

## Contents

---

Contents .....	i
List of Figures.....	iii
List of Tables.....	v
Abbreviations and Acronyms .....	vi
Glossary .....	viii
<b>18 Commercial Fisheries.....</b>	<b>1</b>
<b>18.1 Introduction.....</b>	<b>1</b>
<b>18.2 Consultation .....</b>	<b>1</b>
18.2.1 Commercial Fisheries.....	1
18.2.2 Salmon and Sea Trout Fisheries.....	4
<b>18.3 Assessment Methodology.....</b>	<b>6</b>
18.3.1 Study Area.....	6
18.3.2 Data Sources .....	8
18.3.3 Impact Assessment Methodology .....	10
18.3.4 Assessment Limitations .....	11
18.3.5 Significance Criteria .....	12
18.3.6 Design Envelope and Embedded Mitigation.....	15
<b>18.4 Baseline Environment.....</b>	<b>22</b>
18.4.1 Commercial Fisheries.....	22
18.4.2 Salmon and Sea Trout Fisheries.....	36
18.4.3 Baseline without the Project .....	51
<b>18.5 Development Area Impact Assessment .....</b>	<b>51</b>
18.5.1 Effects of Construction .....	51
18.5.2 Effects of Operation and Maintenance.....	58
18.5.3 Effects of Decommissioning.....	65
<b>18.6 Offshore Export Cable Corridor Impact Assessment .....</b>	<b>65</b>
18.6.1 Effects of Construction/Installation.....	65
18.6.2 Effects of Operation and Maintenance.....	72
18.6.3 Effects of Decommissioning.....	77
<b>18.7 Impact Interactions.....</b>	<b>77</b>
18.7.1 Overview of Impact.....	77
18.7.2 Characterisation of Impact .....	77
18.7.3 Assessment of Significance .....	78
<b>18.8 Cumulative Impact Assessment .....</b>	<b>78</b>
18.8.1 Cumulative Impacts of the Project .....	78

18.8.2	The Project in Conjunction with Other Projects .....	86
<b>18.9</b>	<b>Mitigation</b> .....	<b>98</b>
<b>18.10</b>	<b>Conclusions and Residual Impacts</b> .....	<b>99</b>
18.10.1	Development Area .....	99
18.10.2	Offshore Export Cable Corridor .....	104
18.10.3	Cumulative Impacts of the Project .....	108
18.10.4	The Project in Conjunction with Other Developments .....	113
<b>References</b>	.....	<b>118</b>

## List of Figures

Figure 18.1: Commercial Fisheries Study Areas.....	7
Figure 18.2: Salmon and Sea Trout Fisheries Study Areas.....	8
Figure 18.3: Landings Values by Species (Average 2001 to 2010) in the National Study Area (Source: MMO, 2011).....	22
Figure 18.4: Landings Values by Vessel Category (Average 2001 to 2010) in the Regional Study Area (Source: MMO, 2011).....	23
Figure 18.5: Distribution of Scallops by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012) .....	25
Figure 18.6: Scallop Dredge VMS Position Plot Density (Over-15 m vessels only; 2009) (Source: Marine Scotland, 2010).....	25
Figure 18.7: Scallop Landings Values (Average 2001 to 2010) in the UK (Source: MMO, 2011).....	26
Figure 18.8: <i>Nephrops</i> Landings Values (Average 2001 to 2010) in the National Study Area (Source: MMO, 2011).....	27
Figure 18.9: Distribution of <i>Nephrops</i> by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012) .....	28
Figure 18.10: <i>Nephrops</i> Fishing Grounds by Vessel in the Regional Study Area .....	29
Figure 18.11: Distribution of Squid by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012) .....	30
Figure 18.12: Squid Fishing Grounds by Vessel in the Regional Study Area.....	31
Figure 18.13: Landings Values for Lobster and Crabs (Average 2001 to 2010), in the National Study Area (Source: MMO, 2011) .....	32
Figure 18.14: Creel Fishing Grounds by Vessel in the Regional Study Area .....	33
Figure 18.15: Annual Reported Catch (No. of Individuals) by Method and Region (average 2001 to 2010) (Source: MSS, 2011).....	37
Figure 18.16: Net Fishery (Fixed Engine and Net-and-coble) Reported Catches (1952 to 2010) (Source: MSS, 2011).....	37
Figure 18.17: Annual Catch (No. of Individuals) by Species in Salmon Fishery Districts within the Regional Study Area (average 2001 to 2010) (Source: MSS, 2011) .....	38
Figure 18.18: Annual Reported Catch (No. of Individuals) by Method in Salmon Fishery Districts within the Regional Study Area (average 2001 to 2010) (Source: MSS, 2011).....	39
Figure 18.19: Seasonality of the Salmon Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	40
Figure 18.20: Seasonality of the Grilse Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	40
Figure 18.21: Seasonality of the Sea Trout Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	41
Figure 18.22: Annual Variation (2001 to 2010) of Salmon Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	42
Figure 18.23: Annual Variation (2001 to 2010) of Grilse Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	43
Figure 18.24: Annual Variation (2001 to 2010) of Sea Trout Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011) .....	43

Figure 18.25: Annual (average 2001 to 2010) Net Fisheries Catch by Region and Distribution Fisheries in Scotland (2009) (Source: MSS, 2011)..... 45

Figure 18.26: Annual Fixed Engines Effort (Max. no. of Traps) by Salmon Fishery District (2001 to 2010) (Source: MSS, 2011)..... 45

Figure 18.27: Annual Net-and-coble Effort (Max. no. of Crew) by Salmon Fishery District (2001 to 2010) (Source: MSS, 2011)..... 46

Figure 18.28: Seasonality of the Catch (average 2001 to 2010) by the Net-and-coble Fishery (Source: MSS, 2011) ..... 47

Figure 18.29: Seasonality of the Catch (average 2001 to 2010) by the Fixed Engine Fishery (Source: MSS, 2011) ..... 47

Figure 18.30: Annual Variations in Catches by the Net-and-coble Fishery (Source: MSS, 2011) ..... 48

Figure 18.31: Annual Variations in Catches by the Fixed Engines Fishery (Source: MSS, 2011) ..... 48

Figure 18.32: Seasonality of the Salmon and Sea Trout Fishery in the Forth District (average 2001 to 2010) (Source: MSS, 2011)..... 50

Figure 18.33: Annual Variation in the Reported Catch by Species in the Forth District (2001 to 2010) (Source: MSS, 2011)..... 51

## List of Tables

---

Table 18.1: Commercial Fisheries Scoping Responses and Actions.....	3
Table 18.2: Salmon and Sea Trout Scoping Responses and Actions.....	5
Table 18.3: Criteria to Define the Sensitivity of the Receptor.....	13
Table 18.4: Criteria to Define the Magnitude of an Effect.....	13
Table 18.5: Significance of Impacts.....	14
Table 18.6: Worst Case Scenario Definition - Development Area.....	16
Table 18.7: Worst Case Scenario Definition - Offshore Export Cable Corridor.....	18
Table 18.8: Adverse Impacts Upon Commercial and Recreational Fish and Shellfish Populations.....	52
Table 18.9: Temporary Loss or Restricted Access to Fishing Grounds.....	54
Table 18.10: Increased Steaming Times to Fishing Grounds.....	56
Table 18.11: Displacement of Fishing Vessels into Other Areas.....	57
Table 18.12: Interference to Fishing Activities (Navigational Conflict).....	58
Table 18.13: Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations....	59
Table 18.14: Complete Loss or Restricted Access to Fishing Grounds.....	63
Table 18.15: Increased Steaming Times to Fishing Grounds.....	64
Table 18.16: Displacement of Fishing Vessels into Other Areas.....	64
Table 18.17 Interference with Fishing Activities (Navigational Conflict).....	65
Table 18.18: Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations....	66
Table 18.19: Temporary Loss or Restricted Access to Fishing Grounds.....	69
Table 18.20: Increased Steaming Times to Fishing Grounds.....	71
Table 18.21: Displacement of Fishing Activity into Other Areas.....	71
Table 18.22: Interference to Fishing Vessels (Navigational Conflict).....	72
Table 18.23 Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations.....	73
Table 18.24: Complete Loss or Restricted Access to Fishing Grounds.....	75
Table 18.25: Increased Steaming Times to Fishing Grounds.....	76
Table 18.26: Displacement of Fishing Activity into Other Areas.....	76
Table 18.27: Interference with Fishing Activities.....	77
Table 18.28: Cumulative Impacts of the Project upon Commercial Fish and Shellfish Populations during Construction and Operation.....	79
Table 18.29: Cumulative Effects of the Project during Construction/Decommissioning and Operation.....	83
Table 18.30: Worst Case Design Parameters of Developments in the Forth and Tay.....	87
Table 18.31: Cumulative Adverse Impacts upon Commercial Fish and Shellfish Populations as a Result of the Project in Conjunction with Other Project.....	89
Table 18.32 Summary of Pre- and Post-Mitigation Effects.....	99
Table 18.33: Summary of Effects and Mitigation.....	104
Table 18.34: Summary of Effects and Mitigation.....	108
Table 18.35: Summary of Effects and Mitigation.....	113

## Abbreviations and Acronyms

---

<b>1SW</b>	One-sea-winter Salmon
<b>AC</b>	Alternating Current
<b>ASFB</b>	Association of Salmon Fishery Boards
<b>AST</b>	Atlantic Salmon Trust
<b>Cefas</b>	Centre for Environment, Fisheries and Aquaculture Science
<b>CFWG</b>	Commercial Fisheries Working Group
<b>DECC</b>	Department of Energy and Climate Change
<b>Defra</b>	Department for Environment, Food and Rural Affairs
<b>DFO</b>	District Fishery Office
<b>DSFB</b>	District Salmon Fishery Board
<b>EC</b>	European Commission
<b>EMF</b>	Electromagnetic Fields
<b>ES</b>	Environmental Statement
<b>EU</b>	European Union
<b>FIR</b>	Fishing Industry Representatives
<b>FLO</b>	Fisheries Liaison Officer
<b>FMA</b>	Fishermen's Mutual Association Ltd. (Pittenweem)
<b>FTOWDG</b>	Forth and Tay Offshore Wind Developers Group
<b>HRA</b>	Habitats Regulations Appraisal
<b>IALA</b>	International Association of Lighthouse Authorities
<b>ICES</b>	International Council for the Exploration of the Sea
<b>ICOL</b>	Inch Cape Offshore Limited
<b>IEEM</b>	Institute of Ecology and Environmental Management
<b>IFG</b>	Inshore Fisheries Group
<b>IMO</b>	International Maritime Organisation
<b>MCEU</b>	Marine Consents and Environment Unit

<b>MCZ</b>	Marine Conservation Zone
<b>MMO</b>	Marine Management Organisation
<b>MPA</b>	Marine Protected Area
<b>MSS</b>	Marine Scotland Science
<b>MSW</b>	Multi-sea-winter Salmon
<b>nm</b>	nautical mile
<b>OfTW</b>	Offshore Transmission Works
<b>OSP</b>	Offshore Substation Platforms
<b>SA</b>	Scallop Association
<b>SAC</b>	Special Area of Conservation
<b>SFF</b>	Scottish Fishermen’s Federation
<b>SPA</b>	Special Protection Area
<b>TCE</b>	The Crown Estate
<b>UK</b>	United Kingdom
<b>VMS</b>	Vessel Monitoring System (satellite tracking data)
<b>WTG</b>	Wind Turbine Generators

## Glossary

---

<b>10 - 15 metre</b>	Category of fishing vessels that are between 10 and 15 metres in length.
<b>12 nm limit</b>	Territorial waters of European Union (EU) Member States extend to 12 nm. The coastal Member State manage these waters exclusively within the limits.
<b>6 nm limit</b>	UK vessels have exclusive access to fish within 6 nm of the coast.
<b>6 nm - 12 nm limit</b>	Some access is allowed for certain EU Member States in identified areas around the UK coast, based upon historic access.
<b>Catch and Release</b>	A conservation measure by which fish are caught, landed and released back into the river alive
<b>Creeling</b>	The Scottish designation for potting, also referred to as static gear. The use of small cages or baskets to capture shellfish such as crabs or lobster.
<b>Demersal</b>	Fishing activities or species located near or on the seabed.
<b>Dhan</b>	A surface buoy often made of cork, with a flag on a pole which is used to mark the temporary position of fishing gear, typically nets or pots.
<b>Fast/Super Crabber</b>	A large potting vessel (15-20 m) operating pumped vivier holds which allow crabs/lobsters to be kept alive for several days before returning to port.
<b>Fisheries Liaison Officer</b>	An individual who works as an intermediary between a wind farm developer and the fishing communities ensuring good communication.
<b>Fisheries Industry Representative</b>	A member of the fishing community, who assists the Fisheries Liaison Officer in disseminating information to local skippers and gives feedback on the project.
<b>Fixed Engine</b>	Static nets used to catch salmon on the coast outside of estuary limits. These can be bag or stake nets.
<b>Grilse</b>	A salmon that has returned to fresh water after a single winter at sea.
<b>ICES Rectangle</b>	ICES rectangles create a grid dividing up the earth's surface. They are each aligned to 1° of longitude and 30' of latitude and, for the most part, cover an area of approximately 900 nm <sup>2</sup> .
<b>Multi Sea Winter Salmon</b>	Adult salmon that stay more than one year at sea.
<b>Net and Cobble</b>	A fishing method using a sweep net paid out from a boat (cobble) and worked from the bank or shore or from waters adjacent to the bank or shore, whereby the fish are surrounded by the net and drawn to the bank or shore.
<b>One Sea Winter Salmon</b>	Maturing fish which return to rivers to spawn after one winter at sea.
<b>Over-15 metres</b>	Category of fishing vessels that are greater than 15 metres in length.
<b>Pelagic</b>	Fishing activities or species located in the water column.

<b>Quota</b>	A measure of the quantity of a species that can legally be landed within a set period as determined through the Common Fisheries Policy.
<b>Rod and Line</b>	A method of fishing using a single rod or line with lawful bait or lure.
<b>Under-10 metre</b>	Category of fishing vessels that are less than 10 metres in length.

## 18 Commercial Fisheries

---

### 18.1 Introduction

- 1 This chapter provides an assessment of the potential effects of the construction, operation and decommissioning of the Wind Farm and Offshore Transmission Works (OfTW) upon commercial fishing activities, including salmon and sea trout fisheries. An assessment of the potential cumulative impacts arising from the Project in conjunction with other projects.
- 2 Commercial fishing is defined as any legal fishing activity undertaken for declared taxable profit. For the purposes of this assessment, salmon and sea trout fisheries are addressed separately to other commercial fisheries, due to the fact that they are largely located in-river (with the exception of some coastal netting) and being different in nature to the majority of marine commercial fishing activities.
- 3 This chapter is supported by the following appendices:
  - *Appendix 18A: Commercial Fisheries Baseline Development Area;*
  - *Appendix 18B: Commercial Fisheries Baseline Export Cable Corridor; and*
  - *Appendix 18C: Salmon and Sea Trout Fisheries Baseline.*
- 4 This chapter also shares linkages with the following chapters which have informed elements of the impact assessment and makes reference to their content where relevant:
  - *Chapter 11: Underwater Noise;*
  - *Chapter 12: Benthic Ecology;*
  - *Chapter 13: Natural Fish and Shellfish;*
  - *Chapter 19: Shipping and Navigation; and*
  - *Chapter 23: Summary.*

### 18.2 Consultation

#### 18.2.1 Commercial Fisheries

- 5 Inch Cape Offshore Limited (ICOL) has engaged the local and wider fishing industry from an early stage of Project development. In order to facilitate effective dialogue, a Fisheries Liaison Officer (FLO) and Fishing Industry Representatives (FIRs) with an understanding of fisheries in the region of the Development Area were appointed. Regular consultation has been undertaken, and is ongoing with the organisations listed below:
  - Scottish Fishermen's Federation (SFF);
  - Scallop Association (SA);
  - Anglo Scottish Fishermen's Association;
  - Fishermen's Mutual Association (Pittenweem) (FMA);

- Arbroath and Montrose Fishermen’s Association;
  - Dunbar Fishermen’s Association;
  - Cockenzie and Port Seton Fishermen’s Association;
  - Marine Scotland;
  - Aberdeen District Fishery Office (DFO);
  - Anstruther DFO;
  - Eyemouth DFO; and
  - South East Inshore Fisheries Group (IFG).
- 6 In addition to site-specific consultation and engagement, which ICOL has undertaken since late 2009, the Forth and Tay Offshore Wind Developers Group (FTOWDG) has collaborated to hold joint discussions with commercial fisheries interests. These meetings were advertised and open to all interested parties. ICOL is committed to ensuring that a collaborative approach is continued, where feasible, throughout future stages of the Project.
- 7 Individual fishermen were also contacted by the FLO to provide information to contribute to the establishment of the commercial fisheries baseline. Where this information has been provided, it has been anonymised and included within the baseline assessment (*see Section 18.4*) and detailed in *Appendix 18A*.
- 8 In addition to the consultation described above, FTOWDG has established a regional Commercial Fisheries Working Group (CFWG) to facilitate future engagement of the fishing industry. This includes representatives of all the fishing activities identified in the Forth and Tay area, the FTOWDG developers, Marine Scotland and The Crown Estate (TCE). The objectives of a CFWG are to address the generic issues affecting fishermen as a result of the proposed developments and may include, but not necessarily be limited to, the development of collaborative mitigation options and defining aspects of construction management plans which can feasibly be standardised.
- 9 Table 18.1 below summarises issues that were highlighted by the consultees in the Scoping Responses, and indicates where in the Environmental Statement (ES) each issue is addressed. Further information consultation relating to natural fish receptors is provided in Chapter 13 *Section 13.2.6*. This includes further informal consultation which has been undertaken in relation to the assessment of the impacts of the Wind Farm and OfTW with relevant stakeholders other than the Scoping Opinion.

**Table 18.1: Commercial Fisheries Scoping Responses and Actions**

Consultees	Scoping Response	Project Response
Marine Scotland Licencing Operations Team (MS-LOT)	The ES should supply detail on the possible impact on navigational issues for both commercial and recreational craft, through: collision risk, navigational safety, risk management and emergency response, marking and lighting of tidal site and information to mariners, effect on small craft navigational and communication equipment, weather and risk to recreational craft which lose power and are drifting, in adverse weather conditions, evaluation of likely squeeze of small craft into routes of larger commercial vessels, and visual intrusion and noise.	Considered and assessed in <i>Chapter 19</i> .
	<p><b>Fishing industry liaison to include:</b></p> <p>Scottish Fisherman’s Federation (SFF), Association of Salmon Fishery Boards (ASFBs), relevant government departments, IFGs.</p>	Described in this <i>Section</i>
	<p>Geo-referenced data likely to be limited because:</p> <ul style="list-style-type: none"> <li>• Shellfish industry is largely unregulated and require little catch reporting; and</li> <li>• Vessel size &lt;15 m so no Vessel Monitoring System (VMS).</li> </ul>	Described in <i>Appendix 18A</i> and <i>Appendix 18B</i> .
	Marine Scotland Science (MSS) is the primary source of information on commercial fish and shellfish in Scotland – most appropriate data on nursery and spawning grounds.	Described in <i>Section 18.4</i> and in <i>Appendices 18A</i> and <i>18B</i> .
	Department for Environment, Food and Rural Affairs (Defra) data layers project – will provide update on fish spawning and nursery grounds.	See <i>Section 13.4</i> of <i>Chapter 13</i> .
	<p><b>Following impacts need to be considered:</b></p> <p>Construction/decommissioning– underwater noise.</p> <p>Operational noise – noise over the long term.</p> <p>Rock armouring around the base of the Wind Turbine Generators (WTGs) – resulting in micro variations in benthic habitats.</p> <p>Electromagnetic Fields (EMF) - Atlantic salmon and European eels.</p>	<p>See <i>Chapter 11</i> for modelling approach.</p> <p><i>Section 12.7</i>.</p> <p>See <i>Section 13.6</i> and <i>13.7</i> of <i>Chapter 13</i>.</p>
MSS	Effects, either short term or long term could manifest in both the Development Area and the Offshore Export Cable Corridor.	Assessed in impact assessments <i>Section 18.5</i> to <i>Section 18.10</i> .

Consultees	Scoping Response	Project Response
	Shellfish are currently most valuable catch in area and a large proportion of the landings are taken by smaller boats. These potential impacts should be assessed through FTOWDG.	Described in <i>Appendix 18A</i> and <i>Appendix 18B</i> and <i>Section 18.4</i> (Baseline Environment), and recognised in impact assessments ( <i>Section 18.5</i> to <i>Section 18.10</i> ).
	Displaced effort may also have direct economic impact, through increased steaming time, vessel costs and reduced catches, competition for limited space.	Assessed in impact assessments <i>Section 18.5</i> to <i>Section 18.10</i> .
	MSS welcomes collaborative approach as outlined in the <i>Scottish Offshore Wind Farms – East Coast: Discussion Document (2) – Approach to Cumulative Effects Statement (FTOWDG, 2010)</i> .	Described in this section and included as <i>Appendix 5B</i> .
	A cumulative and in-combination impact assessment is also a requirement of the Habitats Regulations Appraisal (HRA) with respect to both Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).	See Cumulative Impact Assessment <i>Section 18.8</i> , <i>Section 13.13</i> of <i>Chapter 13</i> and <i>Chapter 9</i>
Marine Scotland Compliance	Potential issues are: <ul style="list-style-type: none"> <li>• Scallop dredgers;</li> <li>• Squid fisheries; and</li> <li>• Vessels using ports in the Aberdeen district may be the most significantly impacted.</li> </ul>	Addressed throughout this chapter ( <i>Section 18.5</i> and <i>18.6</i> ).

### 18.2.2 Salmon and Sea Trout Fisheries

10 Salmon and sea trout fisheries consultation was undertaken and is ongoing with the organisations listed below:

- ASFB;
- Esk District Salmon Fishery Board (DSFB);
- Tay DSFB;
- Forth DSFB;
- Tweed DSFB; and
- Usan Salmon Fisheries Ltd.

- 11 FTOWDG has held joint discussions with these organisations and their members, as well as statutory consultees. ICOL is committed to ensuring that, where feasible, a collaborative approach is continued throughout future stages of the Project.
- 12 Table 18.2 summarises issues that were highlighted by the consultees in the Scoping Responses and indicates which section of this ES addresses each issue. Further information consultation relating to natural fish receptors including salmon and sea trout is provided in Chapter 13 *Section 13.2.6*. This includes further informal consultation which has been undertaken in relation to the assessment of the impacts of the Wind Farm and OfTW with relevant stakeholders other than the Scoping Opinion.

**Table 18.2: Salmon and Sea Trout Scoping Responses and Actions**

Consultees	Scoping Response	Project Response
Scottish Natural Heritage	Consultation should be undertaken with ASFB and relevant DSFBs.	See this Section
	<p>Species to consider include salmon and sea trout.</p> <p>Effect of EMF on Atlantic salmon.</p> <p>Likely Significant Effect in relation to HRA identified for:</p> <ul style="list-style-type: none"> <li>• River Tay – Atlantic salmon and lamprey species;</li> <li>• River Teith - Atlantic salmon and lamprey species; and</li> <li>• South Esk - Atlantic salmon, lamprey species, freshwater pearl mussel.</li> </ul>	See <i>Chapter 13 Sections 13.6, 13.7 and 13.13.</i> Considered in <i>Sections 18.5 to 18.10.</i>
MSS	<p>Migratory fish should be considered, including salmon, sea trout, sea lamprey, river lamprey – adults and juveniles should be included in the assessment. Avoidance of cable route corridors as a potential result of EMF should also be reviewed.</p> <p>Salmon, sea trout, eel – these species use coastal areas. High economic/conservation value.</p> <p>The following questions need to be answered:</p> <ol style="list-style-type: none"> <li>1. Identify which species use the area – feeding/migration/time of year;</li> <li>2. Fish behaviour – swimming depth;</li> <li>3. Impacts related to deployed devices should be assessed including: strike, avoidance, disorientation, delayed migration;</li> <li>4. Cumulative impacts;</li> <li>5. 1-4 above should be assessed to determine likely risk; and</li> <li>6. If there is remaining doubt over potential impacts, developer should recommend a scientifically robust monitoring strategy to assess impacts on stocks as a whole or on particular rivers as necessary.</li> </ol> <p>Developers should review recent report related to migratory salmon, sea trout and European eel.</p>	See <i>Chapter 13 Sections 13.6 and 13.7.</i> Considered in <i>Sections 18.5 to 18.10</i> from a commercial perspective.

## 18.3 Assessment Methodology

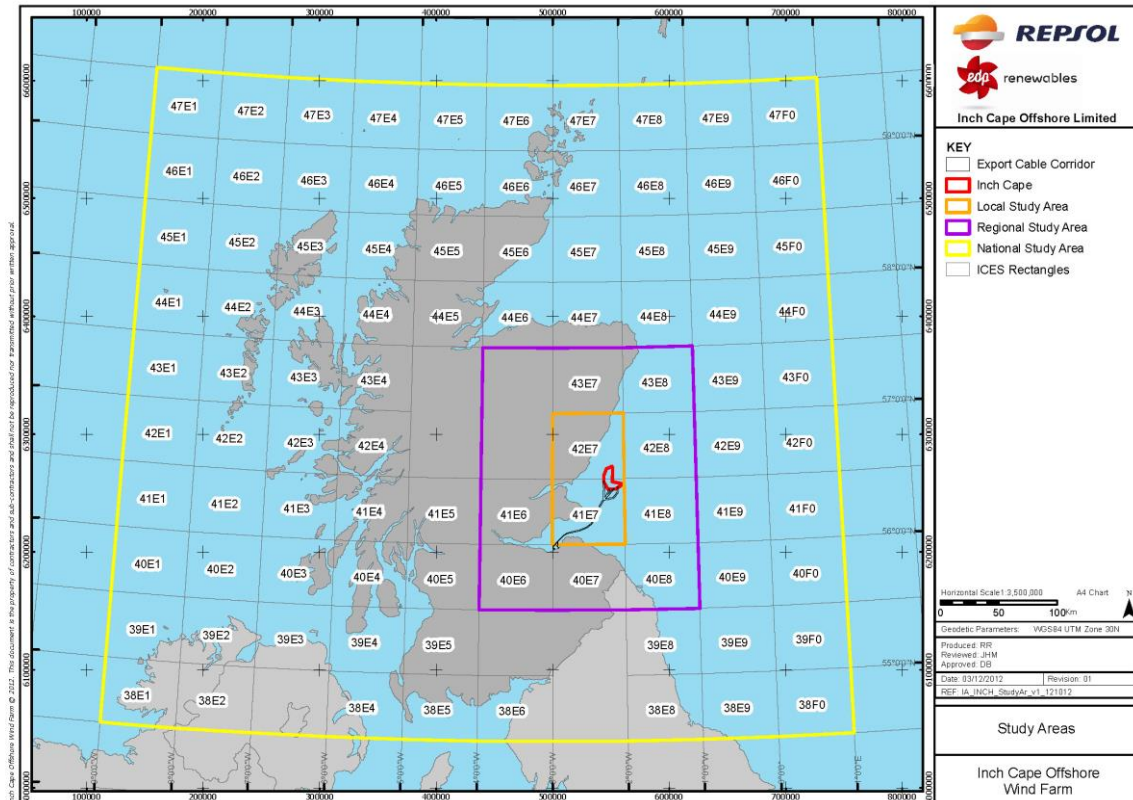
### 18.3.1 Study Area

- 13 Note that the study areas considered in this section are not identical to the study areas in *Chapter 13*, Figure 13.1, as for this assessment the context is focused on the commercial and not ecological interests.

#### Commercial Fisheries

- 14 The study areas for the assessment of commercial fishing activity are shown in Figure 18.1 which also shows the location of the Development Area and the Offshore Export Cable Corridor. International Council for the Exploration of the Sea (ICES) rectangles are also shown; these are the smallest spatial unit used for the collation of fisheries statistical information. It can be seen that the Development Area falls within ICES rectangles 41E7 and 42E7. The large majority of the Offshore Export Cable Corridor passes through 41E7, with a small proportion of the inshore section falling within rectangles 41E6 and 40E7.
- 15 The approach has been to provide a national overview allowing fishing grounds in the Development Area and Offshore Export Cable Corridor to be described within a national context. The Regional Study Area has been defined to ensure sufficient coverage of those grounds surrounding the Project Areas. The Local Study Area is the smallest spatial unit available for the collation of fisheries statistics (i.e. ICES rectangles) relevant to the Project areas. Fishing activities specific to the Development Area and Offshore Export Cable Corridor have been further described where possible.

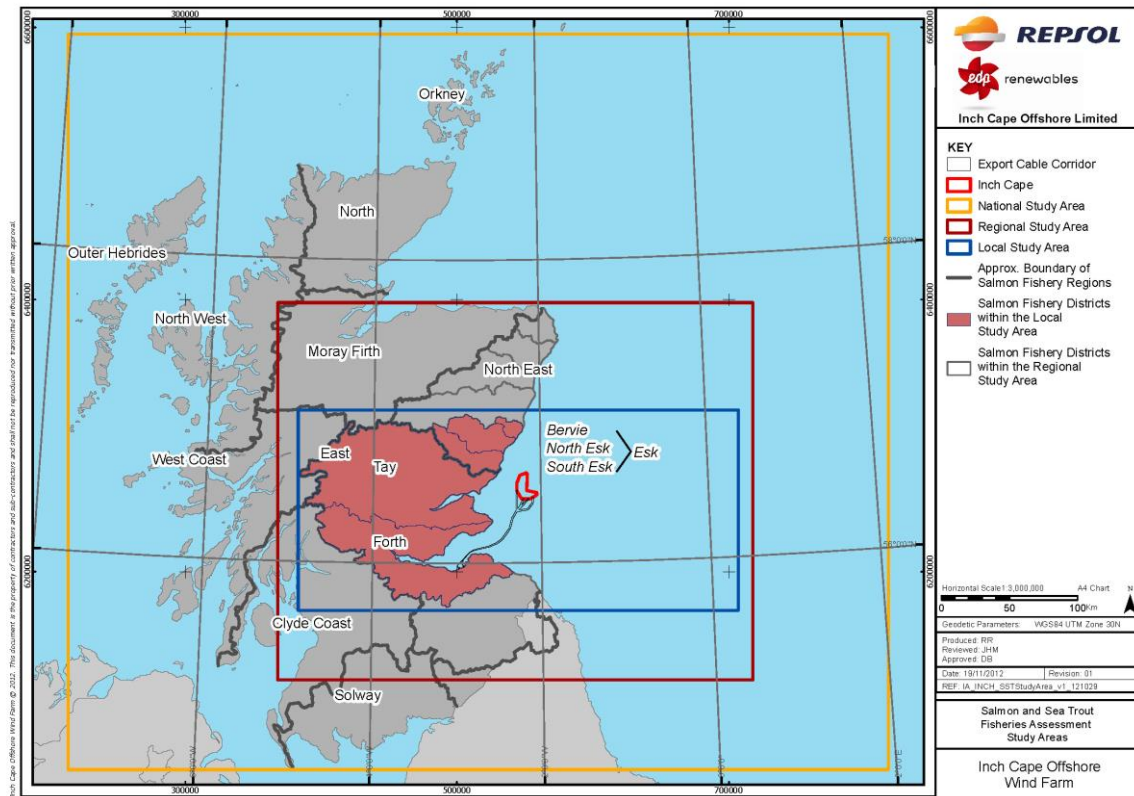
Figure 18.1: Commercial Fisheries Study Areas



### Salmon and Sea Trout Fisheries

- 16 Specific areas of study, different from those identified in Figure 18.1, have been defined at a local, regional and national level (Figure 18.2) for the purposes of assessments relating to salmon and sea trout. The Local Study Area focuses on the salmon fishery districts in closest proximity to the Development Area and Offshore Export Cable Corridor, namely the Tay, the Esk (Bervie, North Esk and South Esk) and the Forth. The Regional Study Area takes account of all salmon fisheries regions located in the vicinity of the Development Area and Offshore Export Cable Corridor including the East and North East regions. In addition, given the migratory behaviour of salmon and sea trout and the importance of the fishing industry across Scotland, information at the national (Scottish) level has also been briefly presented.

