CHAPTER 14: COMMERCIAL FISHERIES

Technical Summary

The main fisheries within the Seagreen Project are dredging for scallops, trawling or netting for haddock, and trawling for squid. Of these, the scallop fishery is the most valuable. There are also important crab and lobster fisheries using fixed gear inshore within the export cable route corridor. A Navigational Risk Assessment has also been completed in tandem with the EIA process that considered safety issues for fishing vessels.

Fishing activity is expected to be excluded from certain areas, or access restricted, during construction and operation of both Project Alpha and Project Bravo. Impacts on both the squid and scallop fisheries are predicted due to potential increased steaming time to fishing grounds, displacement of fishing activity or navigational conflict with other vessels but these are not assessed as significant. Within the export cable route corridor, during both the construction and operation phases, a significant impact is predicted on the crab and lobster fishery that uses static gear. The impact on the scallop, squid and nephrops fisheries that use mobile gear is assessed as not significant.

Safety issues for fishing vessels will be reduced to within acceptable levels by the application of safety zones where construction activity takes place. However, until the appropriate post construction measures have been completed, the safety risks to fishing vessels arising from the installation of array cables or export cables sites are considered to be outside of acceptable limits.

It is predicted that the Seagreen Project will act cumulatively with other wind farms to produce significant impacts on the scallop, squid, nephrops and the crab and lobster fisheries during construction and on the squid and scallop fisheries during operation. In line with the natural fish and shellfish resource assessment a significant impact on Herring has been assessed at both project and cumulative levels during construction. Significant cumulative impacts have also been assessed with regards to safety, displacement and interference with fishing vessels.

A regional Fisheries Working Group is proposed to facilitate future engagement with the fishing industry and to seek to address the cumulative impacts which have been identified that are associated with offshore wind farm development in the region.

INTRODUCTION

14.1. This chapter of the Environmental Statement (ES) provides an assessment of the potential effects of the Seagreen Project upon commercial fishing activities, including salmon and sea trout fisheries. An assessment of the potential cumulative impacts arising from the Seagreen Project in conjunction with other planned marine and coastal developments and activities is also provided.

14.2. 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 separately addressed to other commercial fisheries, as a result of them being largely located in-river (with the exception of some coastal netting) and being different in nature to the majority of marine commercial fishing activities. It is also recognised that salmon is a qualifying feature or primary reason for Special Area of Conservation (SAC) site selection for a number of rivers on the east coast of Scotland. This is further discussed in Chapter 9: Nature Conservation Designations of this ES.

14.3. All figures supporting this chapter can be found in ES Volume II: Figures. The following documents support this chapter and are provided in Volume III: Appendices.

- Appendix I1: Commercial Fisheries Technical Report; and
- Appendix I2: Salmon and Sea Trout Fisheries Technical Report.

14.4. This chapter was produced by Brown and May Marine Limited (Ltd).

CONSULTATION

Commercial Fisheries

14.5. The Applicant 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 understanding of fisheries in the regional area of the development were appointed. Regular consultation has been undertaken and is ongoing, with the organisations listed below.

- Scottish Fishermen's Federation (SFF);
- Scallop Association;
- Anglo Scottish Fishermen's Association;
- Fishermen's Mutual Association (Pittenweem);
- Arbroath and Montrose Fishermen's Association;
- Dunbar Fishermen's Association;
- Cockenzie and Port Seton Fishermen's Association;
- Marine Scotland;
- Aberdeen District Fishery Office;
- Anstruther District Fishery Office;
- Eyemouth District Fishery Office; and
- South East Inshore Fisheries Group.

14.6. In addition to site-specific consultation and engagement, which Seagreen has undertaken since the beginning of project development, the Forth and Tay Offshore Wind Farm Developers Group (FTOWDG) has collaborated to hold joint discussions with commercial fisheries interests. These meetings were advertised and open to all interested parties. Seagreen is committed to ensuring that, where feasible, a collaborative approach is continued throughout future stages of development.

14.7. Individual fishermen were also contacted by Brown and May Marine 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 and the Technical Report (Appendix I1).

14.8. It is proposed that a regional Working Group is established to facilitate future engagement of the fishing industry by the FTOWDG. This will likely include representatives of all the fishing activities identified in the Forth and Tay area, FTOWDG developers, Marine Scotland and The Crown Estate. The objectives of the Working Group 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.

14.9. In addition to the Working Group, regular and advertised public fisheries meetings, open to all fishing interests, will be held.

14.10. Table 14.1 summarises issues that were highlighted by the consultees in the Scoping Opinion (Appendix B2) and indicates which sections of the chapter addresses each issue.

Table 14.1 Summary of commercial fisheries consultation and issues

Consultee	Issue	Relevant Chapter Section
Marine Scotland	A more up to date analysis could be derived using Vessel Monitoring Systems (VMS) and landings data for vessels greater than 15m.	Existing Environment Appendix I1: Commercial Fisheries Technical Report
Marine Scotland	VMS does not capture the detailed distribution of fishing activity by the smaller (under-15m) vessels which fish in the area, particularly in ICES (International Council for the Exploration of the Sea) rectangle 42E7. Shellfish fisheries are currently the most valuable fisheries in the area and a large proportion of the landings are taken by small boats.	Existing Environment Appendix I1: Commercial Fisheries Technical Report
Marine Scotland	Cumulative and in-combination assessment should address the extent of temporary and permanent loss of access to fishing grounds and possible effects of displaced fishing effort.	Impact assessment- Cumulative and In-Combination
Marine Scotland	Displaced effort may have direct economic effects, associated with increased steaming time, vessel costs and reduced catches if vessels have to compete with others in limited space (although in this case it would seem alternative fishing opportunities for small, locally based boats to displace elsewhere are likely to be limited).	Impact assessment - Construction Phase Impact assessment - Operation Impact assessment - Decommissioning
Marine Scotland	Use of additional sources of information – ABPmer's report on the value of fisheries and Daniel Dunstone's report on the Development of spatial information layers for commercial fishing and shellfishing in UK waters to support strategic siting of offshore wind farms.	Existing Environment Appendix I1: Commercial Fisheries Technical Report
Marine Scotland	Cumulative and in-combination effects should make the link between natural fish ecology and commercial fisheries. Cumulative impacts could be considered and the possible effects on coastal (fishing) communities might warrant a mention in the socio-economic section.	Impact assessment- Cumulative and In-Combination
Fife Council Development Services	Impacts on operational fishing fleets from Fife's East Neuk ports should be considered, particularly Pittenweem. The report does not appear to make reference to the East Neuk fishing industry.	Existing Environment Appendix I1: Commercial Fisheries Technical Report
Forth Estuary Forum	Fishermen (UK, European and nomadic) should be engaged in face-to-face meetings held at multiple locations. A number of contacts have been provided in the response which are not included on Seagreen's contacts list.	Baseline Environment Appendix I1: Commercial Fisheries Technical Report
Forth Estuary Forum	If there was to be a proven economic impact on the fishery would there be a way to help fishermen diversify	See relevant sections on mitigation

Consultee	Issue	Relevant Chapter Section
	into new fisheries?	
Forth Estuary Forum	If certain areas are out of bounds could other areas be re-opened?	N/ A
Forth Estuary Forum	Will it still be possible to creel in areas with buried cables?	Impact Assessment – Operation
Royal National Lifeboat Institution (RNLI)	Concerns over increased potential for casualties due to the impacts on the major shipping routes and more particularly on those areas visited by the commercial fishing industry.	Chapter 15: Shipping and Navigation

14.11. Salmon and Sea Trout Fisheries Consultation was undertaken (and is ongoing) with the organisations listed below:

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

14.12. FTOWDG has held joint discussions with DSFBs and their members, as well as statutory consultees. Seagreen is committed to ensuring that, where feasible, a collaborative approach is continued throughout future stages of development.

14.13. Table 14.2 summarises issues that were highlighted by the consultees in the Scoping Opinion (Marine Scotland, January 2011) and indicates which sections of the chapter addresses each issue.

Table 14.2 Summary of salmon and sea trout fisheries consultation and issues

Consultee	Issue	Relevant Chapter Section
ASFB	Important salmon populations in the vicinity of the site include the Esks, Tay, Forth and Tweed	Existing Environment Appendix I2: Salmon and Sea Trout Technical Report Chapter 12: Natural Fish and Shellfish Resource
ASFB	Effects arising from construction: What effect would the construction processes have on fish? Physiological and behavioural effects of underwater noise and vibration resulting from construction operations Direct effects on fish of water quality changes through suspension of sediment in the water column disturbed during construction Indirect effects of water quality changes through effects on food sources available to salmon and sea trout Will the effects of noise and mechanical disruption be assessed prior to construction and would on-going monitoring be put in place if the project is approved and completed	Impact Assessment - Construction Chapter 12: Natural Fish and Shellfish Resource

