li> <li>• <b>Munitions dumps</b> with offshore renewable energy, inshore fisheries, shipping and transport, recreation and tourism, recreational boating</li> <li>• <b>Natural heritage management</b> and principal ports</li> <li>• <b>Waste management</b> and shellfish aquaculture</li> </ul>

<sup>14</sup> Black cells represent “incompatible”, red cells represent “conflict” and yellow cells represent “competition”

	<p>management, landscape and seascape management</p> <ul style="list-style-type: none"> <li>• <b>Shipping and transport</b> internal competition, offshore renewable energy inshore (mobile) fisheries, recreational boating, natural heritage management</li> <li>• <b>Subsea cables and pipelines</b> with historic heritage management, natural heritage management, ports and harbours, inshore (mobile) fisheries</li> </ul>		
<p><b>Same time access</b></p>	<ul style="list-style-type: none"> <li>• <b>Naval defence</b> training areas with inshore fisheries, recreational boating</li> <li>• <b>Recreation and tourism</b> internal competition, restricted areas</li> <li>• <b>Recreational boating</b> with restricted areas, shipping and transport, other recreation tourism</li> <li>• <b>Shipping and transport</b> internal competition</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Shellfish aquaculture</b> with inshore (mobile) fisheries and waste management</li> <li>• <b>Restricted areas</b> with inshore fisheries</li> <li>• <b>Wildfowling</b> with inshore fisheries</li> </ul>	
<p><b>Same clientele/resources</b></p>	<ul style="list-style-type: none"> <li>• <b>Inshore fisheries</b> internal competition, recreational sea angling and recreation, tourism</li> <li>• <b>Natural heritage management</b> with recreational sea angling</li> <li>• <b>Recreation and tourism</b> internal competition</li> <li>• <b>Ports and harbours</b> internal competition</li> <li>• <b>Recreational sea angling</b> with inshore fisheries</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inshore fisheries</b> with natural heritage management</li> <li>• <b>Natural heritage management</b> with wildfowling, offshore renewable energy, subsea cables and pipelines</li> <li>• <b>Wildfowling</b> with natural heritage management</li> </ul>	

### 2016-2017 results

Contacts established in 2011 were contacted in 2016-2017 and asked to review their previous answers and amend as necessary, and offered the opportunity of an in-person meeting or phone call for further discussion. The majority of previous contacts could be reached and only made small adjustments to their previous answers. Some respondents commented that it was too soon to redo the survey. Where contacts changed in authorities and regulatory bodies, it was simple to locate a replacement. For smaller private business, general enquiries were sent to the organisation, or in-house knowledge of contacts was used. In the study period 2016/2017, there was a moratorium on cockling in the Solway so, cocklers could not be interviewed and there is no comparison to 2011 for this sector. The company F5 Karting (landsailing) had also closed down and was unavailable. Having a different set of respondents creates caveats when trying to compare personal perceptions between two years, and so the results are purely for indicative use.

In 2017, there were 1861 interactions (Figure 4). The majority were still perceived as neutral (58%). The full statistical breakdown of responses: Neutral 1074, Positive 324, Competition 140, Conflict 297 and Incompatible 26. Only 'Conflict' appeared to increase in the number of responses since 2011. For example, personal watercraft has appeared to improve interactions with other sectors, and is now more neutral, although there is still a fair amount of conflict (see below).

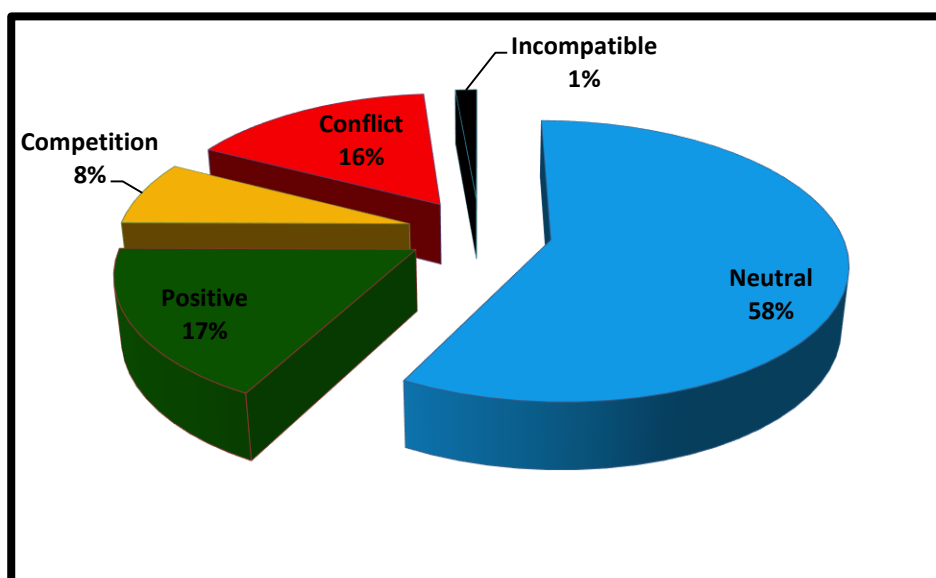


Figure 4: Analysis of responses in 2016-2017

**Key findings from the 2016-2017 cycle are presented below:**

- **Key sectors perceived by respondents as a positive interaction with their sector of interest**
  - HM Coastguard 63% Positive
  - Lifeboats 61% Positive
  - Ecotourism 54% Positive
  - Wildlife watching 38% Positive
  - Coastal monuments and archaeology 19% Positive
  - Rubbish Disposal 11% Positive
  - Sewage disposal 11% Positive
  - Offshore wind 4% Positive<sup>15</sup>
  - Offshore tidal 4% Positive
  - Offshore wave 4% Positive
  
- **Key sectors perceived by respondents as a neutral interaction with their sector of interest**
  - Coastal monuments and archaeology 81% Neutral
  - Wildlife watching 62% Neutral
  - Personal watercraft 58% Neutral
  - Rubbish disposal 50% Neutral
  - Sewage disposal 46% Neutral
  - Ecotourism, 46% Neutral
  - Lifeboats 39% Neutral
  - HM Coastguard 37% Neutral
  - Offshore wind 15% Neutral
  - Offshore wave 11% Neutral
  - Offshore tidal 7% Neutral
  
- **Key sectors perceived by respondents as an incompatible interaction with their sector of interest**
  - Offshore tidal 30% Incompatible
  - Munitions dumps 15% Incompatible
  - Offshore wave 15% Incompatible
  - Offshore wind, 11% Incompatible
  - Sewage disposal 11% Incompatible
  - Defence restricted areas 4% Incompatible
  - Rubbish disposal 4% Incompatible

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<sup>15</sup> Offshore wind, tidal and wave were perceived positively by 'Coastal development'

- **Key sectors perceived by respondents as a conflict interaction with their sector of interest**
  - Offshore wind 55% Conflict
  - Offshore tidal 40% Conflict
  - Offshore wave 37% Conflict
  - Sewage disposal 32% Conflict
  - Personal watercraft 31% Conflict
  - Defence restricted areas 27% Conflict
  - Rubbish disposal 24% Conflict
  - Munitions dumps 16% Conflict
  
- **Key sectors perceived by respondents as a competition interaction with their sector of interest**
  - Offshore wave 33% Competition
  - Offshore tidal 19% Competition
  - Offshore wind 15% Competition
  - Personal watercraft 12% Competition
  - Defence restricted areas 12% Competition
  - Rubbish disposal 11% Competition
  - Munitions dumps 4% Competition
  
- **Perceptions of offshore renewable energy**
  - 81% felt that offshore wind was either Incompatible, in Conflict or in Competition with their sector
  - 85% felt the same about offshore wave
  - 89% felt the same about offshore tidal

Similar to 2011 study, only the volunteer lifeboat service and HM Coastguard viewed all other sectors as either a positive or neutral interaction. All sectors responding viewed the volunteer lifeboat service, HM Coastguard, sea kayaking, ecotourism, coastal walking, radar, static gear (creels and pots), management of biological, chemical and physical environmental quality, management of monuments and archaeology as either a positive or neutral interaction. The change in perceptions between 2011 and 2016 could be due to a number of factors such as, closure of the cockle fishery, changes in quotas/fishing areas, increased awareness of other activities and greater environmental considerations, such as the proposal for extending the Upper Solway Flats and Marshes Special Protected Area.

### Sector growth predictions in 2011 and 2016-2017

In 2011 and 2017, respondents were also asked to predict how they thought their own sector might change in the next ten years: expected growth, decreased activity, stay the same or unsure (Tables 3, 4). These responses are indicative, and each organisation can only respond for the area in which it operates, for example, the NWIFCA is confined to the English Solway.

**Table 3:** 2011 sectors' predictions for their own activity growth in the next 10 years

	Unsure/stay the same	Expansion	Decreased/at risk of closure
<b>2011</b>	<ul style="list-style-type: none"> <li>• Archaeological features (Scotland)</li> <li>• Commercial fisheries (England)</li> <li>• Haaf netters (Scotland and England)</li> <li>• Natural heritage management (England)</li> <li>• NWIFCA (England)</li> <li>• Offshore wind (Scotland and England)</li> <li>• Port of Cairnryan (Scotland)</li> <li>• Recreational boating (Scotland and England)</li> <li>• SEPA (Scotland)</li> <li>• Scallop fishery (Scotland)</li> <li>• Static gear fishing (Scotland)</li> <li>• Sub aqua (Scotland)</li> <li>• Waste management (Scotland)</li> <li>• Wildfowling (Scotland)</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal walking (Scotland and England)</li> <li>• Fixed nets (Scotland)</li> <li>• Historic environment (Scotland)</li> <li>• HM Coastguard (Scotland and England)</li> <li>• Migratory species (Scotland and England)</li> <li>• MOD Dundrennan (Scotland)</li> <li>• Whitehaven Harbour Commissioners (England)</li> <li>• Port of Workington (Scotland and England)</li> <li>• Recreational sea angling (Scotland)</li> <li>• Tidal energy (Scotland and England)</li> <li>• RSPB (Scotland and England)</li> <li>• Velvet crab fishery (Scotland)</li> <li>• Wildlife watching (Scotland and England)</li> </ul>	<ul style="list-style-type: none"> <li>• Cockle fishery (Scotland)</li> <li>• Land sailing (F5karting) (Scotland)</li> <li>• Natural heritage management (Scotland)</li> <li>• Landscape and seascape management (England)</li> <li>• Royal Navy (Faslane) (Scotland)</li> </ul>



**Table 4:** 2016-2017 sectors' predictions for their own activity growth in the next 10 years

	Unsure/stay the same	Expansion	Decrease/at risk of closure
2016-2017	<ul style="list-style-type: none"> <li>• Archaeological features (Scotland)</li> <li>• Commercial fisheries (MMO) (England)</li> <li>• Haaf netters (Scotland and England)</li> <li>• Port of Cairnryan (Scotland)</li> <li>• Scallop fishery (Scotland)</li> <li>• Sub aqua (Scotland)</li> <li>• Wildfowling (Scotland)</li> <li>• SEPA (Scotland)</li> <li>• Waste Management (Scotland)</li> </ul>	<ul style="list-style-type: none"> <li>• Cruising (Scotland and England)</li> <li>• Environmental quality management (Scotland)</li> <li>• Fixed nets (Scotland)</li> <li>• HM Coastguard (Scotland and England)</li> <li>• MOD (Dundrennan) (Scotland)</li> <li>• NWIFCA (England)</li> <li>• Offshore wind (Scotland and England)</li> <li>• Port of Workington (Scotland and England)</li> <li>• Recreational sea angling (Scotland)</li> <li>• RSPB (Scotland and England)</li> <li>• Tidal energy (Scotland and England)</li> <li>• Waste management (Scotland)</li> <li>• Whitehaven Harbour Commissioners (England)</li> </ul>	<ul style="list-style-type: none"> <li>• Landscape and seascape management (England)</li> <li>• Natural heritage management (Scotland)</li> <li>• Royal Navy (Faslane) (Scotland)</li> <li>• Seascape management (Scotland)</li> <li>• Static gear fishing (Scotland)</li> </ul>

Sectors were asked to describe what factors were driving change within their activity (Table 5). Understanding what is driving change in sustainable development is key to providing an appropriate level of response through marine plans and other legislation. Although the information is specific to the Solway Firth, it helps to illustrate how the marine and coastal environment could change from pressures in the near or medium-term future.

**Table 5:** Factors driving change within sectors 2011-2017

Availability of funds	Coastal development	Customer needs	Digitalisation	Environmental Regulations	External pressures	Internal management	Quality improvement
<ul style="list-style-type: none"> <li>• Archaeology</li> <li>• Coastal walking</li> <li>• Cumbria County Council (Planning)</li> <li>• Dumfries and Galloway Council (biodiversity)</li> <li>• Dumfries and Galloway Council (ranger service)</li> <li>• HM Coastguard</li> <li>• Kippford Slipway</li> <li>• Land sailing</li> <li>• Recreational boating</li> <li>• RSPB</li> <li>• Scottish Natural</li> </ul>	<ul style="list-style-type: none"> <li>• Port of Workington</li> <li>• RSPB</li> <li>• Scottish Natural Heritage</li> <li>• SEPA</li> </ul>	<ul style="list-style-type: none"> <li>• Kippford Slipway<sup>16</sup></li> <li>• Offshore wind (E.ON)<sup>17</sup></li> <li>• Port of Cairnryan<sup>18</sup></li> <li>• SEPA<sup>19</sup></li> <li>• Tidal Energy (Solway Energy Gateway)<sup>20</sup></li> <li>• Wildfowl and Wetlands Trust Caerlaverock<sup>21</sup></li> </ul>	<ul style="list-style-type: none"> <li>• HM Coastguard</li> <li>• Offshore wind (E.ON)</li> </ul>	<ul style="list-style-type: none"> <li>• Dumfries and Galloway Council (waste management)</li> <li>• Fixed net fisheries</li> <li>• Haaf netting</li> <li>• Natural England</li> <li>• Newton Stewart Sub Aqua Club</li> <li>• NWIFCA</li> <li>• Offshore wind (E.ON)</li> <li>• RSPB</li> <li>• Scallop fisheries</li> <li>• Scottish Natural Heritage</li> </ul>	<ul style="list-style-type: none"> <li>• Newton Stewart Sub Aqua Club</li> <li>• Scottish Natural Heritage</li> <li>• SEPA</li> <li>• Static Gear Association</li> <li>• Wildfowling</li> </ul>	<ul style="list-style-type: none"> <li>• MOD Dundrennan</li> <li>• MOD Faslane</li> <li>• Port of Cairnryan</li> </ul>	<ul style="list-style-type: none"> <li>• Dumfries Cruising Club</li> <li>• Offshore wind (E.ON)</li> <li>• Port of Cairnryan</li> <li>• Sea Angling</li> <li>• SEPA</li> </ul>

<sup>16</sup> Requests for specialist equipment that can be found online

<sup>17</sup> New and innovative energy solutions

<sup>18</sup> More passengers are travelling

<sup>19</sup> Increasing demand for clean water for people, business, wildlife and habitats

<sup>20</sup> Public need for reliable and cost effective renewable energy

<sup>21</sup> Increased numbers wildlife watchers and ecotourists

- Heritage
- Sea angling
- Solway Yacht Club
- Whitehaven Harbour Commissioners

- SEPA
- Tidal Energy (Solway Energy Gateway)

### 3: Sectoral information

#### Historic/cultural heritage management 2016-2017

*This overarching sector includes the following sectors: coastal and marine monuments and archaeology.*

As the Solway is a significant historic resource with finds dating back to prehistoric times, there is year round interest in terms of archaeology and historic assets (Figures 5, 6, 7). The seaways and coast are fundamental to the historic, cultural and maritime history of the area, and of UK significance. There is particular interest in the value of coastal heritage resources, including small ports, landing places and historic forts along the coastline. Also, the heritage fisheries such as haaf netting and stake nets are seen as an important cultural feature of the Solway and are particularly important to the local people. Table 6 details the historic heritage interactions within the Solway Firth.