Figure 18.2: Salmon and Sea Trout Fisheries Study Areas



- 17 Note that the study areas considered above are not identical to the study areas in Chapter 13, Figure 13.1, as for this assessment the context is focused on the commercial and not ecological interests.

### 18.3.2 Data Sources

#### Commercial Fisheries

- 18 The principal sources of data and information used for the collation of the commercial fisheries baseline were:
- ICES;
  - Marine Management Organisation (MMO);
  - Marine Scotland;
  - MSS;
  - DFOs;
  - SFF; and
  - Fishermen and their representatives including appointed Fisheries Industry Representatives (FIRs).

19 The following reports were reviewed and relevant information included in the baseline:

- ICES Stock Assessment Reports and other ICES publications of relevance;
- European Commission (EC)/National and Local Fisheries Legislation;
- Marine Scotland and MSS publications;
- Oil and Gas United Kingdom (UK) publications;
- Centre for Environment, Fisheries and Aquaculture Science (Cefas) publications; and
- Any other additional relevant publications.

20 The following datasets were analysed for inclusion in the baseline:

- MMO Fisheries Statistics (landings values and fishing effort data 2001 to 2010);
- MMO Surveillance Sightings (2001 to 2010);
- MMO UK Satellite Tracking (VMS) Data (2007 to 2010);
- Marine Scotland Satellite Tracking (VMS) Data (2009); and
- Marine Scotland Data Analysis (2007 to 2011).

21 There is no single data source or recognised model for establishing commercial fisheries baselines. An approach is therefore required that incorporates a number of different data and information sources, each subject to varying sensitivities and limitations. *Appendix 18A* describes commercial fishing activities in progressive detail, building upon the sources and analysis listed. The sensitivities and limitations of these data sources are described in *Appendix 18A*.

### **Salmon and Sea Trout Fisheries**

22 The principal sources of data and information used for the collation of the salmon and sea trout fisheries baseline were:

- MSS; and
- Consultation with DSFBs, netmen and other fisheries stakeholders.

23 The principal datasets used to inform the salmon and sea trout fisheries baseline were:

- MSS salmon and sea trout catch data by salmon fishery region (1952 to 2010);
- MSS salmon and sea trout catch data by salmon fishery district (2001 to 2010); and
- MSS salmon and sea trout netting effort data (2001 to 2010).

24 It should be noted that the analysis of fisheries statistics given below is not intended as an assessment of the abundance or state of the stocks, but as an indication of the underlying population trends and relative importance of the fisheries of salmon and sea trout by region and fishery district in Scotland. Further, the critical time for fisheries does not necessarily represent critical times for salmon and sea trout movement and catch data are limited in

terms of presenting an accurate baseline of fish populations and fish migration outside of the time of fisheries. This also holds true for rod-and-line catches which do not account for the closed season and give no effort value.

- 25 Each fishery in Scotland is required to provide the number and total weight of salmon, grilse and sea trout caught and retained during each month of the fishing season. In this context, the term salmon refers to multi-sea-winter salmon (MSW), whilst grilse refers to one-sea-winter salmon (1SW).
- 26 The catch data used for the purposes of this assessment are as reported. Where there are no records of reported catches, it has been assumed that no fish have been caught. It is recognised that there may be a degree of error as a result of misreporting of catches. In addition, further errors may also exist within the catch dataset due to misclassification of fish between the grilse and salmon categories.
- 27 Rod-and-line fisheries are also required to provide the monthly numbers and total weight of salmon, grilse and sea trout which were caught and released back into the river, a practice which is known as “catch and release”. As a result, MSS catch data for the rod-and-line fishery is broken down into two categories; “rod-and-line” and “catch and release”. Note that the total catch by the rod-and-line fishery is in effect the sum of the catches recorded in both categories. Where appropriate, data from both categories have been combined to give an indication of the total rod-and-line catch. Similarly, the catch by net-and-coble and fixed engines (bag and stake nets) has been combined in some instances to provide an indication of the total catch by the net fishery.
- 28 The catch data used in this report and presented in *Appendix 18C* are Crown copyright, used with the permission of MSS. Marine Scotland is not responsible for interpretation of these data by third parties.

### 18.3.3 Impact Assessment Methodology

- 29 As a result of salmon and sea trout fisheries being either in-river or coastal, it is considered that there will not be direct impacts to these fishing activities arising from the construction/decommissioning and operation of the Wind Farm and OfTW. It is possible, however, that indirect effects to species in the offshore marine environment could affect coastal and in-river salmon and sea trout fisheries. A full assessment of the potential impacts upon the ecology of these species is provided in *Chapter 13*.
- 30 The aspects requiring assessment in the case of all other commercial fisheries are as specified in the Cefas and Marine Consents and Environment Unit (MCEU) (2004) Guidelines, as listed below:
- Implications for fisheries during the construction phase;
  - Implications for fisheries when the development is completed;
  - Adverse impacts upon commercially harvested fish and shellfish populations;

- Adverse impacts upon recreational fish and shellfish populations;
  - Complete loss or restricted access to traditional fishing grounds;
  - Safety issues for fishing vessels;
  - Increased steaming times to fishing grounds;
  - Obstacles on the seabed post-construction; and
  - Interference to fisheries activities.
- 31 These were ratified in consultation with fisheries interests. In addition to the above, consultation with fishing interests across a number of UK offshore wind farm projects has identified an additional potential impact requiring assessment:
- Displacement of fishing activity into other areas.
- 32 An assessment of the impacts listed above is separately described for the Development Area and Offshore Export Cable Corridor. Subsequently, an assessment of the cumulative impacts arising from works within the Development Area and Offshore Export Cable Corridor together is provided. Lastly, an assessment of the cumulative impacts arising from the Wind Farm and OfTW in conjunction with other projects is given.
- 33 In the case of each assessment, the potential impacts arising from the construction/decommissioning and operational phases are considered.
- 34 The potential effects of decommissioning are considered to be equivalent to and potentially lower than the worst case effects assessed for the construction phase. The approach to decommissioning is described in *Section 7.12*. A decommissioning plan will be prepared in accordance with the requirements of the *Energy Act 2004* (see *Chapter 3: Regulatory Requirements, Section 3.2.5*) and will be subject to approval from the Department of Energy and Climate Change (DECC) prior to implementation.

#### 18.3.4 Assessment Limitations

- 35 The principal limitation of an assessment of the impacts upon commercial fishing activities is the likely change in the baseline over time. This could be due to a number of reasons: fluctuations in landings, changes in fisheries legislation or management policies, the introduction of conservation policies, economic constraints such as fuel costs or crew availability, or environmental restrictions such as weather. As a result, the scope of the assessment is limited to the baseline that has been described.
- 36 The assessment has primarily assessed Project specific and cumulative impacts relative to fishing grounds in the Regional Study Area. In the case of certain fisheries, however, fishing activities are not limited to grounds within this area, with a number of vessels potentially targeting grounds around Scotland and on occasion around the UK. Although it is noted that individual vessels may spend more time in certain regional areas such as along the east coast of Scotland, it is not possible within the scope of this assessment to consider the extent of

an impact on a vessel by vessel basis, and instead the availability of fishing grounds in the wider area is taken into account.

- 37 The ICES rectangle provides useful and detailed baseline data for quality and value of landings in the study areas. However ICES rectangles are much larger resolution than the Project areas. The Development Area only covers 3.6 per cent of the ICES rectangles in which it is contained. It is not appropriate to scale the quantity and value to the percentage of the Project areas for comparison, as fishing effort is unlikely to be uniform throughout the rectangle. As a result the ICES quantities and values cannot be used to derive the value of landings specifically related to the Project, which will likely be lower than the total for the total landings in the rectangle.
- 38 Impacts on the ecology of natural fish and shellfish species of commercial and recreational importance arising from the construction/decommissioning and operation of the Wind Farm and OfTW may indirectly affect commercial fishing activities, including those in-river. An assessment of the effect upon natural fish and shellfish populations is given in *Section 13.6 and 13.7* and the findings are summarised in the relevant sections below. It should be noted, however, that the methodology used to assess impacts in the biological environment differ from the one used in the commercial fisheries assessment, being largely based upon Institute of Ecology and Environmental Management (IEEM) (2010) guidelines for ecological impact assessments.

#### 18.3.5 Significance Criteria

- 39 The significance criteria used for the commercial fisheries assessment are provided below (Table 18.3, Table 18.4 and Table 18.5). In addition to the limitations described above, it should however be noted that there is currently no universally recognised methodology for quantifying the assessment of impacts of offshore wind farm developments upon commercial fishing activities. As such a level of professional judgement is required.
- 40 In instances where the findings of *Chapter 13* have been summarised, the significance criteria used in that chapter (detailed in *Section 13.5*) applies.

#### Sensitivity of the Receptor

- 41 The receptor has been defined by fishery (i.e. the scallop fishery, the *nephrops* fishery, the squid fishery, the creel fishery, etc.) and sensitivities have been defined for each fishery. It is possible that the sensitivity of the fishery may vary according to each potential impact, as well as for different phases of development (construction/decommissioning or operation). In the case of each impact (separately described for each phase of development), the sensitivity of the fishery is therefore described. Table 18.3 shows the criteria used in this assessment to define the sensitivity of the receptor (fishery).

**Table 18.3: Criteria to Define the Sensitivity of the Receptor**

Characteristic	Sensitivity	Definition
Adaptability	Low	Fishing vessels are required to amend fishing practices slightly, but no significant change
	Moderate	Fishing vessels are limited in their ability to adapt
	High	Fishing vessels cannot adapt
Tolerance	Low	Outwith of peak fishing period or low change in fishing practices
	Moderate	During peak fishing periods and discernible change in fishing practices
	High	Fishing activities cannot be undertaken
Recoverability	Low	Fishing activities can resume with little effect
	Moderate	Fishing activities resume but with a discernible effect
	High	Fishing activities cannot be resumed
Value	Low	Low loss of economic value of fishery affected
	Moderate	Moderate loss of economic value of fishery affected
	High	High loss of economic value of fishery affected

**Magnitude of Effect**

- 42 The magnitude of each impact is predicted, based upon its spatial extent, duration and severity relative to commercial fishing activities. Table 18.4 below gives the criteria used to define the magnitude of an effect for the purposes of this assessment.

**Table 18.4: Criteria to Define the Magnitude of an Effect**

Characteristic	Category	Definition
Spatial Extent	Negligible	Not in the proximity of fishing grounds, or very low intensity fishing grounds
	Low	In the proximity of low intensity fishing grounds
	Moderate	In the proximity of frequently targeted fishing grounds which comprise a proportion of receptor fishing grounds

Characteristic	Category	Definition
	High	In the proximity of high intensity fishing grounds which comprise the majority of fishing grounds for the receptor
Duration	Negligible	Very short term, or in periods of very low intensity fishing activities
	Low	Short term, or outwith of principal fishing periods
	Moderate	Temporary (i.e. during construction period, or peak fishing period)
	High	Permanent (i.e. during operation phase)
Frequency	Does not apply to commercial fishing because it is assumed that works will be consistent throughout the construction/decommissioning periods. In the case of operation, the assessment considers the Wind Farm and OfTW.	
Severity	Negligible	No discernible, or very low change to fishing practices
	Low	Some amendment to fishing practices but no significant change
	Moderate	Fishing activities have limited opportunity to adapt and there is a discernible reduction in Development Area and Offshore Export Cable Corridor
	High	Fishing activities cannot be undertaken in the Project areas

### Evaluation of Effects

- 43 Table 18.5 below provides the matrix used to evaluate the significance of the impact, taking into account the sensitivity of the receptor and the magnitude of effect. Effects which are assessed as being of moderate/major or major significance are considered to be significant.

**Table 18.5: Significance of Impacts**

Magnitude of Impact	Sensitivity of resource/receptor		
	Low	Moderate	High
<b>Negligible</b>	Negligible/Minor	Minor	Minor/Moderate
<b>Low</b>	Minor	Minor/Moderate	Moderate
<b>Moderate</b>	Minor/Moderate	Moderate	Moderate/Major
<b>High</b>	Moderate	Moderate/Major	Major

- 44 The significance criteria above are not used in relation to health and safety of fishing vessels and crew. Instead, safety risks to commercial fishing activities are defined as those in excess of existing safety risks incurred during the course of normal fishing activities. Where there are no identified safety risks (i.e. risks are considered to be commensurate with or less than those risks incurred in the course of normal fishing activities), these are considered not significant. Where safety risks are identified, these are considered significant for the purposes of this assessment. Further information on the calculation of risks to all vessels, including fishing vessels is given in *Chapter 19*.

### 18.3.6 Design Envelope and Embedded Mitigation

- 45 A worst case development scenario upon which to base impact assessment has been defined in *Chapter 7: Description of Development*. Those design parameters that will have the greatest potential impact upon commercial fisheries have been identified and are summarised below in Table 18.6.
- 46 Adverse effects could occur in two ways: the first is the potential for the Wind Farm and OfTW to cause adverse impacts to fish and shellfish of commercial importance, which could result in indirect effects upon commercial fishing activities. Whilst this potential effect is summarised in this assessment, it is fully assessed in *Section 13.6 to 13.9*. The second is the potential for the Wind Farm and OfTW to constitute a physical obstacle and/or safety risk to the continuation of normal fishing activities as described in the baseline (*Section 18.4*). Accepting that the *Chapter 13* will identify and assess the worst case parameters for potential effects upon fish and shellfish species, it is the second factor which has determined the worst case parameters for commercial fisheries.
- 47 Commercial fishing is not expected to be excluded from the entirety of the Development Area or along the Offshore Export Cable Corridor during the construction phase, although rolling safety/exclusion zones of 500 m are considered to be in place around major construction vessels. It is possible that installed infrastructure will have safety/exclusion zones of 50 m (or an appropriate size to incorporate infrastructure). In the case of the operational phase, it is expected that fishing activities will be able to be resumed to some degree within the Development Area, although it is recognised that certain fishing methods, by virtue of gear configuration and mode of deployment, may be restricted in their ability to operate as normal.
- 48 Taking into account the potential for fishing vessels to regain some degree of access in the operational phase, it is considered that the structures with the combined biggest footprint poses the worst case scenario to fishing activities. This includes the maximum duration of construction activities, and associated exclusion zones, the highest number of Wind Turbine Generators (WTGs) with the smallest spacing, and the maximum number of additional infrastructure such as Offshore Substation Platforms (OSPs) and sub-sea cables, etc.
- 49 Table 18.6 gives the commercial fisheries worst case design parameters for the Wind Farm and OSPs during the construction, operational and decommissioning phases.

**Table 18.6: Worst Case Scenario Definition - Development Area**

Potential Impact	Design Envelope Scenario Assessed
Construction (and Decommissioning)	
Adverse impacts upon commercially exploited fish and shellfish populations	See <i>Section 13.3</i> and the worst case scenario definition summarised in <i>Table 13.2</i> .
Temporary loss or restricted access to fishing grounds	<p>Infrastructure and procedures resulting in the maximum loss of fishing grounds:</p> <ul style="list-style-type: none"> <li>• Four year construction period;</li> <li>• Total Development Area: 150 km<sup>2</sup>;</li> <li>• Progressive installation of 213 WTGs and five OSPs and three meteorological masts (met masts);</li> <li>• Dimensions of infrastructure: WTG - gravity foundations of 65 m diameter per foundation; OSPs - gravity foundations of 130 m diameter per foundation;</li> <li>• Minimum spacing between WTGs: 820 m;</li> <li>• Maximum inter-array cable length: 353 km;</li> <li>• 500 m safety/exclusion zones around construction works;</li> <li>• Progressive installation of inter-array cables across the Development Area for the duration of construction (i.e. fishing activities cannot be undertaken in the area of inter-array cable installation);</li> <li>• Ongoing cable burial and protection works throughout the construction phase (maximum cable burial depth between zero metres and three metres); and</li> <li>• Maximum length of unburied inter-array cables, protected by other means (i.e. rock placement) of 10 per cent.</li> </ul>
Safety issues for fishing vessels	<p>Fishing activities cannot be safely undertaken or resumed (see <i>Chapter 19</i>).</p> <p>In addition, the assessment considers inter-array cables based upon:</p> <ul style="list-style-type: none"> <li>• Maximum inter-array cable length: 353 km;</li> <li>• Maximum unburied sections of inter-array cables of 10 per cent and protected by other means; and</li> <li>• Cable burial depth of between zero metres and three metres.</li> </ul>
Increased steaming times	Maximum number of construction safety/exclusion zones and infrastructure in the Development Area resulting in the maximum disruption to established steaming routes and potential increases in operating costs.

Potential Impact	Design Envelope Scenario Assessed
Interference with fishing vessels	<p>Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply:</p> <ul style="list-style-type: none"> <li>• Location of construction port; and</li> <li>• Approximate number of vessel movements during construction period (approximately 3500).</li> </ul>
Displacement of fishing activity	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.
Operation	
Adverse impacts on commercially exploited species	See <i>Section 13.3</i> and the worst case scenario definition summarised in <i>Table 13.2</i> .
Complete loss or restricted access to fishing grounds	<p>Infrastructure resulting in the maximum loss of fishing ground:</p> <ul style="list-style-type: none"> <li>• Installation of 213 WTGs and five OSPs;</li> <li>• WTG gravity base foundations of 65 m diameter;</li> <li>• OSP gravity base foundations of 130 m diameter;</li> <li>• Minimum spacing between WTGs: 820 m;</li> <li>• Maximum inter-array cable length: 353 km;</li> <li>• Maximum unburied sections of inter-array cables of 10 per cent and protected by other means; and</li> <li>• Cable burial depth of between zero metres and three metres.</li> <li>• Consideration of 50 m safety/exclusion zones around fully and partially installed infrastructure (or an appropriate size to incorporate infrastructure);</li> </ul>
Safety issues for fishing vessels	<p>Fishing activities cannot be safely undertaken or resumed (see <i>Chapter 19</i>).</p> <p>In addition, the assessment considers inter-array cables based upon:</p> <ul style="list-style-type: none"> <li>• Maximum inter-array cable length: 353 km;</li> <li>• Maximum unburied sections of inter-array cables protected by other means;</li> <li>• Cable burial depth of between zero metres and three metres.</li> </ul>
Increased steaming times	Maximum number of infrastructure and associated safety/exclusion zones in the Development Area resulting in the maximum disruption to established steaming routes.

Potential Impact	Design Envelope Scenario Assessed
Interference with fishing vessels	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area (six per day) will result in the highest number of works vessels transiting identified fishing grounds.
Objects on the seabed post-construction	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.
Displacement of fishing activity	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.

50 Table 18.7 gives the commercial fisheries worst case design parameters for the Offshore Export Cable Corridor.

**Table 18.7: Worst Case Scenario Definition - Offshore Export Cable Corridor**

Potential Impact	Design Envelope Scenario Assessed
<b>Construction (and Decommissioning)</b>	
Adverse impacts upon commercially exploited fish and shellfish populations	See <i>Section 13.3</i> and the worst case scenario definition summarised in Table 13.3.
Complete loss or restricted access to fishing grounds	Infrastructure and procedures resulting in the maximum loss of fishing grounds: <ul style="list-style-type: none"> <li>• Approximately 225 days duration of installation over a three year period;</li> <li>• Total export cable length: approximately 83 km;</li> <li>• Maximum number of export cable trenches: six;</li> <li>• Cable burial to approximately one metre where feasible;</li> <li>• Maximum length of unburied cable length, protected by other means (i.e. rock placement), where burial is not feasible;</li> <li>• Safety/exclusion zones around installation works; and</li> <li>• Progressive installation of cable for the duration of construction (i.e. fishing activities cannot be undertaken in the area of export cable installation).</li> </ul>

Potential Impact	Design Envelope Scenario Assessed
Safety issues for fishing vessels	<p>Fishing activities cannot be safely undertaken or resumed (see <i>Chapter 19</i>).</p> <p>In addition, the assessment considers export cables based upon:</p> <ul style="list-style-type: none"> <li>• Maximum export cable length: approximately 83 km;</li> <li>• Cables will be suitably buried or will be protected by other means when burial is not practicable; and</li> <li>• Maximum unburied sections of export cables protected by other means.</li> </ul>
Increased steaming times	Maximum number of construction safety/exclusion zones resulting in the maximum disruption to established steaming routes and potential increases in operating costs.
Interference with fishing vessels	<p>Will result in the highest number of works vessels transiting identified fishing grounds. Impact is associated with navigational conflict and as a result the following parameters apply:</p> <ul style="list-style-type: none"> <li>• Location of construction port; and</li> <li>• Approximate number of vessel movements during construction period (c.3500).</li> </ul>
Displacement of fishing activity	See 'Temporary loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.
<b>Operation</b>	
Adverse impacts on commercially exploited species	See <i>Section 13.3</i> and the worst case scenario definition summarised in Table 13.3.
Complete loss or restricted access to fishing grounds	<p>Infrastructure resulting in the maximum loss of fishing ground:</p> <ul style="list-style-type: none"> <li>• Maximum length of export cable: approximately 83 km;</li> <li>• Cables will be suitably buried or will be protected by other means when burial is not practicable; and</li> <li>• Maximum unburied sections of export cable of 20 per cent and protected by other means.</li> </ul>

Potential Impact	Design Envelope Scenario Assessed
Safety issues for fishing vessels	Fishing activities cannot be safely undertaken or resumed (see <i>Chapter 19</i> ). In addition, the assessment considers export cables based upon: <ul style="list-style-type: none"> <li>• Maximum export cable length: approximately 83 km;</li> <li>• Maximum unburied sections of export cables protected by other means;</li> <li>• Cable burial to approximately one metre where feasible; and</li> <li>• Post-installation status of the export cable.</li> </ul>
Increased steaming times	None
Interference with fishing vessels	Location of operation and maintenance port and maximum number of operation and maintenance vessel trips to the Development Area (six per day) will result in the highest number of works vessels transiting identified fishing grounds.
Objects on the seabed post-construction	Any construction related obstacles and changes to seabed conditions. Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume.
Displacement of fishing activity	See 'Complete loss or restricted access to fishing grounds'. Infrastructure resulting in the maximum loss of fishing grounds.

### Embedded Mitigation Measures

51 A range of Embedded Mitigation measures to reduce environmental effects are captured within the Design Envelope (see *Section 4.5.2*). The assessment of effects on commercial fisheries has taken account of the following Embedded Mitigation measures:

- A regional CFWG has been established to provide a forum for collaborative discussion and action in relation to offshore wind farm developments in the Forth and Tay area and their interactions with commercial fishing activities. The CFWG seeks to:
  - Provide regular contact for representatives of commercial fishermen and the FTOWDG developers to promote communication and understanding;
  - Provide a forum to manage engagement through project(s) lifecycle with particular focus on consenting, pre-construction planning and construction activities;
  - Provide input to general approaches, procedures and protocols with respect to construction management plans and potential mitigation options, promoting standardisation where possible;

- Agree specific offshore working practices relating to marine licence conditions where required;
  - Agree and maintain a current regional assessment of commercial fishing activities; and
  - Identify and develop opportunities between the fishing/renewables industries in the Forth and Tay area.
- A construction management plan will be developed in consultation with fishing industry representatives which establishes a protocol for engagement between ICOL and the fishing industry. This will include details on:
    - Communication channels between the fishing community and ICOL through all phases;
    - Protocol for the navigation of construction and operation vessels to and from the site (e.g. use of transit lanes that will reduce interaction with fishing activities);
    - Procedures in the event of interactions between wind farm construction and operation and fishing activities; and
    - Protocol for the removal of temporary works post-construction including appropriate verification.
  - 500 m 'rolling' safety zones around working areas during construction, decommissioning and major maintenance activities to exclude vessels not associated with the works. Consultation will be undertaken with relevant stakeholders to ensure effective implementation and management of safety/exclusion zones.
  - Structures within the Development Area will be marked and lit in accordance with International Association of Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2008). The final lighting and marking scheme will be agreed with the relevant stakeholders prior to construction.
  - Cables will be suitably buried or will be protected by other means when burial is not practicable which will reduce the risk to fishing vessels from snagging.
  - Promulgation of information and appropriate liaison will be carried out to ensure information on the works are circulated through agreed procedure e.g. Notices to Mariners, Kingfisher and other appropriate media to allow vessels to effectively and safely navigate around the proposed sites.
- 52 These measures would be delivered as part of the Project (see *Appendix 7A: Draft Environmental Management Plan*).

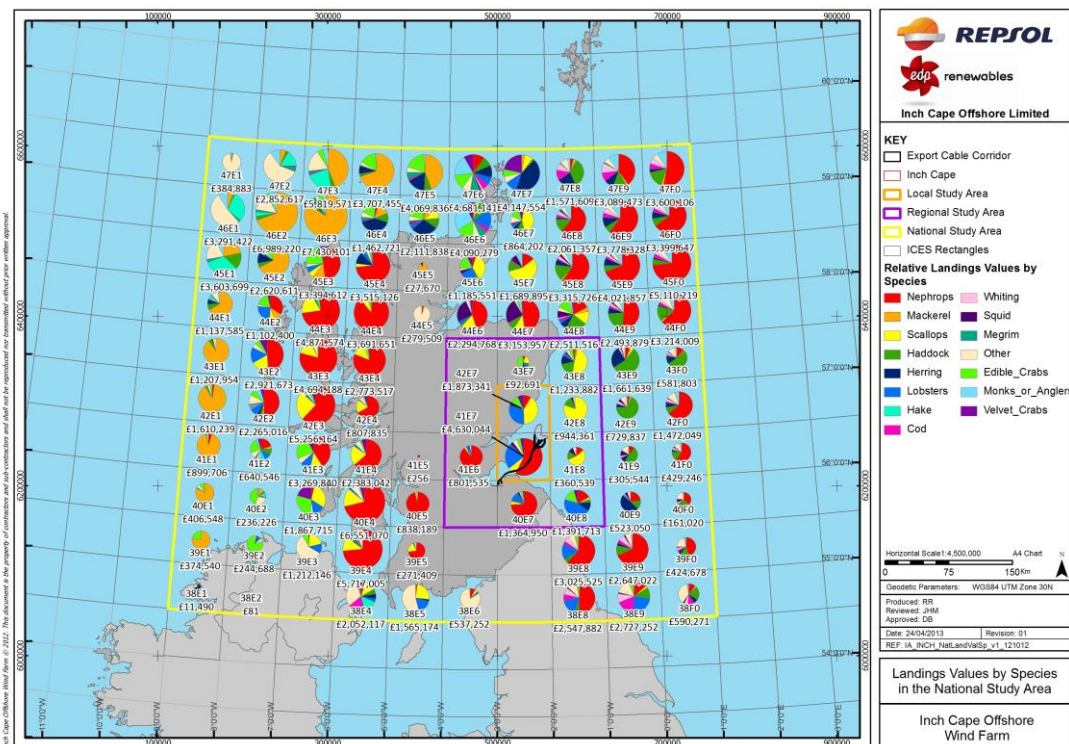
## 18.4 Baseline Environment

### 18.4.1 Commercial Fisheries

#### Development Area Baseline Summary

- 53 The following information has been summarised from *Appendix 18A*.
- 54 ICES rectangles 41E7 and 42E7, within which the Development Area is located, record landings values that are of moderate importance on a national scale and of high importance in the commercial fisheries Regional Study Area (see Figure 18.3).
- 55 The species which comprise the majority of landings from 41E7 are: *nephrops* (57 per cent), lobsters (23 per cent) and king scallops (referred to as ‘scallops’ for the purpose of this assessment) (7 per cent). In ICES rectangle 42E7, the species which comprise the majority of landings are: scallops (40 per cent), lobsters (30 per cent), edible crabs (9 per cent), *nephrops* (9 per cent) and velvet crabs (7 per cent). Squid also records a smaller proportion of the landings values recorded from both rectangles (2.4 per cent in 41E7 and 3.9 per cent in 42E7).

**Figure 18.3: Landings Values by Species (Average 2001 to 2010) in the National Study Area (Source: MMO, 2011)**

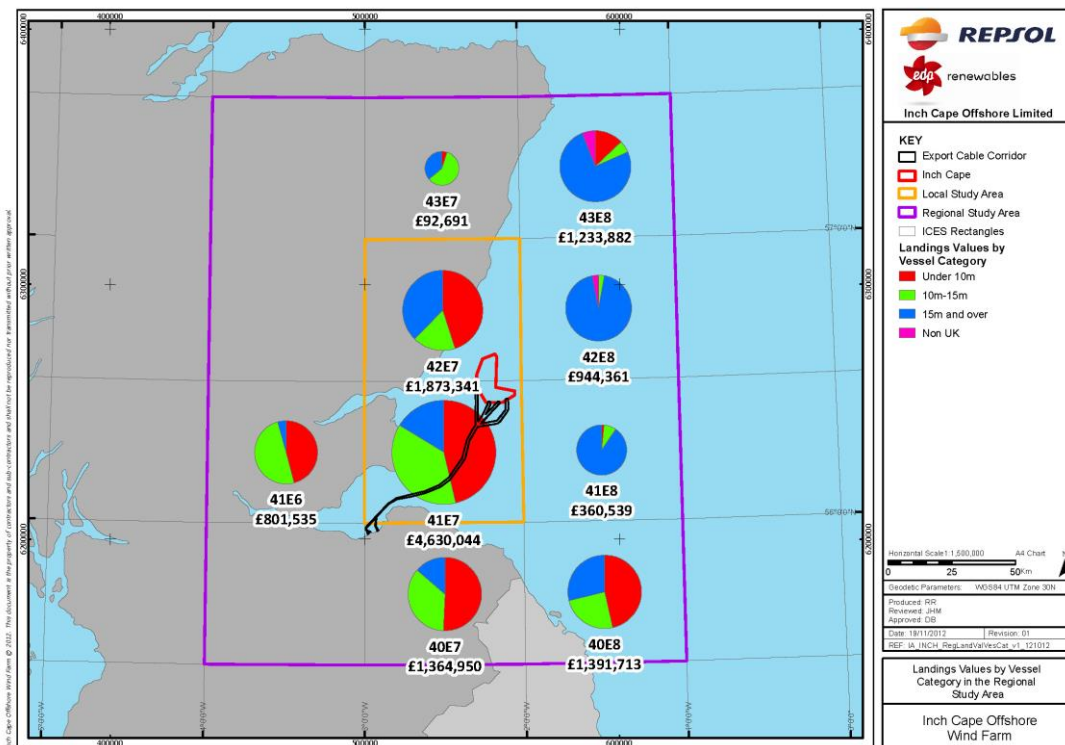


- 56 The fishing methods used to target these species are: boat dredging for scallops, demersal trawling for *nephrops* and squid, and creeling for lobster, edible crabs and velvet crabs. The majority of the vessels operating these gear types in both rectangles 41E7 and 42E7 are under-15 m in length, and it is therefore of note that the activities of these vessels will not

be included within the vessel monitoring system (VMS) datasets. Landings by over-15 m vessels are highest in offshore rectangles although the activities of this fleet comprise over a third of the landings in 42E7, which is attributable to scallop dredging vessels (see Figure 18.4).