Consultee	Issue	Relevant Chapter Section
ASFB	Operational Effects: Physiological and behavioural effects of underwater noise and vibration resulting from turbine operation Are there likely to be electrical or magnetic fields associated with the installation and operation and will these have a discernible effect on salmon? Indirect effects on fish of permanent changes in habitat Whilst salmon use the area primarily as a migration route and are unlikely to remain there for lengthy periods, the habits of sea trout are rather different and this species may use the area more extensively as a feeding area before migration into freshwater systems. Accordingly there may be a risk of more prolonged interaction with sea trout in relation to the site.	Impact Assessment - Operation Chapter 12: Natural Fish and Shellfish Resource
ASFB	The proposed developments should be conducted in full consultation with the local District Salmon Fishery Boards and Fishery Trusts. The Trusts may have a particular interest in assessing potential impacts and monitoring the interactions between fish and developments such as these.	Chapter 12: Natural Fish and Shellfish Resource
Scottish Natural heritage (SNH) and the Joint Nature Conservation Committee (JNCC)	Fish of conservation concern include qualifying interests of adjacent SACs (i.e. Atlantic salmon, sea lamprey and river lamprey) and species listed as a priority on UKBAP, ICES and IUCN Red lists (i.e. European eels)).	Appendix I2: Salmon and Sea Trout Technical Report Chapter 12: Natural Fish and Shellfish Resource
SNH & JNCC	A recent review by Marine Scotland (Malcolm *et. al.*, in prep) summarises available information on the migratory routes and behaviour of Atlantic salmon, sea trout and European eel which may help inform assessment of the movement of some key species on the east coast of Scotland.	Appendix I2: Salmon and Sea Trout Technical Report Chapter 12: Natural Fish and Shellfish Resource
SNH & JNCC	Sea trout is a UKBAP Priority species which supports a number of fisheries in Scotland; many of these fisheries have undergone significant declines in the last 25 years. The draft report from Marine Scotland reviews the data available in relation to sea trout migration routes and behaviour.	Appendix I2: Salmon and Sea Trout Technical Report Chapter 12: Natural Fish and Shellfish Resource
SNH & JNCC	A SNH report (Gill *et al.*, in prep) considers the current state of knowledge with regard to the potential impacts of noise, associated with marine renewable energy, on Atlantic salmon, sea trout and European eel.	Impact Assessment - Construction Chapter 12: Natural Fish and Shellfish Resource
Marine Scotland	The proposed development will need to consider potential impacts on migratory fish including salmon, sea trout, lamprey and sandeels during all phases of the project.	Impact Assessment – Construction Impact Assessment - Operation Chapter 12: Natural Fish and Shellfish Resource
Marine Scotland	In cases where there is uncertainty over potential impacts it may be necessary for the developer to implement a monitoring strategy to assess the impacts on salmonid fish populations	Chapter 12: Natural Fish and Shellfish Resource

ASSESSMENT METHODOLOGY

Study Area

14.14. The study area for the assessment of commercial fishing activity is shown in Figure 14.1. The immediate study area (ISA) is the smallest available spatial unit used for the collation of fisheries statistics, which includes Project Alpha, Project Bravo and the Transmission Infrastructure, collectively known as the Seagreen Project. When possible the fishing activities in the specific area of the Seagreen Project have been further described. The regional study area (RSA) comprises the Outer Forth and Tay area encompassing the Zone and the Scottish Territorial Water (STW) sites, extending from 56° N in the south to 57° 30'N in the north and seawards out to 0° W. In addition, a brief national overview representing the wider study area (WSA) has been given to provide context for the fishing activities in the general area of the Seagreen Project.

14.15. For salmon and sea trout fisheries, the area of study has been defined at an immediate, regional and wider level (Figure 14.2). The ISA focuses on the salmon fishery districts located in closest proximity to the Seagreen Project, namely the Tay and the Esk (Bervie, North Esk and South Esk). The RSA takes account of all salmon fisheries regions located in the vicinity of the Seagreen Project including the East and North East regions. In addition, given the migratory behaviour of salmon and sea trout and the importance of the fishery across Scotland, for the WSA data and information at the national (Scottish) level have also been briefly described.

14.16. It should be noted that in general the terrestrial boundary for the Seagreen Project offshore works (wind farms, supporting offshore infrastructure, export cable route and landing) is delineated by the Mean High Water Spring (MHWS) tidal limit. All onshore works (being assessed as part of a separate Environmental Impact Assessment (EIA)) terminate at Mean Low Water Spring (MLWS). This results in an overlap of study areas between the offshore and onshore developments. This approach follows that adopted for previous Round 1 and Round 2 offshore wind farms.

Data Collection

Data Sources

Commercial Fisheries

14.17. The principal sources of data and information used for the collation of the commercial fisheries baseline were:

- International Council for the Exploration of the Sea (ICES);
- Marine Management Organisation (MMO);
- Marine Scotland;
- Marine Scotland Science (MSS);
- District Fishery Offices (DFOs);
- The Scottish Fishermen's Federation; and
- Fishermen and their representatives.

14.18. 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 UK publications;
- Centre for Environment, Fisheries and Aquaculture Science (CEFAS) publications; and
- any other additional relevant publications.

14.19. The following statistical datasets were analysed for inclusion in the baseline:

- MMO Fisheries Statistics (landings values and fishing effort data 2000-2010);
- MMO Surveillance Sightings (2000-2010);
- MMO UK Satellite Tracking (VMS[1]) Data;
- Marine Scotland Satellite Tacking (VMS) Data (2009); and
- Marine Scotland Data Analysis (2007-2010).

14.20. 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 I1: Commercial Fisheries Technical Report describes commercial fishing activities in progressive detail, building upon the sources and analysis listed above.

14.21. The sensitivities and qualifications of these data sources are described in Appendix I1: Commercial Fisheries Technical Report, Section 5.

Salmon and Sea Trout Fisheries

14.22. 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, netsmen and other fisheries stakeholders.

14.23. 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 (1952-2010);
- MSS salmon and sea trout catch data by salmon fishery district (2001-2010); and
- MSS salmon and sea trout netting effort data (2001-2010).

14.24. 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.

1 VMS data applies to fishing vessels over15m in length only

14.25. 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).

14.26. 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, however, 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.

14.27. Rod-and-line fisheries are also required to provide the monthly numbers and total weight of those salmon, grilse and sea trout which were caught and released back into the river, a practice 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.

14.28. The catch data used in this report are Crown copyright, used with the permission of MSS. Marine Scotland is not responsible for interpretation of these data by third parties.

Approach to Assessment

14.29. As a result of salmon and sea trout fisheries being either in-river or, to a lesser extent, coastal, it is considered that there will not be direct impacts arising from the construction/ decommissioning and operation of the Seagreen Project. However, changes to the behaviour of the 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 these species in the marine environment is described in Chapter 12: Natural Fish and Shellfish Resource.

14.30. In the absence of published guidelines by Marine Scotland regarding the assessment of impacts of wind farm developments upon commercial fishing activities, the aspects requiring assessment for the Seagreen Project are as specified in the CEFAS & Marine Consents and Environment Unit (MCEU) (2004) Guidelines, as follows:

- implications for fisheries during the construction phase;
- implications for fisheries when the development is completed;
- adverse impact on commercially harvested fish and shellfish populations;
- adverse impact on recreational fish populations;
- complete loss or restricted access to traditional fishing grounds;
- safety issue for fishing vessels;
- increased steaming times to fishing grounds;
- obstacles on the sea bed post construction; and
- interference with fisheries activities.

14.31. In addition to the above, the following potential impact has been included subsequent to consultation with fishing interests:

- displacement of fishing activity into other fishing areas.

14.32. An assessment of the above impacts will be separately applied to the construction/ decommissioning phases and the operational phase in terms of site specific effects. In the absence of detailed information on the decommissioning schedules and methodologies, it is considered that the potential impacts associated with the decommissioning phase will be of no greater significance, and in all likelihood less, than those incurred during the construction phase.

Assessment Limitations

14.33. The principal limitation of an assessment of impacts upon commercial fishing activities is the potential of the established baseline to change over time. This may be for a number of reasons, for example fluctuations in landings, changes in legislation and management policies, economic constraints such as fuel costs and crew availability or environmental restrictions such as weather. As a result, the assessment undertaken is limited by the baseline identified.

14.34. Certain fishing activities identified in the baseline are not limited to the regional study area, with a number of vessels potentially targeting grounds around Scotland and 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. Instead, fishing grounds affected by the Seagreen Project have been considered within the context of their relative importance to the regional study area, as well as to available fishing grounds around the UK.

14.35. Changes to the behaviour of species of commercial importance in the offshore marine environment, arising from the construction/ decommissioning and operation of the Seagreen Project, may indirectly affect commercial fishing activities (including those in-river). An assessment of the potential effects upon fish and shellfish species is provided in Chapter 12: Natural Fish and Shellfish Resource and the findings summarised in the relevant sections. It should be noted that the methodology used to assess impacts on the ecology of fish and shellfish species (including significance criteria) differs from the one used in this assessment of commercial fisheries, being largely based on the IEEM (2010) guidelines for ecological impact assessment.

14.36. The impact assessment on salmon and sea trout fisheries is subject to a number of limitations due to lack of current knowledge on the sensitivity of the species to certain potential impacts. In addition, as a result of uncertainties in relation to the distribution of these species and the use that they may make of the area of the three proposed sites, a number of conservative assumptions have been made.

Significance Criteria

14.37. The significance criteria described below has been used for this assessment. However, the impacts of offshore wind farm developments upon commercial fishing activities cannot be easily categorised and as a result, the application of the significance criteria to an assessment of effects is largely qualitative and based upon professional judgement.

14.38. The receptor has been defined by fishery: i.e. the scallop fishery, the squid fishery, the whitefish fishery, the Nephrops fishery and the crab and lobster fishery, and sensitivities have been defined on this basis. It should be noted, however, that the sensitivity of the fishery may vary with each potential impact, as well as between the construction/

decommissioning and operational phases, and as a result these are separately described. In each instance, the following characteristics are taken into account, as given in Table 14.3.

14.39. The magnitude of an effect is considered for each predicted impact on a fishery by fishery basis. Table 14.4 provides the definition of terms relating to the magnitude of a potential impact upon commercial fisheries used for the assessment. Magnitude of a potential impact is defined geographically, temporally and in terms of likelihood of impact.

14.40. Table 14.5 applies the significance criteria to the assessment of an effect, taking into account the magnitude of impact and sensitivity of the receptor. In the context of the assessment of impacts to Commercial Fisheries, a low magnitude combined with a low value/ sensitivity is given minor significance.