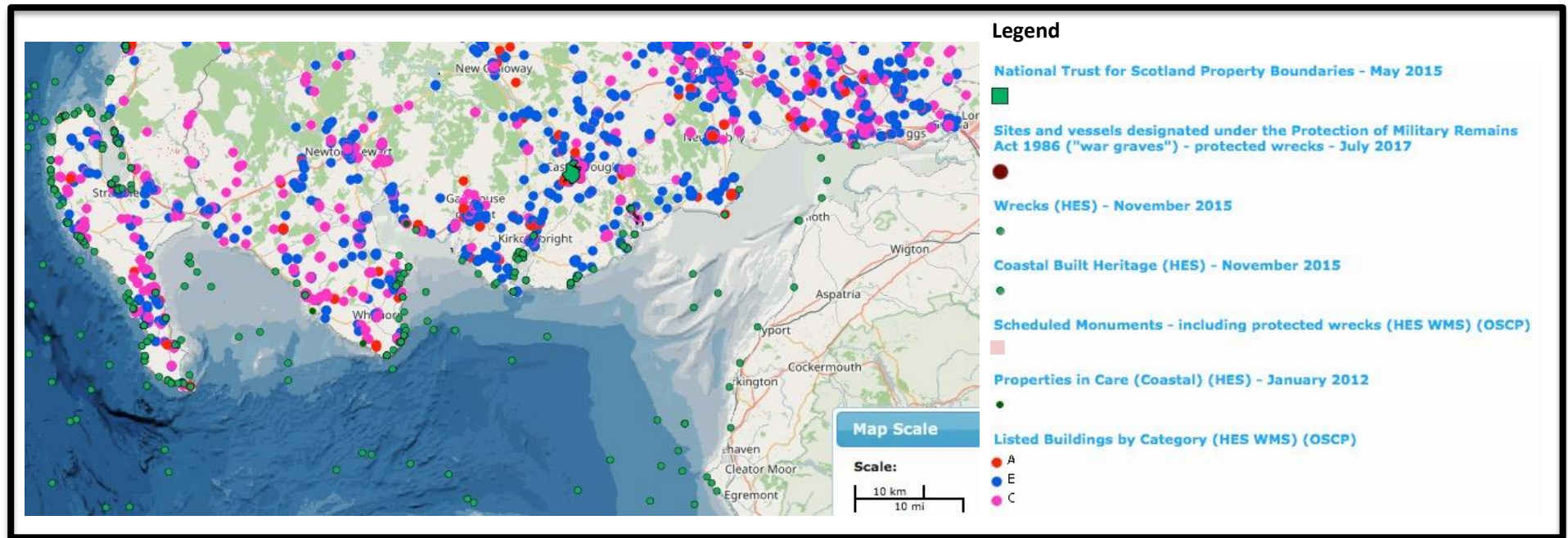


Figure 5: Historic and heritage sites in the Scottish Solway Firth<sup>22</sup>

<sup>22</sup> Marine Scotland (2017)

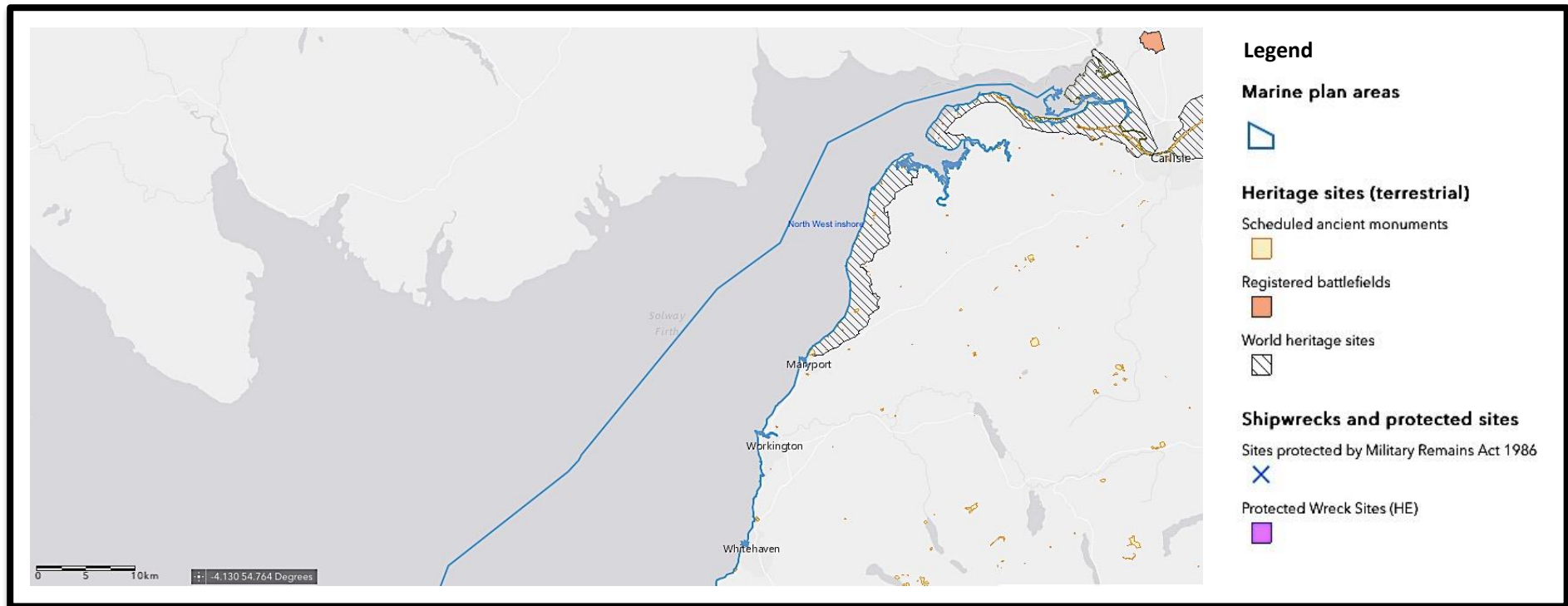


Figure 6: Historic and heritage site on the coast of the English Solway Firth<sup>23</sup>

<sup>23</sup> MMO (2017)



Figure 7: Red asterisks representing historic and heritage sites<sup>24</sup> in the coastal area of the English Solway<sup>25</sup>

<sup>24</sup> Sites include: Architectural Component, Circumstantial Evidence, Cropmark, Documentary Evidence, Earthwork, Find, Natural Feature, Other Structure, Place Name, Roofed Building, Ruined Building, Site of, Standing Monument.

<sup>25</sup> Cumbria County Council (2017)



**Table 6:** Historic/cultural heritage management sub sector interactions

<b>Interaction with:</b>	<b>Type of interaction</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Potentially conflict or, depends on location and extent	Pseudofeces could possibly smother or reduce the quality of a heritage feature. Potential for competition for access to marine and coastal monuments, such as wrecks, which attract visitors year-round
<b>Coastal development</b>	Competition	Infrastructure can impact upon the coastal aesthetics and public access
<b>Dredging</b>	Neutral	Space separation at present but numerous coastal built heritage sites to consider for new requests
<b>Environmental quality management</b>	Neutral	No direct impact on natural heritage management
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Neutral	No direct impact on natural heritage management
<b>Inshore fisheries</b>	Neutral/ Competition (cockles)	Neutral regarding marine or coastal monuments and archaeology, mostly because they shift with the seasons and are dependent upon the tide. Cockling beds create for space. (Only applies if cockle fishery reopens)
<b>Kite surfing/ land sailing</b>	Neutral	No direct impact on natural heritage management
<b>Mooring and anchorages</b>	Potential competition	Coastal communities and migratory species may suffer disturbance
<b>Munitions dumps</b>	Incompatible	No-go zone
<b>Natural heritage management</b>	Neutral	Sector does not directly interact with heritage management
<b>Naval defence</b>	Competition	Infrastructure could impact upon existing historic resources such as the World War II gun batteries and look out positions around Loch Ryan and the Machars
<b>Offshore renewable energy installations</b>	Potential conflict, depends on location and extent	Changes to areas that may have cultural or heritage significance
<b>Ports and harbours</b>	Potential competition	Coastal communities and migratory species may suffer disturbance from noise
<b>Recreational boating</b>	Neutral	No direct impact on natural heritage management
<b>Rubbish and sewage disposal</b>	Conflict	Threatens coastal quality and aesthetics
<b>Sea angling and bait digging</b>	Neutral	Spatial separation
<b>Shipping and transport</b>	Neutral	No direct impact on natural heritage management
<b>Subsea cables and pipelines</b>	Conflict, or competition depends on location and extent	Changes to areas that may have cultural or heritage significance, competition for space, if historic/heritage features were displaced for modern convenience



<b>Wildfowling</b>	Neutral	No direct impact on natural heritage management
<b>Wildlife watching, coastal walking and ecotourism</b>	Positive	Historic sites are frequently ecologically valuable, which attracts visitors and hence a positive interaction with tourism sectors

The development of digital recording and understanding historic resources was desired, as this is important in mitigating development where the structures involved could be protected. This could be an opportunity for further data layers to be added to the Marine Scotland maps NMPi and Marine Evidence Base. Current information on status of archaeological and heritage assets also provides a foundation for boosting historic tourism to the area. Impact on historic archaeological sites would increase if coastal development were to increase on the undeveloped coast through the need for survey work prior to construction. However, this appears unlikely, as Local Development Plans are focussed upon improving the already developed areas of the coast and protecting the undeveloped coastline, where appropriate.

### **Inshore fisheries 2016-2017**

*This overarching sector includes the following subsectors: Scallop dredge, Queenie dredge, Queenie trawl, Nephrops trawl, Brown shrimp trawl, Demersal trawl, Pelagic trawl, Static Gear, (Creels & Pots), Cockling (boat), Intertidal cockling (hand & tractor), Other intertidal and coastal shellfisheries, Drift netting, Fixed netting, Electrofishing, haaf netting and stake nets.*

Marine Scotland manages the Scottish inshore and offshore waters of the Solway whilst the Marine Management Organisation (MMO) manages English inshore and offshore waters. Established by Marine Scotland, the non-statutory West Coast Regional Inshore Fishery Group (RIFG) manages inshore fisheries out to 6 nm in the Scottish Solway Firth. Within the English Solway Firth, the statutory North West Inshore Fisheries Conservation Authority (NWIFCA) manages inshore fisheries out to 6 nm. Although some fisheries are seasonal, there is fishing activity throughout the year around the Solway Firth.

Haaf netting in the Solway is a heritage tradition that was first introduced to the area by the Vikings. This type of fishing was once carried out in many of the estuaries on the Solway Coast but is now limited to the Nith and the Annan in Dumfries and Galloway and the Eden in Cumbria. The Scottish Haaf Netters Association is a voluntary organisation with charitable status that aims to keep the tradition of haaf net fishing alive, with seasonal activity from 1<sup>st</sup> June-10<sup>th</sup> September (Figures 8,9). In English Cumbrian waters, the Environment Agency (EA) controls the amount of activity via the number of licences awarded (105). In Scotland, Annan Council awarded 35 licences for netting, of which 28 are active.

The [Scottish Sea Angling Conservation Network](#) aims to work in partnership with numerous other organisations at the local and national level to try and improve fish stocks. This is for the benefit of all and to try and ensure that there will be more and larger fish for recreational anglers to catch, which could then also boost tourism to the area. In the Solway Firth, charter boat sea angling activity is May-October, whilst shore angling is year-round but not as intensive during the summer.

Some static gear fishers commented that the majority of negative interactions occurred with visiting users (Table 7). Intensity maps for the number of onshore vessels are also given (Figures 8,9).

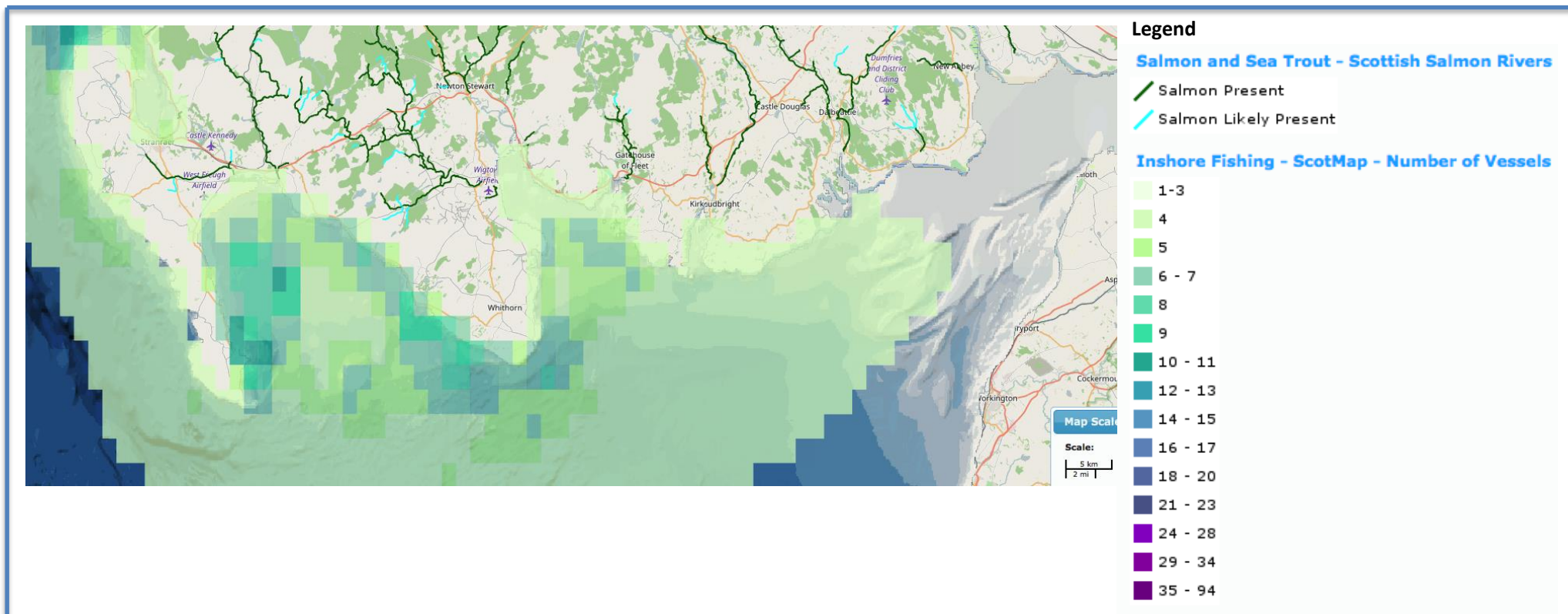


Figure 8: Inshore fishing density maps in the Scottish Solway<sup>26</sup>

<sup>26</sup> Marine Scotland (2017)