- 57 Landings values for species targeted in rectangles 41E7 and 42E7 are broadly highest in late summer, between July and September, although there are moderate values recorded for the remainder of the year.

**Figure 18.4: Landings Values by Vessel Category (Average 2001 to 2010) in the Regional Study Area (Source: MMO, 2011)**



- 58 Pittenweem in Fife is the principal port where the majority of landings from rectangle 41E7 (50.9 per cent) are recorded to be landed. This represents 95.4 per cent of the port's total annual income. The ports of Crail, Methil and Leven, St. Andrews, Anstruther, Granton, North Berwick, Cove, Burntisland, St. Monans, Newhaven and West Wemyss record lower percentages of the total landings values from 41E7, although it should be noted that these landings contribute a high proportion of their total average annual values (see *Appendix 18A, Section 18A.5.1.3.3*).

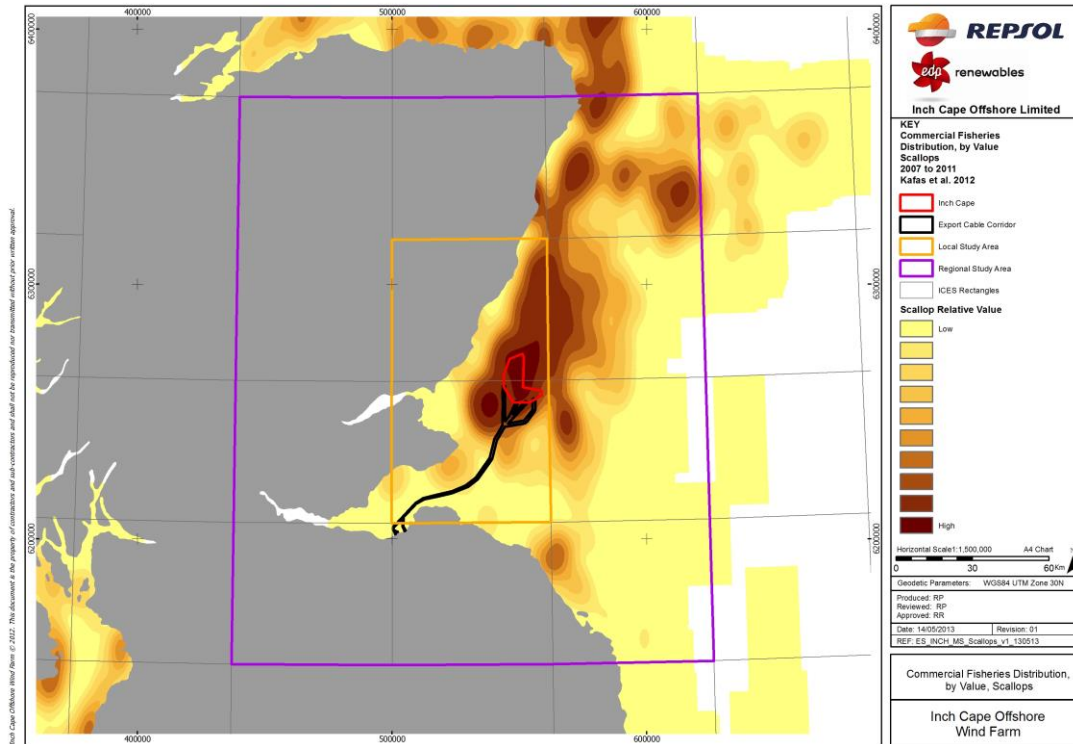
- 59 Arbroath records the highest landings values from rectangle 42E7 (32.5 per cent) and this represents 68.5 per cent of the port's total annual income. Aberdeen also records a significant proportion of the landings values (27.5 per cent), however this only represents 4.9 per cent of the port's total income. Ports such as Gourdon, Stonehaven, Johnshaven, Cove and Catterline record lower percentages of the total landings values from 42E7,

however these landings contribute a higher proportion of their total average annual values (see *Appendix 18A, Section 18A.5.1.3.3*).

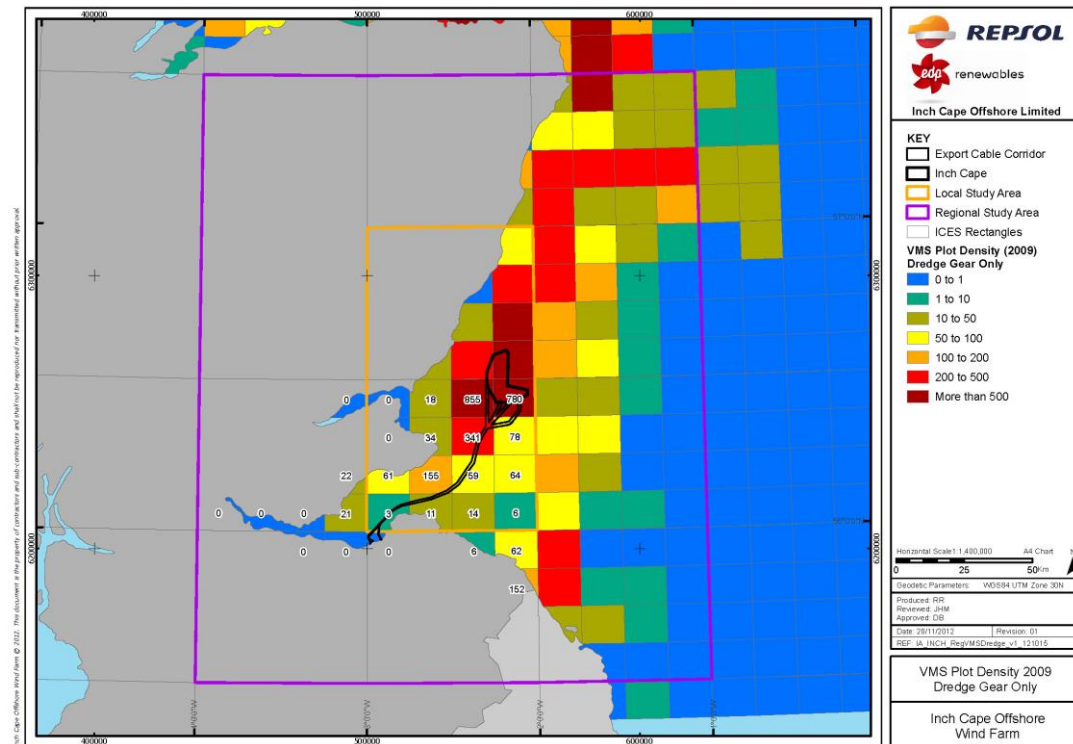
### Scallop Fishery

- 60 Rectangles 42E7 and 41E7 record the second and fourth highest scallop landings in the commercial fisheries Regional Study Area, respectively (£742,213 and £326,349, averaged 2001 to 2010). Scallops are targeted by vessels operating boat dredges.
- 61 Scallop vessels generally tow either one or two beams, onto which a number of dredges are attached, depending upon vessel size, engine power and winch capacity. In Scottish waters, vessels are allowed up to eight dredges per (vessel) side inside six nautical miles (nm); ten dredges per side between six and 12 nm and 14 dredges per side outside 12 nm. In English waters, vessels are allowed up to eight dredges within 12 nm, with no restrictions outside 12 nm (Great Britain Parliament, 2012). It is possible that revisions to the number of dredges operated will apply in the future, potentially to align the number of dredges employed in Scottish and English waters (pers. comm., 2012a). This may have the effect of increasing the number of dredges operated inside 12 nm, including in the Development Area. The principal type of dredge used is the English 'Springer' type, whereby the scallops are raked from the seabed by steel teeth that are attached along the leading edge of the dredges and which can penetrate the seabed to a depth of approximately 20 cm.
- 62 The majority of vessels targeting scallops in the Development Area are over 15 m in length and as a result included in the analysis of VMS data, which can therefore be considered accurate in further describing their activities. Scallop activity, as illustrated by Marine Scotland data (see Figure 18.5) indicates that scallop dredging is distributed across the Development Area. Annual fluctuations in activity due to the cyclical nature of the fishery should however be noted. VMS data for 2009 showed that the Development Area is located in the vicinity of the highest intensity fishing grounds in the commercial fisheries Regional Study Area (see Figure 18.6).

**Figure 18.5: Distribution of Scallops by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012)**

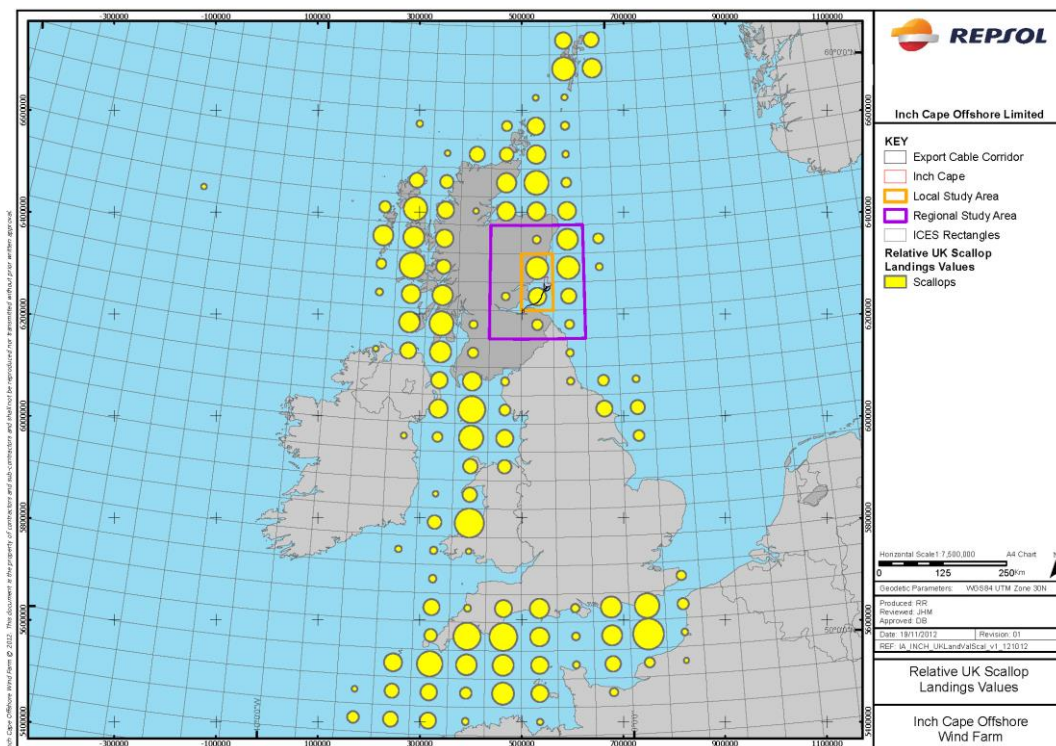


**Figure 18.6: Scallop Dredge VMS Position Plot Density (Over-15 m vessels only; 2009) (Source: Marine Scotland, 2010)**



- 63 Larger category scallop vessels are capable of fishing in difficult weather conditions and continuously for several days. These vessels are described as nomadic due to their geographical range; variously targeting grounds around the UK. Analysis of scallop landings in the UK shows that landings in the commercial fisheries Regional Study Area are of moderate importance (see Figure 18.7).
- 64 Scallop fishing by the nomadic fleet is generally cyclical; grounds are intensively targeted for a period and then left to recover. Scallop grounds around the UK are located on the Scottish east and west coasts, in the Irish Sea and the English Channel (see Figure 18.7). The number of vessels dredging in the Forth and Tay area will therefore vary annually, depending upon productivity and access to other grounds.
- 65 Scallop dredging is not currently restricted by quota and activity occurs year round, although it peaks in the summer months. Regional restrictions or closures may apply elsewhere, although there are none in place in the Regional Study Area at the present time.
- 66 In addition to the over-15 m fleet, several small category vessels with home ports in the commercial fisheries Regional Study Area are able to target scallops and, by virtue of their size, are limited in their operational range. Such vessels may be multi-purpose, able to reconfigure gear to target alternative fisheries.

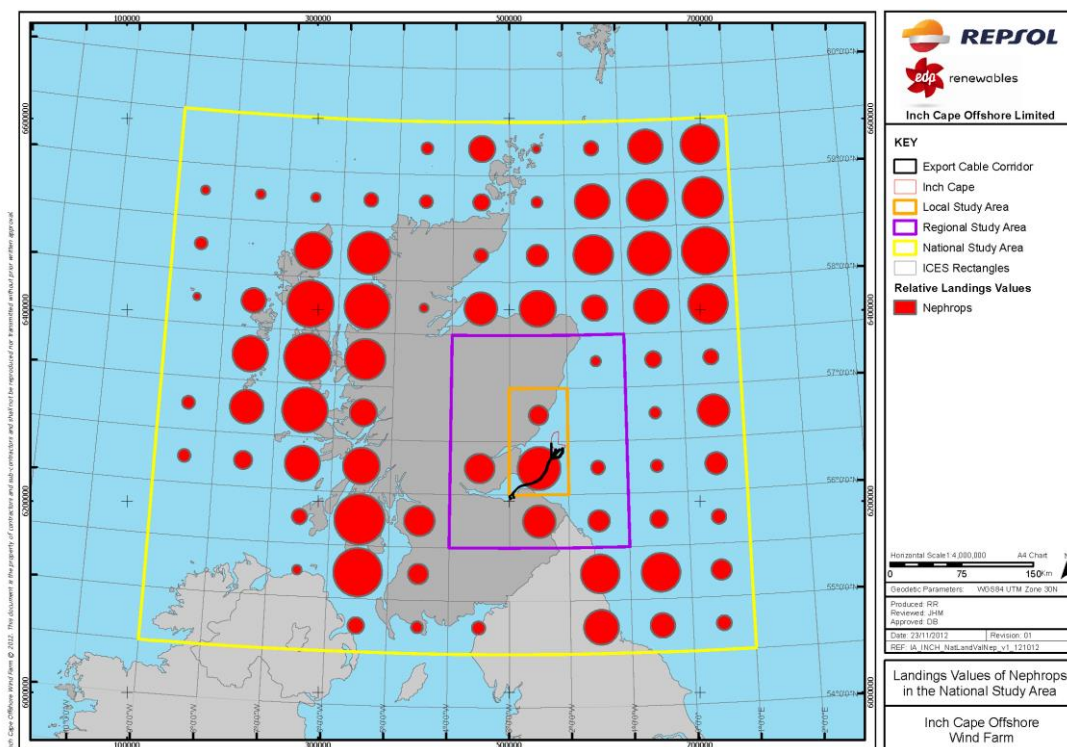
**Figure 18.7: Scallop Landings Values (Average 2001 to 2010) in the UK (Source: MMO, 2011)**



Nephrops Fishery

- 67 *Nephrops* are an important shellfish species in the Forth and Tay area, with the highest landings values recorded in rectangle 41E7 (£2,644,374, averaged 2001 to 2010), within which the Development Area is partially located, which are moderately important on a national scale. Rectangle 42E7 records a relatively much lower level of landings (£162,179, averaged 2001 to 2010) (see Figure 18.8).
- 68 *Nephrops* are principally targeted by vessels operating demersal otter trawls. Due to the substrate-specific requirements of the species, *nephrops* fishing grounds are limited to their being present in sediments which can be characterised as soft and muddy. Otter boards are used to maintain the horizontal opening of the net and fish/shellfish are herded between the boards and into the net as the gear is towed along the seabed. Vessels targeting *nephrops* can operate either one or two nets. The penetration depth of the otter boards into the seabed can be up to 300 mm on muddy substrates.

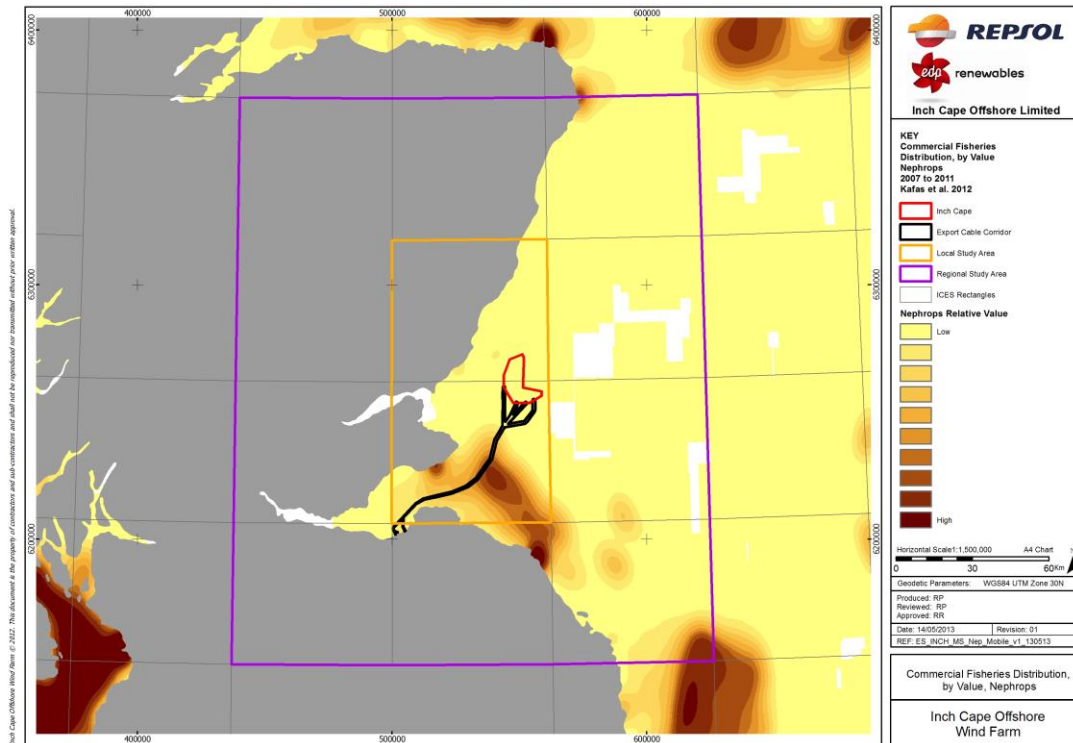
**Figure 18.8: *Nephrops* Landings Values (Average 2001 to 2010) in the National Study Area (Source: MMO, 2011)**



- 69 *Nephrops* are targeted by both the under and over-15 m fleets. The under-15 m fleet is generally comprised of local vessels which concentrate activity on grounds which are accessible from their home ports. The over-15 metre fleet predominantly target grounds further offshore in the North Sea, although it is noted that larger category vessels, from ports such as Fraserburgh, may on occasion fish in the Development Area, likely as a result of a lack of opportunities elsewhere (pers. comm., 2011a).

70 *Nephrops* activity by the over-15 m fleet, as illustrated by Marine Scotland data, is recorded outside of the Development Area, predominantly in grounds to the south (see Figure 18.9 below).

**Figure 18.9: Distribution of *Nephrops* by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012)**

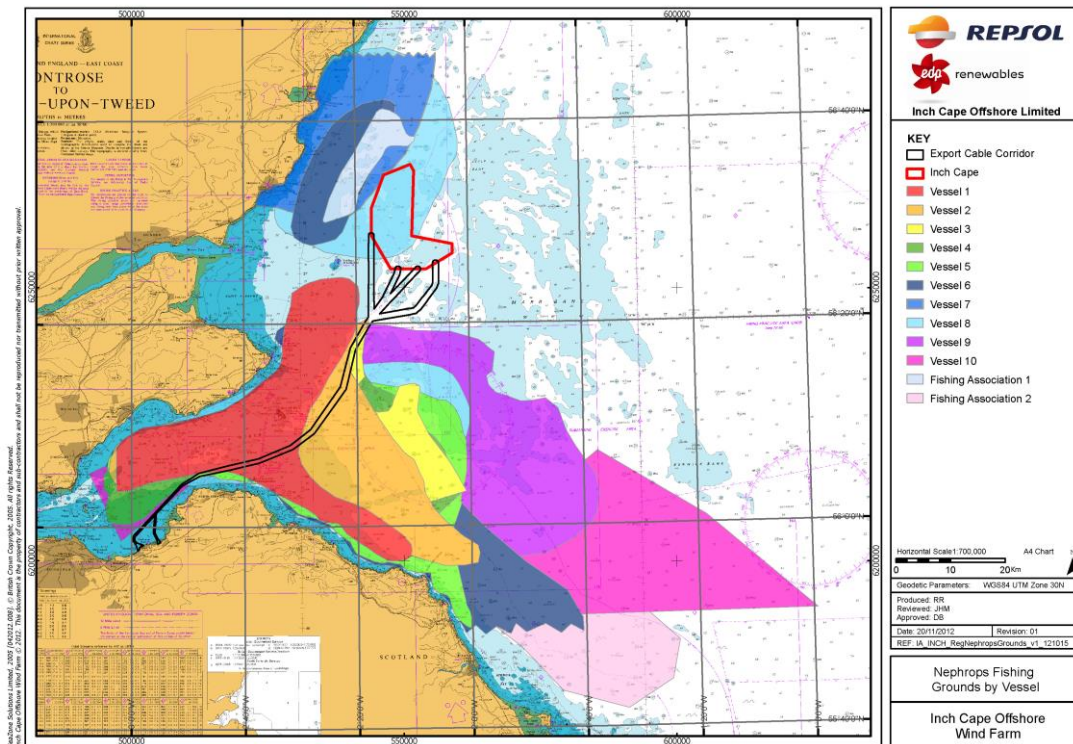


71 Consultation with fishermen identified that a large proportion of *nephrops* vessels operating in the commercial fisheries Regional Study Area are under-15 m in length and therefore not VMS monitored. *Nephrops* activity by the under-15 m fleet has been identified throughout the Regional Study Area, including an area immediately north-west of the Development Area (see Figure 18.10). The limited distribution of the species due to specific substrate requirements should be noted.

72 *Nephrops* are targeted year round, although there are seasonal fluctuations in landings, with a marked peak recorded during the summer months (July and August). Weather conditions, particularly for the smaller category vessels, are a significant factor in determining levels of activity in the winter months.

73 *Nephrops* are currently considered to be sustainably exploited in the Forth and Tay area by the local fleet and the numbers of vessels targeting the species are not considered to be likely to vary significantly in the future (pers. comm., 2011a).

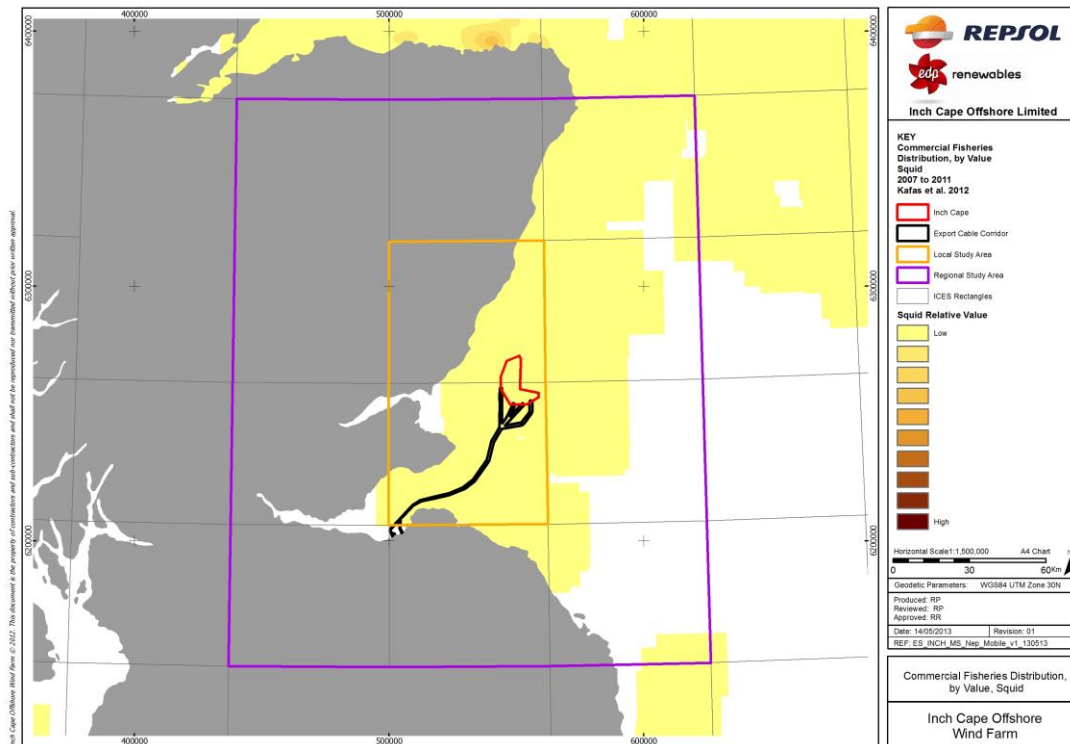
Figure 18.10: *Nephrops* Fishing Grounds by Vessel in the Regional Study Area



### Squid Fishery

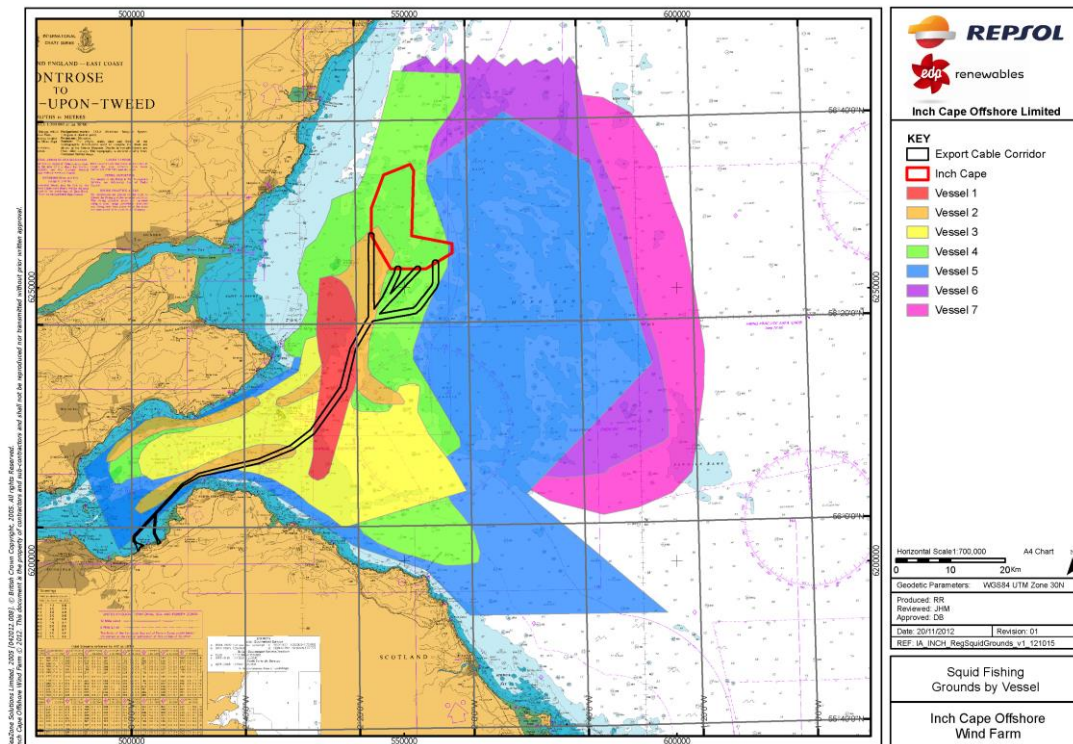
- 74 Squid is reported to be an increasingly important fishery in the Forth and Tay area. The fishery is currently unregulated and demersal vessels constrained by restrictions on other pressure stocks (such as *nephrops* or whitefish) are able to reconfigure gear to target the species.
- 75 Squid have a short lifespan and stock levels depend on the survival success rates of individual breeding seasons. Although squid grounds are often located in inshore areas, grounds will vary each year and fishermen will generally move further offshore as the season progresses to target the species in deeper waters.
- 76 Annual landings values vary significantly as the fishery is dependent upon the seasonal arrival of the species in the study areas. Marine Scotland data (over-15 m vessels only) showed squid activity to be primarily located in inshore areas adjacent to the coast, at relatively low levels (see Figure 18.11 below).
- 77 Peak landings values for squid occur between August and October, although fishermen reported an unusually long fishing season in 2010, with activity continuing into November (pers. comm., 2011b).

Figure 18.11: Distribution of Squid by Value (Average 2007 to 2011) in the Regional Study Area (Source: Marine Scotland, 2012)



- 78 The squid fishery is generally targeted by vessels operating bottom otter trawls. For the most part, activity is by vessels with home ports in the commercial fisheries Regional Study Area, although boats will arrive from further afield if the fishery is productive: vessels have been observed from Fraserburgh and Peterhead (pers. comm., 2012b).
- 79 Bottom otter trawlers targeting *nephrops* or whitefish will reconfigure gear to operate nets with a smaller mesh size and higher headline. Squid can be targeted on a variety of seabed substrates and vessels may employ protective gear, such as rockhoppers, on rough ground.
- 80 A proportion of the fleet targeting squid, particularly in inshore areas, will be under-15 m and therefore these vessels will not be included within the VMS datasets. Consultation with squid fishermen in the Regional Study Area suggested that grounds are found throughout the Forth and Tay area, including within the Development Area (see Figure 18.12). Further, fishermen stated that squid fishing grounds are not fixed and squid are being found in grounds further offshore than previous years (pers. comm., 2010).

Figure 18.12: Squid Fishing Grounds by Vessel in the Regional Study Area



81 At present, squid is considered to be resistant to fishing pressure. It is, however, thought in some quarters that squid spawning grounds need to be identified and effectively managed in order to protect future stocks. Squid stocks are erratic and as such it is not currently possible to predict future stocks.

### Creel Fishery

82 Rectangles 41E7 and 42E7 record two of the highest landings values for crab and lobster in the commercial fisheries Regional Study Area (£1,336,878 and £867,681, respectively, averaged 2001 to 2010), which are moderately important on a national scale (see Figure 18.13). It can be seen that the highest proportion of these landings are of lobster.

83 Crab and lobster are principally targeted by full time static gear vessels setting creels, although there are a number of part time vessels who will set a small number of creels in inshore areas during the summer months. Lobsters are targeted on rocky, uneven ground and around wreck sites. Crab species (including edible and velvet crabs) are targeted on a variety of substrates. Fishing is year round, although there is a significant peak in activity in the summer months.

84 Vessels targeting crab and lobster are generally under-15 m in length and, as a result will not be monitored by VMS datasets. The fishery is most active in the summer months, partly due to the movement of the species but also due to weather conditions, which are a significant factor in determining levels of activity in the winter months.