Table 14.3 Definition of terms relating to the sensitivity of commercial fisheries

Characteristic	Category	Definition
Adaptability (i.e. availability of fishing grounds)	Negligible	Fishing vessels are not required to avoid or adapt to an effect
	Low	Fishing vessels are required to amend fishing practices slightly, but no significant change
	Medium	Fishing vessels are limited in their ability to adapt
	High	Fishing vessels cannot adapt
Tolerance	Negligible	No discernible, or very low change in normal fishing practices
	Low	Outwith of peak fishing period or low change in fishing practices
	Medium	During peak fishing periods and discernible change in fishing practices
	High	Fishing activities cannot be undertaken
Recoverability	Negligible	Very short term, or within a period of very low fishing activity so fishing activities can resume without any discernible effect
	Low	Short term, or outwith of peak fishing periods so fishing activities can resume with little effect
	Medium	Temporary (i.e. fishing activities cannot be undertaken during construction, or peak fishing period)
	High	Permanent (i.e. fishing activities cannot be undertaken throughout operation)
Value	Negligible	Very low loss of economic value of fishery affected
	Low	Low loss of economic value of fishery affected
	Medium	Moderate loss of economic value of fishery affected
	High	High loss of economic value of fishery affected

Table 14.4 Definition of terms relating to the magnitude of impact upon commercial fisheries

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
	Medium	In the proximity of frequently targeted fishing grounds which comprise a proportion of fishing grounds to the receptor
	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
	Medium	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 phases. In the case of operation, the assessment considers the entire installed infrastructure for the lifetime of the project.	
Severity	Negligible	No discernible, or very low change to fishing practices
	Low	Some amendment to fishing practices but no significant change
	Medium	Fishing activities have limited opportunity to adapt and there is a discernible reduction in the area of development
	High	Fishing activities cannot be undertaken in the area of development

Table 14.5 Assessment of Significance

Value / Sensitivity	Magnitude			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

14.41. Effects which are moderate or major are considered to be significant in relation to the EIA regulations.

14.42. In the instances whereby the development potentially poses a risk to the health and safety of a fishing vessel and crew, the significance criteria used for the assessment is not applied. Instead, the risk is assessed to be within or outside acceptable limits. The parameters used to define acceptable limits are given in Table 14.6. These are consistent with the definition of the levels of risk as significant or not significant in terms of vessel navigation, collision risk, and response to marine incidents given in Chapter 15: Shipping and Navigation (paragraphs 15.33 to 15.34). It is considered that the Intermediate Risk criterion in Table 14.6 below falls within acceptable limits.

14.43. Impacts which are within acceptable limits are considered not significant in terms of EIA Regulations. Impacts with are outwith acceptable limits are considered to be significant in terms of the EIA Regulations.

Table 14.6 Risk Matrix Description

Risk Region	Risk	Description
	Broadly Acceptable Region (Low Risk)	Generally regarded as insignificant and adequately controlled. Nonetheless the law requires further risk reductions if it is reasonably practicable. However, at these levels the opportunity for further risk reduction is much more limited.
	Tolerable Region (Intermediate Risk)	Typical of the risks from activities which people are prepared to tolerate to secure benefits. There is however an expectation that such risks are properly assessed, appropriate control measures are in place, residual risks are as low as is reasonably practicable (ALARP) and that risks are periodically reviewed to see if further controls are appropriate.
	Unacceptable Region (High Risk)	Generally regarded as unacceptable whatever the level of benefit associated with the activity.

14.44. It should however be noted that an assessment of risks in this section is qualitative and for the purposes of the EIA only. Further, it is recognised that although the applicant will endeavour to facilitate continued access to fishing grounds within the operational site, individual skippers' assessment of the safety risks may differ to that provided here.

EXISTING ENVIRONMENT

Commercial Fisheries

The Wider Study Area (WSA), Regional Study Area (RSA) and the Immediate Study Area (ISA)

14.45. ICES rectangle 42E8, within which the Seagreen Project is located, records landings values that are of moderate to low importance on a national scale, and of moderate importance in the regional study area. The species which comprise the percentage values of landings from 42E8 are: king scallops (78.6%), haddock (13.5%) and squid (3.0%) (Figure 14.3, averaged 2001-2010).

14.46. The following fishing methods are used (Figure 14.4): boat dredging for scallops, demersal trawling or seine netting for haddock, and demersal trawling for squid.

14.47. Aberdeen is the principal port recording the majority of landings from rectangle 42E8 (57.5%), although this only represents 5.1% of the port's total annual income. In contrast, ports such as Arbroath (11.0%) and Montrose (5.0%) record relatively smaller proportions of the landings values from the local area, but which represent a larger proportion of each port's total value (11.7% and 16.5%, respectively).

14.48. The majority of vessels operating in rectangle 42E8 are over-15m in length (Figure 14.5, 93.9%) and the activities of these vessels are included within the satellite tracking (VMS) datasets. Vessels between 10 and 15m in length account for a lower percentage of the vessels operating in 42E8 (2.8%), with under-10m vessels recording negligible levels (0.3%). The remainder of activity (3%) has been recorded by non-UK vessels.

14.49. Landings values for all species from rectangle 42E8 are broadly highest in spring and early summer (April to June), although there are also moderate catches recorded in March, July and August (Appendix I1: Commercial Fisheries Technical Report).

14.50. In addition to the principal fisheries identified in rectangles 42E8, the following fishing activities are also undertaken in the WSA: bottom trawling for nephrops, and creeling for lobster and crab.

Scallop Fishery

14.51. Rectangle 42E8 records the second highest scallop landings in the regional study area, (£742,549, averaged 2001-2010), which are moderately important on a UK scale (Figure 14.6).

14.52. King scallops are principally targeted by boat dredges. 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, scallop vessels are restricted by the number of dredges that can be operated: within 6NM[2] no more than eight dredges per side are permitted, within 6 – 12NM up to ten dredges aside are permitted and outside 12NM vessels are allowed to operate up to 14 dredges per side. A revision to scallop gear allowances in Scottish waters may be made in the future, to align with those enforced in English waters: a limit of 8 dredges aside inside 12NM and no limit on the number outside of 12NM (pers. comm. Scallop industry representative, 2012). This may have the effect of increasing the number of dredges operated outside of 12NM in Scottish waters, including the area of the Seagreen Project.

14.53. 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.

14.54. The majority of vessels targeting scallops in immediate area of the Seagreen Project are over 15m in length and as a result, analysis of VMS data is accurate in further describing their activities. Scallop activity, as illustrated by Marine Scotland data (2008, showing the highest recorded level of activity in the four year period of data provided) (Figure 14.7) and VMS data (2009) (Figure 14.8) indicates that scallop dredging occurs in areas along the north east coast, including the Scalp Bank and in the vicinity of the Seagreen Project. Annual fluctuation in activity should be noted.

14.55. 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. Scallop fishing for the nomadic fleet is generally cyclical; grounds are intensively targeted for a period and then left to recover. Scallop grounds around the UK are on the Scottish east and west coasts, in the Irish Sea and the English Channel (Figure 14.6). The number of vessels dredging the Forth and Tay area will therefore vary annually, depending upon productivity and access to grounds.

14.56. Scallop dredging is not currently restricted by quota or effort 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 area of the Seagreen Project at the present time.

14.57. In addition to the over-15m fleet, several small category vessels with home ports in the RSA 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.

2 1nm is equal to 1.852km

Whitefish Fishery

14.58. Whitefish, principally haddock in the RSA, is targeted by Scottish seine netters and demersal trawlers offshore of the Seagreen Project, predominantly in areas to the east and north-east. Haddock is targeted throughout the year, although activity peaks in the summer months (May to August, inclusive).

14.59. Whitefish is principally targeted by the over-15m fleet and VMS data indicate that landings are moderate in north-eastern areas of the regional study area and negligible within the Seagreen Project (Figure 14.9).

14.60. Historically, there was a whitefish fishery in the region; however, fisheries management policies and availability of resource have had the effect of making the fishery unviable. It is not it considered likely that vessels will resume the fishery in the area in the future, largely due to ongoing restrictions on cod and other whitefish species. There are currently no whitefish vessels based at local ports and whitefish landings are either by visiting vessels or by-catch from another fishery.

Squid Fishery

14.61. Squid is reported to be an increasingly important fishery in the Forth and Tay area. It is currently unregulated and demersal vessels constrained by restrictions on other pressure stocks are able to reconfigure gear to target the species. Annual landings values vary significantly as the fishery is dependent upon the arrival of the species in the area. Although spatial distribution data between 2007 and 2009 (over-15m vessels only) showed squid activity to be primarily located in inshore areas adjacent to the coast, the same dataset for 2010 showed the widest distribution of activity in the four year period of data provided (Figure 14.10), with activity identified in locations further offshore than previously.

14.62. Peak landings for squid occur between June and September, although fishermen reported that 2010 saw an unusually long squid season, with activity continuing into November (pers. comm. Consultation meeting, 2011).

14.63. The fishery is targeted by vessels with home ports in the regional and wider study area. Bottom otter trawlers targeting nephrops or whitefish will reconfigure gear to operate nets with a smaller mesh size and higher headline. The species can be targeted on a variety of seabed substrates and vessels may employ protective gear such as rockhoppers on rough ground. The majority of vessels in 42E8 are over 15m and are therefore satellite tracked. A proportion of the fleet will, however, be under 15m, particularly in areas closer inshore, and their activity is not included within the VMS datasets. Consultation with squid fishermen (Figure 14.11) in the RSA suggests that grounds are found throughout the Forth and Tay area, including, to a degree, areas within the Seagreen Project.

14.64. 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, they will vary each year and fishermen will generally move further offshore as the season progresses to target the species in deeper waters.

14.65. 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 highly sensitive to environmental change and as such it is not currently possible to predict future stocks.

Nephrops Fishery

14.66. Nephrops is an important shellfish species in the Forth and Tay area, with the highest recorded landings in rectangles 41E7 and 41E6. Nephrops constitute £3,854 (0.4%) of the total value of 42E8, which are of negligible importance on a regional scale. The majority of vessels in 42E8 are over 15m and VMS data (2009) shows that nephrops activity is outwith of the Seagreen Project, predominantly recorded in areas further south and north (Figure 14.12).