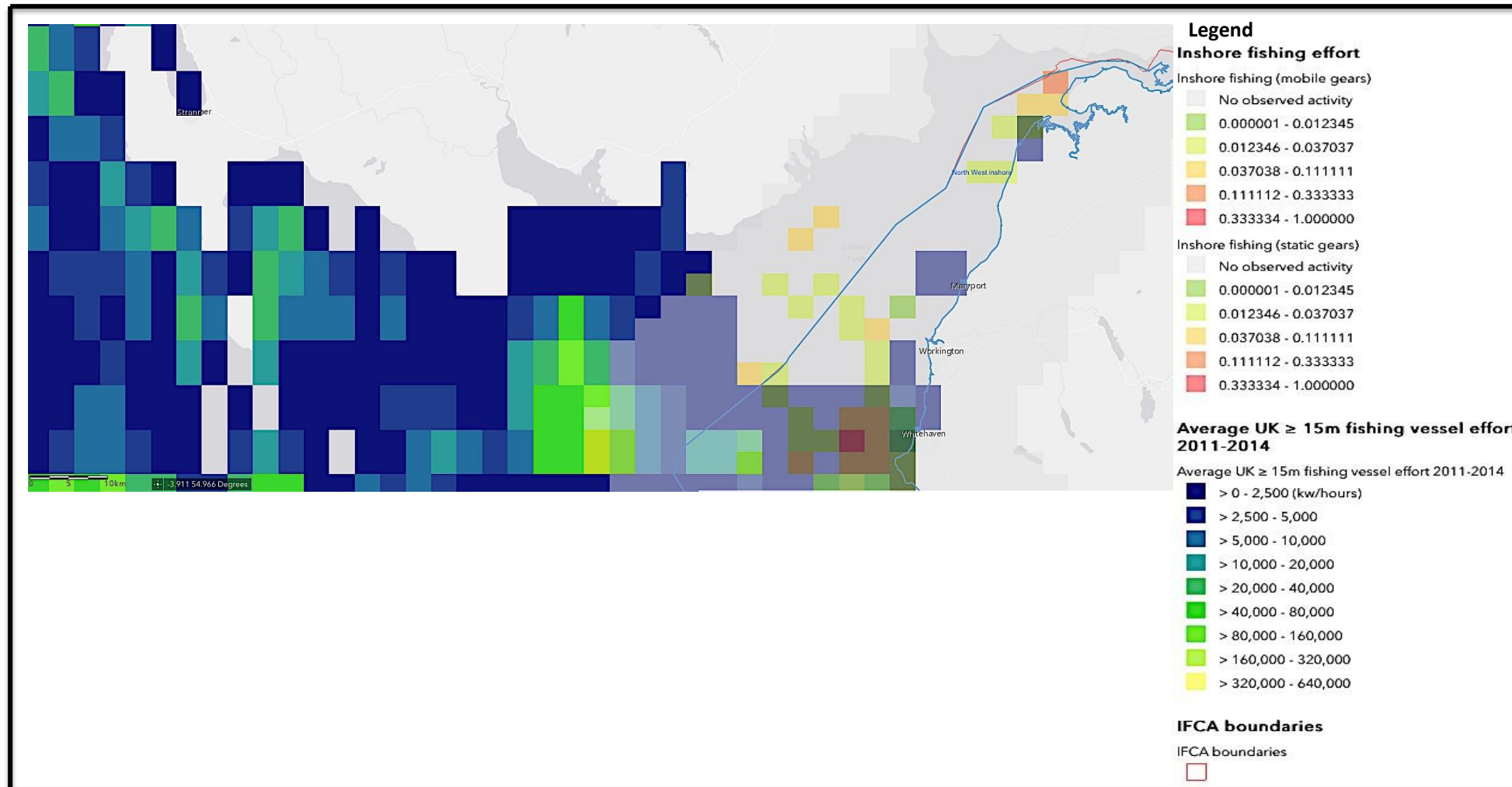


Figure 9: Inshore fisheries spatial data for the English Solway <sup>27</sup>

<sup>27</sup> MMO (2017)

**Table 7:** Inshore fisheries subsector interactions

<b>Interaction with:</b>	<b>Type of interaction:</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Neutral	However, if a new <b>salmon</b> farm was proposed, it could compete in the market with commercial fishing and shellfish aquaculture
<b>Coastal development</b>	Positive	Piers and jetties can provide fishing marks for shore anglers
<b>Dredging</b>	Positive	Good for navigation as long as material relocated sensitively
<b>Environmental quality management</b>	Positive	Improves the water environment for fish and haaf netters wading in the water welcomed better management of sewage disposal
<b>Historic heritage management</b>	Positive	Marine monuments can provide fishing marks for shore anglers
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Positive	Essential for fishers' safety and HM Coastguard keeps a useful record of shipping movements
<b>Inshore fisheries</b>	Positive	Inshore fishers want the cockle fishery to reopen and want to diversify into velvet crab. Fixed nets on the Scottish side of the Solway allow haaf netters to determine when salmon and sea trout are moving into the estuary
<b>Kite surfing/land sailing</b>	Neutral	In general do not interfere with fishing
<b>Mooring and anchorages</b>	Neutral	In general do not interfere with fishing but can become a conflict for drift net fisheries
<b>Munitions dumps</b>	Conflict	Restricts fishing areas
<b>Natural heritage management</b>	Conflict	Management of other mobile and migratory species conflicts due to the Environment Agency's and Scottish Natural Heritage's measures to manage migratory salmon and sea trout. Present restrictions prevent night fishing and reduced the number of licences of the haaf netters annual catch from a maximum of 2,300 in 1996 to a maximum catch of 700 in 2016. Access to foreshore for recreational anglers is limited due to breeding and wintering birds
<b>Naval defence</b>	Conflict	Restricts fishing areas
<b>Offshore renewable energy installations</b>	Incompatible	Perimeter restricts fishing vessel access, fishers lack insurance coverage to go between turbines even if permitted. Noise nuisance could restrict fish movement. Haaf netting is dependent upon the tidal flow of the water
<b>Ports and harbours</b>	Positive	Choice of where to dock boosts the profits of the fishing industry. Port of Workington is larger than Whitehaven
<b>Recreational boating</b>	Neutral/potential competition	Most sailors responsible but some visitors unaware that the environment can cause competition for drift netting
<b>Rubbish and sewage disposal</b>	Positive	The Isle of Whithorn signed up to an international programme, 'Fishing for Litter' in 2011 and fishers try to remove debris, as it helps to keep their gear safe and protect the marine environment.

<b>Sea angling and bait digging</b>	Conflict	Recreational sea anglers and commercial fishers need to strike a better balance in terms of access and the potential negative practices of the commercial sector.
<b>Shipping and transport</b>	Neutral	Shipping routes are established and known to fishers
<b>Subsea cables and pipelines</b>	Incompatible	Fewer cables buried to save costs and fishers cannot trawl over pipelines and cables, exclusion zone increases linearly with size of offshore renewable development
<b>Wildfowling</b>	Neutral	Operate in different spaces
<b>Wildlife watching and ecotourism</b>	Positive	Raises awareness and promotes haaf netting

Inshore fishers perceived an opportunity for a velvet crab, *Necora puber*, fishery supplying the continent to open following the need for species diversification after diminished finfish quota. There is also an increasing ambition for the Solway cockle fishery to reopen following the recent partial commercial assessment conducted by Marine Scotland Science. Fishers strongly believe the Galloway cockle fishery is waiting to be sustainably harvested by local companies. However, reopening the fishery would require a further ecological sustainability study to ensure cockle stocks have recovered to a sustainable catchable yield.

Haaf fishing activity could only increase if more licences were available; haaf netting is strictly limited by the tide and the weather as it takes places on the edge of the water. However, the specific spatial and time requirements of haaf netting limited the opportunity for conflicts arising with other sectors.

The Scottish Sea Angling conservation network perceived opportunity to make changes for sea angling to deliver “best value” of a common shared resource. “Best value” being the income for an area that could be generated by catching one individual fish several times with the associated revenue generated from boat fees, accommodation etc. Sea angling, natural heritage and tourism would benefit from this promotion. Sea angling activity is predicted to increase by providing angling facilities and a sea-angling centre.

The Solway Firth is unusual in that it is the only western Scottish Marine Region absent of seawater finfish (specifically, salmon) aquaculture. There is also no comparable sector to fill this void, although Loch Ryan hosts a small native oyster fishery and other shellfish experience a degree of husbandry, for example the inner Solway cockle beds.

### **Natural heritage management 2016-2017**

*This overarching sector includes the following subsectors: intertidal and seabed environment/communities, breeding and wintering birds, other mobile/migratory species and management of coastal habitats.*

One of the key features of the Solway Firth is its designation as a European Marine Site (EMS). The estuary is particularly important for wintering birds and migrating fish stocks.<sup>28</sup> The [Solway EMS Management Scheme](#) builds upon existing structure and draws suitable actions from plans already in place for example, the [Local Biodiversity Action Plan](#) and Shellfish Management Plan. Building upon, rather than the creation of new plans, is more efficient than forming extra regulating partnerships. Similarly, drawing upon existing knowledge and networks where practical is the model Scotland's network of Marine Planning Partnerships (MPP).

On the English side, the Solway Area of Outstanding Natural Beauty (AONB) is known to have protected species including the Natterjack toad (*Epidalea calamita*) and the Small Blue butterfly (*Cupido minimus*). Silloth's coastal region is protected under international designations such as Ramsar sites, and Natura 2000, national designations such as a Site of Special Scientific Interest and local designations such as County Wildlife Sites (Figure 10,11). The marshes to the north of Allerdale are an important habitat for wild geese and swans.<sup>29</sup> The Royal Society for the Protection of Birds (RSPB) has a vested interest in the Solway Firth as an important area for many species of birds as a world class designated site of importance. Table 8 details how other sectors can impact upon the natural heritage of the Solway Firth.

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<sup>28</sup> Solway Firth EMS (2002)

<sup>29</sup> Cumbria County Council Biodiversity Data Network (2008)