85 Creel fishing grounds are predominantly recorded in coastal areas, along the north and south coasts of the Regional Study Area. Grounds offshore of Arbroath are particularly important crab and lobster grounds and the port is the most important in the local area, with a number of full-time and part-time creel boats. Although the majority of creel boats operate inshore of the Development Area, several of these vessels have been identified as fishing within the Development Area (see Figure 18.14).

**Figure 18.13: Landings Values for Lobster and Crabs (Average 2001 to 2010), in the National Study Area (Source: MMO, 2011)**

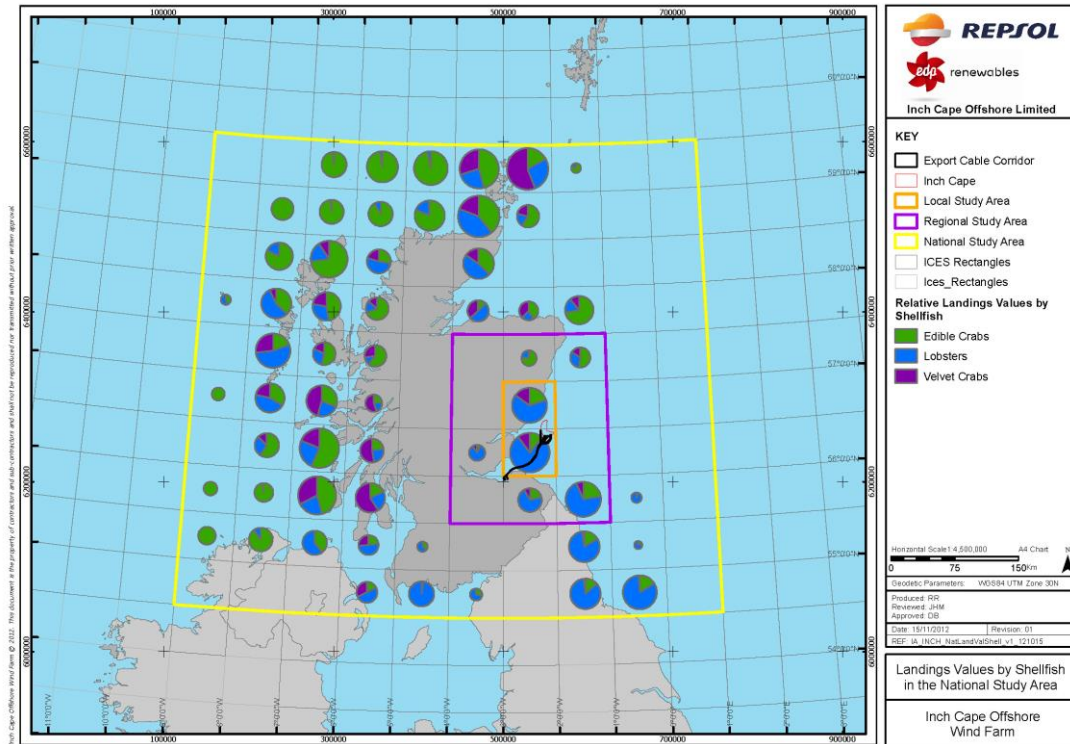
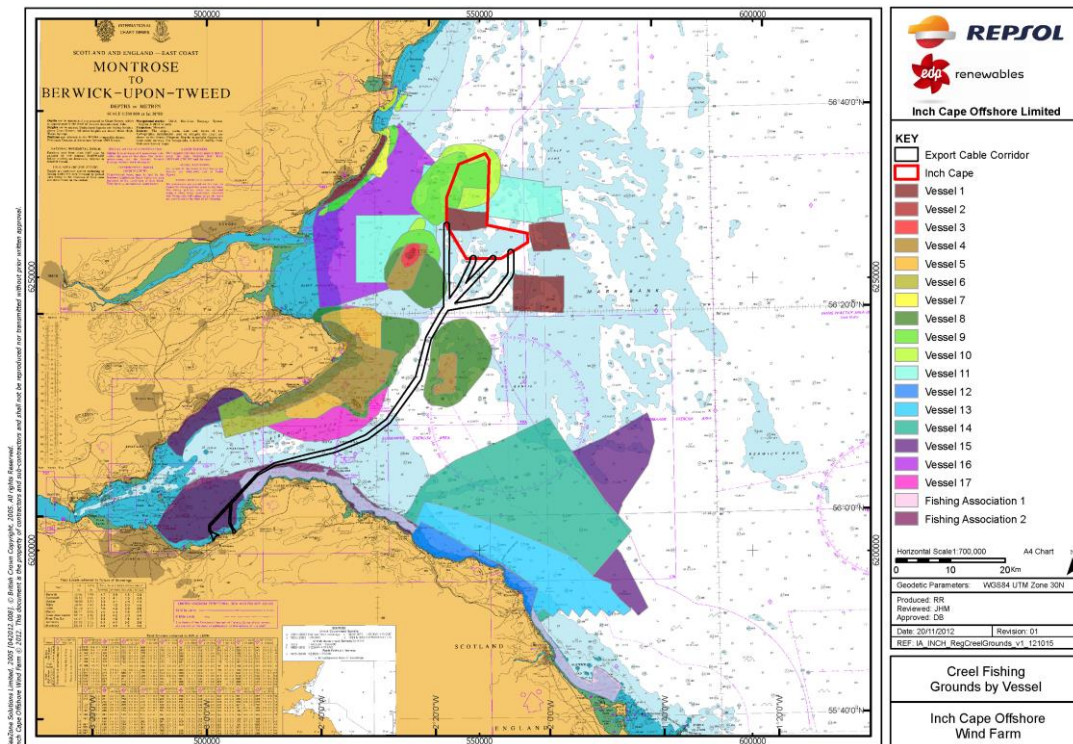


Figure 18.14: Creel Fishing Grounds by Vessel in the Regional Study Area



**Offshore Export Cable Corridor**

- 86 The following information has been summarised from *Appendix 18B*.
- 87 The Offshore Export Cable Corridor predominantly passes through ICES rectangles 41E7, with two cable landfall options both within in 40E7. Due to the corridor passing in close proximity to rectangles 40E6 and 41E6, a summary of the activity recorded in these has also been provided. It should be noted however, that no landings have been recorded in 40E6 which may not be entirely representative of the level of activity in this discrete area, with landings potentially being allocated to an adjacent rectangle.
- 88 The species comprising the majority of the landings values are as described previously: *nephrops*, crustaceans and scallops, and to a lesser extent squid. As mentioned previously, scallops are targeted by vessels boat dredging, *nephrops* and squid by vessels demersal trawling and crab and lobster by vessels setting creels.
- 89 Landings values from 41E7 are of high importance in the commercial fisheries Regional Study Area (Figure 18.4). ICES rectangles 41E6 and 40E7, record relatively lower landings values of *nephrops*, crustaceans and scallops, although the much more limited sea area within these rectangles is likely to be the principal reason for this. Rectangle 40E7 additionally records very low landings of surf and razor clams, targeted by vessels operating mechanised and boat dredges. The large majority of vessels operating in these rectangles are under-15 m in length (Figure 18.4).

- 90 As mentioned previously, the majority of landings values from rectangle 41E7 are landed into the port of Pittenweem. In rectangle 40E7, Eyemouth (73.0 per cent), St Abbs (12.3 per cent) and Dunbar (6.5 per cent) record the highest proportion of landings values and these represent 28.3 per cent, 93.4 per cent and 13.3 per cent of each port's total annual income, respectively.
- 91 In rectangle 41E6, Port Seton records 88.1 per cent of the landings values, which is 93.3 per cent of its total annual income. Eyemouth (2.1 per cent), Cove (Leith) (1.5 per cent) and Newhaven (1.4 per cent) comprise a proportion of the remaining landings values, which constitute 0.5 per cent, 18.3 per cent and 35.6 per cent of the ports' total annual income, respectively.
- 92 Landings for the majority of commercial species targeted in the Offshore Export Cable Corridor are broadly highest in late summer, between July and September, with seasonal squid landings values extending into October.

#### Nephrops Fishery

- 93 *Nephrops* are principally targeted by bottom otter trawl vessels in rectangle 41E7, within which the majority of the Offshore Export Cable Corridor is located. This rectangle records the highest landings values in the Regional Study Area. Marine Scotland data (over-15 m only) identified *nephrops* fishing activity in the Firth of Forth area, through which the Offshore Export Cable Corridor passes (see Figure 18.9). Consultation with fishermen also identified *nephrops* grounds targeted by the under-15 m fleet along the Offshore Export Cable Corridor, which broadly corresponds to the Marine Scotland data (see Figure 18.10).
- 94 Consultation identified that the majority of vessels targeting *nephrops* in the Firth of Forth have home ports in the area. These vessels are often smaller category vessels, which will be limited in their operational range and more susceptible to adverse weather conditions.
- 95 As has been previously stated, Pittenweem is the principal *nephrops* port in the Firth of Forth area, and the fleet will concentrate activities in grounds including the area of the Offshore Export Cable Corridor. In addition, there are *nephrops* trawlers operating out of Dunbar and Port Seton, targeting grounds in the vicinity of the inshore section of the Offshore Export Cable Corridor.

#### Scallop Fishery

- 96 As previously stated, the large majority of scallop activity is by over-15 m vessels and as a result their activity will be accurately represented by VMS data. In addition, a large proportion of vessels are considered 'nomadic', variously targeting grounds in the wider North Sea, although it is recognised that this will vary from vessel to vessel. VMS data analysis and consultation with fishermen (see Figure 18.5), indicates that the majority of activity occurs along the northern section of the Offshore Export Cable Corridor, in proximity to the Development Area, with the greater proportion of grounds extending northwards.

### Squid Fishery

- 97 Increasing landings of squid have been reported in the Forth and Tay area in recent years, targeted by vessels towing reconfigured demersal trawl gear. It is considered that the large majority of vessels targeting *nephrops* in the Firth of Forth area will alternatively target squid if the fishery is productive. As a result, a significant proportion of vessels will be under-15 m. It has however also been reported that larger category vessels from as far afield as Peterhead and Fraserburgh may be seasonally present if the fishing is good. Significant annual variations in landings of the species should however be noted, with some years recording very low levels of activity (i.e. 2009) and others recording very high landings (2010) in comparison.
- 98 Marine Scotland data for 2010 (over-15 m only) shows squid activity to be fairly widely distributed across the Forth and Tay area, occurring in areas further offshore than previously identified (see Figure 18.11). Consultation with the under-15 m fleet identified squid fishing grounds throughout the commercial fisheries Regional Study Area, including along the extent of the Offshore Export Cable Corridor (see Figure 18.12).

### Creel Fishery

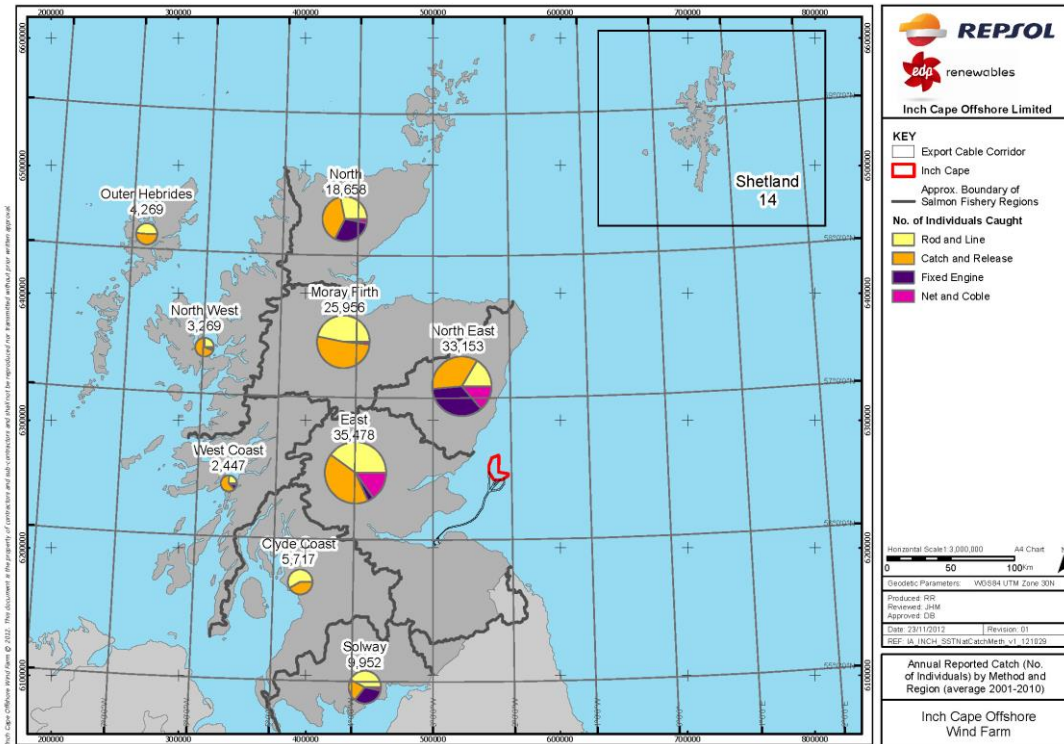
- 99 Crab and lobster fishing grounds are predominantly located in inshore areas, although a number of vessels are now increasingly able to target grounds further offshore. Fishing grounds in the vicinity of the northern section of the Offshore Export Cable Corridor are targeted by vessels from local ports such as Arbroath, which is an important fishing port for vessels fishing crustaceans. Consultation with local fishermen identified that the large majority of creel fishing grounds are not located within the Offshore Export Cable Corridor: fishing is concentrated in inshore grounds within 2.5 nm of the coast, and in offshore areas including the Bell Rock and to a lesser extent the Development Area. Fishing grounds are seasonal and creels will change location according to the abundance of target species.
- 100 The mid-section of the Offshore Export Cable Corridor does not pass through identified creel grounds (see Figure 18.14). Furthermore, survey work undertaken in September 2012 did not encounter any creel gears within the Offshore Export Cable Corridor. In the southern section of the Offshore Export Cable Corridor, consultation with fishermen identified creel activity in coastal areas adjacent to and including the landfall locations. Important local fishing ports in this area include Dunbar and Port Seton, although creel fishing grounds identified by fishermen during consultation did not locate Dunbar grounds within the Offshore Export Cable Corridor. Several creel vessels from Port Seton do have fishing grounds in the immediate vicinity of the landfall options, as was confirmed during the Offshore Export Cable Corridor survey in September 2012.
- 101 Creels vessels in the Regional Study Area are predominantly smaller category boats with limited operational range and susceptibility to adverse weather conditions, although it is recognised that several 'fast' crabbers or 'super' crabbers have entered the fleet. The fishery peaks in the summer months and although the majority of landings are by full-time vessels, a number of part-time boats will also target the fishery during this time.

## 18.4.2 Salmon and Sea Trout Fisheries

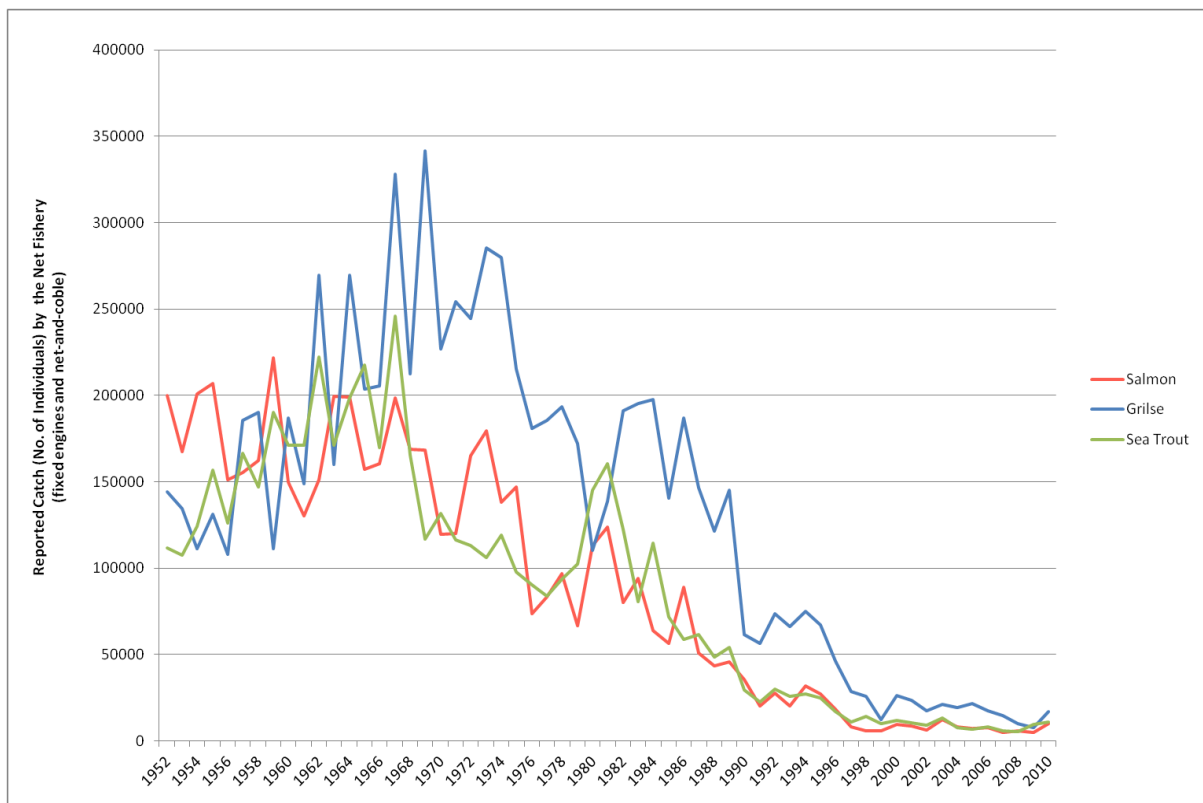
### Overview

- 102 The right to fish for salmon in Scotland, whether inland or at sea, is a heritable right (a right relating to land). The taking of salmon without the right or written permission to do so is prohibited under the *Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003* (Scottish Parliament, 2003).
- 103 The only lawful fishing methods to catch salmon and sea trout in inland waters are rod-and-line and net-and-coble. At sea it is prohibited to catch fish by enmeshment. Effectively, the only lawful methods to catch salmon and sea trout at sea are net-and-coble, fixed engines and rod-and-line.
- 104 All Scottish salmon fisheries are closed for a minimum of 168 days a year. Actual closure dates may vary but are mostly from late August to mid-February, depending upon individual DSFB policy. Angling may continue for a few weeks either side of this. Weekly closed times are also nationally enforced, being 24 hours on a Sunday in the case of angling and 60 hours per week for all other methods.
- 105 Salmon fisheries are saleable and netsmen or companies may acquire fishing rights over relatively large areas, although coastal salmon fishing is limited by virtue of gear restrictions. Other interested parties may also purchase rights. For example, the Atlantic Salmon Trust (AST) has historically bought coastal sites to close them down as a conservation measure in order to halt coastal netting activities. Similarly, rod-and-line interests may buy up river or coastal netting rights to close them down, often through the DSFBs.
- 106 An indication of the contribution of each fishing method to the total reported catch by salmon fishery region in Scotland is given in Figure 18.15, expressed as annual (average 2001 to 2010) fish caught by method. In general terms, rod-and-line (rod-and-line and catch and release combined) accounts for the majority of the reported catch in most salmon fishery regions, although particularly in salmon fishery regions along the north and east coasts of Scotland, netting (fixed engines and net-and-coble) accounts for a relatively high percentage of the total catch.
- 107 It should be noted that the national trend is a decrease in netting effort and therefore the contribution of netting to the annual catch may, depending on the fishery region and district under consideration, overestimate the current levels of exploitation. The decrease in catches by the net fishery from historic levels is illustrated in Figure 18.16. This shows the number of fish caught by net-and-coble and fixed engines from 1952 to 2010 in Scotland.

**Figure 18.15: Annual Reported Catch (No. of Individuals) by Method and Region (average 2001 to 2010) (Source: MSS, 2011)**



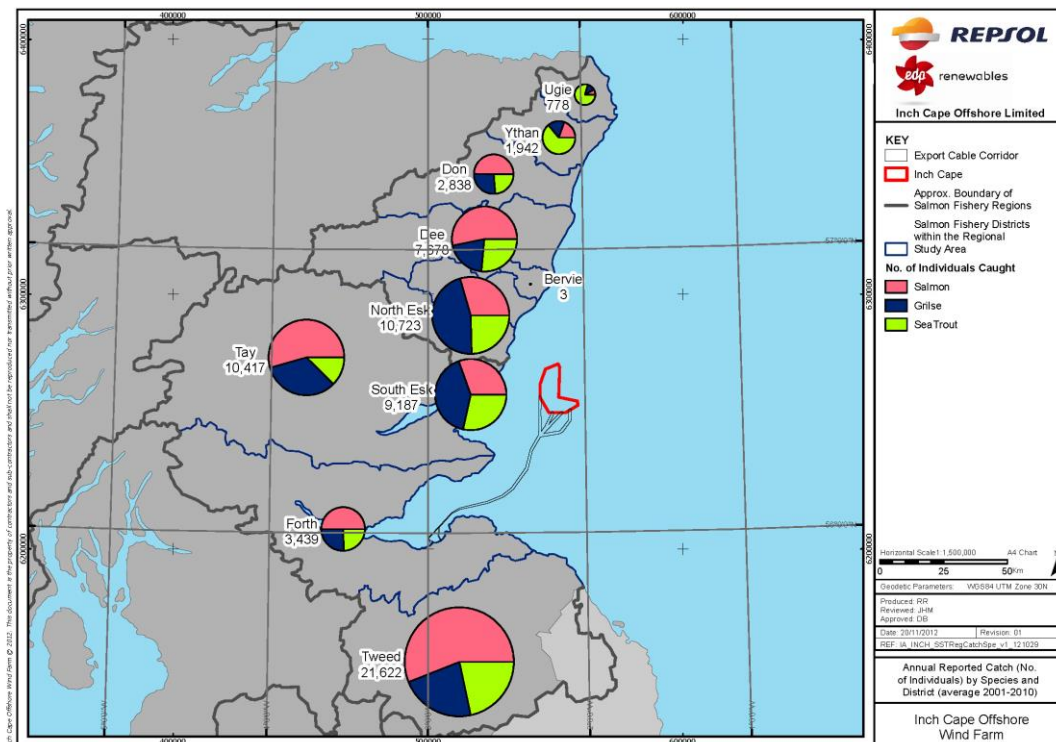
**Figure 18.16: Net Fishery (Fixed Engine and Net-and-coble) Reported Catches (1952 to 2010) (Source: MSS, 2011)**



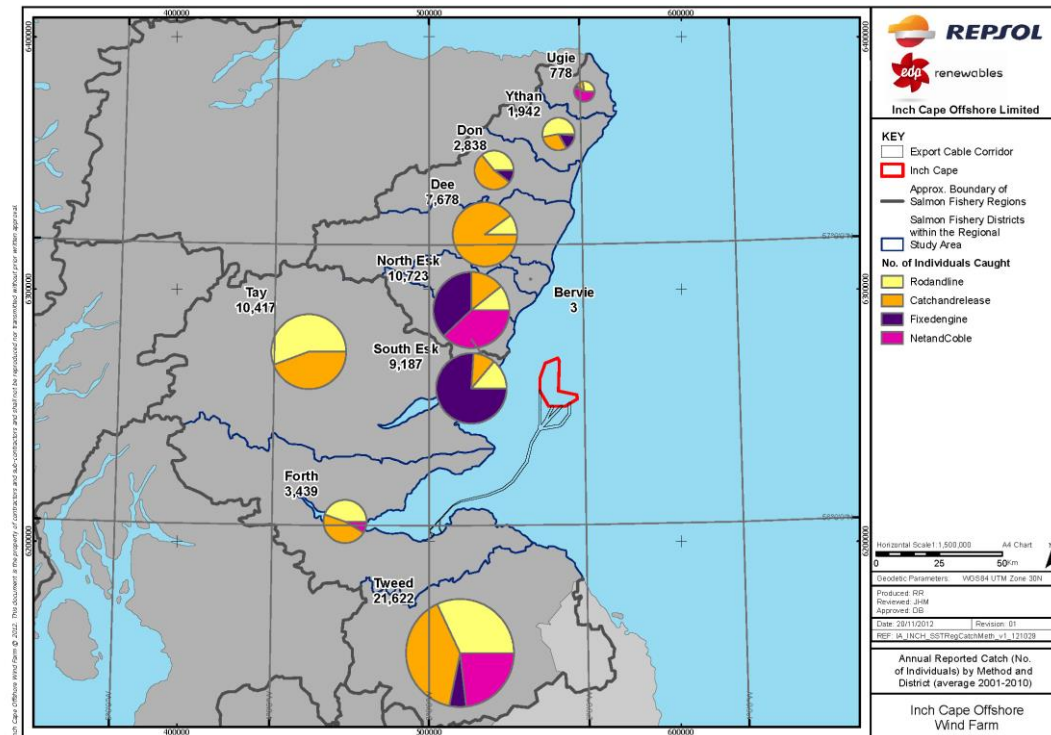
**Salmon and Sea Trout Fisheries in the Regional Study Area**

- 108 An indication of the annual reported catch by species and method in the regional study area is given in Figure 18.17 and Figure 18.18 respectively, expressed as the number of individuals caught by district (average 2001 to 2010). Highest catch numbers are recorded from the Tweed and Esk district (including the North Esk, South Esk and Bervie) and, to a lesser extent, from the Tay and the Dee.
- 109 Salmon and grilse account for the majority of the catch in all the districts within the salmon and sea trout fisheries Regional Study Area, with the exception of the Ythan and Ugie, where sea trout is the principal species caught.
- 110 The principal fishing method in the Regional Study Area is rod-and-line, including catch and release (e.g. Dee and Tay). Netting by both fixed engines and net-and-coble, however, occurs at varying degrees in a number of districts (e.g. North Esk and Tweed). It should be noted, however, that the North Esk’s coastal netting stations have been bought out by the Esk DSFB in 2007. Fixed engines are still commercially operational in the South Esk, with Usan Salmon Fishery (Montrose) constituting the principal fishery in the South Esk area.

**Figure 18.17: Annual Catch (No. of Individuals) by Species in Salmon Fishery Districts within the Regional Study Area (average 2001 to 2010) (Source: MSS, 2011)**



**Figure 18.18: Annual Reported Catch (No. of Individuals) by Method in Salmon Fishery Districts within the Regional Study Area (average 2001 to 2010) (Source: MSS, 2011)**

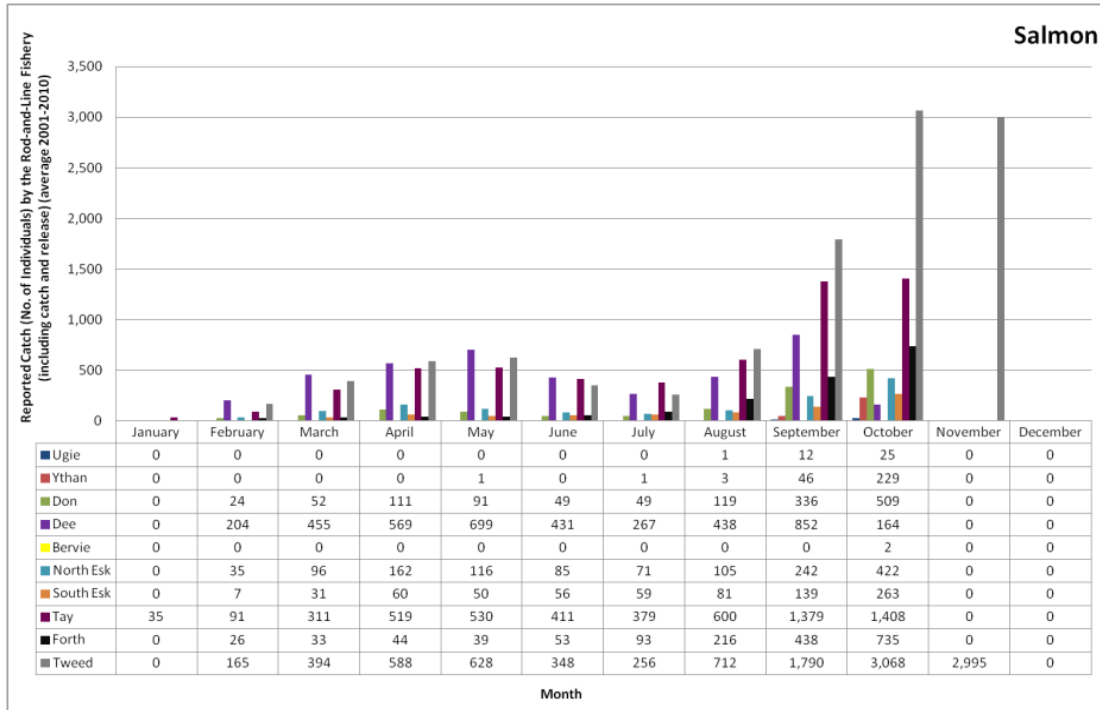


### **The Rod-and-Line Fishery**

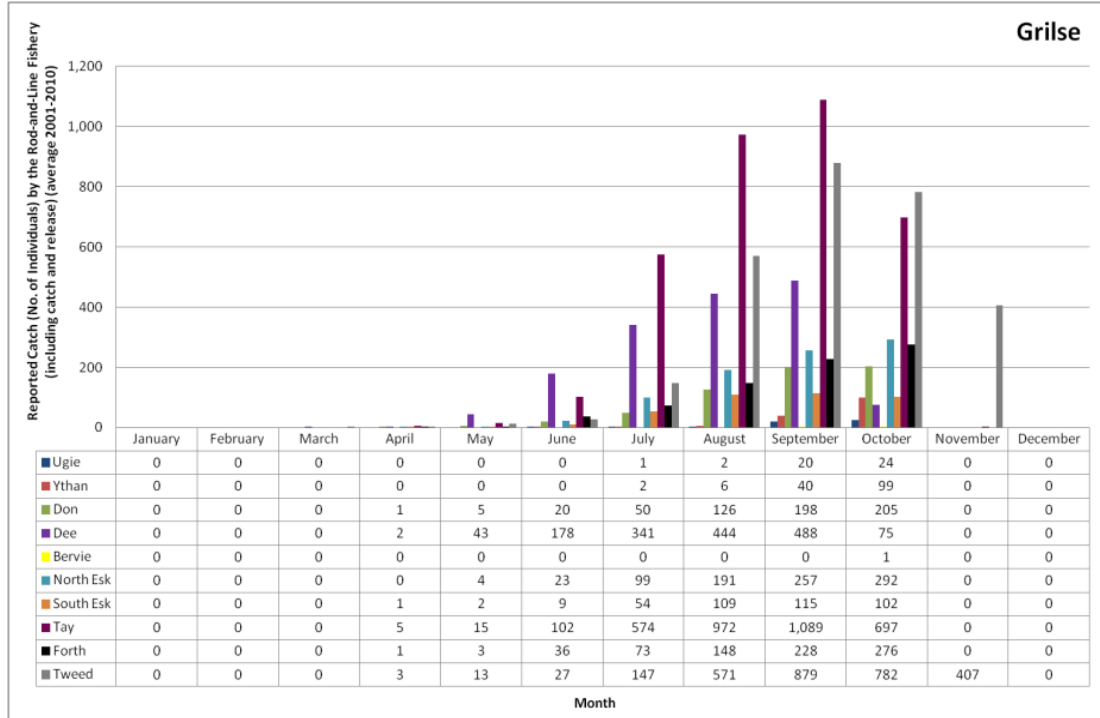
#### ***Seasonality of the Fishery***

- 111 An indication of the seasonality of the rod-and-line fishery within the Regional Study Area by month and district is given in Figure 18.19 to Figure 18.21 by species.
- 112 Rod-and-line salmon catches peak in September and October in most districts within the Regional Study Area with the Tweed also recording high catches in November. Whilst relatively lower, salmon catches are also of importance from March to August, particularly in the Dee, Tay and Tweed, reflecting the diversity of salmon runs in the Regional Study Area.
- 113 Grilse are principally caught from July to October with peak catches recorded from August to October in most districts. In the Tweed, as for salmon, relatively high grilse catches are also recorded in November.
- 114 Sea trout are principally caught from May to October, with highest catches being recorded in June, July and August. In the Tweed, as for grilse and salmon, relatively high sea trout catches are also recorded in November.