14.67. Consultation with nephrops fishermen (Figure 14.13) identified that a large proportion of nephrops vessels operating in the RSA are from local home ports and are under 15m, so not monitored by VMS.

14.68. Nephrops inhabit muddy substrates and are principally targeted by demersal otter trawlers. Vessels can employ either single or twin rig demersal gear with a 70mm mesh cod end to target the species. Vessels target nephrops year round although there are seasonal fluctuations in landings, with a marked peak recorded during the summer months (July and August) in the RSA. Weather conditions, particularly for the smaller category vessels are a significant factor in determining levels of activity in the winter months.

Crab and Lobster Fishery

14.69. Although crab and lobster landings are relatively high in inshore areas, rectangle 42E8 however records negligible landings values of the species.

14.70. Crab and lobster are principally targeted by full time static gear vessels setting pots/ creels, although there are also 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.

14.71. Vessels targeting crab and lobster are generally under-15m in length and as a result, weather conditions are a significant factor in determining levels of activity in the winter months.

14.72. Creel fishing grounds are predominantly inshore of the Seagreen Project, and are generally concentrated several miles from the shore along the north and south coasts of the RSA. Grounds offshore of Arbroath are particularly important crab and lobster grounds and the port has a fleet of full-time and part-time creel boats. Several creel vessels have been identified operating in deeper waters offshore and in the vicinity of the Seagreen Project (Figure 14.14). In addition, consultation with fishing interests has identified the growth of the newest sector of the crab and lobster fleet; larger vessels fishing the extent of the study area and potentially out to 25NM and employing relatively large amounts of gear (pers. comm. Fishing Industry Representative, 2012).

Other Commercial Fisheries

14.73. There is currently an artisanal summer fishery in the Forth and Tay area for mackerel, targeted by small, inshore vessels operating hand lines and jiggers. Local creel vessels may target mackerel during the summer months whilst also setting creels for lobster and crab.

14.74. Historically, sprats were targeted in the Inner Forth until the fishery was closed due to concerns over juvenile herring by-catch. There are however proposals to survey the area to identify clean sprat stocks which may lead to a small scale fishery in the future, although this will be in areas away from Project Alpha and Project Bravo.

14.75. Sandeels were historically targeted by the Danish fleet on the Wee Bankie in the Firth of Forth. Sandeel fishing grounds in the North Sea were closed in 2000 as a result of concerns over stock populations and the impacts on predator species, and, although parts of the North Sea fishery were reopened in 2009, there is still a moratorium on sandeel trawling along the east coast of Scotland. It is possible however that the species may recover to sufficient levels for the fishery on the Wee Bankie to open again in the future.

Project Alpha

14.76. Dredging for scallops is the principal fishing activity recorded in the Project Alpha site (Figure 14.7). As described previously, the majority of vessels are over 15m and as a result are recorded in the VMS datasets. Activity fluctuates over the four year period of data (VMS charts provided by MS, see paragraph 14.19) and the cyclical nature of the fishery should be noted.

14.77. There is limited activity recorded by over 15m vessels targeting squid in 2010 (Figure 14.10), using VMS datasets, although the previous three years of analysed data do not show this activity within the boundary of the site. Consultation identified grounds including the Project Alpha site (Figure 14.11). The significant annual variation in the productivity and distribution of squid activity should be noted.

Project Bravo

14.78. Dredging for scallops is the principal fishery recorded in the Project Bravo site (Figure 14.7). As described previously, the majority of vessels are over-15m and as a result are captured in the VMS datasets. Activity fluctuates over the four year period of data but levels are slightly lower in the Project Bravo site compared to the Project Alpha site over the period. The cyclical nature of the fishery should however be noted.

14.79. Over 15m vessels targeting squid have not been identified within the Project Bravo site using VMS data analysis (Figure 14.10), although consultation identified grounds including the Project Bravo site (Figure 14.11). The significant annual variation in the productivity and distribution of squid activity should be noted.

Transmission Asset Project

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.80. The OSPs which form part of the Transmission Asset Project will be located within the boundaries of Project Alpha and/ or Project Bravo. As such the OSPs are assessed within the assessment of Project Alpha and Project Bravo and hence are excluded from the Transmission Asset Project to avoid duplication. The baseline environment in relation to the OSPs is therefore as described above in relation to Project Alpha and Project Bravo.

Export Cable Route (ECR) Corridor

14.81. The ECR corridor predominantly passes through ICES rectangle 42E7, and to a lesser extent, rectangle 42E8. The landfall section falls within rectangle 41E7, although this constitutes only a very small proportion of the rectangle (Figure 14.1).

14.82. Rectangle 42E7 records landings of lobster and crab (edible and velvet) which are important on a regional and national scale, landings of scallops which are important on a regional scale and, to a lesser extent, landings for nephrops and squid, respectively.

14.83. Rectangle 42E8, in which a very small proportion of the offshore section of the cable route is located, principally records landings of scallop, haddock and squid respectively, as discussed previously.

14.84. Rectangle 41E7, within which a very small proportion of the landfall site is located, records high landings values of nephrops and crustaceans, which are important on a regional and national scale.

14.85. The majority of vessels operating in rectangle 42E7 land their catch into Arbroath (32.5%), which represents 68.5% of the port's total annual value. A proportion of vessels also land their catch into Aberdeen (27.5%), however this only represents 4.9% of the port's total average annual value. Ports such as Gourdon (14.1%), Stonehaven (4.7%), Johnshaven (4.7%), Cove (0.2%) and Catterline (0.1%) however, record relatively smaller proportions of the landings values from rectangle 42E7, but this represents a larger proportion of each port's total annual value (93.4%, 91.8%, 94.1%, 91.0% and 100.0%, respectively).

14.86. The majority of vessels operating in rectangle 41E7 land their catch into Pittenweem (50.9%) and this represents 95.4% of the port's total annual value. Ports such as Crail (5.8%), Methil and Leven (5.0%), St. Andrews (2.8%), Anstruther (2.6%) and West Wemyss (0.1%) record relatively smaller proportions of the landings values from rectangle 41E7, but this also represents a large proportion of each port's total annual value (99.6%, 95.8%, 99.1%,99.5% and 100.0%, respectively).

14.87. A considerable proportion of vessels operating in rectangles 41E7 and 42E7 (with the exception of those vessels discussed previously) are under-15m (83.7% and 62.1%, respectively) and hence will not be included in the VMS dataset. Information gathered through fieldwork and consultation is therefore of primary importance in identifying the activities of these vessels.

14.88. Scallop dredging activity along the cable route is concentrated in areas immediately adjacent to the Project Alpha site boundary and along the mid-section of the ECR corridor (Figure 14.7). There is negligible activity recorded in the inshore section of the route.

14.89. Fishing for squid has been identified along the mid and offshore section of the ECR corridor in 2010 (Figure 14.10). Additionally, consultation also identified squid grounds transecting the route (Figure 14.10).

14.90. Figure 14.6 and Figure 14.11 shows that there is limited fishing activity for over-15m nephrops vessels along the cable route, with activity concentrated along the western section of the cable route and in areas adjacent to the landfall sites. As has been previously mentioned, however, the majority of locally based nephrops vessels are under-15m and hence not included within these datasets. Several of the vessels sampled have identified nephrops fishing grounds through which the cable route will pass (Figure 14.13).

14.91. Figure 14.10 shows that high intensity in an inshore area to the immediate north of the ECR corridor landfall site. The area is reported to be rocky ground, which is the ideal habitat of crustacea such as lobster. The grounds of several vessels have additionally been located in areas further offshore, including the mid-section of the route. There are an estimated 15 full time vessels targeting crab and lobsters in the areas around the ECR corridor, listed in Table 14.7, the large majority of which are based in Arbroath, which has an important static gear fleet. There are additionally a number of part time vessels who will set creels in inshore areas during the summer months.

Table 14.7 Vessels reported to target crab and lobster grounds in the vicinity of the ECR.

Vessel	Home Port	Length
Vessel DU	Arbroath	8.54m
Vessel DA	Arbroath	9.00m
Vessel DH	Arbroath	9.80m
Vessel CY	Arbroath	8.75m
Vessel CO	Montrose	7.52m
Vessel CM	Arbroath	7.33m
Vessel CC	Arbroath	9.60m
Vessel CU	Arbroath	8.20m
Vessel DD	Arbroath	9.20m
Vessel D	Arbroath	9.90m
Vessel CV	Arbroath	8.25m
Vessel CK	Arbroath	6.90m
Vessel CN	Arbroath	7.39m
Vessel DI	Montrose	9.90m
Vessel DJ	Montrose	9.90m

14.92. The inshore area immediately in the vicinity of the ECR landfall is not reported to be fished by vessels targeting crab and lobster.

Salmon and Sea Trout Fisheries

Overview

14.93. 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 (protection) (Scotland) Act, 1951.

14.94. 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.