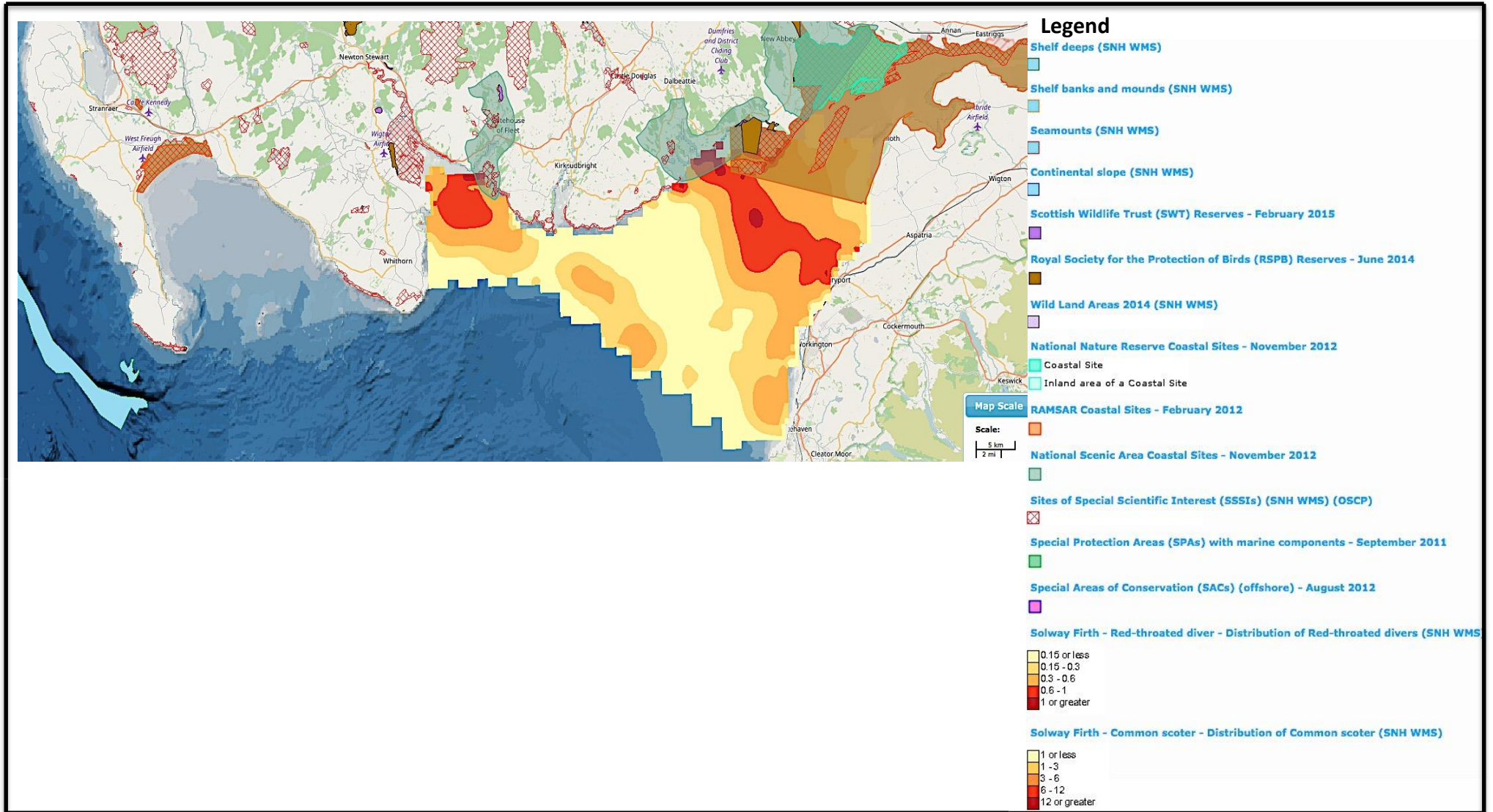


Figure 10: Natural heritage features in the Scottish Solway<sup>30</sup>



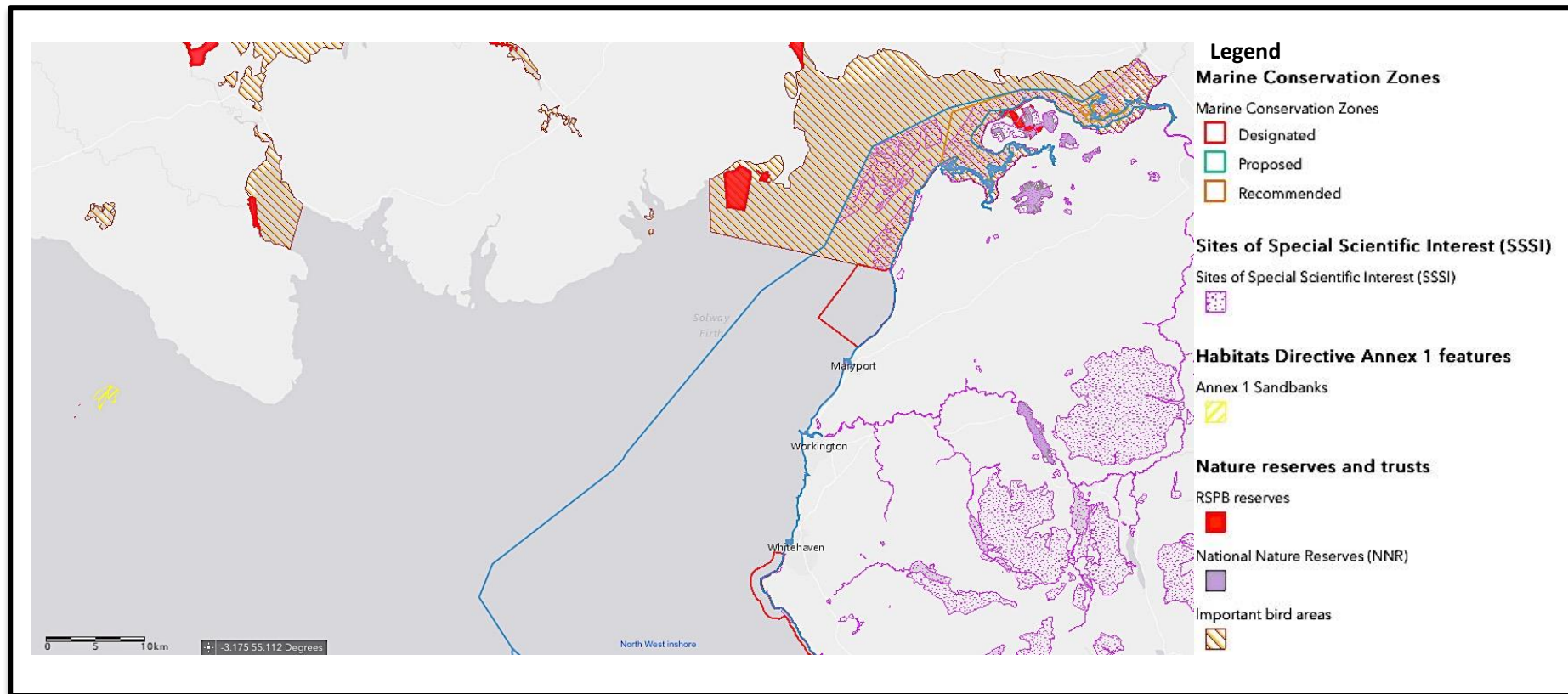


Figure 11: Natural heritage designations in the English Solway<sup>31</sup>

<sup>30</sup> Marine Scotland (2017)

<sup>31</sup> MMO (2017)

**Table 8:** Natural heritage management subsector interactions

<b>Interaction with:</b>	<b>Type of interaction</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Conflict/positive	Possibly disrupting natural ecosystem community and control of some migratory birds such as eider eating mussels. Shellfish aquaculture was perceived as positive to mobile and migratory species as some seabirds use the marker buoys as roosts to extend their foraging range
<b>Coastal development</b>	Conflict	Diminishes the natural environment
<b>Dredging</b>	Conflict	Shifts and moves the intertidal environment
<b>Environmental quality management</b>	Positive	Improves the environmental quality management
<b>Historic heritage management</b>	Positive	Strong historic and natural heritage management can synergistically boost tourism
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Positive	Protect people along the coast and sea who are enjoying the natural heritage of the Solway Firth
<b>Inshore fisheries</b>	Conflict/neutral	Reducing food availability for birds and other predators and through bycatch of non-target species. Static gear nets and creel pots were seen as selective enough to be neutral to intertidal bird communities
<b>Kite surfing/land sailing</b>	Competition	During bird breeding months, these were in competition for space with wildlife watchers
<b>Mooring and anchorages</b>	Conflict	Possibly shifts and moves the intertidal environment
<b>Munitions dumps</b>	Incompatible	No-go zone
<b>Naval defence</b>	Potential conflict	Infrastructure, vessels and restricted areas take precedent over natural heritage management
<b>Offshore renewable energy installations</b>	Incompatible	Removing space from breeding and wintering birds and potentially damaging the environment and communities of the intertidal zone for example, avoidance and collisions
<b>Ports and harbours</b>	Neutral	Perceived as neutral as these are already largely established in the Solway Firth and have become part of the environment
<b>Recreational boating</b>	Neutral	Majority of boats are small and generally stick to established areas and Royal Yachting Association routes.
<b>Rubbish and sewage disposal</b>	Incompatible/conflict	If sited insensitively, was perceived as incompatible by management of coastal habitats and other mobile and migratory species with management and in conflict with the remaining subsectors
<b>Sea angling and bait digging</b>	Conflict	Disturbance to sensitive bird sites
<b>Shipping and transport</b>	Conflict/competition	Wave action from ships during high tides can wash out breeding birds, such as terns. Shipping and transport as well as recreational cruises were in competition for space

		management of coastal habitats
<b>Subsea cables and pipelines</b>	Competition/neutral	Competition for space with management of coastal habitats. Subsea cables and pipelines are usually buried and so do not interact with breeding birds or the intertidal communities
<b>Wildfowling</b>	Conflict	Removes birds from the natural environment, the wildfowling season disturbs wintering bird populations
<b>Wildlife watching and ecotourism</b>	Positive	Boosts awareness and interest in the sector

The RSPB wants to promote year-round wildlife watching in the Solway Firth and to implement monitoring in a more joined-up manner. Bird watching is already active year-round and the RSPB expects it to increase over the next ten years, due to the acquisition of two nature reserves, Barclye Farm and the Crook of Baldoon. RSPB Scotland has expanded the RSPB Mersehead Reserve by 112 ha to accommodate the Svalbald population of 40,000 barnacle geese (*Branta leucopsis*) that winter on the Solway. Revitalising burns and ditches to create an interconnected habitat of salt marsh and sand dunes will create more wetland area for birds.<sup>32</sup> Natural heritage management and environmental quality management are generally positive for birds. Wildlife watching provides opportunities to improve the economy and to raise awareness of birds and the other wildlife in the area.

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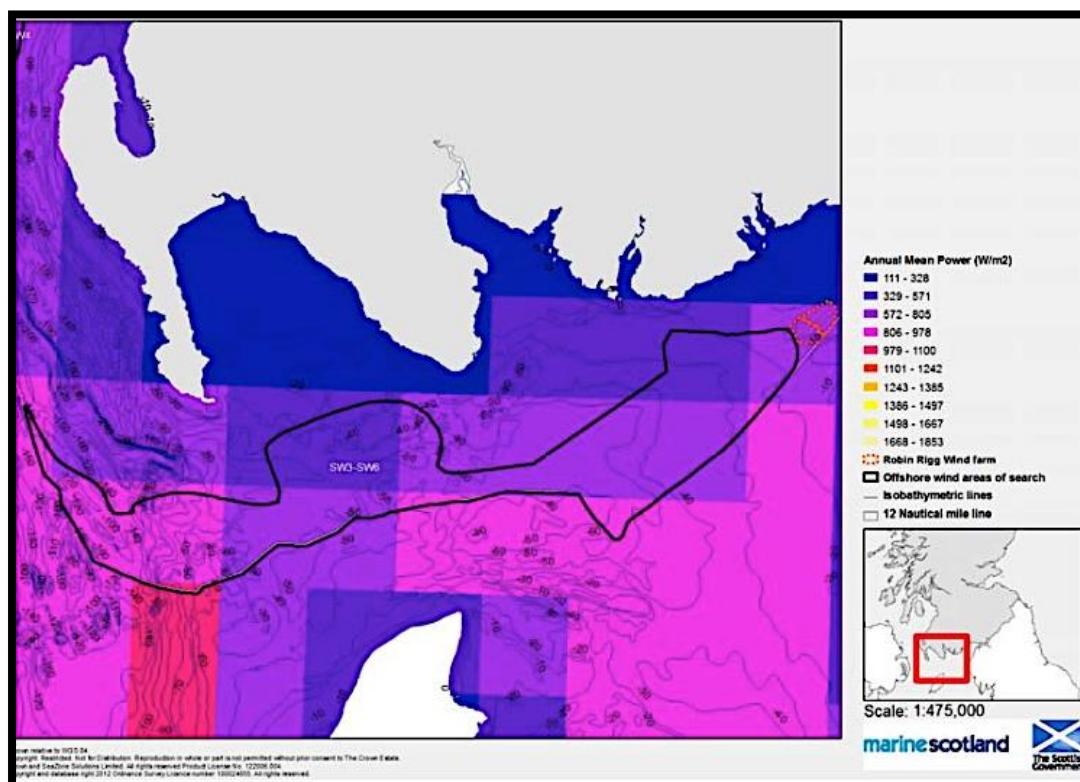
<sup>32</sup> RSPB (2017)

### Offshore renewable installations 2016-2017

*This overarching sector includes the following subsectors: Offshore wind installations and tidal energy installations. Wave energy was not interviewed as no interested parties in the Solway Firth area were found.*

The Solway Firth has moderate to high wind resources with a mean power density of  $0.8 \text{ kWm}^{-2}$  and is targeted in Marine Scotland's Regional Location Guidance document for offshore wind energy in Scottish Waters (Figure 12). However, there are currently no plans for further offshore wind development in the region. E.ON Climate and Renewables have generated power from 60<sup>33</sup> turbines at the Robin Rigg site since 2010 (Figure 13). The turbines are located in Scottish waters but electric cabling makes landfall in Cumbria, England.

In addition to having a strong wind power source, the Solway Firth has the second greatest tidal range in the UK, with mean annual power density reaching  $0.59 \text{ kWatt m}^{-2}$ . As such, the area is part of Marine Scotland's Regional Location Guidance document for tidal energy in southwest Scottish Waters (Figure 14). Landscape and seascape management activity is expected to increase significantly due to the growing need for reliable and cost-effective renewable energy.



**Figure 12:** Mean wind energy concentrations in the Solway Firth<sup>34</sup>

<sup>33</sup> Two turbines have been removed for operational safety

<sup>34</sup> Marine Scotland (2012a)

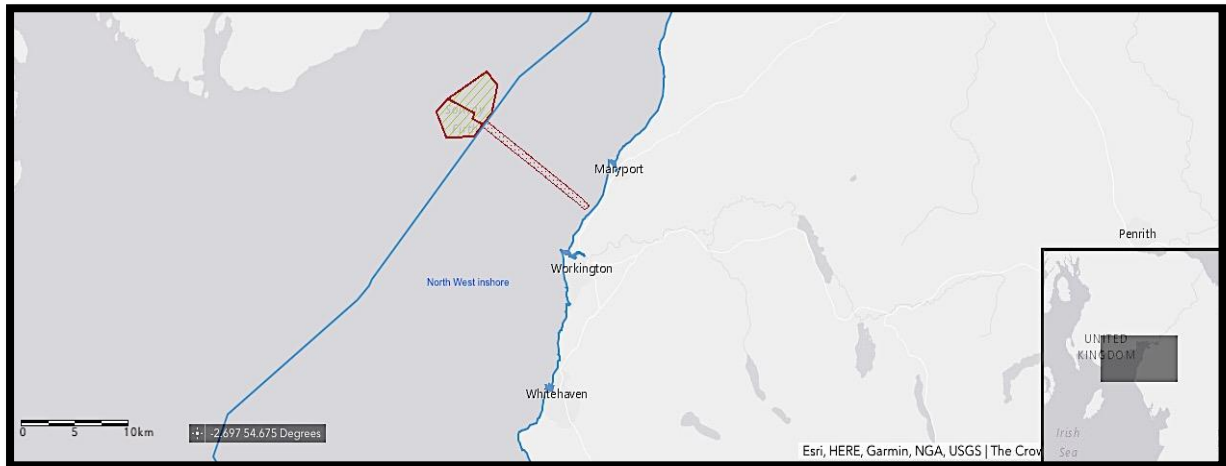


Figure 13: Polygons indicating the Robin Rigg offshore wind farm<sup>35</sup>

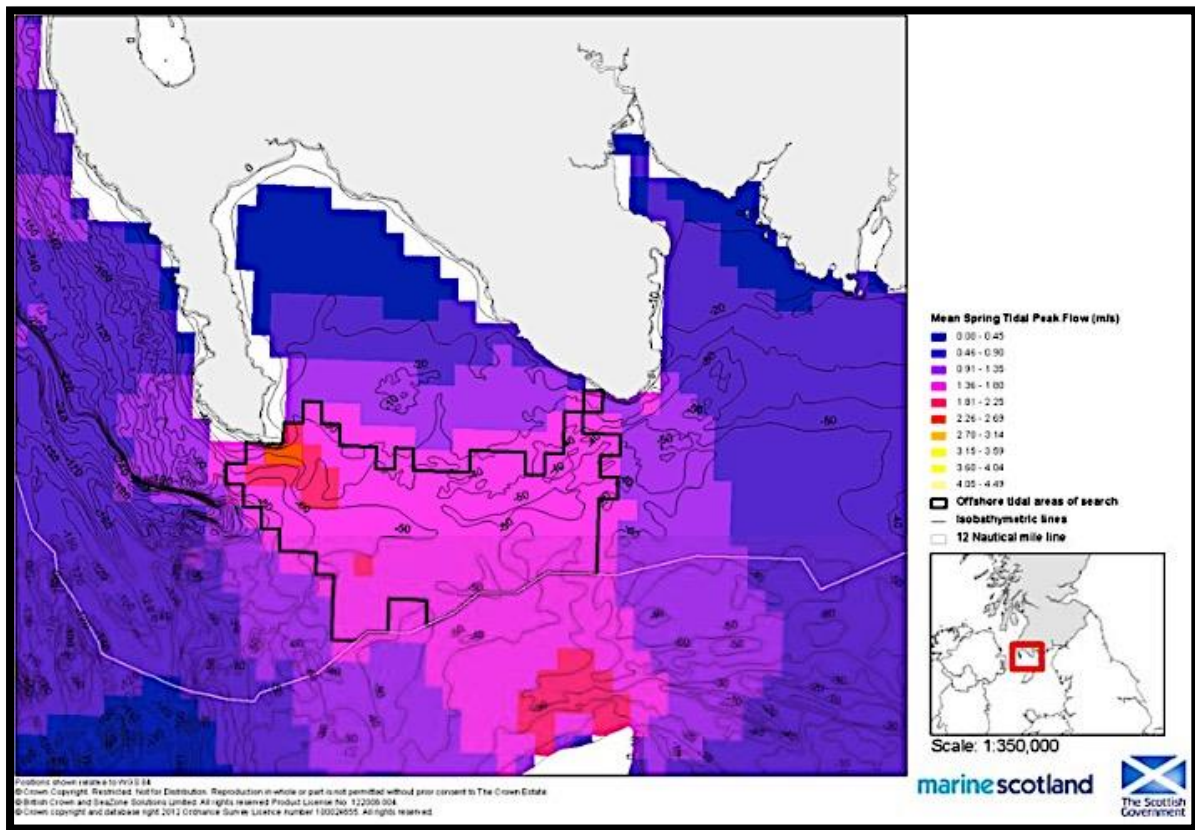


Figure 14: Mean tidal energy concentrations in the Solway Firth<sup>36</sup>

Detailed interactions between offshore tidal and wind energy can be found below (Table 9).