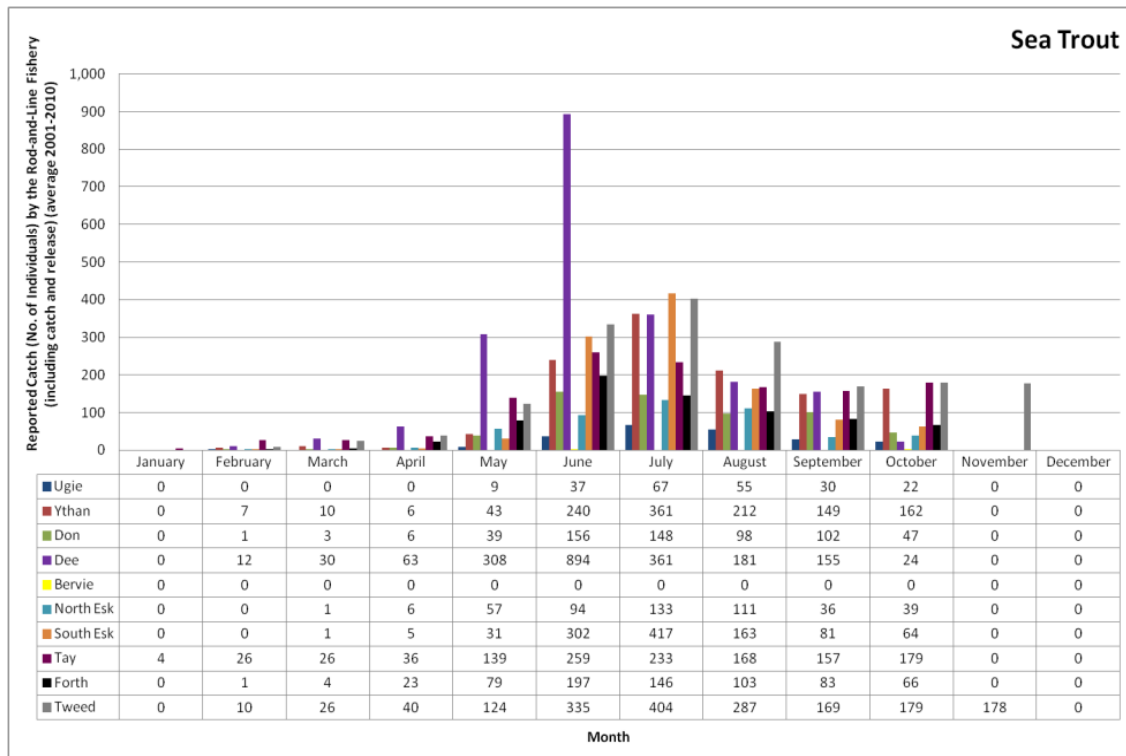
**Figure 18.19: Seasonality of the Salmon Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



**Figure 18.20: Seasonality of the Grilse Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



**Figure 18.21: Seasonality of the Sea Trout Catch (average 2001 to 2010) by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



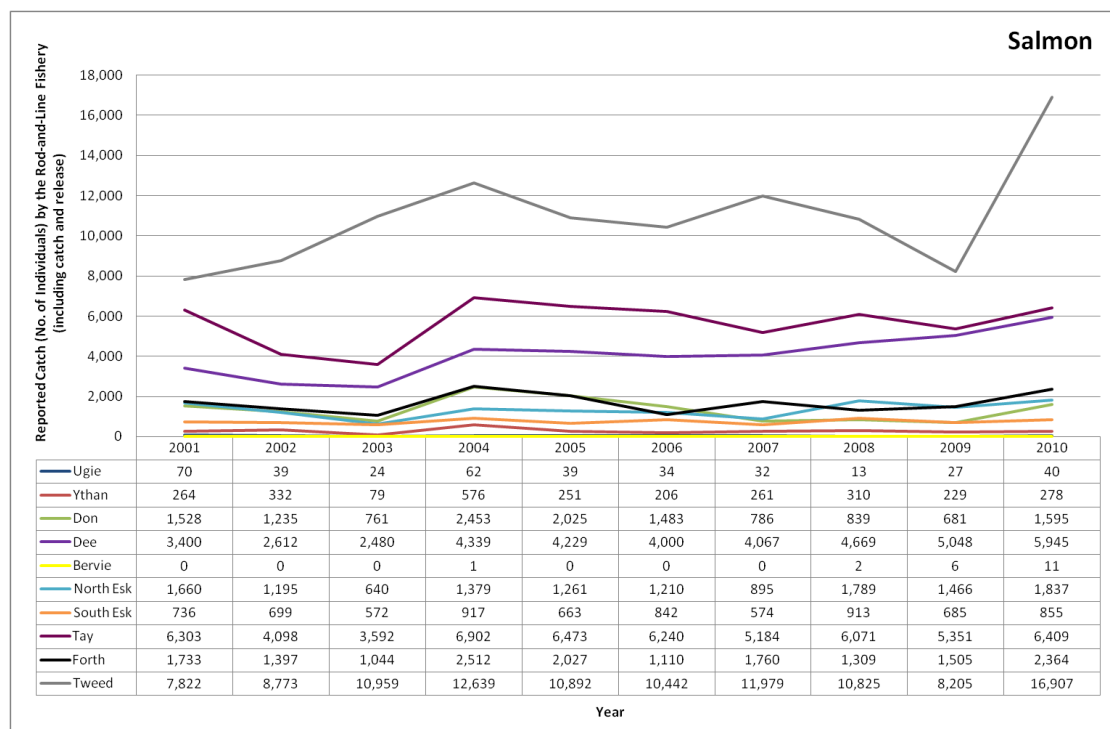
Annual Variation of the Fishery

- 115 Catches vary annually, as shown in Figure 18.22 to Figure 18.24, by species. In the Ythan, salmon catches have remained relatively stable, peaking in 2004, after a low recorded in 2003. Salmon and grilse catches in the Ugie have fluctuated over the years, remaining comparatively low.
- 116 In the Don, salmon catches have fluctuated over the period 2001 to 2010, with lows recorded in 2003 and from 2007 to 2009, followed by an increase in catches in 2010. Catches of grilse peaked in 2004 and 2010, remaining comparatively stable. Salmon and grilse catches in the Dee have shown a general increase from 2001 to 2010, with catches in 2010 representing almost double the catches recorded at the beginning of the times series.
- 117 In the North Esk, salmon catches have varied over the years, whilst for grilse there has been a relative increase in the catch, with 412 grilse caught in 2001 compared to 1,471 in 2010. In the South Esk, salmon and grilse catches remained comparatively low, with no clear trend apparent from 2001 to 2010.
- 118 In the Tay, salmon catches remained stable with the exception of a decline recorded in 2002 and 2003. Grilse catches peaked in 2006, before declining in 2009 and 2010. In the Forth, salmon and grilse catches have fluctuated over the years, with salmon catches peaking in 2004 and grilse catches peaking in 2004 and 2010.
- 119 In the Tweed, rod-and-line salmon catches peaked in 2004, 2007 and 2010. From 2007 to 2009, there was a decrease in the catch, with 2009 having catches similar to those of 2001,

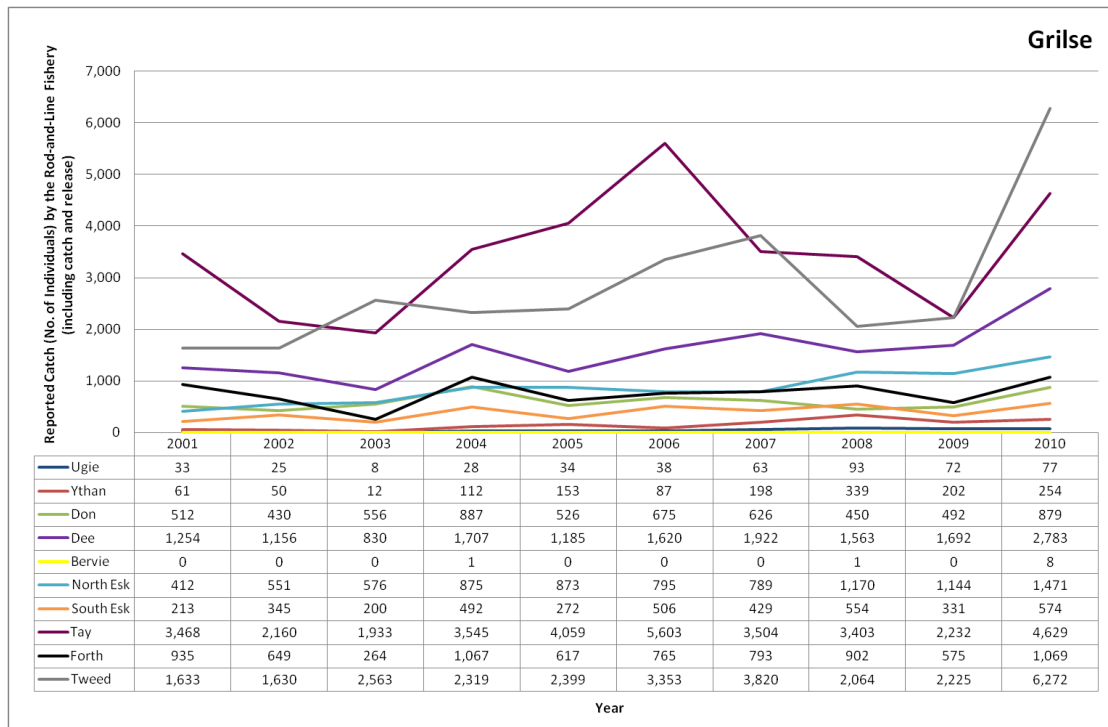
the year recording the lowest catch within the ten year period. In 2010, salmon catches increased significantly, with 8,205 individuals caught in 2009 and 16,907 individuals caught in 2010. Grilse catches in the Tweed have shown a similar pattern, with an overall increase from 2002 to 2007, relatively lower catches in 2008 and 2009, and significantly higher catches in 2010.

120 Sea trout catches have shown a general decline during the first years of the time series, with a low being recorded in all districts in 2003, after which the general trend has been one of an overall increase. An exception to this is the South Esk and the Don, where there has been a decline in the sea trout catch.

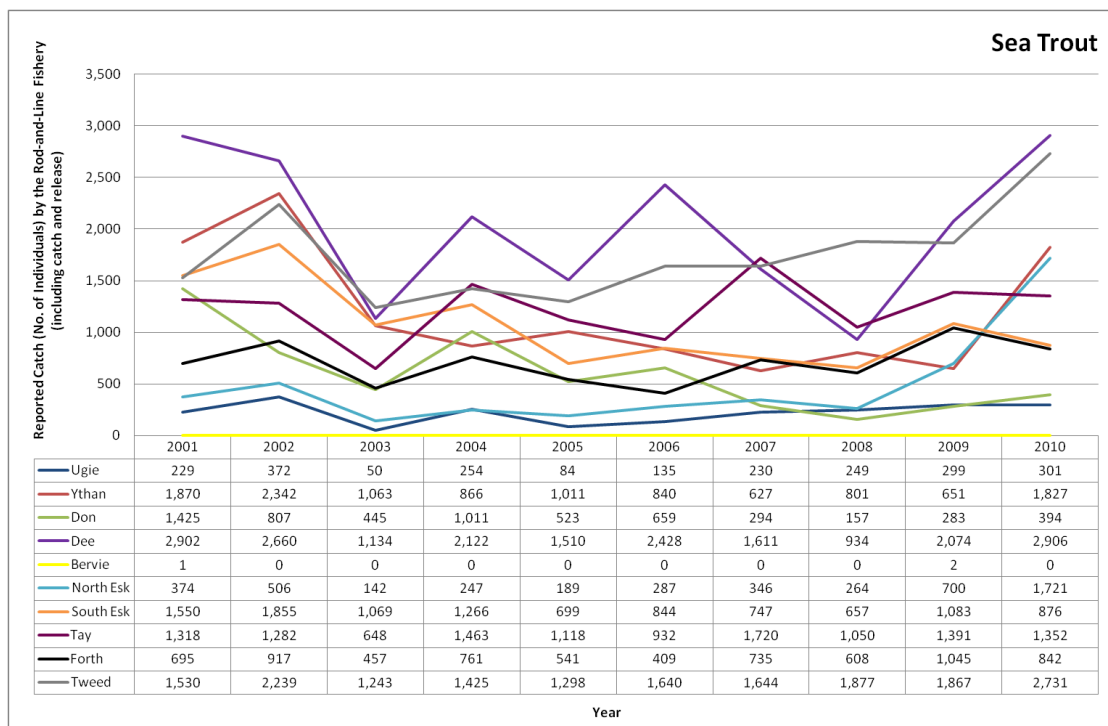
**Figure 18.22: Annual Variation (2001 to 2010) of Salmon Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



**Figure 18.23: Annual Variation (2001 to 2010) of Grilse Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



**Figure 18.24: Annual Variation (2001 to 2010) of Sea Trout Catches by the Rod-and-Line Fishery (including Catch and Release) (Source: MSS, 2011)**



### The Net Fishery

- 121 Net fishing for salmon and sea trout is generally in decline, as fishing rights have been bought or leased by conservation interests for the purposes of stopping netting operations. As a result, average values between 2001 and 2010 are likely to overestimate the current levels of net-and-coble and fixed engine fisheries.
- 122 The annual reported catch of the net fishery (net-and-coble and fixed engines) by salmon fishery regions is illustrated in Figure 18.25, by species and method. Net-and-coble principally takes place in the North Esk and the Tweed districts, and to a much lesser extent in the Forth, Ugie and Tay. The majority of the catch by the fixed engines fishery within the Regional Study Area comes from the Esk district (North and South Esk), and, to a lesser extent, the Tweed. The Don, Ythan and Ugie also record comparatively low catches by this method.
- 123 The North East is the principal region in terms of netting activity in a national context, with the majority of the catches in this region concentrated in the Esk district (North and South Esk). The North Esk's coastal netting stations were bought out by the Esk DSFB in 2007. Fixed engines are still commercially operational in the South Esk, with Usan Salmon Fishery (Montrose) constituting the principal fishery in the South Esk area.
- 124 The net fishery in the East Region is located in the Tweed district, where it is predominantly undertaken using net-and-coble. In the Tay, netting is limited to several net-and-coble fisheries (which operate upstream of Dundee) and coastal nets in the northern reaches of the district where the Usan Fishery has salmon fishing rights.
- 125 An indication of the annual variation in fishing effort by net fisheries in the Regional Study Area, broken down by fixed engines and net-and-coble in districts where these methods are used, is given in Figure 18.26 and Figure 18.27, respectively.

Figure 18.25: Annual (average 2001 to 2010) Net Fisheries Catch by Region and Distribution Fisheries in Scotland (2009) (Source: MSS, 2011)

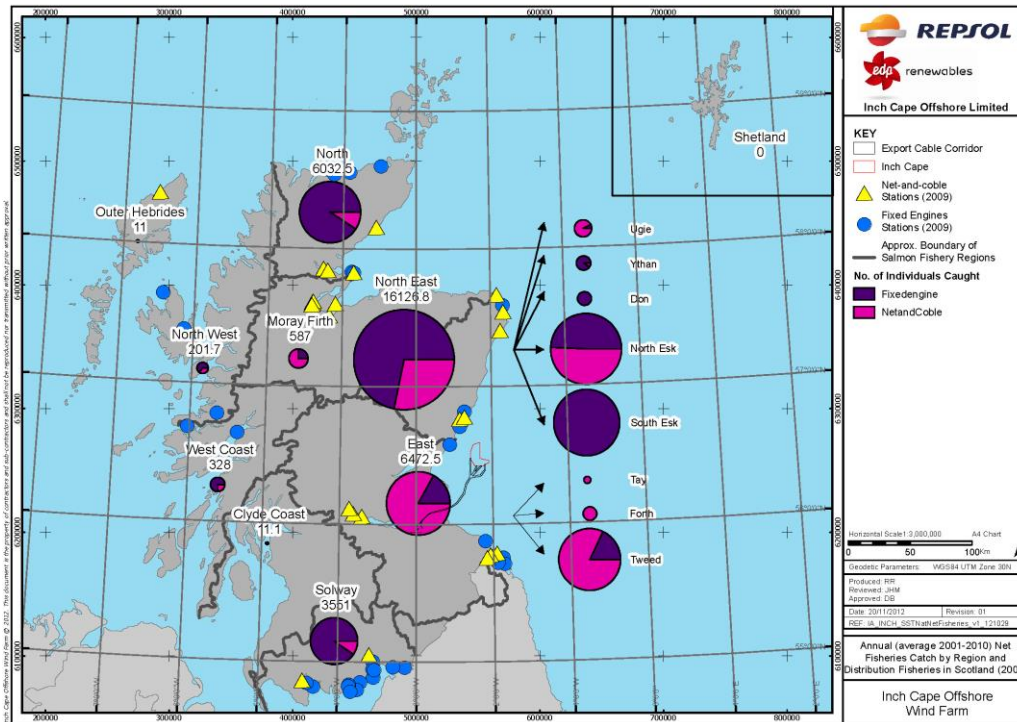
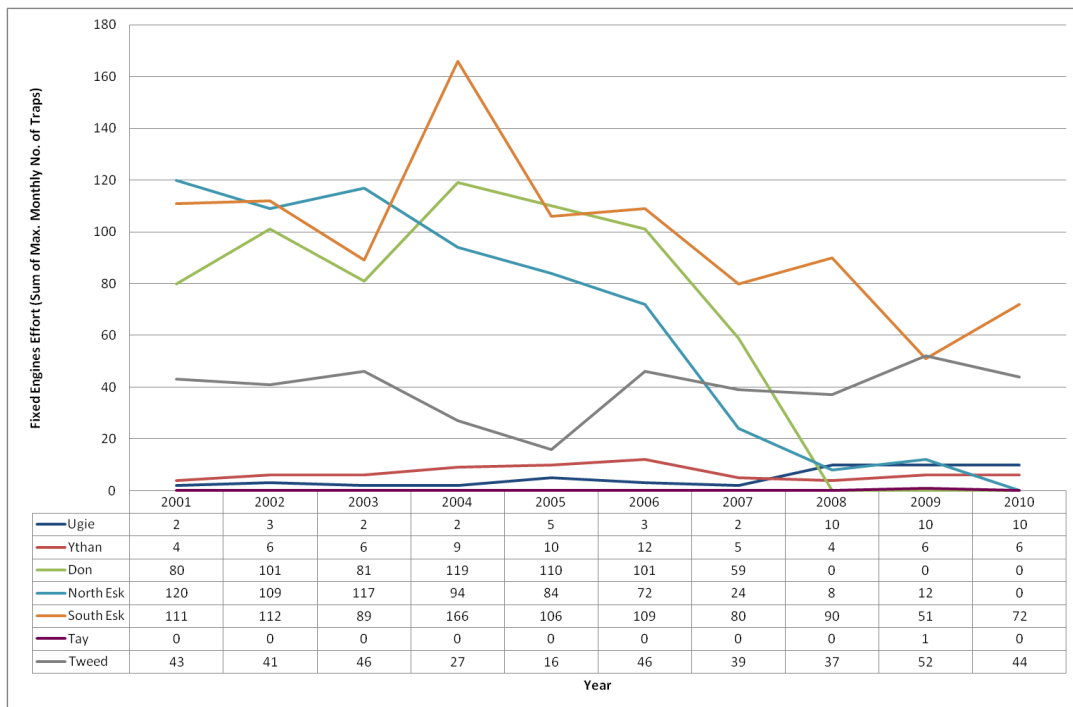
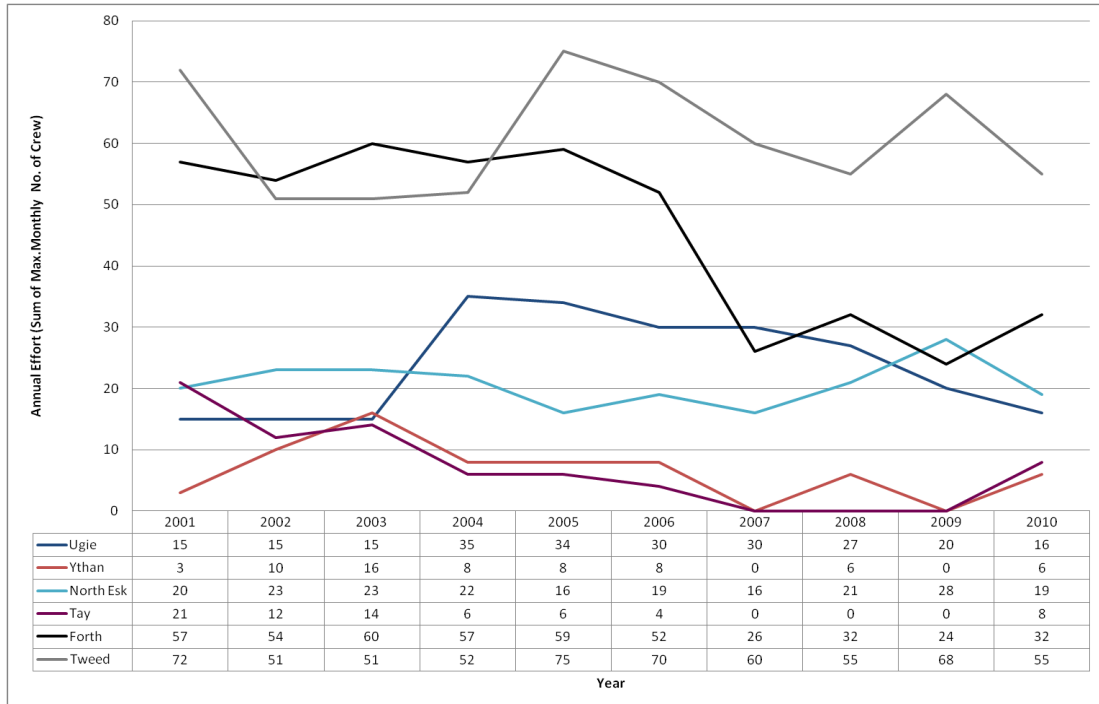


Figure 18.26: Annual Fixed Engines Effort (Max. no. of Traps) by Salmon Fishery District (2001 to 2010) (Source: MSS, 2011)



**Figure 18.27: Annual Net-and-coble Effort (Max. no. of Crew) by Salmon Fishery District (2001 to 2010) (Source: MSS, 2011)**



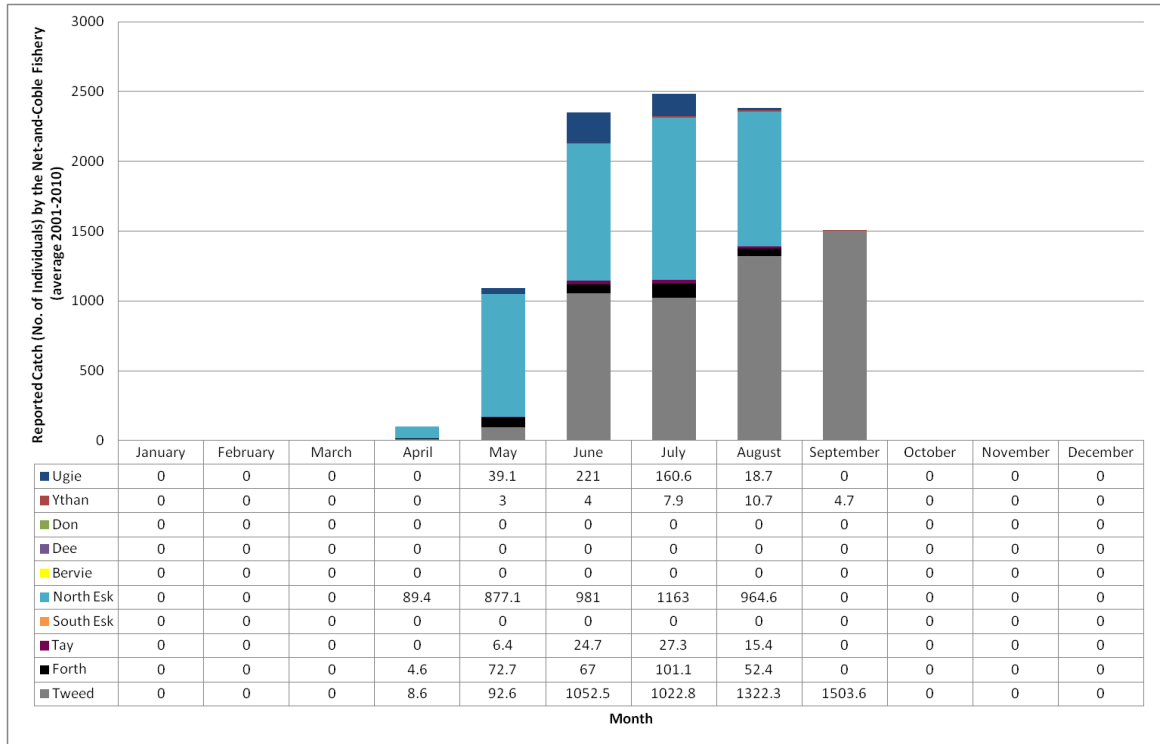
Seasonality of the Fishery

- 126 An indication of the seasonality of the net-and-coble and fixed engines fisheries within the Regional Study Area by month and district are given in Figure 18.28 and Figure 18.29, respectively. Detailed information about the seasonality of the net fishery by method, species and district is provided in *Appendix 18C*.
- 127 Net-and-coble principally takes place in the North Esk and Tweed districts, and to a much lesser extent in the Ugie, Forth, Tay and Ythan. In the North Esk catches are highest from May to August, peaking in July. In the Tweed, highest catches are recorded from June to September, peaking in September.

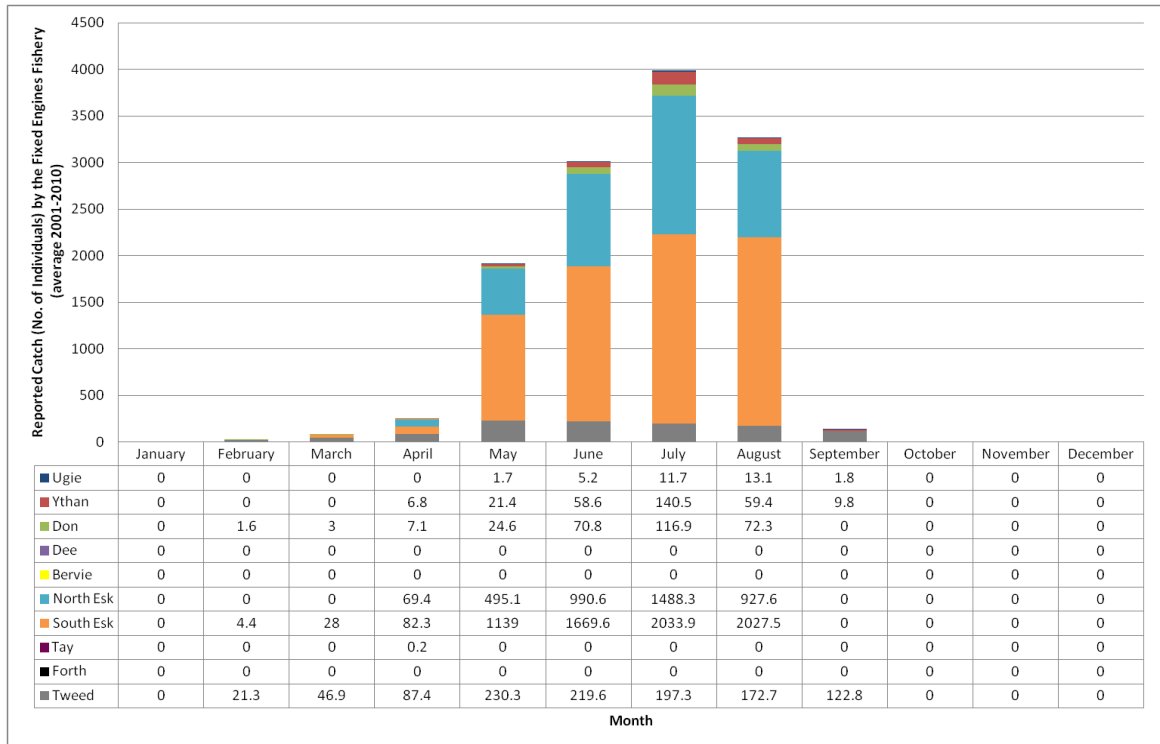
Annual Variation of the Fishery

- 128 An indication of the annual variations in catches by the net-and-coble and fixed engine fisheries within the Regional Study Area during the period 2001 to 2010 by year and district are given in Figure 18.30 and Figure 18.31, respectively, by species. Detailed information about annual variations of the net fishery by method, species and district is provided in *Appendix 18C*.