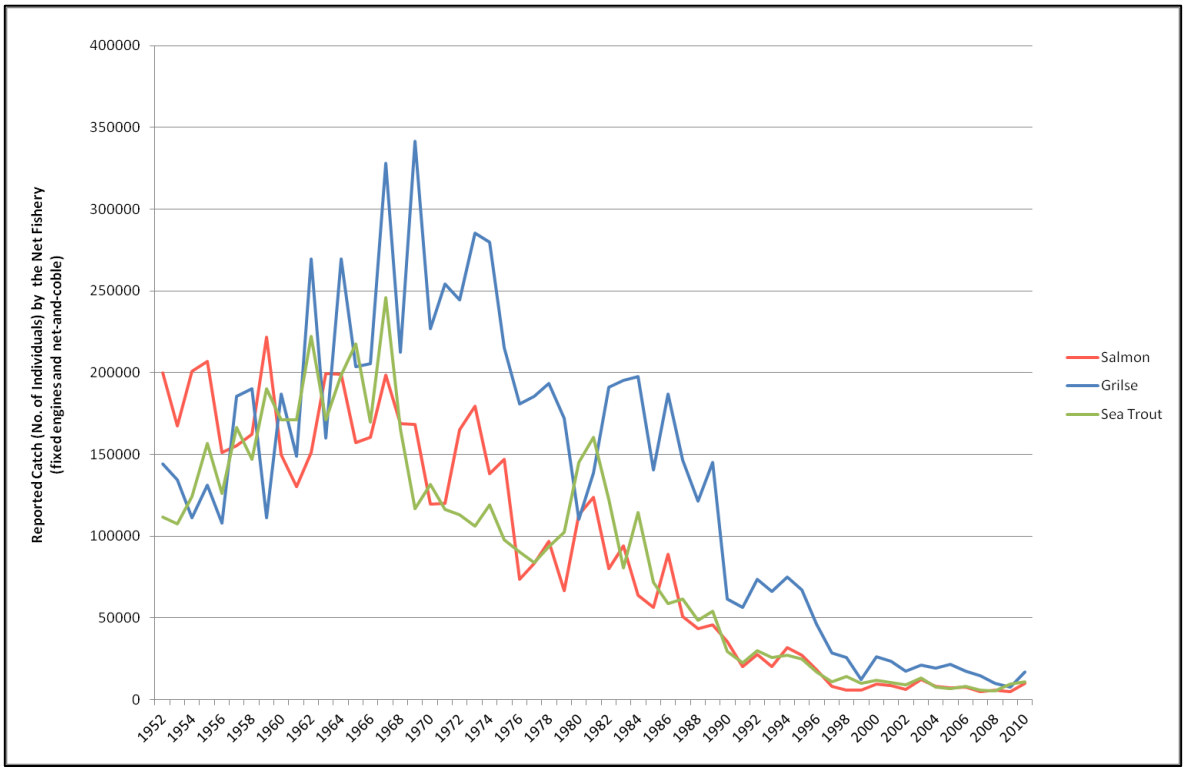
14.95. All Scottish salmon fisheries are closed for a minimum of 168 days a year. Actual closure dates may vary but are mostly from late August to mid-February, depending upon individual DSFB policy. Angling may continue for a few weeks either side of this. Weekly closed times are also nationally enforced, being 24 hours (Sunday) in the case of angling and 60 hours for all other methods.

14.96. Salmon fisheries are saleable and netsmen or companies may acquire fishing rights over relatively large areas. Coastal heritable rights extend out to 12nm, although coastal salmon fishing is limited by virtue of gear restrictions. Other interested parties may also purchase rights. For example, the Atlantic Salmon Conservation Trust 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.

14.97. An indication of the contribution of each fishing method to the total reported catch by salmon fishery region in Scotland is given in Figure 14.15, 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 in some areas, 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.

14.98. It should be noted that the national trend is a decrease in netting effort and therefore the contribution of netting to the annual average 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 Plot 14.1 (Source MSS). This shows the number of fish caught by net-and-coble and fixed engines from 1952 to 2010 in Scotland.

Plot 14.1 Net Fishery (Fixed Engines and Net-and-Coble) Reported Catches (1952-2010)



Salmon and Sea Trout Fisheries in the Regional Study Area

14.99. An indication of the annual reported catch by species and method in the regional study area is given in Figure 14.16 and Figure 14.17 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.

14.100. Salmon and grilse account for the majority of the catch in all the districts within the regional study area, with the exception of the Ythan and Ugie, where sea trout is the principal species caught.

14.101. 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 District Salmon Fishery Board (EDSFB) 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.

14.102. Salmon has been a primary reason for the selection of 11 Scottish rivers as Special Areas of Conservation (SACs). Of these SACs, four (the Dee, South Esk, Tay and Tweed) are located in the regional study area. In addition, in the river Teith, a tributary of the Forth which is also a SAC, salmon is a qualifying reason for selection of the site.

The Rod-and-Line Fishery

Seasonality of the Fishery

14.103. An indication of the seasonality of the rod-and-line fishery within the regional study area by month and district is given in Plot 14.2 (Source MSS).

14.104. 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 area.

14.105. 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.

14.106. In the districts within the regional study area 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 grilse catches are also recorded in November.

Annual Variation of the Fishery

14.107. Catches vary annually, as shown in Plot 14.3 (Source MSS). 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.

14.108. In the Don, salmon catches have fluctuated over the period 2001-2010, 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 of the catches recorded at the beginning of the time series.

14.109. In the North Esk salmon catches have shown ups and downs 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.

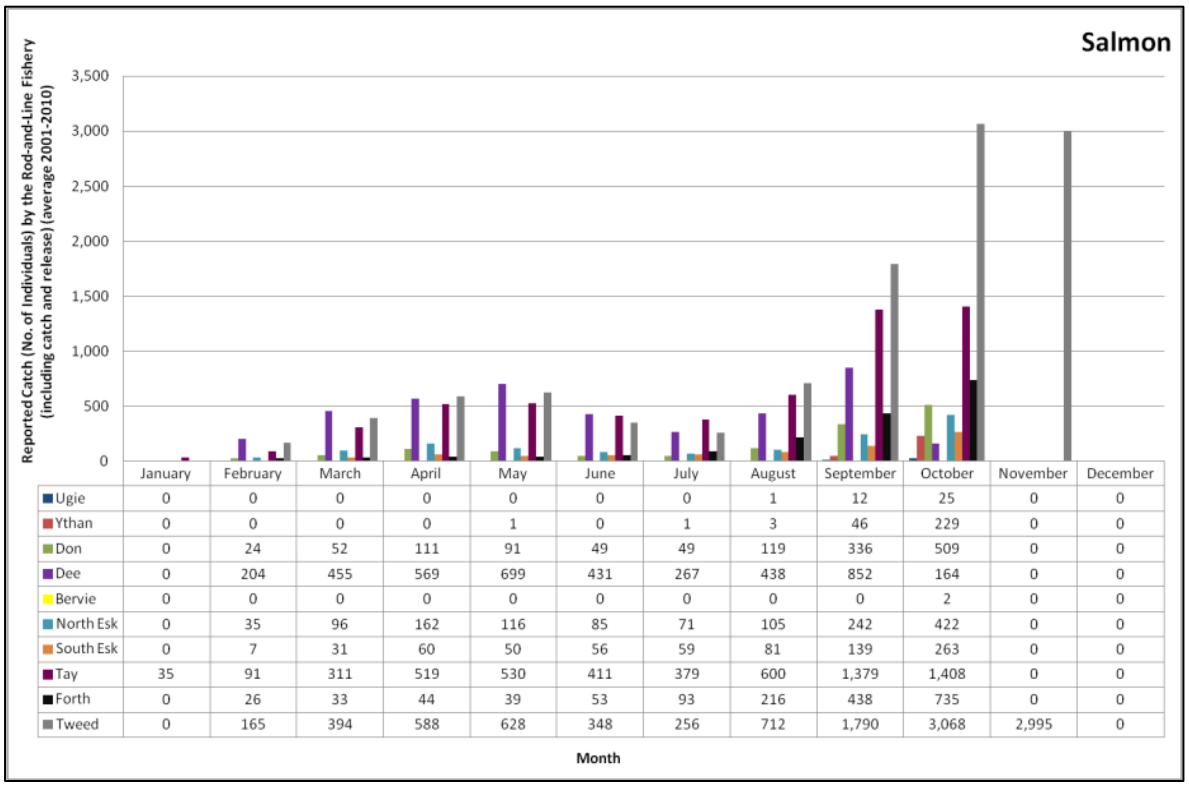
14.110. In the Tay, salmon catches remained stable with the exception of the lows recorded in 2002 and 2003. Grilse catches peaked in 2006, decreased to a low in 2009 and duplicated again in 2010. In the Forth, salmon and grilse catches have fluctuated over the years, with salmon catches peaking in 2004 and grilse catches peaking in 2004 and 2010.

14.111. 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

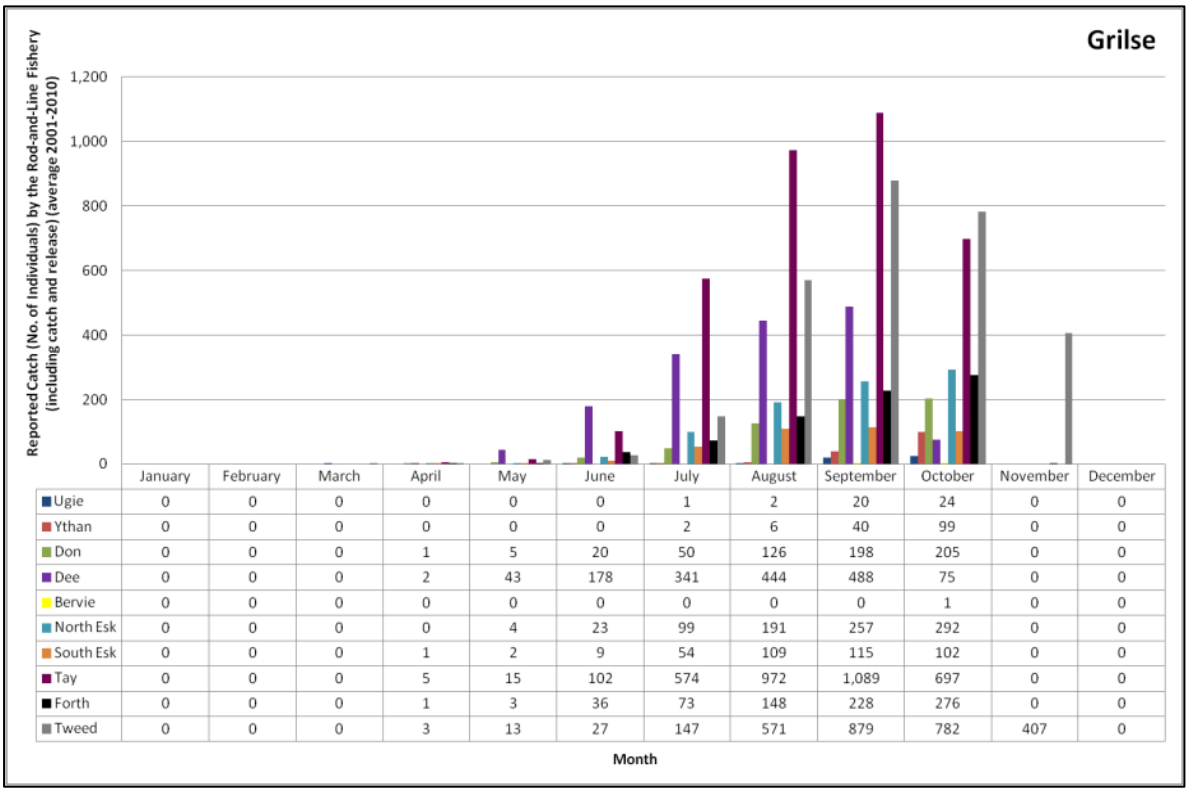
increased significantly, with 8,205 individuals caught in 2009 and 16,907 individuals caught in 2010. Grilse catches in the Tweed have shown a similar pattern, with an overall increase from 2002 to 2007, relatively lower catches in 2008 and 2009, and significantly higher catches in 2010.