<sup>35</sup> MMO (2017)

<sup>36</sup> Marine Scotland (2012b)



**Table 9:** Offshore renewable energy installations subsector interactions

<b>Interaction with:</b>	<b>Wind</b>		<b>Tidal</b>		
	<b>Type of interaction:</b>	<b>Reasoning</b>	<b>Type of interaction:</b>	<b>Reasoning</b>	
<b>Shellfish aquaculture</b>	Potential conflict	Could be competing for space	Neutral	No sites present to compete	
<b>Coastal development</b>	Potential competition	Competes with coastal power stations	Neutral	No direct interaction with turbine bridge	
<b>Dredging</b>	Positive	Regular and well-managed dredging good for maintenance around the turbines.	Neutral	No direct interaction with turbine bridge	
<b>Environmental quality management</b>	Neutral	Does not directly impact turbines	Neutral	No direct interaction with turbine bridge	
<b>Historic heritage management</b>	Neutral	Does not directly impact offshore wind	Neutral	No direct interaction with turbine bridge	
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Positive	Safety of crew	Neutral	No direct interaction with turbine bridge	
<b>Inshore fisheries</b>	Competition/neutral/positive	Competition with trawl/mobile gear, neutral with static and intertidal. Creels and pots perceived as positive intertidal gear	Neutral/potential competition	Brown shrimp trawl and haaf netting competes for space. Potential competition if cockle fishery reopens	
<b>Kite surfing/land sailing</b>	Neutral	Different marine space requirements	Neutral	Different marine space requirements	
<b>Mooring and anchorages</b>	Neutral	Not used	Neutral	Not required	
<b>Munitions dumps</b>	Conflict	Management issues if sited insensitively	Incompatible	Space is unusable	
<b>Natural heritage management</b>	Positive	Management of seabed environment beneficial for turbines	Potential conflict	Birds may interact with energy infrastructure	
<b>Naval defence</b>	Neutral	Spatial separation	Neutral	No defence structures near proposed location	
<b>Offshore renewable energy installations</b>	Competition	Competition for grid connection if integration not possible	Neutral	Wind utilises a different resource	
<b>Ports and harbours</b>	Positive	Increased use drives investment, space for service boat	Neutral	No direct interaction with turbine bridge	
<b>Recreational</b>	Neutral	Does not interact	Neutral	No direct	

<b>boating</b>					interaction with turbine bridge
<b>Rubbish and sewage disposal</b>	Neutral	Does not directly impact turbines	Incompatible		Rubbish could clog turbines
<b>Sea angling and bait digging</b>	Neutral	Different marine space requirements	Neutral		Different marine space requirements
<b>Shipping and transport</b>	Neutral	Own service boats used	Neutral		No direct interaction with turbine bridge
<b>Subsea cables and pipelines</b>	Conflict	Localised with turbine cabling	Neutral		Spatially separated
<b>Wildfowling</b>	Neutral	Different marine space requirements	Neutral		Different marine space requirements
<b>Wildlife watching and ecotourism</b>	Positive	Promotes interest in offshore wind as part of the seascape	Positive		Can be done from the bridge and promotes local interest

E.ON predicted its level of activity would stay the same around the Solway in the near future, although activity at a UK scale may increase. National and international clean energy targets drive requirements for more renewable energy generation and are subject to local consultation and suitable offshore sites. In collaboration with coastal development, offshore developments could also have a positive knock-on effect if local supply chains are involved in construction, monitoring and maintenance etc. There are three companies interested in progressing the tidal sector in the Solway and who could potentially end up in competition with each other however, each has a different approach to turbine design.

### **Lagoon**

[Tidal Lagoon Power](#) has outlined an interest to create a full-scale shore-attached Tidal Lagoon off western Cumbria as one of its projects following the completion of the Swansea Bay Tidal Lagoon.

### **Offshore turbines**

[Tidal Electric](#) is seeking interest in creating the world's first 200 MW offshore tidal lagoon in the Solway. The renewable energy plant would use an impoundment wall to capture the energy of the moving tides.

### **Electric Bridge**

[Solway Energy Gateway Ltd](#) is aiming to develop tidal energy within the Solway Firth in order to deliver profits back into a Community Interest Company. Solway Energy Gateway aims for tidal

energy to be extracted via an electric bridge connecting the Scottish and English sides of the Solway where the Solway railway viaduct used to be.

### **Ports and harbours 2016-2017**

Statutory harbour authorities operate within a legal environment, overseen by the Department of Transport and HM Marine and Coastguard Agency. Small private/independent ports are represented by the British Port Association, which acts as a national lobbying association.

Ports and harbours are seen as the gateway between land and sea activities (Figures 15,16) and are economic hubs for nearby coastal communities. Ports and harbours within the Solway Firth are often close to designated or heritage sites and so have to be aware of environmental sectors. As such, they have a wide range of interactions (Table 10).

The Port of Cairnryan Ltd is a statutory harbour authority governing Cairnryan Port and the company is wholly owned by Larne Harbour Ltd. part of the P&O Ferries group. P&O Ferries operate a passenger and freight service from Cairnryan to Larne in Northern Ireland. Conventional ferries operate year-round, whilst a high-speed ferry operates from mid –March to the end of September.

The Port of Workington is wholly owned and operated by Cumbria County Council, which is the statutory harbour authority and aims to support the transport infrastructure for businesses in the immediate hinterland and beyond as part of the strategic plan for Britain's Energy Coast. The Port's principal cargo handling facilities are centred on the Prince of Wales Dock. The Port Authority operates its own locomotives on the site's extensive internal rail system.

Whitehaven is a trust port defined as a 'body corporate in perpetual succession'. It is a 'not for profit' organisation. The trustees act on behalf of the Ports division of the Department of Transport however they act within the private sector.



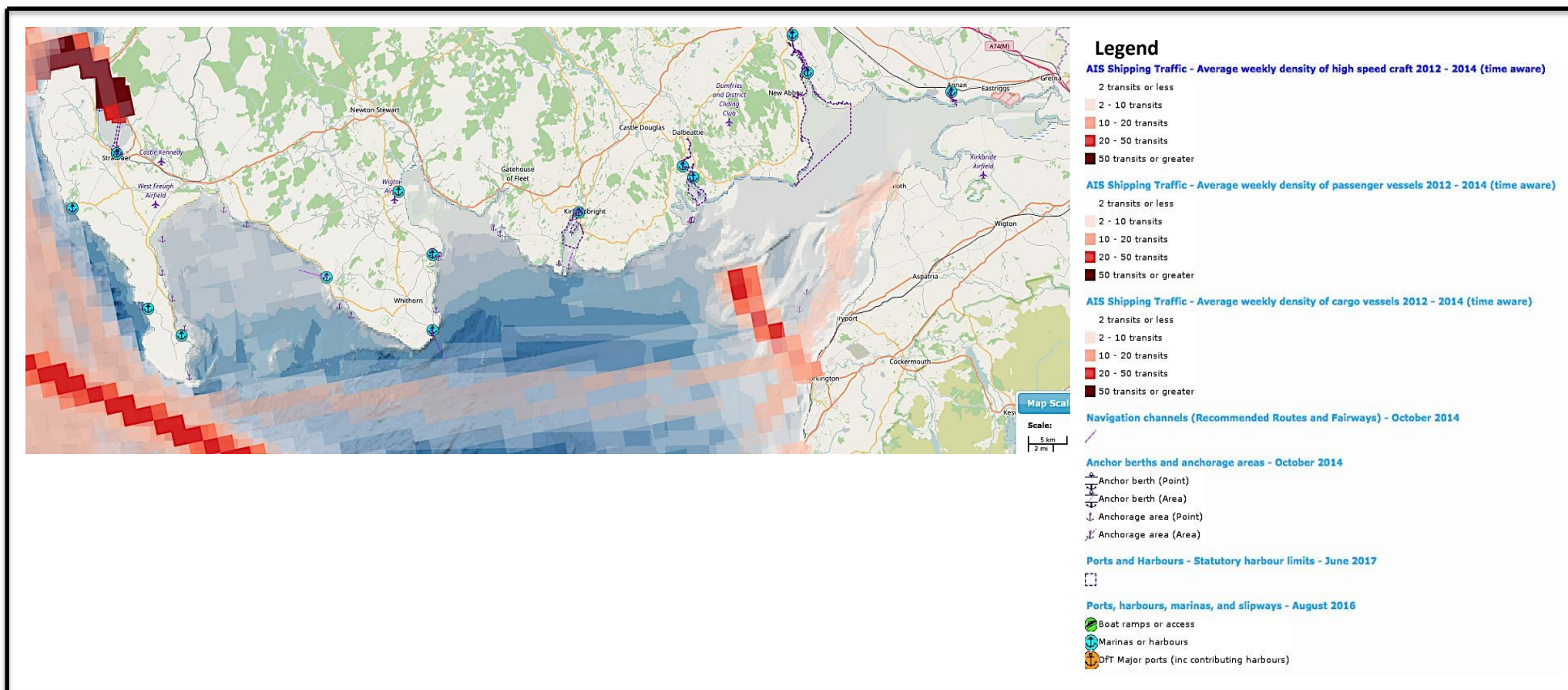


Figure 15: Ports and shipping activity in the Scottish Solway<sup>37</sup>

<sup>37</sup> Marine Scotland (2017)

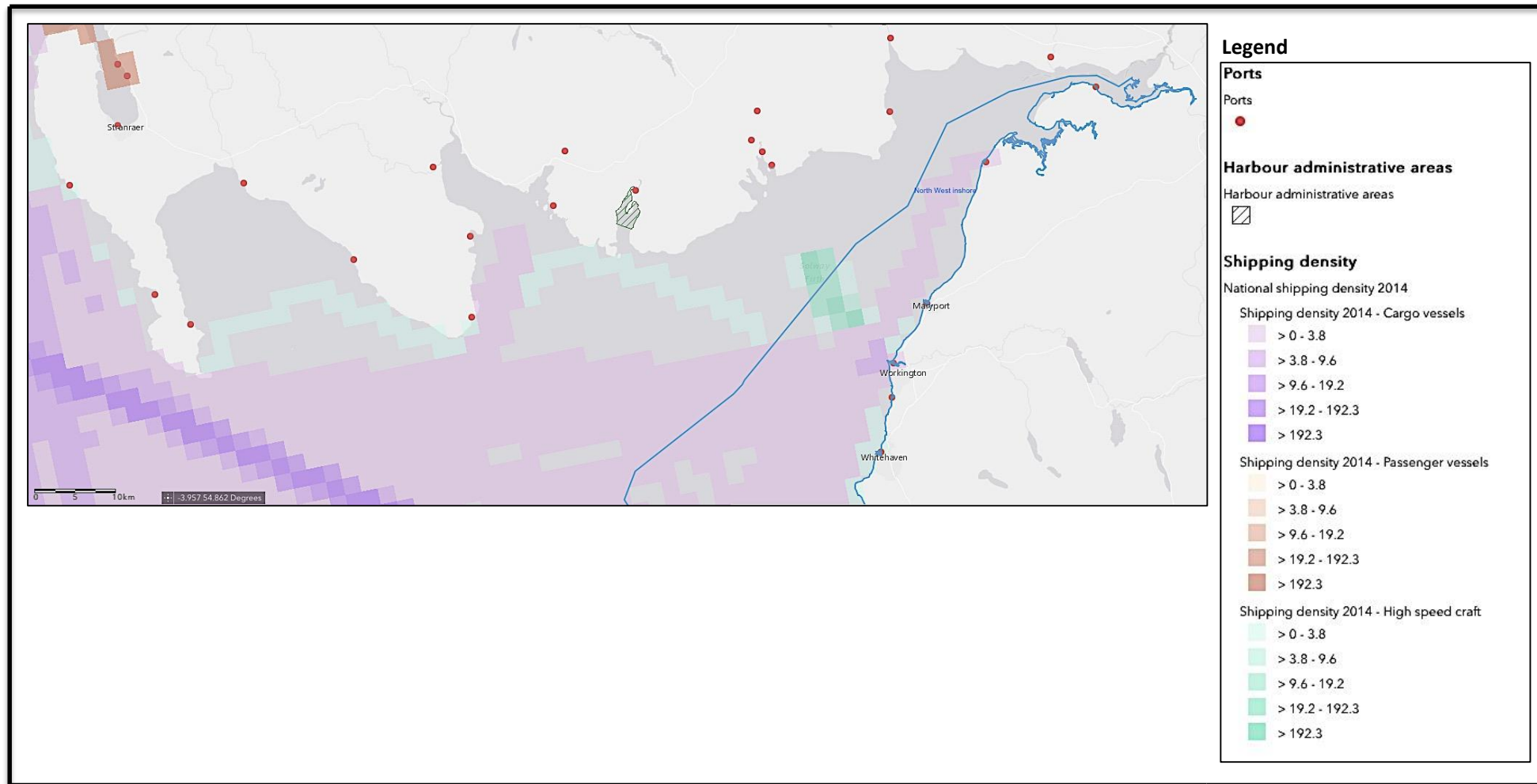


Figure 16: Ports and shipping activity in the English Solway<sup>38</sup>

<sup>38</sup> MMO (2017)

**Table 10:** Ports and harbours subsector interactions

<b>Interaction with:</b>	<b>Type of interaction:</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Potentially positive	Brings revenue into the ports and harbours
<b>Coastal development</b>	Positive	Prosperity of ports and harbours are often interlinked with coastal development
<b>Dredging</b>	Positive	Essential to prevent siltation of ports and harbours
<b>Environmental quality management</b>	Positive	Improvements in water quality improve the image, usage and access of ports and harbours.
<b>Historic heritage management</b>	Neutral	Does not directly affect port and harbour activities
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Positive	Essential for the safety of those using ports and harbours
<b>Inshore fisheries</b>	Positive	Brings revenue into the ports and harbours
<b>Kite surfing/land sailing</b>	Neutral	Does not directly affect port and harbour activities
<b>Mooring and anchorages</b>	Positive	A well-integrated facility, with appropriate management raises the profile of the port and improves its market position
<b>Munitions dumps</b>	Neutral	Generally do not affect port activities
<b>Natural heritage management</b>	Competition	Management of the intertidal and seabed environment, migratory and breeding and wintering birds space for ports and harbours had to be compromised
<b>Naval defence</b>	Positive	Possibility of surface vessels creating extra work for the Port of Workington as a consequence of new builds
<b>Offshore renewable energy installations</b>	Positive	May provide work and renewable energy for the port, and an opportunity to develop as part of the Energy Coast
<b>Ports and harbours</b>	Positive	Workington, Silloth, Maryport and Whitehaven create a positive knock-on effect in trade for the area. Also non-competitive as they each service a slightly different sector
<b>Recreational boating</b>	Positive/conflict	A well-integrated facility for personal yachts, with appropriate management raises the profile of the port and improves its market position. Jet skis and small power boats do not always respect designated zones
<b>Rubbish and sewage disposal</b>	Conflict	Marine litter degrades the aesthetic of ports and harbours
<b>Sea angling and bait digging</b>	Positive/neutral	Sea angling using port facilities but bait digging utilises a different space
<b>Shipping and transport</b>	Positive	The main economic opportunity for ports and harbours and Workington already provides facilities for tankers, bulk carriers, container vessels and coastal cargo. Cruise ships would be encouraged as Workington has been identified as the most suitable gateway to the Lake District National Park.
<b>Subsea cables and pipelines</b>	Neutral/Positive	Laying and servicing of cables and pipelines creates greater revenue for the Port; but the existence of the

		cables themselves is a neutral interaction to ports and harbours.
<b>Wildfowling</b>	Neutral	Utilises a different space
<b>Wildlife watching and ecotourism</b>	Positive	Highlights the importance of having an adjacent leisure harbour and its users as important stakeholders.