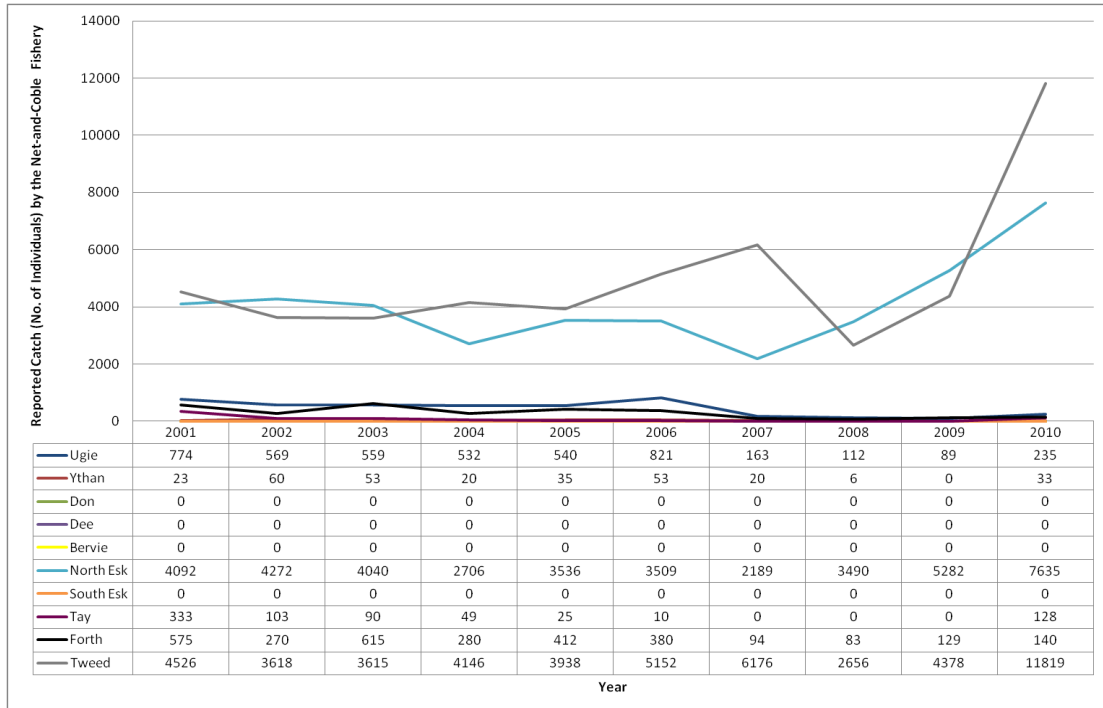
**Figure 18.28: Seasonality of the Catch (average 2001 to 2010) by the Net-and-coble Fishery (Source: MSS, 2011)**



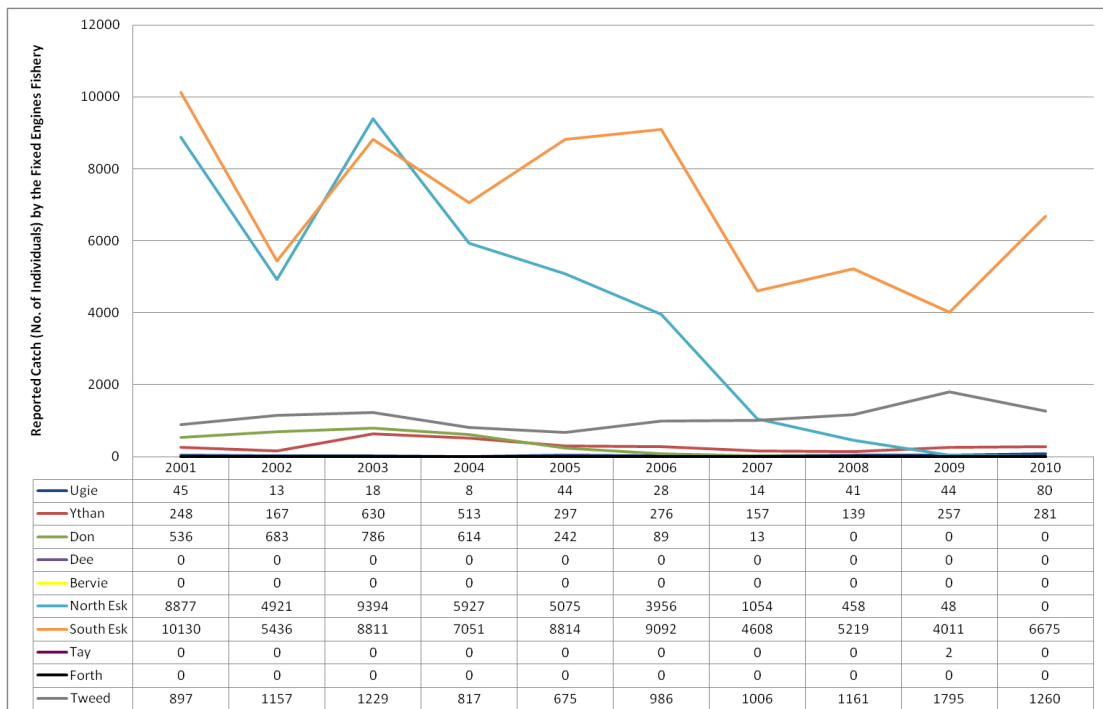
**Figure 18.29: Seasonality of the Catch (average 2001 to 2010) by the Fixed Engine Fishery (Source: MSS, 2011)**



**Figure 18.30: Annual Variations in Catches by the Net-and-coble Fishery (Source: MSS, 2011)**



**Figure 18.31: Annual Variations in Catches by the Fixed Engines Fishery (Source: MSS, 2011)**



### Designated Sites

129 A number of rivers in the Regional Study areas are SACs, with salmon being a qualifying reason for selection of the site. These are discussed in Chapter 9 and *Section 13.13* and include the following;

- River Tay SAC;
- River Teith SAC;
- River South Esk SAC;
- River Dee SAC; and
- River Tweed SAC.

### Offshore Transmission Works

130 The location of the Offshore Export Cable Corridor is shown in Figure 18.2. Both landfall options for the Offshore Export Cable Corridor are located within the Forth district.

131 The following sections provide an indication of the principal fishing methods, seasonality and annual variation of the Forth District salmon and sea trout fisheries.

132 It should be noted that whilst both salmon and sea trout make an important contribution to the fishery in the Forth, the relative importance of each species may vary depending on the river under consideration. In addition, the times and relative importance of different runs may also vary between different rivers within the district.

133 The River Forth is principally a salmon river, however, other rivers within the district (e.g. the Tyne and Allen) are predominantly sea trout rivers (Forth DSFB consultation questionnaire).

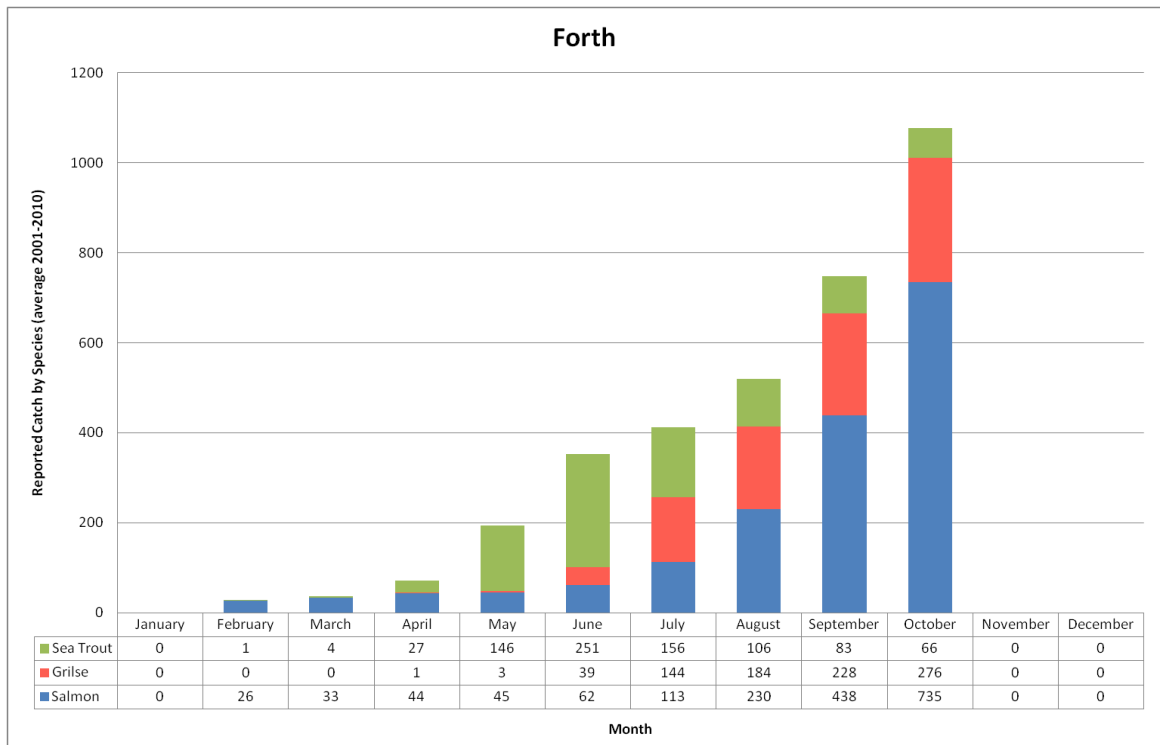
134 Salmon and sea trout fishing in the Forth district is principally undertaken by rod-and-line (including catch and release). Netting in this district is limited, with two net-and-coble stations currently fully operational. In addition, fixed engines are not used and no net fisheries in areas relevant to the Offshore Export Cable landfall options are operational at present.

### Seasonality of the Fishery

135 The salmon and sea trout fishery runs from 1 February to 31 October. During the 2001 to 2010 period, the highest salmon and grilse catches have been recorded from July to October with peak catches recorded in September and October. Sea trout catches have been highest from May to August, peaking in May and June (Figure 18.32).

136 The principal runs in the Forth district take place in June and July for grilse and in August and September for salmon. In addition, there is an improving spring salmon run in the district (Forth DSFB consultation questionnaire).

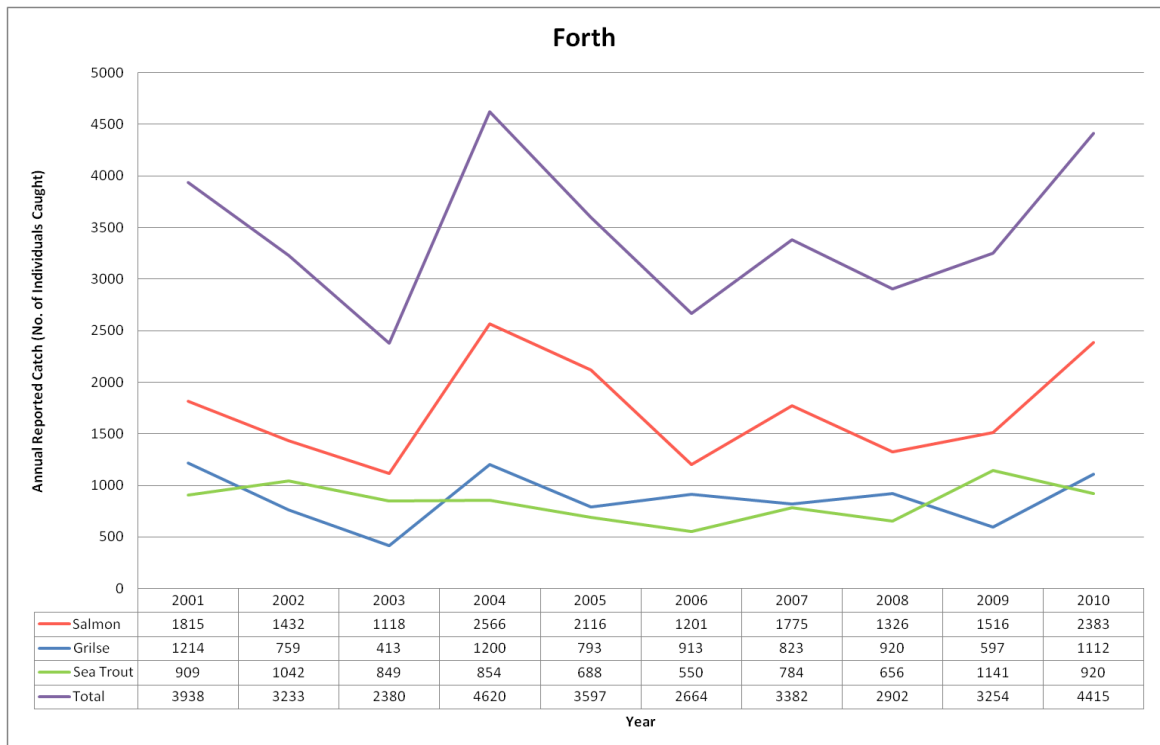
**Figure 18.32: Seasonality of the Salmon and Sea Trout Fishery in the Forth District (average 2001 to 2010) (Source: MSS, 2011)**



Annual Variation of the Fishery

137 The annual variation of catches in the Forth district is shown in Figure 18.33. Salmon, grilse and sea trout catches have fluctuated during the ten year period. High catches have been recorded in 2001, 2004, 2007 and 2010 with no clear trends being apparent. In the case of sea trout, after an overall decline from 2002 to 2006, there has been a relative increase in the catch with 2009 recording the highest catch for this species.

**Figure 18.33: Annual Variation in the Reported Catch by Species in the Forth District (2001 to 2010) (Source: MSS, 2011)**



#### 18.4.3 Baseline without the Project

138 Trends in fishing activities are difficult to establish on a yearly basis and an assessment of the potential scale of an effect over a longer period is therefore unrealistic. It should, however, be noted that commercial fishing is subject to numerous factors which may cause it to differ in the future from the baseline provided. This could be as a result of, for example, changes in fisheries management policies and legislation, alterations in species distribution and abundance, the introduction of marine conservation areas, increases in running costs such as fuel prices, etc.

### 18.5 Development Area Impact Assessment

#### 18.5.1 Effects of Construction

139 An assessment of the potential effects of the Development Area during the construction phase is provided below. It should be noted that only those fisheries sensitive to an effect are assessed in each instance. In the instance of the salmon and sea trout fishery only adverse effects upon commercial and recreational fish and shellfish populations are relevant to the assessment.

#### Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

140 There is the potential for the construction within the Development Area to result in adverse impacts upon commercial fish and shellfish populations and hence affect the commercial fisheries targeting those species. An assessment of these potential effects is fully described

in Section 13.6. Table 18.8 below has been reproduced from Section 13.12 and shows the significance of effect assessed on each species under consideration.

141 As described in Section 18.4 the principal commercial species targeted in the Development Area are: scallops, squid, *nephrops*, crab and lobster. In addition, there are commercial and recreational fisheries for salmon and sea trout in coastal and in-river waters.

**Table 18.8: Adverse Impacts Upon Commercial and Recreational Fish and Shellfish Populations**

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Direct temporary habitat disturbance	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
			SAC qualifying feature species (Salmon)	High	Negligible
Indirect disturbance as a result of sediment deposition and temporary increases in suspended sediment concentrations (SSC)	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
			SAC qualifying feature species (Salmon)	High	Negligible

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Barrier effects, disturbance or physical injury associated with construction noise	Scallops	Shellfish	Low	Mortality/injury and Behaviour = Negligible	Mortality/injury and Behaviour = Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Negligible/Minor ; Behaviour = Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Negligible/Minor ; Behaviour = Minor
SAC qualifying feature species (Salmon)		Low	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Minor/Moderate ; Behaviour = Moderate	

**Temporary Loss or Restricted Access to Traditional Fishing Grounds**

- 142 The two principal aspects of the construction of the Development Area which could result in the temporary loss or restricted access to fishing grounds:
- Safety/exclusion zones around construction vessels (500 m); and
  - Infrastructure that has been installed in addition to that within construction safety/exclusion zones (500 m), including WTGs, OSPs and sub-sea cables.
- 143 It is anticipated that there will be rolling 500 m safety/exclusion zones around major construction works or vessels within the Development Area, from which all vessels would be excluded. These will occur for the duration of the construction phase (up to four years) at locations throughout the Development Area. The location of the safety/exclusion zones and the seasonality of fisheries will render these exclusion zones more sensitive, depending upon the time of year. For the purposes of this assessment, the most sensitive period for each fishery has been considered.
- 144 Around a maximum of 353 km of cabling will be installed within the Development Area during the construction period (up to four years). The inter-array cables will be suitably buried or will be protected by other means when burial is not practicable which will reduce

the risk to fishing vessels from snagging. It is considered that fishing vessels will not be able to safely operate in the vicinity of these cables until their post-installation status has been confirmed. A protocol for the removal of temporary works post-construction including appropriate verification will be implemented.

- 145 The fisheries affected by the temporary loss or restricted access to fishing grounds in the Development Area are the scallop fishery, and to a lesser extent squid and creel fisheries.
- 146 The sensitivity of the scallop fishery recognises that the Development Area encompasses scallop fishing grounds which are consistently fished on a yearly basis and record of high intensity of VMS position plots in the Regional Study Area, but takes into account the wider availability of grounds and the nomadic nature of a large proportion of the fleet, variously targeting grounds around the UK. The sensitivity of the scallop fishery is therefore high.
- 147 The sensitivity of squid fishery takes into account the limited activity recorded within the Development Area but recognises the significant fluctuations in squid landings annually. The sensitivity is therefore low.
- 148 The sensitivity of the creel fishery takes into account the limited grounds recorded within the Development Area and recognises that the majority of productive creel grounds are located in coastal areas inshore of the Development Area. The sensitivity of the creel fishery is therefore low.
- 149 The *nephrops* fishery has not been assessed under this effect, due to the negligible level of recorded activity within the Development Area.
- 150 The magnitude of effect takes into account the temporary duration of total construction activities (four years). The magnitude of effect is therefore moderate for all receptors.
- 151 The significance of the effect of temporary loss or restricted access to fishing grounds during the construction phase is given in Table 18.9 below.

**Table 18.9: Temporary Loss or Restricted Access to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	High	Moderate	Moderate/Major
	Squid Fishery	Low	Moderate	Minor/Moderate
	Creel Fishery	Low	Moderate	Minor/Moderate

**Safety Issues for Fishing Vessels**

- 152 An assessment of the safety issues for commercial fishing vessels as a result of the construction within the Development Area focuses on the risks to vessels undertaking normal fishing activities as described in the baseline: boat dredging for scallops, bottom

trawling for squid and creeling for crab and lobster. Although it is recognised that there are other potential navigational risks associated with this phase of the Project, this issue, including a wider assessment of the safety risks to navigation, is fully described in *Chapter 19*.

- 153 As previously stated, there will be 500 m safety/exclusion zones around major construction vessels within the Development Area where necessary, from which all fishing vessels will be excluded. Structures and equipment which is partially or fully installed will be marked and it is possible that safety/exclusion zones of 50 m will be established (or an appropriate size to safely encompass the footprint). Risks to fishing vessels where designated safety/exclusion zones exist would only occur if there were infringements of these zones, it should also be recognised that with methods such as twin rigging and pelagic trawling, fishing gear being towed will extend each side of the vessel will exceed 50 m. Further, it should be recognised that in line with standard maritime practice, the ultimate responsibility with regards to safety lies with the master of a vessel. Compliance with designated safety/exclusion zones during the construction phase would not result in additional, unacceptable, safety risks to commercial fishing activities.
- 154 There is the potential for obstacles to be left on the seabed during construction which could result in damage to or loss of fishing gears, as well as representing an ongoing safety hazard during operation. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears. Contractors will be obliged and monitored to ensure compliance with standard offshore policies prohibiting the discarding of objects or waste at sea (International Maritime Organisation (IMO), 1996). The appropriate reporting and recovery of accidentally dropped objects, where it is reasonably practicable, is also required. Compliance with these commitments will negate the risks from obstacles left of the seabed from construction.
- 155 In addition to the safety/exclusion zones around major construction vessels (500 m), a maximum of 353 km of inter-array cabling will be installed. The risk to undertaking normal fishing activities in the vicinity of inter-array cables, and particularly bottom towed activities, includes snagging and/or interference from trenching spoil or a change in seabed conditions. It is therefore considered that once the post-installation status of the inter-array cables has been confirmed, and if necessary the appropriate corrective measures completed, there will not be any residual safety risks which would result in additional, unacceptable, safety risks to commercial fishing activities.

#### **Increased Steaming Time to Fishing Grounds**

- 156 The implementation of safety/exclusion zones within the Development Area during the construction phase could result in some short term increases in steaming distances and times, and therefore higher operational costs for fishing vessels. As previously stated, it is anticipated that there will be 500 m safety/exclusion zones around major construction vessels from which all fishing vessels will be excluded.

- 157 The sensitivity of the scallop fishery takes into account the operational range and nomadic nature of the majority of the scallop vessels, and the limited grounds in areas offshore of the Development Area. The sensitivity of the scallop fishery to increased steaming times to fishing grounds is therefore considered to be low.
- 158 The sensitivity of the squid fishery recognises the very limited grounds offshore of the Development Area, as well as the significant annual fluctuations in squid fishing grounds in the Regional Study Area. The sensitivity is therefore considered to be low.
- 159 The sensitivity of the creel fishery takes into account the very limited grounds offshore of the Development Area, and is as a result, low.
- 160 The magnitude of effect has taken into account the temporary duration of construction (up to four years), and the limited spatial extent of the change associated with the discreet locations of safety/exclusion zones across the Development Area relative to the fishing grounds identified for scallop, squid and creels. The magnitude of effect is therefore low.
- 161 The significance of the effect on increased steaming times to fishing grounds during the construction phase is given in Table 18.10 below.

**Table 18.10: Increased Steaming Times to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Increased Steaming Times to Fishing Grounds	Scallop Fishery	Low	Low	Minor
	Squid Fishery	Low	Low	Minor
	Creel Fishery	Low	Low	Minor

**Displacement of Fishing Vessels into other Areas**

- 162 Concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of the Wind Farm and OSPs could result in increased competition for grounds outside of the Development Area. This might result in either conflict between vessels competing for the same resource, or between different fishing methods (i.e. static and towed gear vessels).
- 163 The extent of displacement will be a direct function of the temporary loss or restricted access to fishing grounds during the construction period, as assessed previously. The sensitivity of the fisheries, the magnitude of the effect and the resulting significance of effect are given in Table 18.11 below.

**Table 18.11: Displacement of Fishing Vessels into Other Areas**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Displacement of Fishing Vessels into other Areas	Scallop Fishery	Moderate	Moderate	Moderate
	Squid Fishery	Low	Moderate	Minor/Moderate
	Creel Fishery	Low	Moderate	Minor/Moderate

**Interference with Fishing Activities**

- 164 All of the potential impacts included in this assessment could cause interference to fishing activities. An additional impact to be considered is the potential for navigational conflicts arising between fishing vessels and construction vessels transiting to and from the Development Area. This could include the fouling of static gear marker buoys and dhans (marker flags), or towed gear vessels being required to alter towing direction. This impact therefore has the potential to interfere with more vessels than those operating within the Development Area, depending upon the location of the construction port. As a result, the *nephrops* fishery is also sensitive to this effect, as well as the scallop, squid and creel fisheries.
- 165 Taking into account the mobility of the towed gear fleet, nephrops and squid vessels are considered to be of low sensitivity to navigational interference. Recognising, however, the static nature of creel gear, set in the water for periods of several days, the crab and lobster fishery located in the vicinity and inshore of the Development Area has less tolerance and adaptability and is therefore of moderate sensitivity.
- 166 The magnitude of effect is determined by the location of the construction port and transit routes to the Development Area, as this influences the spatial extent of impact relative to fishing grounds. At the current time, however, the location of the construction port (and hence associated transit routes) is not confirmed and so the conservative assumption has been made that construction and works vessel transits will be in the vicinity of static and towed gear grounds. Furthermore, the magnitude of effect is higher for static gear (creels) than for towed gear, due to the relatively larger spatial extent of impact, relative to their more discrete fishing grounds.
- 167 The significance of the effect of interference to fishing activities arising from navigational conflict is provided in Table 18.12 below.

**Table 18.12: Interference to Fishing Activities (Navigational Conflict)**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Interference to Fishing Activities arising from Navigational Conflict	Scallop Fishery	Low	Low	Minor
	Squid Fishery	Low	Low	Minor
	Creel Fishery	Moderate	Moderate	Moderate
	<i>Nephrops</i> Fishery	Low	Low	Minor

### 18.5.2 Effects of Operation and Maintenance

168 An assessment of the potential effects of the Wind Farm and OSPs within the Development Area during operation is provided below. It should be noted that only those fisheries sensitive to an effect are assessed in each instance. In the instance of the salmon and sea trout fishery only adverse effects upon commercial and recreational fish and shellfish populations are relevant to the assessment.

169 The impacts described below should be considered in the context of the operational life of the Wind Farm and OSPs. Trends in fishing activities are difficult to establish over such a long time period and the impact assessment is based upon the current baseline, the limitations of which are recognised as described in 18.3.4..

#### **Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations**

170 There is the potential for the operation of the Wind Farm and OSPs to result in adverse impacts upon commercial fish and shellfish populations and hence affect the commercial fisheries targeting those species. An assessment of these potential effects is fully described in *Section 13.6*. Table 18.13 below has been reproduced from the assessments in *Chapter 13* and shows the significance of effect assessed on each species under consideration.

171 The principal commercial species currently targeted in the vicinity of the Development Area are: scallops, squid, *nephrops*, crab and lobster. In addition there are commercial and recreational fisheries for salmon and sea trout in coastal and in-river waters.

**Table 18.13: Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations**

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Long term loss of original habitat	Scallops	Shellfish	Low	Low	Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate
Behavioural responses to EMFs associated with cabling	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect	
Disturbance or physical injury associated with operational noise	Scallops	Shellfish	Low	Negligible	Negligible/Minor	
	<i>Nephrops</i>					
	Crab and lobster					
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor	
	Salmon and sea trout		Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)			High	Negligible	Minor/Moderate	
Effect on fish and shellfish resources due to reduced fishing effort within Development Area	Scallops	Blanket assessment across receptors	Not assigned	Not assigned	Not assigned but considered to be Negligible/Minor (+ve)	
	<i>Nephrops</i>					
	Crab and lobster					
	Squid					
Creation of new habitat due to presence of project specific infrastructure	Scallops	Shellfish	Low	Moderate	Minor/Moderate (+ve)	
	<i>Nephrops</i>					
	Crab and lobster					
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor (+ve)	
	Salmon and sea trout		Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor (+ve)
			SAC qualifying feature species (Salmon)	High	No impact	No impact

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Temporary habitat disturbance via operations and maintenance (O&M) activities	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	

**Complete Loss or Restricted Access to Fishing Grounds**

- 172 Commercial fishing is not currently prohibited from occurring within operational wind farm sites. It is however possible that operational safety/exclusion zones will apply around structures, from which fishing vessels will be excluded. This may include 50 m (or an appropriate size to incorporate infrastructure) safety/exclusion zones around WTGs (maximum of 213) and OSPs (maximum of five OSPs). Given that the total area of the Development Area is 150 km<sup>2</sup>, this accounts for a relatively small proportion of the total area.
- 173 Inter-array cables will be suitably buried or will be protected by other means when burial is not practicable. Subject to the successful burial of the array cables, to be confirmed by post-installation surveys as appropriate and, if necessary, corrective measures where target burial depth has not been achieved (i.e. use of protective materials where appropriate), it is considered that where feasible fishing activities will be able to resume in these areas once the cables are operational.
- 174 The Design Envelope has identified the minimum separation distance between WTGs as 820 m. Specifications of scallop gear provided by a sample of fishermen have estimated a maximum of 60 m total gear width during normal fishing operations (pers. comm., 2011c). The maximum gear width of the largest recorded demersal trawler targeting squid has identified a maximum gear spread between otter doors of 92 m (pers. comm., 2011d). Given these parameters, and taking into account the minimum spacing, it is considered that some

degree of access may be regained within the operational sites, particularly in the case of the smaller vessels in the fleet.

- 175 It is however recognised that individual skippers may consider it unsafe to continue fishing within operational wind farm sites because of the presence of infrastructure, which would therefore result in the complete loss of the Development Area for these vessels.
- 176 The fisheries affected by the complete loss or restricted access to fishing grounds in the Development Area are the scallop fishery, and to a lesser extent squid and creel fisheries.
- 177 The sensitivity of the scallop fishery recognises that the Development Area encompasses scallop fishing grounds which are consistently fished on a yearly basis and record the highest intensity of VMS position plots in the Regional Study Area, but takes into account the wider availability of grounds in the regional area and the nomadic nature of a large proportion of the fleet, variously targeting grounds around the UK. The sensitivity of the scallop fishery is therefore moderate.
- 178 The sensitivity of squid fishery takes into account the activity recorded within the Development Area but recognises the significant fluctuations in squid landings and fishing grounds annually. The sensitivity is therefore low.
- 179 The sensitivity of the creel fishery takes into account the limited grounds recorded within the Development Area and recognises that the majority of productive creel grounds are located in coastal areas inshore of the Development Area. The sensitivity of the creel fishery is therefore low.
- 180 The *nephrops* and salmon and sea trout fishery has not been assessed under this effect, due to the negligible level of recorded activity within the Development Area.
- 181 The magnitude of effect takes into account the operational life of the Wind Farm and OSPs, but recognises the low spatial extent of the impact due to the relatively small area of fishing grounds permanently lost as a result of infrastructure and associated safety/exclusion zones and the degree of access regained to fishing grounds within the Development Area. The magnitude of effect is moderate.
- 182 It is however recognised that a number of skippers of scallop dredge vessels may be reluctant to fish within the operational site due to the safety implications associated with scallop dredge gear and snagging risks. It therefore follows that these vessels will be permanently excluded from the Development Area for the duration of operation, resulting in moderate sensitivity, high magnitude and therefore a moderate/major significance of loss of fishing area on these vessels.
- 183 The significance of the effect of complete loss or restricted access to fishing grounds during operation is given in Table 18.14 below.

**Table 18.14: Complete Loss or Restricted Access to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Complete Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Moderate	High	Moderate/Major
	Squid Fishery	Low	Moderate	Minor/Moderate
	Creel Fishery	Low	Moderate	Minor/Moderate

**Safety Issues for Fishing Vessels**

- 184 An assessment of the safety issues for commercial fishing vessels as a result of the operation of the Wind Farm and OSPs focuses on the risks to vessels undertaking normal fishing activities as described in the baseline: boat dredging for scallops, bottom trawling for squid and creeling for crab and lobster. Although it is recognised that there are other potential navigational risks associated with this phase of the Project, this issue, including a wider assessment of the safety risks to navigation, is fully described in *Chapter 19*.
- 185 As previously stated, it is possible that safety/exclusion zones of 50 m or wider, during specific maintenance activities, will be established (or an appropriate size to safely encompass the footprint). It should also be recognised that in line with standard maritime practice, the ultimate responsibility for safety of the vessel and crew lies with the master of the vessel. Compliance with established safety/exclusion zones during the operation of the Wind Farm and OSPs would not result in unacceptable additional safety risks to commercial fishing activities.
- 186 There is the potential for obstacles to be left on the seabed during construction which could result in damage to, or loss of, fishing gears, as well as representing an ongoing safety hazard during operation. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears. Contractors will comply with standard offshore policies prohibiting the discarding of objects or waste at sea (IMO, 1996). The reporting and recovery of any accidentally dropped objects is also required. Compliance with these commitments will negate the risks from obstacles left of the seabed from construction.
- 187 Cables within the Development Area will be suitably buried or will be protected by other means when burial is not practicable during operation. The successful burial of the array cables will have been confirmed by post-installation surveys. It is therefore considered that fishing activities will be able to resume in these areas once the cables are operational. As a result, there would be no unacceptable safety risks to fishing vessels due to the presence of inter-array cables during operation.

**Increased Steaming Times to Fishing Grounds**

- 188 It is possible that 50 m safety/exclusion zones will be established around structures in the Development Area (or an appropriate size to safely encompass the footprint), from which all fishing vessels will be excluded. Further, *Chapter 19* considers that there is good prospect for fishing vessels to navigate within the Development Area when operational. Relative to the Development Area, there will be very discrete exclusion zones which will require minimal deviation to steaming routes. The magnitude of effect is therefore considered to be low, taking into account the low spatial extent and severity of impact. The sensitivity of all fisheries is also considered to be low, additionally recognising the limited fishing grounds in areas offshore in the Development Area.
- 189 The significance of the effect of increased steaming times to fishing grounds is given in Table 18.15 below.

**Table 18.15: Increased Steaming Times to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Increased Steaming Times to Fishing Grounds	All Fisheries	Low	Low	Minor

**Displacement of Fishing Activity into other Areas**

- 190 As previously stated, concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of the Wind Farm and OSPs could result in increased competition for grounds outside of the Development Area. This might result in either conflict between vessels competing for the same resource, or between different fishing methods (i.e. static and towed gear vessels).
- 191 The extent of displacement will be a direct function of the complete loss or restricted access to fishing grounds during operation, as assessed previously. As such, the sensitivity of the fisheries, the magnitude of the effect and the resulting significance are minor/moderate or moderate, and are given in Table 18.16 below.