14.112. 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.

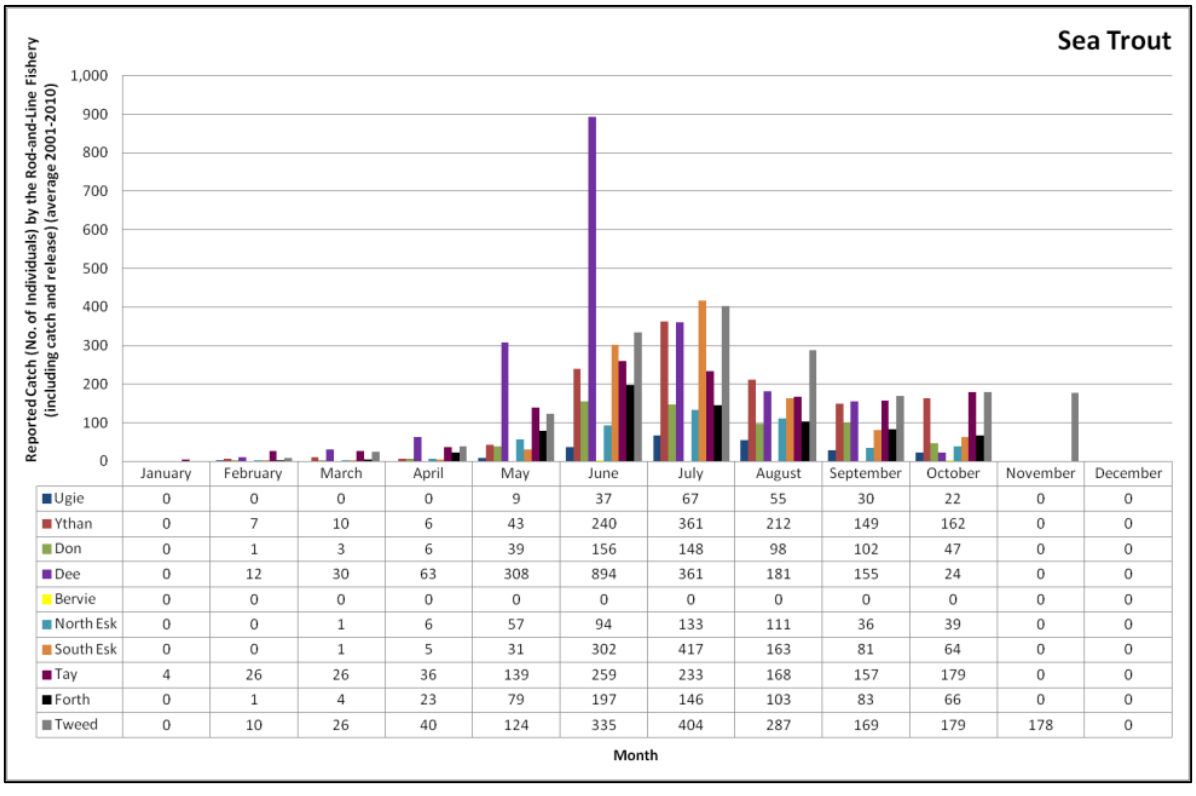
Plot 14.2 Seasonality of the Catch (Average 2001-2010) by the Rod-and-Line Fishery (including Catch and Release) for Salmon, Grilsie and Sea Trout



	January	February	March	April	May	June	July	August	September	October	November	December
Ugie	0	0	0	0	0	0	0	1	12	25	0	0
Ythan	0	0	0	0	1	0	1	3	46	229	0	0
Don	0	24	52	111	91	49	49	119	336	509	0	0
Dee	0	204	455	569	699	431	267	438	852	164	0	0
Bervie	0	0	0	0	0	0	0	0	0	2	0	0
North Esk	0	35	96	162	116	85	71	105	242	422	0	0
South Esk	0	7	31	60	50	56	59	81	139	263	0	0
Tay	35	91	311	519	530	411	379	600	1,379	1,408	0	0
Forth	0	26	33	44	39	53	93	216	438	735	0	0
Tweed	0	165	394	588	628	348	256	712	1,790	3,068	2,995	0

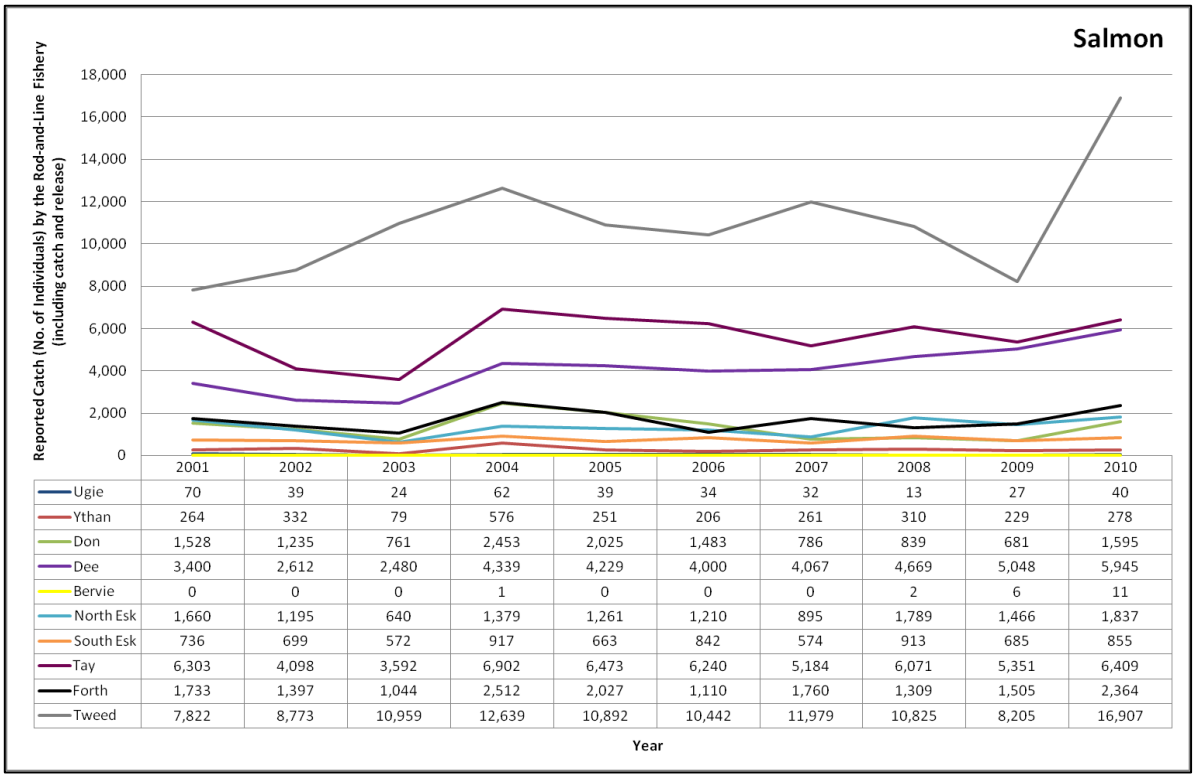


	January	February	March	April	May	June	July	August	September	October	November	December
Ugie	0	0	0	0	0	0	1	2	20	24	0	0
Ythan	0	0	0	0	0	0	2	6	40	99	0	0
Don	0	0	0	1	5	20	50	126	198	205	0	0
Dee	0	0	0	2	43	178	341	444	488	75	0	0
Bervie	0	0	0	0	0	0	0	0	0	1	0	0
North Esk	0	0	0	0	4	23	99	191	257	292	0	0
South Esk	0	0	0	1	2	9	54	109	115	102	0	0
Tay	0	0	0	5	15	102	574	972	1,089	697	0	0
Forth	0	0	0	1	3	36	73	148	228	276	0	0
Tweed	0	0	0	3	13	27	147	571	879	782	407	0