The Port of Cairnryan predicted that ferry activity would likely stay the same over the next decade, as this is mostly dependent upon the volume of passengers, freight customers, and design of the vessels that make use of the port. However, activity increases with the seasonal high speed ferry operating mid-March through September.

The Port of Workington aims to develop sustainable business to support the transport infrastructure for businesses in the immediate hinterland and beyond. The Port's activity is likely to increase, as the development of the Port of Workington is part of the strategic plan for Britain's Energy Coast. The Port of Workington takes its responsibility to the natural environment seriously, and welcomes the chance to show that it is prepared to work with the environmental agencies, as this was good for profile within the local community.

The Whitehaven Harbour Commissioners do not need planning permission for development on their land from Copeland Borough Council but in practice they do get permission to keep good lines of communication open, as the harbour is immediately adjacent to the town. The harbour also has strong links to heritage management, with the Piermaster's House being a grade II listed building and the Old New Quay is a grade II listed structure.

### Recreational boating 2016-2017

In 2010, sailing and boating were worth more than £101 million and supported 2,730 jobs in Scotland.<sup>39</sup> This sector's development has occurred with little formal coordination or strategic input, and like many recreation activities, is driven by water users' enthusiasm. Sailing has the potential to increase value in Scotland, from £101 million in 2010, to £145 million by 2020.<sup>40</sup>

The Solway Yacht Club aims to promote sailing on the Solway and to train cadets under Royal Yachting Association licensed trainers, with most activity April to October. Two distinct seasons were identified: in summer, with greater visitors and members' sailing; and winter, a busier period when vessels use facilities for overwintering. The whole of the Solway is used but most racing is between Rockcliffe Bay and Auchencairn Bay, and sometimes onto Kirkcudbright Bay. The main area used for dinghy racing includes the waters of the Urr Estuary, usually restricted to the south by a line from Hestan Island to Castle Point south of Rockcliffe (Figure 17). Occasionally dinghy races may circumnavigate Hestan Island.

Powered personal watercraft including motorised dinghies, jet skis, and small recreational boats are frequently sighted in the summer months when visibility is clearer and the weather better. Use has increased with improvements to marinas and slipways and this in turn has led to a greater number of interactions (Table 11).

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<sup>39</sup> BMF Scotland (2015)

<sup>40</sup> Awakening the Giant (2015)



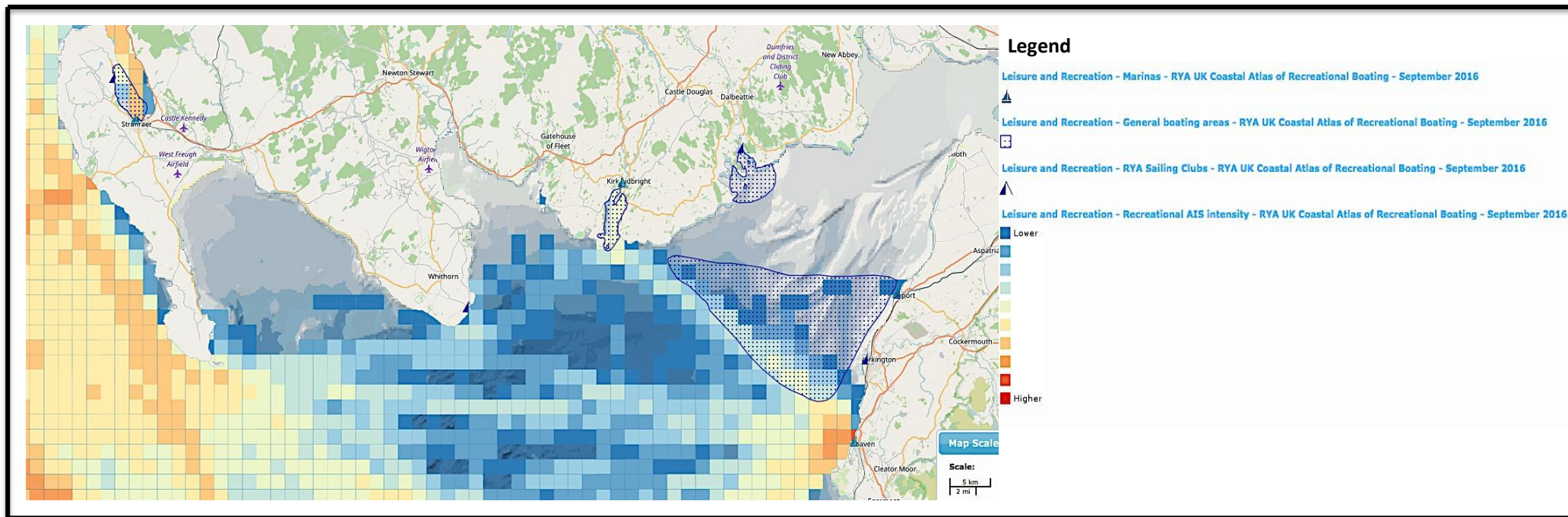


Figure 17: Recreational boating intensity map of the Solway Firth<sup>41</sup>

<sup>41</sup> Recreational boating data was provided by the Royal Yachting Association to both the MMO and Marine Scotland (Marine Scotland, 2017)

**Table 11:** Recreational boating sectoral interactions

<b>Interaction with:</b>	<b>Type of interaction</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Potential conflict	Dependent on extent and location
<b>Coastal development</b>	Potential conflict	Restrictions around Ministry of Defence Dundrennan Firing Range
<b>Dredging</b>	Neutral	Usually not necessary for smaller craft but causes no issue
<b>Environmental quality management</b>	Potential conflict	Seawater quality, viruses and bacterial Coliforms, Leptospirosis and Norovirus are potentially dangerous for dinghy sailors in estuarine waters, such as at Kippford. Untreated sewage outfalls adversely affect biological and bacterial quality
<b>Historic heritage management</b>	Neutral	Does not directly impact sailing
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Positive	Essential for the safety of yacht users
<b>Inshore fisheries</b>	Conflict	Anchored electrofishing boats witnessed around Barlocco Island off the Borgue coast and the Fleet Islands, restricting sailing navigation there
<b>Kite surfing/land sailing</b>	Neutral	Different space utilisation
<b>Mooring and anchorages</b>	Positive	Good for landing and/or overnight stays, whilst navigation aids are essential for yachts for location reference
<b>Munitions dumps</b>	Incompatible	No-go zone
<b>Naval defence</b>	Competition	When the Kirkcudbright range is out of bounds yachts have to make a 3nm detour around it
<b>Natural heritage management</b>	Neutral	Does not directly impact sailing
<b>Offshore renewable energy installations</b>	Conflict	Can restrict yacht sailing, safety issues, reduces aesthetic appeal
<b>Ports and harbours</b>	Positive	Good for landing and/or overnight stays, whilst navigation aids are essential for yachts for location reference
<b>Recreational boating</b>	Conflict/Positive	Jet skis unaware of designated zones, causing a significant level of disturbance regarding wash and noise to yachts. All personal craft promote sailing and are viewed positively by the yacht club
<b>Rubbish and sewage disposal</b>	Potential conflict	Needs to be consider core routes of sailors so as to not diminish seascape aesthetics and water quality
<b>Sea angling and bait digging</b>	Neutral	Different space utilisation
<b>Shipping and transport</b>	Competition	Surface vessels create minor competition for sailing space
<b>Subsea cables and pipelines</b>	Neutral	Anchorage are space separated from cables and pipelines
<b>Wildfowling</b>	Neutral	Different space utilisation
<b>Wildlife watching and ecotourism</b>	Neutral	Different space utilisation

Recreational boaters welcomed the improvement in facilities for yachtsmen in harbours and marinas as it made using the seas more accessible. The Royal Yachting Association has several Codes of Conducts, including the [Green Blue](#), which aims to work alongside natural heritage management to reduce the impact of watercraft upon the marine environment.



### River Basin Management 2016-2017

Transboundary river basin districts are managed as part of the [Water Framework Directive](#) and are good non-marine examples of coherent planning across borders. [The Scottish Environmental Protection Agency](#) (SEPA) and the [English Environment Agency](#) (EA) are the two competent authorities for the Water Framework Directive assessment on water quality in the cross border Solway Tweed River Basin District (STRBD) (Figure 18). Amongst other responsibilities, both Agencies manage permits for land-based water discharges out to 3 nm and report on environmental flood risk and manage fisheries for salmon, sea trout, eel, smelt and lamprey out to 6 nm. The Scottish and English Agencies differ:

- The EA is responsible for flood warning and defence, whereas SEPA is responsible only for flood warning (the local authorities are responsible for flood defence)
- SEPA is responsible for local air pollution control, whereas this is a local authority function in England and Wales
- The EA can bring its own prosecutions and claim legal expenses in successful cases, whereas SEPA must submit cases through the Procurator Fiscal and cannot claim expenses

Both agencies jointly produced the STRB Management Plan and SEPA responded to the interview. SEPA did not complete the sectoral interactions matrix, because as a regulator, the authority has numerous relations with different industries. However, a representative provided greater information on SEPA's roles and responsibilities in the Solway Firth attached written survey form. SEPA has a key role in the environmental quality management sector. They also provide advice, work with and, in some instances regulate, aquaculture, tourism sites such as bathing beaches, coastal development and flooding.

In the 2015 update to the STRBD Management Plan, the two most widespread pressures on the water environment were rural diffuse pollution and modifications to the physical condition of water bodies, both being connected to land use. Measures required to address all the pressures on the water environment are generally very similar across the district. However, the ways the measures are planned and delivered align with each country's national approach. Scotland's approach included land managers, public bodies and voluntary organisations working together to strengthen measures, focussing on reducing rural diffuse pollution and impacts on physical condition. England has a main programme of measures funded from a variety of sources, focussing on habitat improvement, reductions in nutrient levels and improvements to point source discharges.



**Figure 18:** Solway Tweed River Basin District Management Area<sup>42</sup>

The EA classifies estuaries as one of the main areas of concern due to historical contaminants (Figure 19). Rural diffuse pollution is a huge challenge for River Basin Management (RBM), along with toxic substances and urban diffuse pollution and changes to the physical condition of the water environment.<sup>43</sup> The nutrient-rich runoff flows out of the Solway Estuary into the Celtic Seas, causing further spreading pollution. Increasing presence of Invasive Non-Native Species (INNS) for example, the freshwater American signal crayfish (*Pacifastacus leniusculus*) and saltwater Japanese skeleton shrimp (*Caprella mutica*) pose a continued containment challenge. Spread of invasives is often through hulls or ballast water being contaminated with planktonic larvae. Invasive species can displace and outcompete endemic species, important to the Solway Firth's natural heritage. Increased shipping and transport and larger capacity marinas and ports can exacerbate prevalence and spread risk of INNS.

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<sup>42</sup> Scottish Government (2015)

<sup>43</sup> SEPA (2014)



**Figure 19:** The Solway Firth as a priority rural diffuse pollution catchment<sup>44</sup>

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<sup>44</sup> Scottish Government (2015)

### **Wildfowling 2016-2017**

Wildfowling is the hunting of game birds, usually by shooting, of species of geese, ducks and waders. The Wildfowling Association of Caerlaverock and District aims to safeguard and promote the tradition of recreational wildfowling within the inner Scottish Solway. Controlled wildfowling is allowed by permit under bye-laws over a designated zone within part of Caerlaverock National Nature Reserve. The Caerlaverock Panel for which Scottish Natural Heritage provides the Chair and Secretary oversees the wildfowling scheme; its members represent local wildfowlers, the landowner, and national shooting and conservation bodies. The wildfowling season runs from 1<sup>st</sup> September to the 20<sup>th</sup> February below the mean high water mark from Caerlaverock round to Glencaple and across to the New Abbey Pow and Carsethorn (Figure 20). The perceptions of this sector are recorded below (Table 12).

The [South Solway Wildfowlers Association](#) (SSWA) is based on the English Side of the Solway Firth and controls the wildfowling on a large area of the English side of the Solway Firth including all the intertidal sands which are declared as a no shooting and sanctuary zone to afford protection to winter wildfowl and waders. SSWA marshes start at Skinburness near Silloth and extend right the way round to Rockliffe near Carlisle with over 30 miles of foreshore taking in marshes such Skinburness, Calvo, Border, Brownrigg, Salt Coates, Newton, Cardurnock, Burgh and Rockliffe. Over the areas that the SSWA controls below the mean high water mark, the shooting season is the same for the Scottish Solway, between the 1st September and 20th February. Shooting normally takes place at dawn and dusk when birds move between roosting and feeding grounds.



Figure 20: Key wildfowling sites in the Scottish Solway Firth (red asterisks) and the English Solway (black asterisks)<sup>45</sup>

<sup>45</sup> Google Maps (2017)

**Table 12: Wildfowling subsector interactions**

<b>Interaction with:</b>	<b>Type of interaction</b>	<b>Reasoning</b>
<b>Shellfish aquaculture</b>	Potential conflict	Dependent on proposed locations and extent, through disturbance to sea birds and the attraction of predators such as eider. Potential for wildfowl to eat shellfish.
<b>Coastal development</b>	Competition	Site development takes away space for birds to breed
<b>Dredging</b>	Potential conflict	Capital dredging impacts the seabed, which can then have secondary affects upon seabirds however; maintenance dredging is not such an issue.
<b>Historic heritage management</b>	Positive	Historic sites can be used as nest sites for birds
<b>HM Coastguard and Royal National Lifeboat Institution</b>	Neutral	Helpful in reporting oil spills to the authorities and to the RSPB.
<b>Inshore fisheries</b>	Potential conflict	If carried out in inappropriate areas and if they are targeting the food source of sea birds. Non-target species are sometimes caught Shellfishing and illegal electrofishing was perceived to exacerbate the loss of intertidal invertebrates and increase disturbance
<b>Environmental quality management</b>	Positive	Water quality essential for birds and wildfowling
<b>Kite surfing/land sailing</b>	Conflict	Kite surfing and land sailing caused disturbance around Mersehead Sands and Southerness to nesting, feeding and roosting waders.
<b>Mooring and anchorages</b>	Neutral	Space not used for wildfowling
<b>Munitions dumps</b>	Neutral	Different space utilised
<b>Natural heritage management</b>	Positive	Appreciated by wildfowlers as it helps the bird communities
<b>Naval defence</b>	Neutral	Different space utilised
<b>Offshore renewable energy installations</b>	Potentially incompatible or conflict	Dependent upon their location and/or extent would disrupt bird movement, foraging and/or roosting patterns
<b>Ports and harbours</b>	Neutral	Space not used for wildfowling
<b>Recreational boating</b>	Neutral	Recreational small powerboats, jet skis, bird disturbance. Jet skis were specifically a problem in Loch Ryan and in the Nith Estuary, which are particularly sensitive locations for birds.
<b>Rubbish and sewage disposal</b>	Positive	If responsibly dealt with
<b>Sea angling and bait digging</b>	Neutral	If done responsibly
<b>Shipping and transport</b>	Neutral	Poses the risk of oil spills
<b>Subsea cables and pipelines</b>	Conflict	Reduces natural aesthetic and can interfere with wildfowling
<b>Wildfowling</b>	Neutral	Different space utilisation
<b>Wildlife watching and ecotourism</b>	Positive	Promotes interest in the birds

The wildfowling community wanted the sustainable management of the area and are willing to take on other sectors' views and interests in achieving this. Environmental quality management, in particular water quality management, by SEPA, the EA and Local Authorities is essential for wildfowling, so any potential new management strategies would be a welcome opportunity. Although sediment change from tidal energy may become an issue and siting would be crucial, there is an opportunity for collaboration with renewable sectors. Siting of any developments would have to be done sensitively, with due consideration to specialist advice. For example, Goose roosts would have to be considered when siting cables and pipelines.