**Table 18.16: Displacement of Fishing Vessels into Other Areas**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Displacement of Fishing Vessels into other Areas	Scallop Fishery	Moderate	Moderate	Moderate
	Squid Fishery	Low	Moderate	Minor/Moderate
	Creel Fishery	Low	Moderate	Minor/Moderate

**Interference with Fishing Activities**

- 192 As has been previously stated, there is the additional potential for navigational conflicts in the operational phase in addition to those effects described above. The magnitude of effect will be largely determined by the location of the operations and maintenance port(s), which at the current time are not confirmed. As a result, a conservative assumption has assumed that transit routes will be in the vicinity of static and towed gear grounds. However, activity by operations and maintenance vessels will be less in duration than that occurring during the construction phase and furthermore it is considered that codes of conduct between works vessels and fishing vessels will be well established by the completion of construction activities, irrespective of port used. As a result, the sensitivity of all fisheries, including the crab and lobster fishery is low. The magnitude of effect is also low.
- 193 The significance of interference with fishing activities arising from navigational conflict is identified in Table 18.17 below.

**Table 18.17 Interference with Fishing Activities (Navigational Conflict)**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Interference with Fishing Activities arising from Navigational Conflict	All Fisheries	Low	Low	Minor

**18.5.3 Effects of Decommissioning**

- 194 The potential effects of decommissioning are considered to be equivalent to and potentially lower than the worst case effects assessed for the construction phase. The approach to decommissioning is described in *Chapter 7.12*. A decommissioning plan will be prepared in accordance with the requirements of the *Energy Act 2004* (see *Chapter 3: Regulatory Requirements, Section 3.2.5*) and will be subject to approval from DECC prior to implementation.

**18.6 Offshore Export Cable Corridor Impact Assessment**

**18.6.1 Effects of Construction/Installation**

- 195 The Offshore Export Cable Corridor assessment includes the Export Cables and all associated cable protection. This assessment considers a maximum of six Alternating Current (AC) cables each installed in a trench with maximum width of one meter, with a trench affected width of six metres. Installation of the Offshore Export Cables is expected to commence in 2017, with installation works lasting approximately 15 months (450 days), within a three year period. The approximate length of the Offshore Export Cable Corridor is 83 km, from the Development Area to the landfall options.

- 196 There is the potential for Offshore Export Cable installation activities to result in adverse impacts upon commercial and recreational fish and shellfish populations, and hence result in changes to behaviour or a decline in species abundance which may affect commercial and recreational fishing activities. This effect is briefly summarised within this section and fully assessed in *Section 13.6 and 13.7*. Table 18.18 below has been reproduced from *Chapter 13.12* and shows the significance of effect assessed on each species under consideration.
- 197 The principal commercial species targeted in the vicinity of the Offshore Export Cable Corridor are: scallops, squid, *nephrops*, crab and lobster. In addition, there are commercial and recreational fisheries for salmon and sea trout in coastal and in-river waters.

**Table 18.18: Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations**

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Direct temporary habitat disturbance via Export Cable installation	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate
Indirect disturbance as a result of sediment deposition and temporary increases in SSC.	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate
Disturbance or physical injury associated with construction noise	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	

**Temporary Loss or Restricted Access to Fishing Grounds**

- 198 The principal effects of the installation of the Offshore Export Cables are: safety/exclusion zones of 500 m around major works activities from which fishing vessels will be excluded, and the additional temporary loss of fishing grounds in the Offshore Export Cable Corridor until the area is confirmed to be safe for fishing activities to be resumed.
- 199 Rolling safety/exclusion zones of 500 m will be applied throughout the installation phase of the Offshore Export Cables (a total of 225 days over a three year period), from which all non-construction vessels will be excluded. The seasonality of fishing activity relative to the location of safety/exclusion zones will render these exclusion zones more sensitive depending on the time of year. A conservative assumption has however been made, which considers that safety/exclusion zones in proximity to fisheries at peak periods of activity.
- 200 The Offshore Export Cable Corridor from the landfall options to the Development Area is approximately 83 km in length and approximately 1.4 km at its widest point. A maximum of

six AC cables in six trenches will be installed within the Offshore Export Cable Corridor. The Offshore Export Cables will be suitably buried or will be protected by other means when burial is not practicable. In the event that Offshore Export Cables are unable to be buried they will be laid and protected by other means, such as rock placement or mattresses. Due to the potential safety risks associated with fishing in the vicinity of installed Offshore Export Cables (either by snagging on cables, or as a result of changes to the seabed conditions), it is considered that there will be a temporary loss of access to fishing grounds as the installation schedule advances, ultimately encompassing the length of the corridor (approximately 83 km). Fishing vessels may be subject to exclusion from specific areas until post-installation surveys confirm the status of the seabed, and, if necessary, corrective measures have been undertaken.

- 201 The commercial fisheries identified in the Offshore Export Cable Corridor, which will be affected by the temporary loss of access to fishing grounds are:
- Boat dredging for scallops in the vicinity of the Offshore Export Cable Corridor;
  - Bottom trawling for *nephrops* in the central and inshore Offshore Export Cable Corridor;
  - Bottom trawling for squid in locations along the Offshore Export Cable Corridor, which will vary on an inter annual basis; and
  - Creeling for crab and lobster in the inshore section of the Offshore Export Cable Corridor, and to a lesser extent in proximity to the Development Area.
- 202 As previously stated, the seasonality of the fisheries should be considered relevant to the installation schedule of the Offshore Export Cables: generally, fishing activity is highest during the summer months, particularly with regard to smaller vessels which are more limited in their ability to operate by winter weather conditions. In addition, the limited seasonality of fisheries should be noted, particularly the squid fishery, which is largely targeted between July and September.
- 203 The operational range of fishing vessels also determines the sensitivity of the fisheries: larger category vessels capable of targeting grounds throughout the Regional Study Area and sometimes further afield (such as the nomadic scallop fleet) are less sensitive to the temporary loss of grounds along the Offshore Export Cable Corridor than smaller, locally based vessels, which are restricted to discrete fishing grounds in reasonable proximity to their home ports.
- 204 The sensitivity of the scallop fleet recognises that a proportion of the Offshore Export Cable Corridor in proximity to the Development Area is located on scallop fishing grounds. The wider availability of scallop grounds, as well as the operational range and nomadic fishing patterns of a large proportion of the vessels targeting this fishery are however recognised. The sensitivity of this fishery is therefore low.
- 205 *Nephrops* is the most valuable fishery in the Firth of Forth, including areas through which the Offshore Export Cable Corridor passes. The sensitivity of the fishery recognises the relatively small proportion of *nephrops* grounds the Offshore Export Cable Corridor encompasses but

takes into account the limited operational range of the large majority of *nephrops* boats in the local area and the importance of local grounds. In addition, the sensitivity assumes that the temporary loss of grounds will be during the peak fishing period. The sensitivity of the *nephrops* fishery is therefore moderate.

- 206 In the case of the squid fishery, the sensitivity has been defined taking into account the fishing grounds within the Offshore Export Cable Corridor but recognising the significant annual variation in the location and productivity of the fishery. The sensitivity of the squid fishery is low.
- 207 With regard to static gear vessels targeting the crab and lobster fishery in the Offshore Export Cable Corridor, their sensitivity has been defined taking into account their limited operational range and seasonality, and the discrete location of fishing grounds. Further, the fishing activity is static (i.e. creels are set and left in position) and so are less adaptable. This has resulted in the fishery being assigned a moderate sensitivity.
- 208 The magnitude of effect takes into account the temporary nature of the impact (i.e. limited to the installation phase), and the spatial extent (Offshore Export Cable Corridor of 83 km in length and one kilometre in width). It has also been assumed that the installation period and associated temporary loss of fishing grounds throughout the Offshore Export Cable Corridor will encompass the peak seasonal periods for all of the affected fisheries. The magnitude is therefore moderate.
- 209 The significance of the effect of temporary loss or restricted access to fishing grounds during the installation phase of the Offshore Export Cables is provided in Table 18.19 below.

**Table 18.19: Temporary Loss or Restricted Access to Fishing Grounds**

Effect	Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Moderate	Minor/Moderate
	<i>Nephrops</i> Fishery	Moderate	Moderate	Moderate
	Squid Fishery	Low	Moderate	Minor/Moderate
	Crab and lobster Fishery	Moderate	Moderate	Moderate

**Safety Issues for Fishing Vessels**

- 210 Rolling safety/exclusion zones of 500 m or other exclusion areas will be applied during the installation phase of the Offshore Export Cables (see *Section 7.13* for more information on safety/exclusion zones) from which all non-construction associated vessels will be excluded for the duration of the installation phase, a maximum duration of 225 days over a three year period. Risks to fishing vessels would only occur if infringements of these safety/exclusion zones occurred. In line with standard maritime practice, the ultimate responsibility with

regard to safety lies with the master of a vessel. Assuming vessels are in compliance with these safety/exclusion zones during the construction phase then the Offshore Export Cables would not result in any safety risks to commercial fishing activities.

- 211 There is the potential for obstacles to be left on the seabed during the installation of the Offshore Export Cables which could result in damage to, or loss of, fishing gears, as well as representing an ongoing safety hazard during operation. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears. Contractors will be obliged and monitored to ensure compliance with standard offshore policies prohibiting the discarding of objects or waste at sea (IMO, 1996). The reporting and recovery of any accidentally dropped objects is also required. Compliance with these commitments will negate the risks from obstacles left of the seabed from construction.
- 212 Although fishing vessels will be excluded from the 500 m safety/exclusion zones around major construction vessels, it is not considered that fishing vessels will be excluded from the remainder of the Offshore Export Cable Corridor. It is however, recognised that there are safety risks associated with continuing normal fishing activities in these areas where installation works have occurred. This includes snagging and/or interference from a change in seabed conditions or as a result of Offshore Export Cable protection. It is considered that once the post-installation status of the Offshore Export Cables has been confirmed safety risks to fishing vessels throughout the Offshore Export Cable Corridor will be acceptable.

#### **Increased Steaming Times to Fishing Grounds**

- 213 The implementation of 500 m safety/exclusion zones during the installation phase could result in some increases in steaming distances and times, and therefore higher operational costs for vessels. The safety/exclusion zones implemented during the installation phase of the Offshore Export Cables will however be discrete and in transitory locations along the Offshore Export Cable Corridor resulting in limited spatial extent and duration of effect and as a result the magnitude of effect is considered to be low.
- 214 Taking into account the discrete nature of safety/exclusion zones relative to available fishing grounds in the wider, regional and local areas (as shown in Figure 18.1), the sensitivity of all fisheries is considered to be low.
- 215 The significance of the effect of increased steaming times to fishing grounds during the proposed installation phase of the Offshore Export Cables is given in Table 18.20 below.

**Table 18.20: Increased Steaming Times to Fishing Grounds**

Effect	Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Increased Steaming Times to Fishing Grounds	All fisheries	Low	Low	Minor

**Displacement of Fishing Vessels into Other Areas**

- 216 Concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of the Wind Farm and OSPs could result in increased competition for grounds outside of the Development Area. This might result in either conflict between vessels competing for the same resource, or between different fishing methods (i.e. static and towed gear vessels).
- 217 The extent of displacement will be a direct function of the temporary loss or restricted access to fishing grounds during the installation period, as assessed previously. As such, the sensitivity of the fisheries, the magnitude of the effect and the resulting significance of effect are the same, and are given in Table 18.21 below.

**Table 18.21: Displacement of Fishing Activity into Other Areas**

Effect	Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Displacement of Fishing Activity into other Areas	Scallop Fishery	Low	Moderate	Minor/Moderate
	<i>Nephrops</i> Fishery	Moderate	Moderate	Moderate
	Squid Fishery	Low	Moderate	Minor/Moderate
	Crab and lobster Fishery	Moderate	Moderate	Moderate

**Interference with Fishing Activities**

- 218 As previously stated, an additional impact to be considered is the potential for navigational conflicts arising between fishing vessels and construction/installation vessels transiting to and from the Development Area. This could include the fouling of static gear marker buoys and dhans (marker flags), or towed gear vessels being required to alter towing direction.
- 219 Taking into account the mobility of the towed gear fleet, the squid, *nephrop* and scallop vessels are considered to be of low sensitivity to navigational interference. Recognising, however, the static nature of creel gear, set in the water for periods of several days, the crab

and lobster fishery has less tolerance and adaptability and is therefore of moderate sensitivity.

- 220 The magnitude of effect is partly determined by the location of the construction port and transit routes to the Development Area, as this influences the spatial extent of impact relative to fishing grounds. At the current time, however, the location of the construction port (and hence associated transit routes) is not confirmed and so the conservative assumption has been made that construction and works vessel transits will be in the vicinity of static and towed gear grounds. The amount of works vessel traffic is however to be considerably lower than that incurred during construction of the Wind Farm and OSPs, and the installation period is considerably shorter. As a result, the magnitude of effect is low for all fisheries.
- 221 The significance of the effect of interference to fishing activities arising from navigational conflict is provided in Table 18.22 below.

**Table 18.22: Interference to Fishing Vessels (Navigational Conflict)**

Effect	Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Interference with Fishing Vessels arising from Navigational Conflict	Scallop Fishery	Low	Low	Minor
	<i>Nephrops</i> Fishery	Low	Low	Minor
	Squid Fishery	Low	Low	Minor
	Crab and lobster Fishery	Moderate	Low	Minor/Moderate

### 18.6.2 Effects of Operation and Maintenance

- 222 An assessment of the potential effects of the Offshore Export Cables during operation is provided below. It should be noted that only those fisheries sensitive to an effect are assessed in each instance.
- 223 The impacts described below should be considered in the context of the operational life of the Project. Trends in fishing activities are difficult to establish over such a long time period and the impact assessment is based upon the current baseline, the limitations of which are recognised.

#### Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

- 224 There is the potential for the operation of the Offshore Export Cables to result in adverse impacts upon commercial fish and shellfish populations and hence affect the commercial fisheries targeting those species. An assessment of these potential effects is fully described in *Section 13.7*. Table 18.23 below has been reproduced from *Section 13.12* and shows the significance of effect assessed on each species under consideration.

225 The principal commercial species currently targeted in the vicinity of the Offshore Export Cable Corridor are: scallops, squid, *nephrops*, crab and lobster. In addition there are commercial and recreational fisheries for salmon and sea trout in coastal and in-river waters.

**Table 18.23 Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations**

Effect	Receptor(as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Long term loss of original habitat	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)			High	Negligible	Minor/Moderate
Behavioural responses to EMFs associated with cabling	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor

Effect	Receptor(as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate
Creation of new habitat due to presence of project specific infrastructure	Scallops	Shellfish	Low	Negligible	Negligible/Minor (+ve)
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor (+ve)
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor (+ve)
SAC qualifying feature species (Salmon)		High	No impact	No impact	
Temporary habitat disturbance via O&M activities	Scallops	Shellfish	Low	Negligible	Negligible/Minor (+ve)
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor (+ve)
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor (+ve)
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	

**Complete Loss or Restricted Access to Fishing Grounds**

- 226 Offshore Export Cables will be buried wherever feasible and protected by other means when this is unachievable, such as rock placement or mattresses. Fishing vessels will be able to resume fishing activities in the Offshore Export Cable Corridor once the protocol for removal of temporary works post-construction including appropriate verification has been implemented.
- 227 In light of the measures above, which will enable normal fishing activities to be safely resumed, the operational Offshore Export Cables are not considered to have a discernible effect on fishing activities. The sensitivity of all fisheries to the effect is low, given that there will be no change to current fishing activities and the magnitude of effect is therefore negligible. The significance of the effect of the complete loss or restricted access to fishing grounds during the operation of the Offshore Export Cables is given in Table 18.24 below.

**Table 18.24: Complete Loss or Restricted Access to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Complete Loss or Restricted Access to Fishing Grounds	All Fisheries	Low	Negligible	Negligible/Minor

**Safety Issues for Fishing Vessels**

- 228 There is the potential for obstacles to be left on the seabed during the installation of the Offshore Export Cables which could result in damage to or loss of fishing gears, as well as representing an ongoing safety hazard during operation. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears. Contractors will be obliged and monitored to ensure compliance with standard offshore policies prohibiting the discarding of objects or waste at sea (IMO, 1996). The appropriate reporting and recovery of accidentally dropped objects, where it is reasonably practicable, is also required. Compliance with these commitments will negate the risks from obstacles left of the seabed from construction.
- 229 Provided that cable protection measures are satisfactorily completed and protocol for removal of temporary works post-construction including appropriate verification has been implemented to confirm that fishing activities can safely resume, there are no unacceptable safety risks to fishing vessels during the operation of the Offshore Export Cables.

**Increased Steaming Times to Fishing Grounds**

- 230 The operational Offshore Export Cables are not considered to have any discernible effect upon the steaming times of vessels to fishing grounds. The sensitivity of fishing vessels to

this effect is considered to be low and the magnitude of effect is therefore negligible. The significance of effect is provided in Table 18.25 below.

**Table 18.25: Increased Steaming Times to Fishing Grounds**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Increased Steaming Times to Fishing Grounds	All Fisheries	Low	Negligible	Negligible/Minor

**Displacement of Fishing Activities into other Areas**

- 231 As previously stated, the potential displacement of fishing vessels is a function of the complete loss or restricted access to fishing grounds incurred during the operation of the Offshore Export Cables. As such, the sensitivity of the fisheries, the magnitude of the effect and the resulting significance of effect are the same, and are given in Table 18.26 below.

**Table 18.26: Displacement of Fishing Activity into Other Areas**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Displacement of Fishing Activity into other Areas	All Fisheries	Low	Negligible	Negligible/Minor

**Interference with Fishing Activities**

- 232 As previously stated, an additional impact to be considered is the potential for navigational conflicts arising between fishing vessels and construction vessels transiting to and from the Development Area. This could include the fouling of static gear marker buoys and dhans (marker flags), or towed gear vessels being required to alter towing direction.
- 233 It is considered that there will be a very low level of transiting works vessels relative to the installation period. Further, it is considered that the code of conduct between operations and maintenance vessels and fishing vessels will be well established. As a result, the magnitude of effect is negligible, and the sensitivity of the fishery is low.
- 234 The significance of the effect of interference to fishing activities arising from navigational conflict during the operation of the Offshore Export Cables is given in Table 18.27 below.

**Table 18.27: Interference with Fishing Activities**

Effect	Receptor	Sensitivity of the Receptor	Magnitude of Effect	Significance of Effect
Interference with Fishing Activities arising from Navigational Conflict	All Fisheries	Low	Negligible	Negligible/Minor

### 18.6.3 Effects of Decommissioning

235 The potential effects of decommissioning are considered to be equivalent to and potentially lower than the worst case effects assessed for the construction phase. The approach to decommissioning is described in *Chapter 7.12*. A decommissioning plan will be prepared in accordance with the requirements of the *Energy Act 2004* (see *Chapter 3: Regulatory Requirements, Section 3.2.5*) and will be subject to approval from DECC prior to implementation.

## 18.7 Impact Interactions

### 18.7.1 Overview of Impact

236 The impact interactions associated with the Project are considered to be:

- Complete loss or restricted access to traditional fishing grounds;
- Interference to fishing activities;
- Safety issues for fishing vessels; and
- Displacement of fishing activity.

237 It is possible that the above impact interactions could combine to cause an increased level of impact on commercial fishing activities, in particular the scallop and crab and lobster fisheries. Impacts during construction and decommissioning are considered likely to have the greatest potential for impact interactions due to the number and extent of activities taking place during these phases.

238 Impact interactions during the operational phase are not likely to occur as significant impacts have only been identified on the scallop fishery as a result of loss of, or restricted access to, traditional fishing grounds.

### 18.7.2 Characterisation of Impact

239 During construction and decommissioning, there is considered to be impacts on the scallop, *nephrops* and crab and lobster fisheries as a result of loss of, or restricted access to, traditional fishing grounds and displacement of fishing activity into other areas. There is also considered to be interference to crab and lobster fisheries due to potential navigational

conflict with works vessels and impacts on all fisheries during construction due to safety risks associated with inter-array and Offshore Export Cables post-installation.

### 18.7.3 Assessment of Significance

240 It is likely that during the construction phase, impacts will occur on the crab and lobster fishery as a result of impact interaction of all four impacts identified; these are predicted to be moderate. Impact interactions will also occur on the scallop and nephrops fisheries as a result of loss of fishing area, displacement of fishing activities and interference with fishing vessels. The impact interaction on these fisheries is also considered to be moderate.

## 18.8 Cumulative Impact Assessment

241 In addition to separately describing the potential impacts for the Development Area and Offshore Export Cable Corridor during the construction/decommissioning and operation phases, the cumulative impacts of these activities, collectively known as the Project, are described in Section 18.8.1 below.

242 Cumulative impacts arising from the effects of the Project in conjunction with other projects and activities are described in *Section 18.8.2*. A range of other projects, both onshore and offshore were identified through consultation with relevant stakeholders for cumulative impacts with the Project (full details can be found in Section 4.7.3; Figure 4.1). It is recognised that a number of these projects could potentially contribute to the cumulative impacts on commercial fish receptors. For the majority of commercial fish receptors and projects, the scale, nature and distance from the Project suggests that they will not interact with a significant proportion of any receptors that could result in an cumulative impact.

243 As such the assessment in Section 18.8.2 principally focuses on the two additional offshore wind farm developments in the Forth and Tay area, which are in closest proximity to the Project and for which detailed project information is available.

244 In certain instances, however, the wide operational range of certain fishing vessels (i.e. in the case of the nomadic scallop fleet, around the UK) may result in them being affected by projects in addition to those in the Forth and Tay area. The cumulative impact is dependent on the productivity of the grounds and the final project design, which will influence the level to which the fishery will be impacted by the potential effects. It is not anticipated that these effects will increase significance above the levels described in Section 18.8.2.

### 18.8.1 Cumulative Impacts of the Project

245 The cumulative impact of the Project takes into account the construction/decommissioning and operation of the Development Area and Offshore Export Cable Corridor. A fishery is considered to have the potential to sustain a cumulative impact only if it is affected by the Project components.

246 As described in the individual assessments, scallop dredging is the principal activity located in the Development Area, and to a lesser extent trawling for squid and creeling for crab and

lobster. All of these activities are located in both the Development Area and the Offshore Export Cable Corridor.

- 247 Fishing for *nephrops* has only been identified in the Offshore Export Cable Corridor, and as a result the fishery will only be cumulatively affected by the potential for interference as a result of navigational conflict.
- 248 The sensitivity and magnitude have been redefined and a rationale provided for the cumulative impact assessed.
- 249 There is the potential for cumulative adverse impacts upon commercial fish and shellfish populations and hence affect the commercial fisheries targeting those species. An assessment of these potential effects is fully described in *Chapter 13.9*. Table 18.28 below has been reproduced from *Chapter 13.12* and shows the significance of effect assessed on each species under consideration.
- 250 Table 18.29 summarises the cumulative impacts of the Project, including a rationale for the cumulative significance of effect.

**Table 18.28: Cumulative Impacts of the Project upon Commercial Fish and Shellfish Populations during Construction and Operation**

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
<b>Construction</b>					
Direct temporary habitat disturbance	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Indirect disturbance as a result of sediment deposition and temp increased in SSC	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
	SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate	
Barrier effects disturbance or physical injury associated with construction noise	Scallops	Shellfish	Low	Mortality/injury and Behaviour = Negligible	Mortality/injury and Behaviour = Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Negligible/Minor; Behaviour = Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Negligible/Minor; Behaviour = Minor
	SAC qualifying feature species (Salmon)	High	Mortality, injury = Negligible; Behaviour = Low	Mortality, injury = Minor/Moderate; Behaviour = Moderate	

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
<b>Operational</b>					
Long term loss of original habitat	Scallops	Shellfish	Low	Low	Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	
Behavioural responses to EMF associated with cabling (no cumulative impact)	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Low	Moderate	

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Disturbance or physical injury associated with operational noise	Scallops	Shellfish			No cumulative effect for project
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)			
	Salmon and sea trout	Mobile fish species (Sea trout)			
		SAC qualifying feature species (Salmon)			
Creation of new habitat due to presence of project infrastructure (Cable protection)	Scallops	Shellfish	Low	Moderate	Minor/Moderate (+ve)
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor (+ve)
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor (+ve)
		SAC qualifying feature species (Salmon)	High	No impact	No impact
Temporary habitat disturbance via O&M activities	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				

Effect	Receptor (as per Chapter 18 Grouping)	Receptor (as per Chapter 13 Grouping)	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate

**Table 18.29: Cumulative Effects of the Project during Construction/Decommissioning and Operation**

Impact	Receptor	Development Area	Offshore Export Cable Corridor	Cumulative	Rationale
<b>Construction/Decommissioning</b>					
Temporary loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major	Minor/Moderate	Moderate	Small cumulative increase of effect, taking into account the limited grounds along the Offshore Export Cable Corridor, which does not increase the significance of impacts.
	Squid fishery	Minor/Moderate	Minor/Moderate	Minor/Moderate	Limited increase in spatial extent of effect. Significant annual variation in location and level of fishing activity taken into account.

Impact	Receptor	Development Area	Offshore Export Cable Corridor	Cumulative	Rationale
	Crab and lobster fishery	Minor/Moderate	Moderate	Moderate	Identified cumulative effect for fishery in the vicinity of the Development Area and the Offshore Export Cable Corridor adjoining. Limited cumulative increase of effect taking account of limited spatial increase.  Port Seton fishery not cumulatively affected.
Safety issues for fishing vessels	All fishing vessels	See rationale	See rationale	See rationale	No unacceptable safety risks where there are designated safety/exclusion zones.  Safety risks associated with inter-array and Offshore Export Cables outwith of designated safety/exclusion zones.
Increased steaming time to fishing grounds	Scallop fishery	Minor	Minor	Minor	Discrete nature of safety/exclusion zones will not result in discernible increase in cumulative effect.
	Squid fishery				
	Crab and lobster fishery				
Displacement of fishing vessels into other areas	Scallop fishery	Moderate	Minor/Moderate	Moderate	Function of the temporary loss or restricted access, and assessment for this effect applies.
	Squid fishery	Minor/Moderate	Minor/Moderate	Minor/Moderate	
	Crab and lobster fishery	Minor/Moderate	Moderate	Moderate	

Impact	Receptor	Development Area	Offshore Export Cable Corridor	Cumulative	Rationale
Interference with fishing activities (navigational conflict)	Scallop fishery	Minor	Minor	Minor	Tolerance of towed gear fishing vessels to navigational conflict will not result in discernible increase in cumulative effect.
	Squid fishery				
	<i>Nephrops</i> fishery				
	Crab and lobster fishery	Moderate	Minor/Moderate	Moderate	Increased sensitivity of the fishery to navigational conflict. Limited additional cumulative effect due to relatively smaller contribution of the Offshore Export Cable Corridor to the effect.
<b>Operation</b>					
Complete loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major	Negligible/Minor	Moderate	Negligible increase in effect arising from the operation of the Offshore Export Cables.
	Squid fishery	Minor/Moderate	Negligible/Minor	Minor/Moderate	
	Crab and lobster fishery	Minor/Moderate	Negligible/Minor	Minor/Moderate	
Safety issues for fishing vessels	All fishing vessels	See rationale	See rationale	See rationale	No safety risks for all operational infrastructure within designated safety/exclusion zones  No safety risks for array and Offshore Export Cables providing appropriate post installation measures are completed.
Increased steaming time to fishing grounds	All fisheries	Minor	Negligible/Minor	Minor	Negligible increase in effect arising from the operation of the Offshore Export Cables.

Impact	Receptor	Development Area	Offshore Export Cable Corridor	Cumulative	Rationale
Displacement of fishing vessels into other areas	Scallop fishery	Moderate	Negligible/Minor	Moderate	Fisheries which will not be undertaken within the Development Area or Offshore Export Cable Corridor will move elsewhere.
	Squid fishery	Minor/Moderate	Negligible/Minor	Minor/Moderate	
	Crab and lobster fishery	Minor/Moderate	Negligible/Minor	Minor/Moderate	
Interference with fishing activities (navigational conflict)	All fisheries	Minor	Negligible/Minor	Minor	Negligible increase in effect arising from the operation of the Offshore Export Cables.

### 18.8.2 The Project in Conjunction with Other Projects

251 The following section describes the in-combination impacts arising from the impacts of the Project in conjunction with other relevant marine and coastal developments and activities which have the potential to interact with the Project and the identified commercial fisheries in this area.

#### Developments in the Forth and Tay

252 Developments in the Forth and Tay which are considered in the assessment include:

- Neart na Gaoithe offshore wind farm and offshore transmission infrastructure; and
- Firth of Forth Phase 1 offshore wind farms (Project Alpha and Project Bravo) and offshore transmission infrastructure.

253 A summary of the design specifications of the Neart na Gaoithe and Firth of Forth Phase 1 offshore wind farms and associated offshore transmission infrastructure is provided in Table 18.30.

**Table 18.30: Worst Case Design Parameters of Developments in the Forth and Tay**

<b>Worst Case Design Parameters</b>	<b>Neart na Gaoithe Design Envelope</b>	<b>Firth of Forth Phase 1 Design Envelope</b>
Wind Farm site location	South west of Development Area	East of Development Area, outside of 12 nm
Number of Wind Farms	One	Two (Project Alpha and Project Bravo)
Wind Farm development area	100 km <sup>2</sup>	197 km <sup>2</sup> (Project Alpha) 194 km <sup>2</sup> (Project Bravo)
Maximum number of WTGs	128	75 (per wind farm)
Minimum spacing between WTGs	450 m	610 m
Foundation type	Gravity base structure	Gravity base structure
Maximum number of OSPs	2 x 50 by 50 m	Three (Project Alpha) Two (Project Bravo)
Maximum number of met masts		Three (per wind farm)
Maximum length of inter-array cables	220 km	355 km (per wind farm)
Installation status of inter-array cables	Buried where feasible, protected elsewhere	Buried where feasible, protected elsewhere
Wind Farm construction period	Two years	Three years (per wind farm)
Location of export cable route	South of site to Thorntonloch	West of Project Alpha to Carnoustie
Maximum number of export cables	Two	Six
Maximum length of export cable route	33 km	530 km
Installation status of export cables	Buried where feasible, protected elsewhere	Buried where feasible, protected elsewhere
Export cable installation period	Several months	9 months within a 2 year period

254 As been previously stated, scallop dredging is the most important fishery in the Development Area, as well as along a proportion of the Offshore Export Cable Corridor. Scallop dredging is recorded in the Firth of Forth Phase 1 site and along a proportion of the

Firth of Forth export cable route. There is a low level of activity recorded within the Neart na Gaoithe site and along the export cable route.