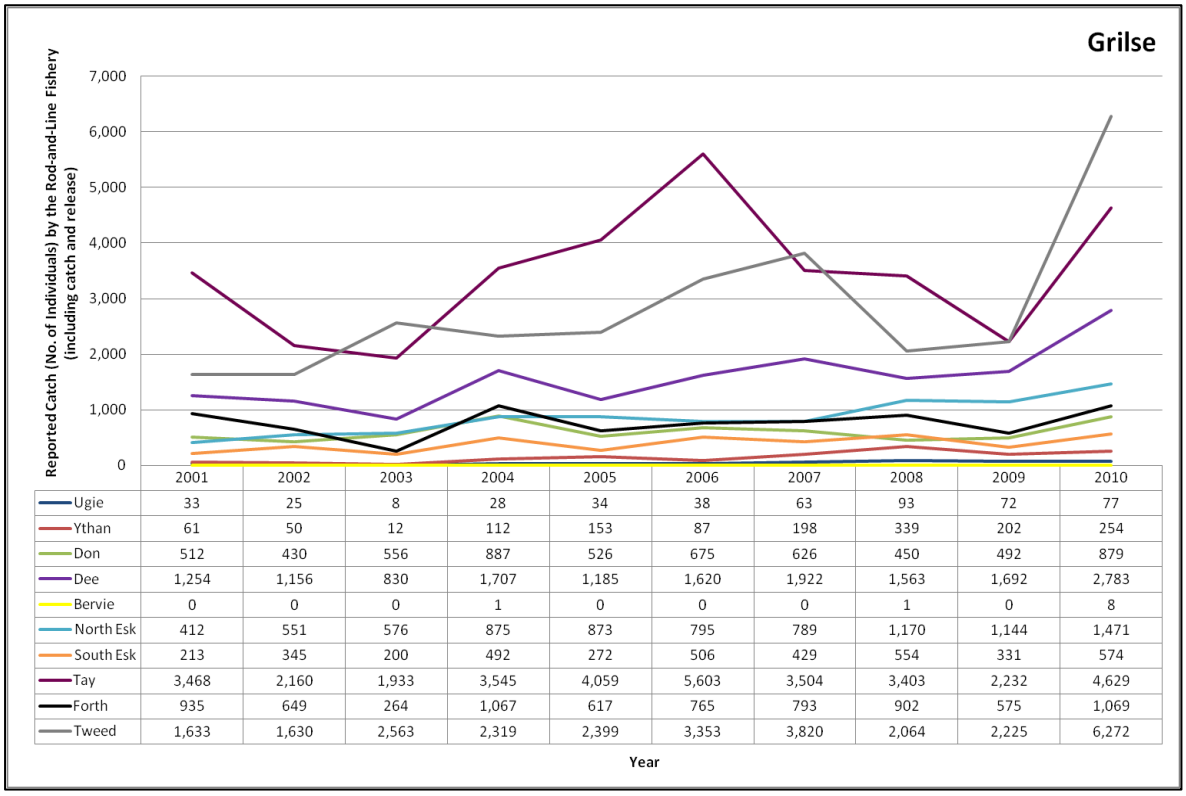


	January	February	March	April	May	June	July	August	September	October	November	December
Ugie	0	0	0	0	9	37	67	55	30	22	0	0
Ythan	0	7	10	6	43	240	361	212	149	162	0	0
Don	0	1	3	6	39	156	148	98	102	47	0	0
Dee	0	12	30	63	308	894	361	181	155	24	0	0
Bervie	0	0	0	0	0	0	0	0	0	0	0	0
North Esk	0	0	1	6	57	94	133	111	36	39	0	0
South Esk	0	0	1	5	31	302	417	163	81	64	0	0
Tay	4	26	26	36	139	259	233	168	157	179	0	0
Forth	0	1	4	23	79	197	146	103	83	66	0	0
Tweed	0	10	26	40	124	335	404	287	169	179	178	0

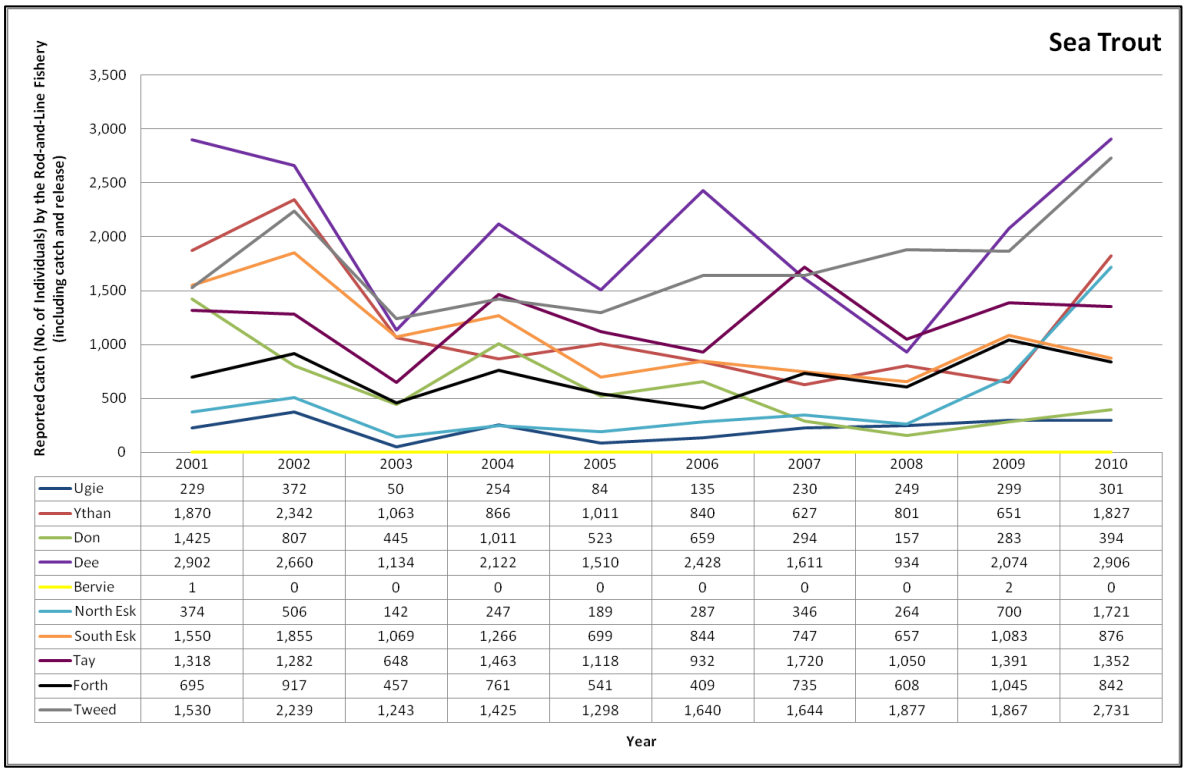
Plot 14.3 Annual Variation (2001-2010 of Catches by the Rod-and-Line Fisher (including Catch and Release) for Salmon, Grilsie and Sea Trout



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	70	39	24	62	39	34	32	13	27	40
Ythan	264	332	79	576	251	206	261	310	229	278
Don	1,528	1,235	761	2,453	2,025	1,483	786	839	681	1,595
Dee	3,400	2,612	2,480	4,339	4,229	4,000	4,067	4,669	5,048	5,945
Bervie	0	0	0	1	0	0	0	2	6	11
North Esk	1,660	1,195	640	1,379	1,261	1,210	895	1,789	1,466	1,837
South Esk	736	699	572	917	663	842	574	913	685	855
Tay	6,303	4,098	3,592	6,902	6,473	6,240	5,184	6,071	5,351	6,409
Forth	1,733	1,397	1,044	2,512	2,027	1,110	1,760	1,309	1,505	2,364
Tweed	7,822	8,773	10,959	12,639	10,892	10,442	11,979	10,825	8,205	16,907



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	33	25	8	28	34	38	63	93	72	77
Ythan	61	50	12	112	153	87	198	339	202	254
Don	512	430	556	887	526	675	626	450	492	879
Dee	1,254	1,156	830	1,707	1,185	1,620	1,922	1,563	1,692	2,783
Bervie	0	0	0	1	0	0	0	1	0	8
North Esk	412	551	576	875	873	795	789	1,170	1,144	1,471
South Esk	213	345	200	492	272	506	429	554	331	574
Tay	3,468	2,160	1,933	3,545	4,059	5,603	3,504	3,403	2,232	4,629
Forth	935	649	264	1,067	617	765	793	902	575	1,069
Tweed	1,633	1,630	2,563	2,319	2,399	3,353	3,820	2,064	2,225	6,272



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	229	372	50	254	84	135	230	249	299	301
Ythan	1,870	2,342	1,063	866	1,011	840	627	801	651	1,827
Don	1,425	807	445	1,011	523	659	294	157	283	394
Dee	2,902	2,660	1,134	2,122	1,510	2,428	1,611	934	2,074	2,906
Bervie	1	0	0	0	0	0	0	0	2	0
North Esk	374	506	142	247	189	287	346	264	700	1,721
South Esk	1,550	1,855	1,069	1,266	699	844	747	657	1,083	876
Tay	1,318	1,282	648	1,463	1,118	932	1,720	1,050	1,391	1,352
Forth	695	917	457	761	541	409	735	608	1,045	842
Tweed	1,530	2,239	1,243	1,425	1,298	1,640	1,644	1,877	1,867	2,731

The Net Fishery

14.113. 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-cobble and fixed engine fisheries.