#### 4: Opportunities for conflict management, growth and cooperation identified by the sectors

In the written survey that accompanied the matrix, and during the interview itself, sectors had the opportunity to discuss possible solutions to overcome conflicts in the Solway Firth. Respondents also speculated ways in which coherence could be improved with interacting sectors that shared marine space and/or resources. It also indicated the importance (or lack thereof) that sectors place on the national boundary. The responses (below) demonstrate how some sectors are more closely linked than others. Information is also provided on management measures that have been in place prior to marine planning (Table 13); indicating sectors already have experience in planning for the marine and coastal environment in a cross border ecosystem. Marine planning on both sides of the border has a critical role in facilitating policies to overcome conflicts; the circumstantial information provided by stakeholders below could feed into that process.

**Table 13:** Examples of mechanisms already in place to manage conflict in the Solway Firth

Sector	Management Scheme in place	Area	Purpose
<b>Coastal development</b>	<u>Dumfries and Galloway Shoreline Management Plan</u>	Scotland	Measures for sediment transport and coastal defence
	<u>Allerdale Shoreline Management Plan</u>	England	Measures for sediment transport and coastal defence
	<u>Copeland Shoreline Management Plan</u>	England	Measures for sediment transport and coastal defence
	<u>Carlisle Shoreline Management Plan</u>	England	Measures for sediment transport and coastal defence
	<u>Chapelcross Environmental Management Plan</u>	Scotland	Ensuring appropriate Environmental mitigations are implemented
<b>Historic Environment</b>	<u>Historic Environment Scotland Policy Statement 2016</u>	Scotland	Guides the operation of decision making in the Scottish planning system by providing best practices for managing change in the historic environment
	Historic England's <u>Managing Coastal Change and Ports</u> documents	England	Advise marine and coastal development projects including Government regulators, advisors and industries
<b>Inshore fisheries</b>	<u>Code of Conduct for Solway Scallop and Static Gear fishermen for Luce Bay and Wigtown Bay Areas</u>	Scotland	'Phone First' courtesy conduct scheme
	<u>WCRIFG Fisheries Management Plan</u>	Scotland	A working document that will guide the activities of the WCRIFG
	<u>NWIFCA Principles for the Sustainable Fisheries</u>	England	A standard intended to guide the work of the NWIFCA in managing sea fisheries



			resources in its District
<b>Natural heritage management</b>	<u>Solway Firth European Marine Site Management Plan</u>	Scotland	Preserve the natural environment
	<u>Dumfries and Galloway Local Biodiversity Action Plan</u>	Scotland	Preserve the natural environment
	<u>SNH Wildlife Management Framework</u>	Scotland	Decisions for managing wildlife
	<u>Scottish Outdoor Access Code</u>	Scotland	Access rights and responsibilities
	<u>Scottish Marine Wildlife Watching Code</u>	Scotland	Responsible wildlife watching
	<u>Environmental Liability Directive</u>	Scotland and England	Preserve the natural environment
	<u>Cumbria Local Biodiversity Action Plan</u>	England	Preserve the natural environment
	<u>Marine Wildlife Watching Code</u>	England	Responsible wildlife watching
	<u>Natural England Site Improvement Management Plan</u>	England	Preserve the natural environment
	<u>Solway Coast AONB Management Plan</u>	England	Preserve the natural environment
	<u>The Countryside Code</u>	England	Ensures respect an enjoyment in the countryside
<b>River Basin Management</b>	<u>North Solway Area Management Plan</u>	Scotland	Greater focus to water quality in in Scottish jurisdiction (includes English Esk water bodies for completion)
	<u>South Solway Area Management Plan</u>	England	Greater focus to water quality in in English jurisdiction (includes Scottish Esk water bodies)
	<u>Solway Tweed River Basin Management Plan</u>	Solway Tweed River Basin	Protect and improve the water environment
<b>Recreational boating</b>	<u>The Green Blue</u>	Scotland and England	Advise boating interactions with wildlife
	<u>RYA Safety Management policy</u>	Scotland and England	Safety at sea
<b>Wildfowling</b>	<u>Caerlaverock Guide to Wildfowling</u>	Scotland	Best practice guide
	<u>British Association for Shooting and Conservation Codes of Practice and the Rules and Constitution of the South Solway Wildfowlers Association</u>	England	Best practice guide

### Historic and cultural heritage management

Dependent upon the location and the extent, all new renewable energy activities, subsea cables and pipelines and coastal shellfish aquaculture could potentially be in conflict with the historic environment. It was viewed that this could generally be resolved through sensitive siting. The interaction would then become managed competition for access to heritage areas, which are scattered across the estuary.

The continued development of coastal access along the English North West coast will be a great opportunity for increased use of the Cumbrian historic landscape and seascape. Cumbria County Council are establishing the 100 km coastal path south from Gretna Green down to Allonby, to be completed by 2017/2018.<sup>46</sup> This provides greater coastal access for the public to enjoy the seascape and landscape of the Solway Firth, and promotes interest in visiting the area.

### Inshore fisheries

Fishers perceived a greater number of restrictions on what can be fished in the semi-enclosed Solway Firth compared to the more open east coast Anglo-Scot border. Fishers also commented that although there are representative bodies in place, there is significant scope for improved decision making. IFCAs have no cross-border mechanisms but there is need for a coordinated approach with Marine Scotland and the WCRIFG, for example there is a requirement for creel pots to have escape hatches in England but not in Scotland. Fishers wanted a permit system that benefits local fishers, as the Solway Firth has direct competition with England, Ireland, the Isle of Man, Scotland and Wales. Another option for Solway fishers to manage distribution of transboundary stocks would be a Territorial Use Right for Fisheries management scheme. This would grant exclusive and secure privileges to fish an area of sea to a specific group, who then amongst themselves decide access and allocation criteria.<sup>47</sup>

One Scottish static gear fisher perceived that static gear activity is likely to decrease in the next ten years as they experienced creels not catching as many lobsters, whilst another Scottish static gear fisher perceived activity could increase, highlighting the different perceptions within a sector.

Fishers recognised the potential for a velvet crab, *Necora puber* fishery supplying the continent to open following the need for species diversification after diminished finfish quota. Whelks are already fished for the Far East food markets. Electrofishing for razor clams is illegal (EC

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<sup>46</sup> Stretch One (36 km from Allonby to Whitehaven) is open, with Cumbria County Council establishing 55 km from Whitehaven to Silecroft.

<sup>47</sup> Marine Scotland Science (2015)

Regulation 850/98), but has been prevalent around the waters of Luce Bay, creating conflict with legal fishers.<sup>48</sup>

Scottish inshore fishers also wanted the reopening of the Solway cockle fishery but this first requires an Appropriate Assessment. The fishery can only be opened when it has been established by an Assessment that those activities would not affect the integrity of Special Areas of Conservation (Habitats Directive) or Special Protection Areas (Birds Directive).<sup>49</sup> Harvesting rules also differ across the border; cockles are not harvested until 24 mm in size in the English Solway however, they have to be 30 mm to be harvested in Scotland.<sup>50, 51</sup>

### **Natural heritage management**

Across the Solway, marine developments, including any accompanying coastal infrastructure, can result in a loss of habitat for waders and seabirds as well as cause disturbance, dependent upon location, timing and extent. Impacts of disturbance upon the receiving environment as a whole are not fully understood. Neither are the cumulative effects of different activities upon natural features, although knowledge continues to improve from industries conducting environmental monitoring surveys.

Although there is potential for recreation and tourism to disturb birds, the RSPB noted that by following wildlife codes (Table 13), this generally does not happen. After liaising with the ferry company out of Loch Ryan, ferries now travel slower, to prevent their wash from affecting bird roosts. This demonstrated that sectoral awareness and honest communication can be successful at resolving conflicts, but concern remains with jet skis and small powerboats.

### **Offshore Renewable Energy**

The only existing offshore renewable energy plant in the Solway Firth is Robin Rigg. One of the most significant results of this survey is how sectors perceived an offshore development based in the Scottish jurisdiction but makes landfall in England. The initial impression was that the respondents seemed more concerned if the development would affect their activity, rather than its geographical positioning.

The E.ON Robin Rigg offshore wind farm has three key drivers for the future:

- To improve the efficiency and performance of the wind turbines
- To manage and optimise the life-time costs of the site

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<sup>48</sup> Galloway Gazette (2015)

<sup>49</sup> Marine Scotland Science (2015)

<sup>50</sup> Cockle sexual maturity is reached at 18 mm

<sup>51</sup> Solway Shellfish Management Association (2004), Davies and Lancaster (2007)

- To improve the maintenance quality by being more involved and in control of the operations and maintenance activities, whilst maintaining high standards of health and safety

Since completing the survey, E.ON highlighted that the Robin Rigg environmental monitoring group has had good agency collaboration with potential for greater interaction with the fishing sector through research, development and innovation. In the interest of improving habitats, E.ON stated there is an option for better integration between offshore wind and static gear use.

Despite gathering interest for a tidal development in the estuary, plans remain at an early stage, as it is still a new sector in the UK. This survey data from stakeholders on both sides of the border provides a useful indication on the level of acceptability of a development in the Solway Firth. It provides a useful start for developers to identify where engagement is needed to reduce negative perceptions surrounding offshore developments. Although tidal energy is a different sector to wind energy, lessons can be learned from the interactions the Robin Rigg offshore development experienced during construction and operation phases.

### **Ports and harbours**

Interviewed ports had ambitions for coastal and offshore activities to boost local profits, but any expansion must consider the Local Authority Shoreline Management Plans. Natural heritage management meant that compromises had to be made to port development. The Port of Workington welcomed the chance to show it would work with the environmental agencies, as this would be viewed positively within the local community.

The Port of Workington wanted a well-integrated facility with the adjacent leisure harbour as this would raise the profile of the port and improve its market position. The key ports of the Solway Firth viewed each other as a positive source of competition. Each had a knock-on effect in trade for the area and serviced a slightly different sector. Any new offshore developments as part of the Energy Coast would likely bring economic benefit to the ports and proposals were welcomed.

### **Recreational boating**

One issue for recreational boating is the development of offshore wind farms, which restrict sailing routes and can cause safety issues. Aesthetically, turbines have been described by sailors as diminishing water users' enjoyment of the sea. This conflict is at an impasse as Robin Rigg is established but there are no further plans for offshore wind in the Solway Firth. Scottish users wanted better control of electrofishing as anchored boats have been witnessed around Barlocco Island and the Fleet Islands, restricting navigation there. Public reporting of illegal activity to Marine Scotland can further bring attention to the scale of the issue.

### **River Basin Management**

River Basin Management is essential to water quality of the seas, as rivers and runoff, invariably end up discharging into the ocean. SEPA anticipates that there will be changes and improvement to legislation relating to the natural environment, Bathing Waters and Shellfish Waters in the near future. SEPA and the Solway sectors it interacts with must adapt to deliver a healthy environment that can support sustainable economic growth, provide a safe place for people and protect the natural biodiversity as change occurs. The factors that are driving change include:

- Increasing demand for clean water for people, business, wildlife and habitats
- Increasing pressure for development, which require locations for discharges to water and reduces the space for water ways to meander and flood
- Increased pressure to use the coastal and marine environment for food production through shellfish aquaculture
- Potential climate changes, which will increase the risk of flooding and tidal surges and subsequent changes to our coastline, (climate change may also increase the risk of drought conditions)
- Increased requirement to use the water environment to supply renewable energy

Members of the Solway Area Advisory Group include both Scottish and English representatives, ensuring people involved in the management of this catchment consider what is happening upstream and downstream and does not stop at the border. The Solway estuary is internationally protected as a European Marine Site. Scottish Natural Heritage, Natural England and the Solway Firth Partnership provide information to help determine the best management options for this water body.

To meet the objectives of the WFD better integration with other sectors is needed, such as the [River Basin Planning Advisory and Catchment Groups](#), [Flood Advisory Groups](#), the [Better Regulation Process](#) and the [Scottish Marine Regions](#) for marine planning aspects. There is a continuing need to provide information and advice on issues such as diffuse pollution so that landowners and managers are able to reduce their impacts through better management. SEPA anticipates developing links with the marine stakeholder groups in both Scotland and England during the marine planning process.

### **Wildfowling**

The Scottish Caerlaverock Reserve was created to promote and manage the conflicting interests of wildfowling, conservation, farming and fishing, and wildfowling is conducted by permit.

The South Solway Wildfowling Association has also engaged in conservation projects on its sites, including the creation of [safe hen houses](#) and a [mallard](#) reintroduction scheme. Combining natural heritage management and wildfowling projects did much to dissolve perceived conflicts on both sides of the border. Some sectors still view wildfowling as unethical and there is an opportunity to reduce this through further communication and education projects, potentially facilitated through a neutral third party such as the Solway Firth Partnership (SFP).

## 5: Summary and recommendations

### Sectoral array

From this study, sectors that vary in scale often perceive each other differently, in other words, the vulnerability of an individual user compared to a large-scale semi-permanent feature. For example, static gear viewed all offshore renewable energy as incompatible but offshore wind viewed static gear as a positive, as an opportunity to improve habitat. Many sectors experienced negative interactions with access to closed areas associated with naval defence, but the interactions were manageable as these areas were seen as necessary. Similarly, HM Coastguard and the lifeboat service were unanimously viewed as positive or neutral, because they directly enhance sectors' maritime safety.

Space and time play a significant factor in determining a matrix response. Many activities are seasonal, such as inshore fisheries. Other activities only occur for a short period, for example, the construction phase of an offshore development. Interactions may change over the life of an activity, and this should be considered when developing management plans. Results of this survey are greatly dependent upon what activities are foremost in the minds' of respondents.

Marine plans need to consider the underlying drivers for change in sector development. Table 4 highlighted that between 2011-2017, three factors were most frequently driving change in activity: **availability of funds**, **environmental legislation** and **customer needs**. Within the past 10 years, the UK has implemented numerous environmental regulations, which became the basis for some of this change.<sup>52</sup>

The responses indicate that overall more sectors are expanding than declining in the Solway Firth (Tables 2 and 3). This is positive for the local English and Scottish coastal economies, which are dependent on relatively few sectors, in particular, fisheries, recreation, tourism, and ports. However, increased human activity puts greater strain upon the marine and coastal environment, creating greater challenges for achieving 'Good Environmental Status'. The Scottish National Marine Plan provides a framework for this but in absence of the Solway Marine Region Plan, the English Solway is receiving greater attention to detail through development of the North West Marine Plans.