- 255 In addition to the Development Area and Offshore Export Cable Corridor, bottom trawling for squid and *nephrops* is recorded in the Firth of Forth Phase 1 and Neart na Gaoithe sites and along their respective export cable routes.
- 256 In the case of the crab and lobster fishery, the cumulative impact arising from loss of fishing grounds is considered to apply only to the fishery operating in the vicinity of the Development Area. It should be noted that the vessels targeting the crab and lobster fishery identified in the vicinity of the Offshore Export Cable Corridor landfall options have limited operational ranges and target discrete fishing grounds. Taking this into account, the only additional aspect of development which could cumulatively impact this fishery are the Firth of Forth Phase 1 offshore transmission works.
- 257 As with the site specific impact assessments, the cumulative impacts considered for the construction and operational phases of the projects include:
- Adverse impacts upon commercial and recreational fish and shellfish populations;
  - Temporary/complete loss or restricted access to fishing grounds;
  - Safety issues for fishing vessels;
  - Increased steaming times to fishing grounds;
  - Displacement of fishing vessels into other areas; and
  - Interference to fishing vessels arising from navigational conflict.
- 258 As has been previously stated, in the absence of detailed decommissioning schedules and methodologies, decommissioning should be considered analogous with those effects identified during construction.

#### Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

- 259 There is the potential for the Project in conjunction with the proposed Neart na Gaoithe and Firth of Forth Phase 1 offshore wind farms to cumulatively result in adverse impacts upon commercial and recreational fish and shellfish populations, and hence result in changes to behaviour or a decline in species abundance which may affect commercial and recreational fishing activities. This effect is summarised below and fully assessed in *Section 13.9*.
- 260 Table 18.31 below has been reproduced from Section 13.12 and shows the significance of effect assessed on each species under consideration.

**Table 18.31: Cumulative Adverse Impacts upon Commercial Fish and Shellfish Populations as a Result of the Project in Conjunction with Other Project**

Effect	Commercial Fisheries Receptor	Natural Fish Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
<b>Construction</b>					
Direct temporary habitat disturbance	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	Negligible	Minor/Moderate

Effect	Commercial Fisheries Receptor	Natural Fish Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Barrier effects disturbance or physical injury associated with construction noise	Scallops	Shellfish	Low	Mortality/injury and behaviour = Negligible	Mortality/injury and behaviour = Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Mortality, injury = Negligible; behaviour = low	Mortality, injury = Negligible/Minor ; behaviour = Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Mortality, injury = Negligible; behaviour = low	Mortality, injury = Negligible/Minor ; behaviour = Minor
SAC qualifying feature species (Salmon)			High	Mortality, injury = Negligible; behaviour = low	Mortality, injury = Minor /Moderate; behaviour = Moderate
<b>Operation</b>					
Long term loss of original habitat	Scallops	Shellfish	Low	Low	Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
			SAC qualifying feature species (Salmon)	High	Negligible

Effect	Commercial Fisheries Receptor	Natural Fish Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Behavioural responses to EMF associated with cabling	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Minor
			SAC qualifying feature species (Salmon)	High	Low
Disturbance or physical injury associated with operational noise	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
			SAC qualifying feature species (Salmon)	High	Negligible
Reduced fishing activity	All receptor	Blanket assessment across receptors	Not assigned	Not assigned	Negligible/Minor (+ve)
Creation of new habitat due to presence of infrastructure	Scallops	Shellfish	Low	Moderate	Minor/Moderate (+ve)
	<i>Nephrops</i>				
	Crab and lobster				

Effect	Commercial Fisheries Receptor	Natural Fish Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
		SAC qualifying feature species (Salmon)	High	No impact	No impact
Temporary habitat disturbance via O&M activities	Scallops	Shellfish	Low	Negligible	Negligible/Minor
	<i>Nephrops</i>				
	Crab and lobster				
	Squid	Mobile fish (squid)	Low	Negligible	Negligible/Minor
	Salmon and sea trout	Mobile fish species (Sea trout)	Low	Negligible	Negligible/Minor
SAC qualifying feature species (Salmon)		High	Negligible	Minor/Moderate	

**Temporary or Complete Loss or Restricted Access to Fishing Grounds**

Construction

- 261 There is the potential for the construction schedules of the wind farms in the Forth and Tay to overlap. As a result, it is possible that fishing activity will be temporarily excluded from localised areas in each of the sites during construction as a result of designated safety/exclusion zones. The magnitude of effect will depend upon the construction schedules of each development and the total area of ground to which safety/exclusion zones are applied. It is, however, considered that safety/exclusion zones will be discrete relative to the total areas of the site and available fishing.

- 262 Additionally during the construction phase, the safety risks associated with the installation of array and export cables would result in the progressive loss of access to fishing grounds in these areas as the construction schedule advances. Access to these areas will not resume until the appropriate post-construction surveys confirm that fishing activities can safely resume.
- 263 The sensitivity of the principal fisheries takes into account of the progressive loss of area during the construction phase, principally as a result of the installation of inter-array and export cables, the proportion of fishing grounds the developments encompass and the temporary nature of construction vessels. It also recognises the availability of fishing grounds and, in the case of the scallop fishery, the wider area available outwith of the developments. Due to the distribution of the principal fisheries (scallops, squid, *nephrops* and crab and lobster) across the Regional Study Area and in the vicinity of more than one area of the developments in the Forth and Tay area, the sensitivity of all the fisheries is considered to be moderate.
- 264 The magnitude of effect takes into account the increased spatial extent of the developments relative to fishing grounds, and the likely increase in the overall duration of construction vessels, and is therefore moderate.
- 265 The cumulative impact arising from the construction of the Project in conjunction with the Neart na Gaoithe and Firth of Forth Phase 1 projects is therefore considered to be moderate for all of the principal fisheries in the Regional Study Area.

#### Operation

- 266 Subsequent to the satisfactory completion of post-construction surveys, it is considered that fishing vessels will regain some degree of access to fishing grounds within the operational wind farm sites. Further, it is considered that normal fishing activities will be able to recommence in the vicinity of export cables. As a result, it is considered that those fisheries identified in the vicinity of export cable routes will not be affected during their operation. The fisheries affected by the operation of the wind farms are therefore the scallop and squid fisheries. There is not considered to be a cumulative effect for crab and lobster fisheries in the vicinity of the Development Area and Neart na Gaoithe site, due to the different vessels which target these areas.
- 267 The sensitivity of the scallop fishery takes into account the proportion of grounds that the developments encompass for the duration of the operational phase, relative to scallop fishing grounds in the regional and wider area, but recognises that some degree of access will be regained within the sites. The sensitivity of the fishery is therefore moderate.
- 268 The sensitivity of the squid and *nephrops* fisheries takes into account the increase in grounds affected by the operation of the wind farm developments in the Forth and Tay area, although the significant annual variation in landings is recognised. The sensitivity of these fisheries is moderate.

- 269 The magnitude of effect reflects the current anticipated operational life of the wind farms and spatial extent of the developments, and is therefore moderate.
- 270 The impact upon the scallop, squid and *nephrops* fisheries during the operational phases of the offshore wind farms in the Forth and Tay is therefore expected to be moderate.
- 271 As mentioned previously however, it is recognised that a number of skippers of scallop dredge vessels may be reluctant to fish within the operational wind farm sites due to the safety implications associated with scallop dredge gear and snagging risks. It therefore follows that these vessels will be permanently excluded from the developments in the Forth and Tay for the duration of operation, resulting in moderate sensitivity, high magnitude and therefore a moderate/major significance of loss of fishing area on these vessels.

### **Safety Issues for Fishing Vessels**

#### **Construction**

- 272 As previously stated, it is likely that there will be overlap in the construction schedules of the proposed developments, although it is not at this stage defined what these overlaps will be. It is considered, however, that there will be a number of simultaneous constructions events which will have designated safety/exclusion zones. As with the site specific assessments, compliance with these zones would not result in any safety risks to commercial fishing activities.
- 273 There is additionally the safety risk to fishing vessels posed by the installation of array and export cables. The spatial extent is dependent upon the stage of development of each project and the possible overlap in construction schedules. It is however, recognised that fishing activities will not be able to safely resume until the appropriate post installation surveys have been completed. Until this time, safety risks will be associated with the installation of array and export cables.
- 274 There is the potential for obstacles to be left on the seabed during construction which could result in damage to, or loss of fishing gears, as well as representing an ongoing safety hazard during operation. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears. Contractors will be obliged and monitored to ensure compliance with standard offshore policies prohibiting the discarding of objects or waste at sea (IMO, 1996). The reporting and recovery of any accidentally dropped objects is also required. Compliance with these commitments will negate the risks from obstacles left of the seabed from construction.

#### **Operation**

- 275 All infrastructure will be required to be appropriately marked, in line with standard industry practice.
- 276 It is considered that fishing vessels will be able to safely resume activities in operational sites and in the area of export cables, subsequent to the satisfactory completion of appropriate

post construction measures. There would therefore be no safety risks to commercial fishing activities.

### **Increased Steaming Times to Fishing Grounds**

#### **Construction**

- 277 There is the potential for the safety/exclusion zones applied during the construction phases of the proposed developments to result in increases to steaming times for fishing vessels, particularly in the likely event that construction schedules overlap. Additional safety/exclusion zones may be applied to partially installed or completed infrastructure within the sites.
- 278 The sensitivity of commercial fisheries recognises that there are limited fishing grounds in areas offshore of the sites, although transit in a north to south direction is recognised. In addition the discrete nature of safety/exclusion zones relative to available fishing grounds is recognised. The sensitivity of all fisheries is therefore low.
- 279 The magnitude of effect takes into account the temporary nature of construction vessels but recognises the likely overlap in construction schedules. The limited spatial extent of the safety/exclusion zones is however recognised, although these will be proportionally increased. The magnitude of effect is therefore moderate.
- 280 The impact of the Project in conjunction with the Neart na Gaoithe and Firth of Forth Phase 1 wind farm sites on increased steaming times to fishing grounds during construction is considered to be low/moderate.

#### **Operation**

- 281 *Chapter 19* considers that there is good prospect for fishing vessels to navigate within the operational wind farm sites proposed. There will be no discernible effect from operational export cables upon steaming time. The sensitivity recognises the limited fishing grounds offshore of the wind farms sites, although transit in a north south direction is recognised. In addition the discrete nature of safety/exclusion zones relative to available fishing grounds is recognised. The sensitivity of all fisheries is therefore low.
- 282 The magnitude of effect takes into account the 'good prospect' for navigating through the sites, and is therefore low.
- 283 The impact of the Development Area and Offshore Export Cable Corridor in conjunction with the Neart na Gaoithe and Firth of Forth Phase 1 wind farms on increased steaming times to fishing grounds during the operational phase is considered to be low.

### **Displacement of Fishing Activity**

#### **Construction**

- 284 As has been previously stated, the extent of displacement during the construction period will be a function of the temporary loss or restricted access to fishing grounds. The

assessment and significance of this effect therefore applies. The in-combination impact arising from the Project in conjunction with the proposed Neart na Gaoithe and Firth of Forth Phase 1 offshore wind farms during construction for the scallop, squid and *nephrops* fisheries is therefore considered to be moderate.

#### Operation

- 285 The extent of displacement during operation will be a function of the complete loss or restricted access to fishing grounds. The assessment and significance of this effect therefore applies. The in-combination impact arising from the Project in conjunction with the proposed Neart na Gaoithe and Firth of Forth Phase 1 wind farms during operation for the scallop, squid and *nephrops* fisheries is therefore considered to be moderate.

#### **Interference to Fishing Activities**

##### Construction

- 286 As has been previously stated, there is the potential for navigational conflicts between fishing vessels and construction, operations and maintenance vessels transiting to and from the sites. This relates particularly to static gear and the fouling of marker buoys and dahns, due to gear being left in the water for periods of several days, which renders it more sensitive to interference than towed gear. This interference has the potential to affect more vessels than those operating in the immediate vicinity of the sites, depending upon the location of the construction, operations and maintenance ports, which is not currently known for any of the developments.
- 287 Due to the mobility of the towed gear fleet, the sensitivity of these fisheries is low. The magnitude of effect for the towed gear fleet takes into account the increased number of construction vessels and transits. The significance for this fleet is therefore low.
- 288 Taking into account the discrete fishing grounds for local creel fisheries, largely as a result of limited appropriate substrate and the restricted operational range of the fleet, the potential worst case could assume that all construction related vessel transits are through discrete and important static gear grounds for the duration of the construction phases. As a result, the sensitivity of the fishery is high. The magnitude of effect is higher for static gear (creels), due to the proportionally larger spatial extent of impact relative to their more discrete fishing grounds, and is moderate. The significance is therefore moderate/major.
- 289 It is however considered that the implementation of a construction management plan and the establishment of a regional CFWG will assist in defining protocols such as agreed transit routes, which will mitigate and manage the significance of the effect (see *Section 18.9* below).

##### Operation

- 290 It is expected that all developers will have defined the appropriate protocols and working practices by the operation phases. In addition there will likely be a significant reduction in

vessels transiting to and from the sites. This will reduce the magnitude to low and ensure that the cumulative impact remains at low for all fisheries.

#### **Other Projects and Activities**

- 291 In certain instances, the wide operational range of certain fishing vessels (in some instances all around the UK) may result in them being affected by additional marine development around the UK. This is particularly the case with the nomadic scallop fishery. Additional consideration has therefore been given to projects beyond the Forth and Tay area which could feasibly affect fishing activities in addition to the Project, Neart na Gaoithe and Firth of Forth Phase 1 offshore wind farms.
- 292 With regard to salmon and sea trout fisheries, it is recognised that the geographical range of the species may result in their being affected by developments in the waters surrounding the UK and potentially further afield, although it is not within the scope of this assessment to identify the extent of effect. As previously stated, it is not considered that the fisheries identified for the assessment will be directly affected by development activities and instead there may be changes to the species in the marine environment which could have an indirect effect. Adverse impacts upon fish and shellfish species are assessed in *Chapter 13*.

#### **Other Offshore Wind Farms**

- 293 As mentioned previously, in certain instances the wide operational range of certain fishing vessels (i.e. in the case of the nomadic scallop fleet, around the UK) may result in them being affected by marine developments in addition to those in the Forth and Tay area.
- 294 The wide operational range of certain scallop dredging vessels (in some instances all around the UK) may result in their being affected by additional marine development around the UK. The cumulative effect upon the nomadic scallop fishery is dependent upon the productivity of grounds affected and the scale of effect identified for each development. In addition to the projects outlined in *Section 4.7.3*, the proposed principal developments located in the vicinity of scallop fishing grounds are:
- Firth of Forth Round 3 Zone;
  - Beatrice Offshore Wind Farm;
  - Moray Firth R3 Zone 1 (Eastern Development Area);
  - Argyll Array Offshore Wind Farm;
  - Rampion Round 3 Zone; and
  - Irish Sea Round 3 Zone.
- 295 The cumulative effect upon the nomadic scallop fishery is dependent upon the productivity of grounds affected and the scale of effect identified for each development. Detailed information about all of the projects listed above has not been provided and it is not therefore possible to fully quantify the scale of effect upon the nomadic scallop fishery. In general terms, however, it is considered that in each instance the scale of effect will be

largely defined by the engineering design and construction schedules of individual developments and the ability of vessels to regain access to grounds once the sites are operational. It should be assumed that all consented projects will have overlapping operational phases.

- 296 Project information is however available for the proposed developments in the Moray Firth, the Beatrice Offshore Wind Farm and Moray Firth R3 Zone 1 (Eastern Development Area), both of which have submitted applications for consent. Based on the information provided for these proposals, it is likely that these projects will have construction schedules which overlap with that of the Project, and that similar impacts to scallop fishing activities will be incurred to those identified in the assessment for the Project, although the significance of impacts will be proportional to the level of activity identified in those locations. It is not anticipated that these effects will increase significance above the levels described in Section 18.8.2.

### **Shipping and Navigation**

- 297 There is the potential for changes to current shipping and navigation practices as a result of offshore marine development, which could result in indirect impacts to commercial fishing activities. This would likely be as a result of the displacement of shipping vessels out of traditional navigation routes and into fishing grounds. The scale of effect is dependent upon the level and extent of displacement identified. This is discussed further in *Chapter 19*.

### **Marine Protected Areas (MPAs) and other Closed/Restricted Areas**

- 298 MPAs currently in place have, in certain areas, had the effect of restricting fishing activities, particularly those activities affecting the seabed (i.e. bottom towed gear). In Cardigan Bay, for example, a designated SAC, all scallop dredging is prohibited. It is considered that the Nature Conservation MPAs in Scotland and the Marine Conservation Zone (MCZ) announcements in England and Wales will enforce additional limitations upon certain, if not all, fishing activities in the future.
- 299 There are additional fisheries management policies in place which also restrict or prohibit certain or all types of fishing activities. Such restrictions may be seasonal or annual and are subject to review. There are not currently any restricted or closed areas in the Forth and Tay area in addition to those already identified (see *Appendix 18A* and *Appendix 18B*).

## **18.9 Mitigation**

- 300 The commercial fish assessment has assessed worst case scenario impacts of the Project in isolation and cumulatively. This assessment has concluded that impacts on receptors within the Study Area from Project related activities based on the inclusion of the Embedded Mitigation detailed in Section 18.3.6.
- 301 Based on the outputs from this impact assessment, it has been concluded that the Embedded Mitigation should be supplemented with Addition Mitigation as follows:

- Suitable and sufficient assessment will be undertaken to ensure that all safety risks are reduced as far as reasonably practicable.
- Modifications to bottom towed fishing gear are being investigated in consultation by the offshore renewables industry and the fishing industry which may better enable fishing activities within and around operational wind farms.
- Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.

## 18.10 Conclusions and Residual Impacts

### 18.10.1 Development Area

302 A summary of the impacts, including mitigation and residual impacts, for the Development Area is given in Table 18.32 below. At present, the effects following mitigation are unchanged, with the exception of interference to creel gear as a result of navigational conflict during the construction phase.

**Table 18.32 Summary of Pre- and Post-Mitigation Effects**

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
<b>Construction</b>				
Direct temporary habitat disturbance	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Barrier effects, disturbance or physical injury associated with construction noise	Scallops	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	<i>Nephrops</i>	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	Crab and lobster	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	Squid	Mortality, injury = Negligible/Minor; Behaviour = Minor		Mortality, injury = Negligible/Minor; Behaviour = Minor
	Sea trout	Mortality, injury = Negligible/Minor; Behaviour = Minor		Mortality, injury = Negligible/Minor; Behaviour = Minor
	Salmon	Mortality, injury = Minor/Moderate; Behaviour = Moderate		Mortality, injury = Minor/Moderate; Behaviour = Moderate
Temporary loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major		Moderate/Major
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery			
Safety issues for fishing vessels	All fishing vessels	No safety risks where there are designated safety/exclusion zones		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Increased steaming times to fishing grounds	All fisheries	Minor		Minor
Displacement of fishing activity	Scallop fishery	Moderate		Moderate
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery			
Interference to fishing activities arising from navigational conflict	Scallop fishery	Minor		Minor
	Squid fishery			
	<i>Nephrops</i> fishery			
	Crab and lobster fishery	Moderate	Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.	Minor
<b>Operation and Maintenance</b>				
Long term loss of original habitat	Scallops	Minor		Minor
	<i>Nephrops</i>	Minor		Minor
	Crab and lobster	Minor		Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Behavioural responses to EMFs associated with cabling	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Disturbance or physical injury associated with operational noise	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Effect on fish and shellfish resources due to reduced fishing effort within Development Area	Scallops	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	<i>Nephrops</i>	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Crab and lobster	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	Negligible/Minor (+ve)		Negligible/Minor (+ve)
Creation of new habitat due to presence of project specific infrastructure	Scallops	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	<i>Nephrops</i>	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Crab and lobster	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	No impact		No impact

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Temporary habitat disturbance via O&M activities	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Complete loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major		Moderate/Major
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery			
Safety issues for fishing vessels	All fishing vessels	<p>No safety risks for all operational infrastructure within designated safety/exclusion zones</p> <p>No Safety risks for array cables providing appropriate post installation measures are completed</p>		<p>No safety risks for all operational infrastructure within designated safety/exclusion zones</p> <p>No Safety risks for array cables providing appropriate post installation measures are completed</p>
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements
Increased steaming times to fishing grounds	All fisheries	Minor		Minor
Displacement of fishing activity	Scallop fishery	Moderate		Moderate
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery			

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Interference to fishing activities arising from navigational conflict	All fisheries	Minor		Minor

**18.10.2 Offshore Export Cable Corridor**

303 A summary of the impacts, including mitigation and residual impacts, for the Offshore Export Cable Corridor is given in Table 18.33 below. At present, the effects following mitigation are unchanged, with the exception of the commitment to ensure that all safety risks fall within acceptable safety limits.

**Table 18.33: Summary of Effects and Mitigation**

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
<b>Construction</b>				
Direct temporary habitat disturbance via Export Cable installation	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Indirect disturbance as a result of sediment deposition and temporary increases in SSC	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Disturbance or physical injury associated with construction noise	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Temporary loss or restricted access to fishing grounds	Scallop fishery	Minor/Moderate		Minor/Moderate
	<i>Nephrops</i> fishery	Moderate		Moderate
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery	Moderate		Moderate
Safety issues for fishing vessels	All fishing vessels	No safety risks where there are designated safety/exclusion zones		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements
Increased steaming times to fishing grounds	All fisheries	Minor		Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Displacement of Fishing Activity into other areas	Scallop fishery	Minor/Moderate		Minor/Moderate
	<i>Nephrops</i> fishery	Moderate		Moderate
	Squid fishery	Minor/Moderate		Minor/Moderate
	Crab and lobster fishery	Moderate		Moderate
Interference to fishing activities arising from navigational conflict	Scallop, <i>nephrops</i> and squid fisheries	Minor		Minor
	Crab and lobster fishery	Minor/Moderate	Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.	Minor
<b>Operation and Maintenance</b>				
Long term loss of original habitat	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Behavioural responses to EMFs associated with cabling	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Creation of new habitat due to presence of project specific infrastructure	Scallops	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	<i>Nephrops</i>	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Crab and lobster	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	No impact		No impact
Temporary habitat disturbance via O&M activities	Scallops	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	<i>Nephrops</i>	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Crab and lobster	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	Minor/Moderate		Minor/Moderate
Complete loss or restricted access to fishing grounds	All fisheries	Negligible/Minor		Negligible/Minor
Safety issues for fishing vessels	All fishing vessels	No safety risks providing appropriate post installation measures are completed		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Increased steaming times to fishing grounds	All fisheries	Negligible/Minor		Negligible/Minor
Displacement of fishing activity	All fisheries	Negligible/Minor		Negligible/Minor
Interference to fishing activities arising from navigational conflict	All fisheries	Negligible/Minor		Negligible/Minor

### 18.10.3 Cumulative Impacts of the Project

304 A summary of the impacts, including mitigation and residual impacts, for the cumulative assessment of the Project is given in Table 18.34 below.

**Table 18.34: Summary of Effects and Mitigation**

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
<b>Construction/Decommissioning</b>				
Direct temporary habitat disturbance	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Negligible/Minor		Minor/Moderate
Indirect disturbance as a result of sediment deposition and temp increased in SSC	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Barrier effects disturbance or physical injury associated with construction noise	Scallops	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	<i>Nephrops</i>	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	Crab and lobster	Mortality/injury and Behaviour = Negligible/Minor		Mortality/injury and Behaviour = Negligible/Minor
	Squid	Mortality, injury = Negligible/Minor; Behaviour = Minor		Mortality, injury = Negligible/Minor; Behaviour = Minor
	Sea trout	Mortality, injury = Negligible/Minor; Behaviour = Minor		Mortality, injury = Negligible/Minor; Behaviour = Minor
	Salmon	Mortality, injury = Minor/Moderate; Behaviour = Moderate		Mortality, injury = Minor/Moderate; Behaviour = Moderate
Temporary loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major		Moderate/Major
	Squid fishery	Minor		Minor
	Crab and lobster fishery	Moderate		Moderate
Safety issues for fishing vessels	All fishing vessels	No safety risks where there are designated safety/exclusion zones		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Increased steaming time to fishing grounds	Scallop fishery	Minor		Minor
	Squid fishery	Minor		Minor
	Crab and lobster fishery	Minor		Minor
Displacement of fishing vessels into other areas	Scallop fishery	Moderate		Moderate
	Squid fishery	Minor		Minor
	Crab and lobster fishery	Moderate		Moderate
Interference with fishing activities (navigational conflict)	Scallop fishery	Minor		Minor
	Squid fishery	Minor		Minor
	<i>Nephrops</i> fishery	Minor		Minor
	Crab and lobster fishery	Moderate	Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.	Minor
<b>Operation</b>				
Long term loss of original habitat	Scallops	Minor		Minor
	<i>Nephrops</i>	Minor		Minor
	Crab and lobster	Minor		Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Behavioural responses to EMF associated with cabling (no cumulative impact)	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Moderate		Moderate
Disturbance or physical injury associated with operational noise	Scallops	No cumulative effect for project		No cumulative effect for project
	<i>Nephrops</i>	No cumulative effect for project		No cumulative effect for project
	Crab and lobster	No cumulative effect for project		No cumulative effect for project
	Squid	No cumulative effect for project		No cumulative effect for project
	Sea trout	No cumulative effect for project		No cumulative effect for project
	Salmon	No cumulative effect for project		No cumulative effect for project
Creation of new habitat due to presence of project infrastructure (cable protection)	Scallops	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	<i>Nephrops</i>	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Crab and lobster	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	No impact		No impact

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Temporary habitat disturbance via O&M activities	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Complete loss or restricted access to fishing grounds	Scallop fishery	Moderate/Major		Moderate/Major
	Squid fishery	Minor		Minor
	Crab and lobster fishery	Minor		Minor
Safety issues for fishing vessels	All fishing vessels	No safety risks for all operational infrastructure within designated safety/exclusion zones  No safety risks for array and Offshore Export Cables providing appropriate post installation measures are completed		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements
Increased steaming time to fishing grounds	All fisheries	Minor		Minor
Displacement of fishing vessels into other areas	Scallop fishery	Moderate		Moderate
	Squid fishery	Minor		Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
	Crab and lobster fishery	Minor		Minor
Interference with fishing activities (navigational conflict)	All fisheries	Minor		Minor

#### 18.10.4 The Project in Conjunction with Other Developments

305 A summary of the impacts, including mitigation and residual impacts, for the cumulative assessment of the Project in conjunction with other Developments is given in Table 18.35 below.

**Table 18.35: Summary of Effects and Mitigation**

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Direct temporary habitat disturbance - construction	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Negligible/Minor		Negligible/Minor
Indirect disturbance as a result of sediment deposition and temporary increases in SSC - construction	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Barrier effects or physical injury	Scallops	Mortality/injury and behaviour = Negligible/Minor		Mortality/injury and behaviour = Negligible/Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
associated with construction noise - construction	<i>Nephrops</i>	Mortality/injury and behaviour = Negligible/Minor		Mortality/injury and behaviour = Negligible/Minor
	Crab and lobster	Mortality/injury and behaviour = Negligible/Minor		Mortality/injury and behaviour = Negligible/Minor
	Squid	Mortality, injury = Negligible/Minor; behaviour = Minor		Mortality, injury = Negligible/Minor; behaviour = Minor
	Sea trout	Mortality, injury = Negligible/Minor; behaviour = low		Mortality, injury = Negligible/Minor; behaviour = low
	Salmon	Mortality, injury = Minor/Moderate; behaviour = Moderate		Mortality, injury = Minor/Moderate; behaviour = Moderate
Long term loss of original habitat - operation	Scallops	Minor		Minor
	<i>Nephrops</i>	Minor		Minor
	Crab and lobster	Minor		Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Behavioural responses to EMF associated with cabling - operation	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Minor		Minor
	Salmon	Moderate		Moderate
Disturbance or physical injury associated with operational noise - operation	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate
Reduced fishing activity - operation	Scallops	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	<i>Nephrops</i>	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Crab and lobster	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Squid	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Sea trout	Negligible/Minor (+ve)		Negligible/Minor (+ve)
	Salmon	Negligible/Minor (+ve)		Negligible/Minor (+ve)
Creation of new habitat due to presence of infrastructure - operation	Scallops	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	<i>Nephrops</i>	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Crab and lobster	Minor/Moderate (+ve)		Minor/Moderate (+ve)
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	No impact		No impact
Temporary habitat disturbance via O&M activities - operation	Scallops	Negligible/Minor		Negligible/Minor
	<i>Nephrops</i>	Negligible/Minor		Negligible/Minor
	Crab and lobster	Negligible/Minor		Negligible/Minor
	Squid	Negligible/Minor		Negligible/Minor
	Sea trout	Negligible/Minor		Negligible/Minor
	Salmon	Minor/Moderate		Minor/Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Temporary or complete loss or restricted access to fishing grounds - construction	All fisheries	Moderate		Moderate
Temporary or complete loss or restricted access to fishing grounds - operation	All fisheries	Moderate		Moderate
Safety issues for fishing vessels – construction	All fisheries	No safety risks where there are designated safety/exclusion zones		No safety risks
Safety issues for fishing vessels – operation	All fisheries	No safety risks		No safety risks
Obstacles on the seabed post-construction	All fishing vessels	No safety risks providing contractors adhere to requirements		No safety risks providing contractors adhere to requirements
Increased steaming time to fishing grounds - construction	All fisheries	Minor/Moderate		Minor/Moderate
Increased steaming time to fishing grounds – operation	All fisheries	Minor		Minor
Displacement of fishing vessels into other areas – construction	All fisheries	Moderate		Moderate
Displacement of fishing vessels into other areas – operation	All fisheries	Moderate		Moderate

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Interference with fishing activities (navigational conflict) - construction	Scallop fishery	Minor	Defined navigational routes will be used by vessels. This will reduce the risk of disturbance to static gear.	Minor
	Squid fishery	Minor		Minor
	<i>Nephrops</i> fishery	Minor		Minor
	Crab and lobster fishery	Moderate/Major		Minor
Interference with fishing activities (navigational conflict) - operation	All fisheries	Minor		Minor

## References

---

Cefas/MCEU (2004) *Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements*. Available from <http://www.cefas.co.uk/publications/files/windfarm-guidance.pdf>

FTOWDG (2010) *Scottish Offshore Wind Farms – East Coast. Discussion Document (2) – Approach to Cumulative Effects Assessment*. Royal Haskoning.

Great Britain Parliament (2012) *Scallop Fishing (England) Order 2012 No. 2283*, Parliamentary Under Secretary of State, Defra.

IEEM (2010) *Guidelines for ecological impact assessment in Britain and Ireland: Marine and coastal*, Final Document. IEEM, 2010.

International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) (2008) *Recommendation O-139 – The Marking of Man-made Offshore Structures*, December 2008.

IMO (1996) *Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* [Online]. Available at:

<http://www.imo.org/ourwork/environment/pollutionprevention/pages/1996-protocol-to-the-convention-on-the-prevention-of-marine-pollution-by-dumping-of-wastes-and-other-matter,-1972.aspx> [Accessed 5 September 2012]. Personal Communication (2010) *Conversation with FMA*. October 2010.

Personal Communication (2011a) *Conversation with FIR*.

Personal Communication (2011b) *Consultation Meeting*.

Personal Communication (2011c) *Conversation with Scallop Fisherman*.

Personal Communication (2011d) *Conversation with Whitefish and Squid Fisherman*.

Personal Communication (2012a) *Conversation with Scallop Industry Representative*.

Personal Communication (2012b) *Conversation with Arbroath and Montrose Fishermen's Association*. April 2012.

Scottish Parliament (2003) *Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003*. Available at: <http://www.legislation.gov.uk/asp/2003/15/contents>