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<sup>52</sup> Including but not limited to: [EC Marine Strategy Framework Directive 2008](#), [EC Air Quality Framework Directive 2008](#), [Climate Change Act 2008](#), [Marine and Coastal Access Act 2009](#), [Marine Scotland Act 2010](#), and the [Wildlife and Natural Environment \(Scotland\) Act 2011](#).

### Sharing space

Competition between sectors is not always a negative interaction for example, if sectors are competing for the same custom, this can bring in greater revenue to the Solway and create a drive for improving marine services and products. However, competition for space, time access and resources has to be managed fairly and in a transparent manner, considering both environmental and socioeconomic factors. The 'Phone First' protocol of the [Solway Scallop and Static Gear Code of Conduct](#) is a simple method of two different sectors planning to use the same space but at different times.

Safety at sea is paramount and is firmly established in industrialised sectors. Recognised international management mechanisms such as shipping lanes, enable for example, fishers to reduce collision risks. Greater risk leads to greater conflict, particularly with largely unregulated sectors such as recreational boating, which can congest fishing areas in summer months in the Solway Firth. Personal watercraft users have no legal obligation for formal training other than the use of VHF radio. Risk and associated conflict stemming from lack of formal safety at sea training could be better managed by greater promotion of the [International Regulations for the Prevention of Collision at Sea](#) and [RYA Safety Management Policies](#).

### Cross border governance

An ecosystem approach to marine management in the Solway Firth cannot be coherent until Scottish and English plans are balanced in geographical scale. England has followed a regional approach to planning, by dividing English waters into 11 Inshore and Offshore Plan Areas. Scotland produced a National Marine Plan and it is now taking a staggered approach to regional planning in its 11 Marine Regions through the use of Marine Planning Partnerships. Tailored marine planning from both jurisdictions will become crucial as activity in the Solway Firth increases. It is important to ensure due consideration of sectors unique to the Solway Firth, such as Scottish heritage haaf netting. The Scottish Solway is a designated Scottish Marine Region with the English North West Plan Area encompassing the southern Solway down to the River Dee border with Wales. The much larger North West Plan Area may reduce the specificity of policies pertaining to the sustainable economic development of the English Solway Firth.

Marine Plans should, where appropriate, give due credit to existing management plans and agreements already in place in the Solway Firth for example, the Scallop and Static Gear Code of Conduct. Such measures have been in place prior to the existence of marine planning, and their continued existence suggests success at mitigating conflicts. A Solway Regional Marine Plan will provide added value to those management measures already in place for the terrestrial sphere



by encompassing the adjacent marine sphere, at a greater level of detail than what is provided for by the National Plan.

### **Limitations**

The basic matrix oversimplifies the potentially innumerable interactions taking place day-to-day in the Solway Firth; for example, visitors to the area were not interviewed. However, in combination with respondents' comments, plus notes taken from phone calls and meetings, the survey provides valuable insights into a snapshot in time of local activity. The study's sectoral viewpoints are those of individuals within particular sectors, rather than reflective of broader sectoral views. Therefore, more weight might be given to one person's views and might not be representative of that sector as a whole.

One of the commonest concerns raised by respondents in both cycles of the study, was of the matrix design and, in particular, the constraints imposed by being forced to select a single category for each interaction. Respondents commented that interactions were often far more complex in reality, and cannot be defined by a single word. Many of the interactions that subjects found most difficult to characterise were those that subsequently proved of most interest for discussion. For example, difficulties in assigning interactions to either 'Conflict' or 'Competition' revealed a desire to distinguish theory from practice with respect to existing conflict management mechanisms.

If the sectoral interactions study was to be repeated again, it is recommended that a new technique should be used for spatial mapping. For example, having an Admiralty Chart of the Solway Firth on a tablet that can be drawn over by a respondent in person or via email attachment. This image could then be saved before resetting the blank chart for another respondent to complete. This removes the need for large paper maps, which are easily damaged, difficult to scan back onto a computer with annotations, and problematic to use in the field. Greater advertisement of the study, perhaps through Solway Firth Partnership's website and e-newsletter, might increase the number of sectors reached. Sending a draft of the report out to respondents would also provide a reality check of the information recorded.

## 6. Conclusions

This sectoral survey demonstrates the value of having local coastal partnerships at arm's length from formal MSP purposes. Making use of a neutral body to record and analyse sectoral activity gives the survey greater transparency and credibility. Furthermore, coastal partnerships have existing networks of stakeholders willing to participate in planning exercises, which can be utilised in the interests of good governance.

The eventual Solway Marine Regional Plan will undoubtedly have similar sectoral conflicts to those identified and managed in the forthcoming English North West Marine Plan. The Plans should look deeper into these relations, on their respective sides of the border, to manage conflict and also promote a framework for cooperative, productive and sustainable use of the sea. Respondents unanimously stated that they thought there is scope for greater integration between sectors they interact with, and coherent planning can help facilitate this. The Sectoral Interactions work has identified the main reasons behind competition, conflict and incompatible interactions between activities in the Solway:

- Requiring use of the same marine space
- Requiring access to the same marine space at the same time
- Requiring the same resources or the same customer base

By repeating the study, wider maritime planning practitioners in the Celtic Seas and other Member States may gain insight into the levels and extent of activity within other marine ecosystems. Sectoral Interactions is a quick assessment tool that can be used prior to formal planning processes to highlight areas of activity that may need greater attention through plan policies or objectives. Furthermore, the survey work can identify synergies and examine the mechanisms behind coexistence or conflict within an area. Although the study provides a snapshot in time of activity, other Member States may find that repeating the survey creates useful time series data on the evolving nature of how an ecosystem is used.

This survey was targeted at the Scottish and English stakeholders of the cross border Solway Firth. However, there are also stakeholders from the Isle of Man and Ireland that should be considered. Other practitioners who may be interested in conducting their own Sectoral Interactions work elsewhere should take account of all potential users of their cross border ecosystem for a fully comprehensive study.

Sectoral Interactions creates a snapshot of the core activities taking place at any one time in a cross border ecosystem. However, it does not encompass all activities, and has shown that the

interactions recorded are subject to seasonal change and external pressures. Sectoral interests can be duplicated, on each side of the border or multiple respondents may identify as the same sector. The Solway Firth Partnership is the existing stakeholder group for the area, representing interests from both sides of the border and would be ideally placed to become the core of the Solway Marine Planning Partnership (MPP).

This five-year study provides a useful indicator when beginning to map out the character of the Solway Marine Region. The responses identifying space used by multiple activities can also set the basis for later cumulative effects assessments. These initial results could be used to form a skeleton pan-Solway framework that takes cognisance of the North West Marine Plan policies and tries to create linkages between this and those of the Scottish National Marine Plan, in order to create a Solway Regional Plan.

Plan progression offers the opportunity for both Marine Scotland and the MMO to learn and adapt from the other's experiences within the same ecosystem. The Solway Marine Region can also learn from the existing MPPs in the [Clyde](#) and the [Shetland Islands](#). For example, the Clyde MPP runs structured [working groups](#) to develop options for regional policy, such as Navigation and Infrastructure. A similar structure could be used for the overarching sectors that this study has identified in the Solway Firth.

These plans also need to be flexible enough to accommodate new legislation that may arise once the UK leaves the EU. Having coherent English and Scottish regional plans that adjoin in one ecosystem would be a firm step towards the UK vision of clean, healthy, safe, productive and biologically diverse seas.

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**Appendix I: Questionnaire and matrix****Sectorial Interview Questions**

- 1) Your contact details
- 2) What sector are you representing?
- 3) Are you responding as an individual or as the representative of an organisation?
- 4) What are the aims of your organisation?
- 5) What is the nature of your organisation? (e.g. statutory, voluntary, private company)
- 6) How long has your organisation been operating?
- 7) How many members do you have?
- 8) What area does your organisation cover?
- 9) Is your activity likely to increase, decrease or stay the same over the next ten years?
- 10) What factors are driving change?
- 11) Is your activity seasonal?
- 12) Is there scope to improve integration between your sector and others?

- 13) Are there opportunities for improved management of your sector?
- 14) Are there opportunities for development of your sector?
- 15) Please provide an assessment of interactions between your sector and the others on this list using the categories on sheet.
- 16) If an interaction is categorised as Positive, Competition, Conflict or Incompatible, please provide details indicating the basis for your choice.
- 17) Please provide information on the nature, significance to your sector, timing (e.g. year round, summer only) and spatial extent (e.g. whole of the Solway Firth, Loch Ryan only) of the interactions.
- 18) Are there any other marine and coastal activities, issues or opportunities you would like to comment on?
- 19) Can the information that you have provided be used for future marine planning purposes?

NAME						
SECTORAL GROUP	SECTOR	Positive	Neutral	Competition	Conflict	Incompatible
Recreation and Tourism	Cruisers					
	Yachts					
	Sailing dinghies					
	Small power boats					
	Jet skis					
	Marinas					
	Slipways					
	Moorings & anchorages					
	Sea kayaking					
	Diving					
	Sea angling					
	Bait digging					
	Haaf netting					
	Wildfowling					
	Wildlife watching					
	Wind / kite surfing					
	Land sailing					
	Eco-tourism					
Coastal Walking						
Defence	Coastal infrastructure					
	Submarines					
	Surface vessels					
	Restricted areas					
	Exercise areas					
	Munitions dumps					
Natural Heritage Management	Radars					
	Intertidal environment/ communities					
	Seabed environment/ communities					
	Breeding and wintering birds					
	Other mobile/ migratory species					
Landscape and Seascape Management	Management of coastal habitats					
	Landscape management					
Seascape Management	Seascape management					
Environmental Quality Management	Bacterial quality					
	Biological quality					
	Chemical quality					
	Physical quality					
	Marine and coastal litter					
Historic / cultural heritage management	Coastal monuments and archaeology					
	Marine monuments and archaeology					
Coastal Development	Power stations					
	Residential					
	Industrial					
	Coastal defences					
Waste management	Sewage disposal					
	Rubbish disposal					



NAME						
SECTORAL GROUP	SECTOR	Positive	Neutral	Competition	Conflict	Incompatible
Renewable Energy	Offshore Wind					
	Wave					
	Tidal					
Subsea cables and pipelines	Electricity					
	Oil/Gas Pipelines					
	Telecomms					
Inshore fisheries	Scallop dredge					
	Queenie dredge					
	Queenie trawl					
	Nephrops trawl					
	Brown shrimp trawl					
	Demersal trawl					
	Pelagic trawl					
	Static gear (creels and pots)					
	Cockling (boat)					
	Intertidal cockling (hand and tractor)					
	Other intertidal and coastal shellfisheries					
	Drift netting					
	Fixed netting					
	Electrofishing					
Aquaculture	Shellfish aquaculture					
Shipping and transport	Tankers					
	Bulk carriers					
	Container vessels					
	Coastal bulk cargo					
	Ferries					
	Cruise ships					
Ports and harbours	Principal ports					
	Small ports					
	Piers and jetties					
	Dredging					
	Navigation aids					
Maritime Safety	Lifeboat service					
	HM Coastguard					

Further information on SIMCelt and the Solway Firth Partnership can be found on their websites:

<http://www.simcelt.eu>

<http://www.solwayfirthpartnership.co.uk>

## Appendix II: Respondents to the Solway Firth Sectoral Interactions survey

Sector	Subsector	Organisation	Respondent	Matrix	Questionnaire
Coastal development	Industrial	Port of Workington	Lorraine Waller	Y[?][?]	Y[?][?]
Defence	All	Ministry of Defence	Clive Hayward	Y[?][?]	Y[?][?]
	Exercise areas	Ministry Of Defence	Nigel Davies	Y[?][?]	Y[?][?]
Environmental Quality Management	All	Scottish Environmental Protection Agency	Jackie Galley	X	Y[?][?]
Historic Environment	Cultural heritage management	Dumfries and Galloway Council	Andrew Nicholson	Y[?][?]	Y[?][?]
Inshore fisheries	All commercial	MMO	Jon Parr	Y[?][?]	Y[?][?]
	All commercial	NWIFCA	Mandy Knott	Y[?][?]	Y[?][?]
	Fixed net	Nith District Salmon Fishery Board	Jim Henderson	Y[?][?]	Y[?][?]
	Haaf netters	Haaf Netters Association	Mark Messenger	Y[?][?]	Y[?][?]
	Static gear	Galloway Static Gear Association	June Lohead	Y[?][?]	Y[?][?]
	Scallop	Scallop fisher	Steve Girgan	Y[?][?]	Y[?][?]
Maritime Safety	Both	HM Coastguard	John Hope	Y[?][?]	Y[?][?]
Natural heritage management	All -Biodiversity	Dumfries and Galloway Council	Peter Norman	Y[?][?]	Y[?][?]
	All and Recreation and Tourism	Wetland Wildlife Trust Caerlaverock	Brian Morrell	Y[?][?]	Y[?][?]
	Breeding and wintering birds/tourism	Royal Society for the Protection of Birds	Chris Rollie	Y[?][?]	Y[?][?]
	Landscape and seascape management	Scottish Natural Heritage	Jonathan Warren	Y[?][?]	Y[?][?]
	Landscape and seascape management and environmental quality management	Natural England	Jim Robinson	Y[?][?]	Y[?][?]
Ports and harbours	All	Dumfries and Galloway Council	Ian Cooper and Peter Roberts	Y[?][?]	X
	All	Whitehaven Harbour Commissioners	Celia McKenzie	Y[?][?]	Y[?][?]
	Major ports	Port of Cairnryan	Trevor Wright	Y[?][?]	Y[?][?]

Recreation and tourism	All	Dumfries and Galloway Council	Keith Kirk	Y[?][?]	Y[?][?]
	Coastal walking/ecotourism	Dumfries and Galloway Council	Bryan Scott	X	Y[?][?]
	Land sailing	F5Karting	Carol Ann Brown	Y[?][?]	Y[?][?]
	Sea angling	Scottish Sea Angling Conservation Network	Ian Burrett	Y[?][?]	Y[?][?]
	Slipway	Kippford Slipway	Andy Clarke	Y[?][?]	Y[?][?]
	Sub-aqua	Newton Steward Sub-Aqua Club	Chris Harrison	Y[?][?]	Y[?][?]
	Wildfowling	Caerlaverock and District Wildfowling Association	Keith Brown	Y[?][?]	Y[?][?]
	Yachts	Kippford Yacht Club	John Sproat	Y[?][?]	Y[?][?]
	Yachts and Cruising	Dumfries Cruising Club	Roy Kerr	Y[?][?]	Y[?][?]
Renewable energy	Offshore wind	E.ON	Tim Morgan	Y[?][?]	Y[?][?]
	Offshore tidal	Solway Energy Gateway	Nigel Catterson	Y[?][?]	Y[?][?]
Waste Management	All	Dumfries and Galloway Council	Moir Weatherup	Y[?][?]	Y[?][?]

**Annex III: What is expected to happen for marine planning in the UK**