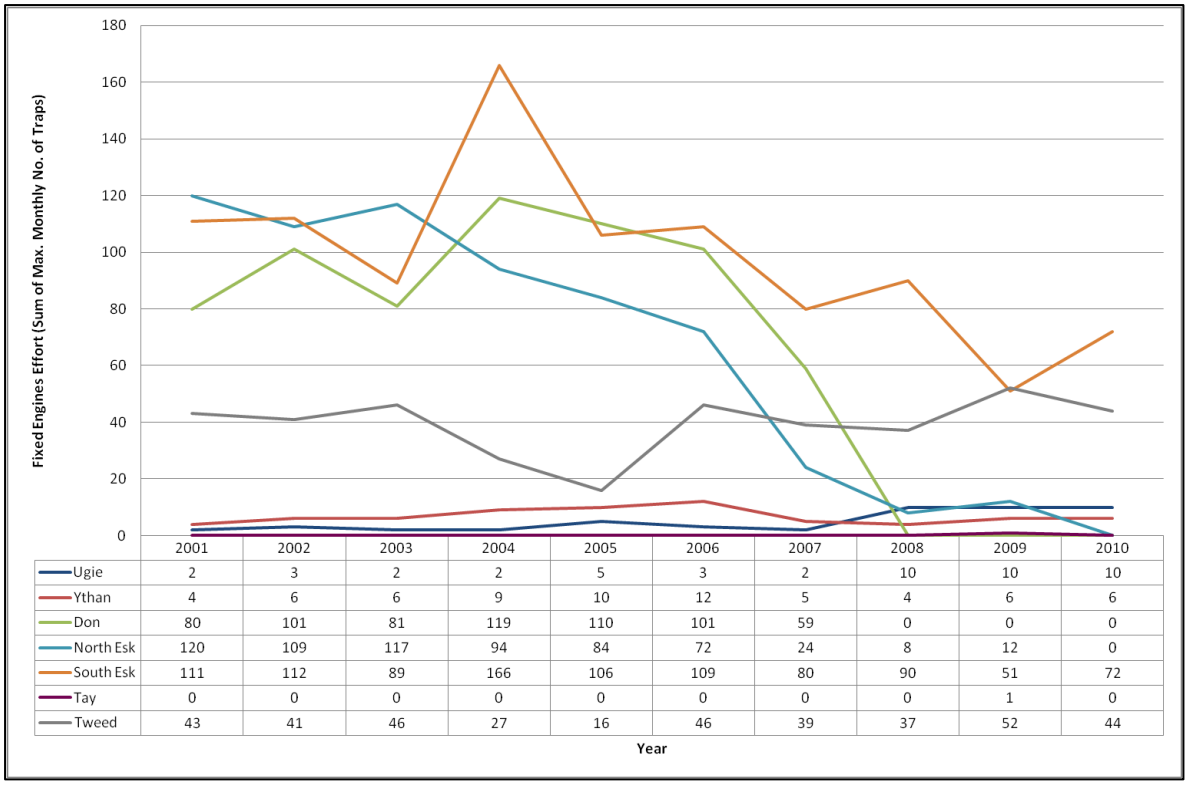
14.114. The annual reported catch of the net fishery (net-and-coble and fixed engines) by salmon fishery region is illustrated in Figure 14.18. Net-and coble principally takes place in the North Esk and the Tweed districts, and to a much lesser extent in the Forth, Ugie and Tay. The majority of the catch 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.

14.115. The North East is the principal region in terms of netting activity within a national context, with the majority of the catches in this region concentrating in the Esk district (North and South Esk). The North Esk's coastal netting stations were bought out by the EDSFB 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.

14.116. 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-cobles fisheries (which operate upstream of Dundee) and coastal nets in the northern reaches of the district where the Usan Fishery has salmon fishing rights.

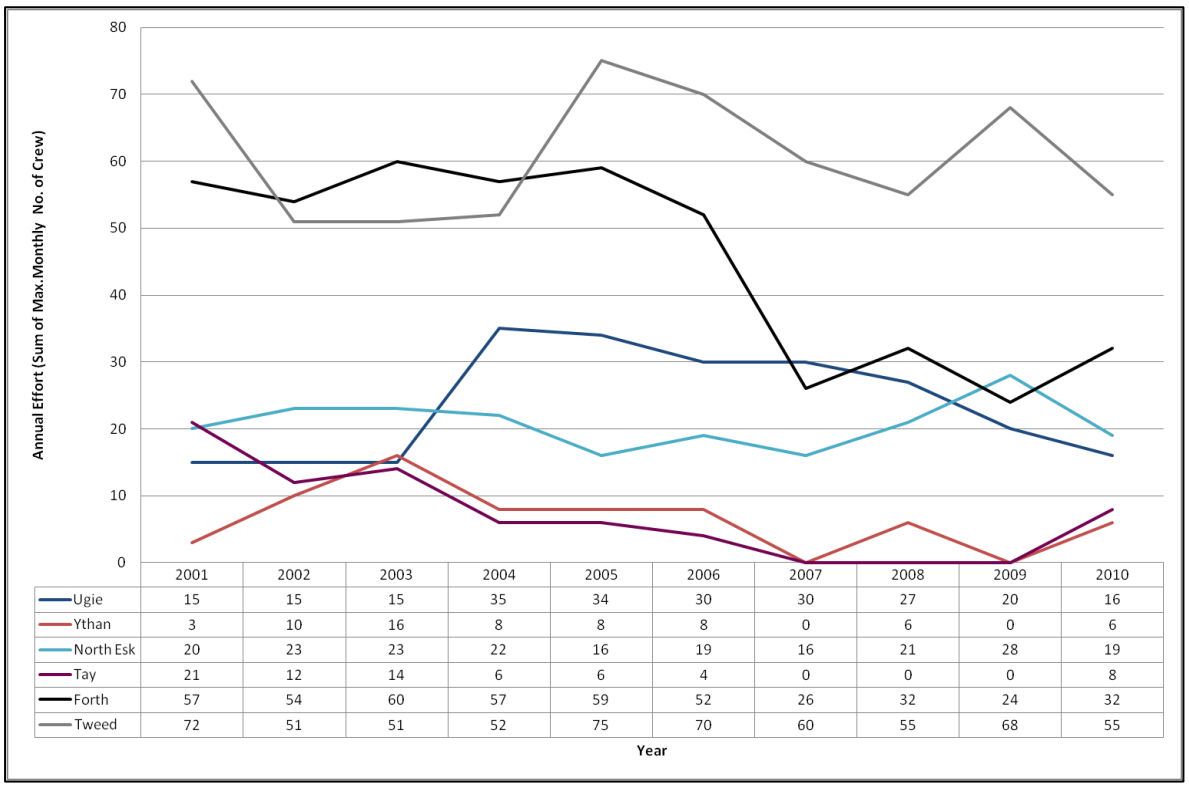
14.117. An indication of the annual variation in fishing effort by net fisheries in the regional study area, broken down by fixed engines and net-and-coble in districts where these methods are used, is given in Plot 14.4 and Plot 14.5 respectively (2001 to 2010).

Plot 14.4 Annual Fixed Engines Effort (Max no of Traps) by SFD (2001-2010)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	2	3	2	2	5	3	2	10	10	10
Ythan	4	6	6	9	10	12	5	4	6	6
Don	80	101	81	119	110	101	59	0	0	0
North Esk	120	109	117	94	84	72	24	8	12	0
South Esk	111	112	89	166	106	109	80	90	51	72
Tay	0	0	0	0	0	0	0	0	1	0
Tweed	43	41	46	27	16	46	39	37	52	44

Plot 14.5 Annual Net-and-Coble Effort (Max no of Crew) by SFD (2001-2010)

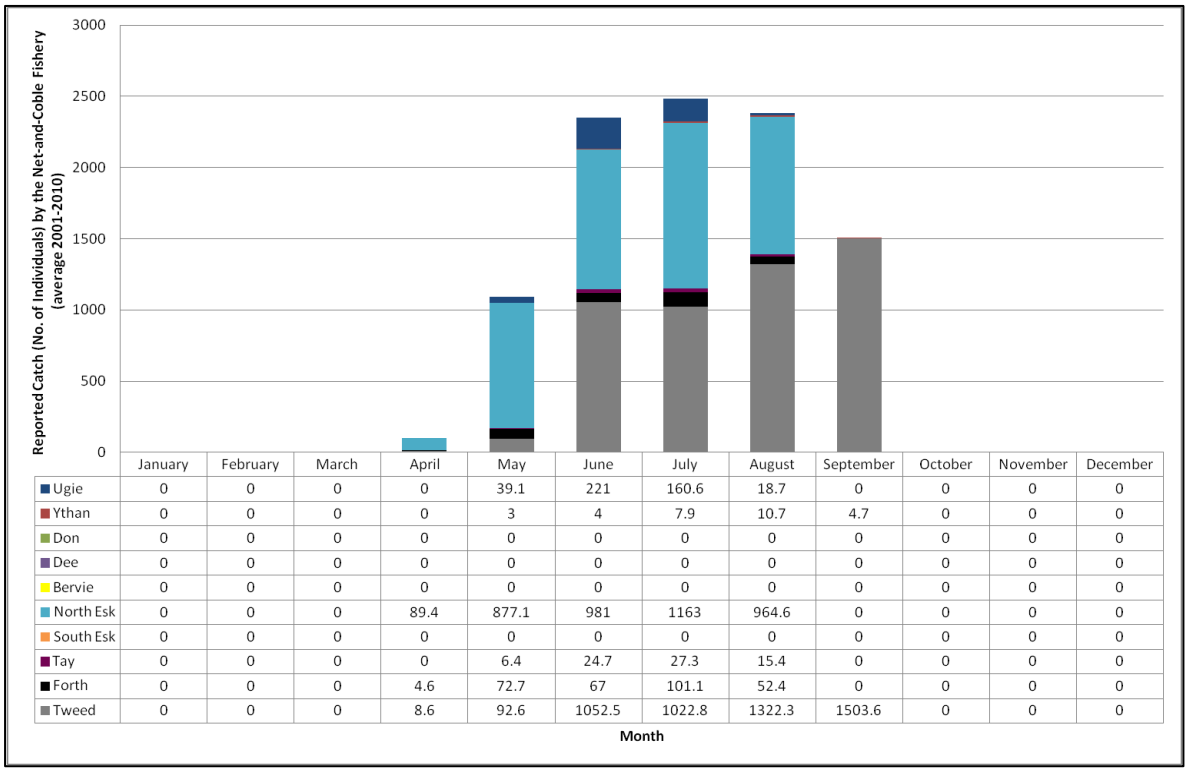


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	15	15	15	35	34	30	30	27	20	16
Ythan	3	10	16	8	8	8	0	6	0	6
North Esk	20	23	23	22	16	19	16	21	28	19
Tay	21	12	14	6	6	4	0	0	0	8
Forth	57	54	60	57	59	52	26	32	24	32
Tweed	72	51	51	52	75	70	60	55	68	55

Seasonality of the Fishery

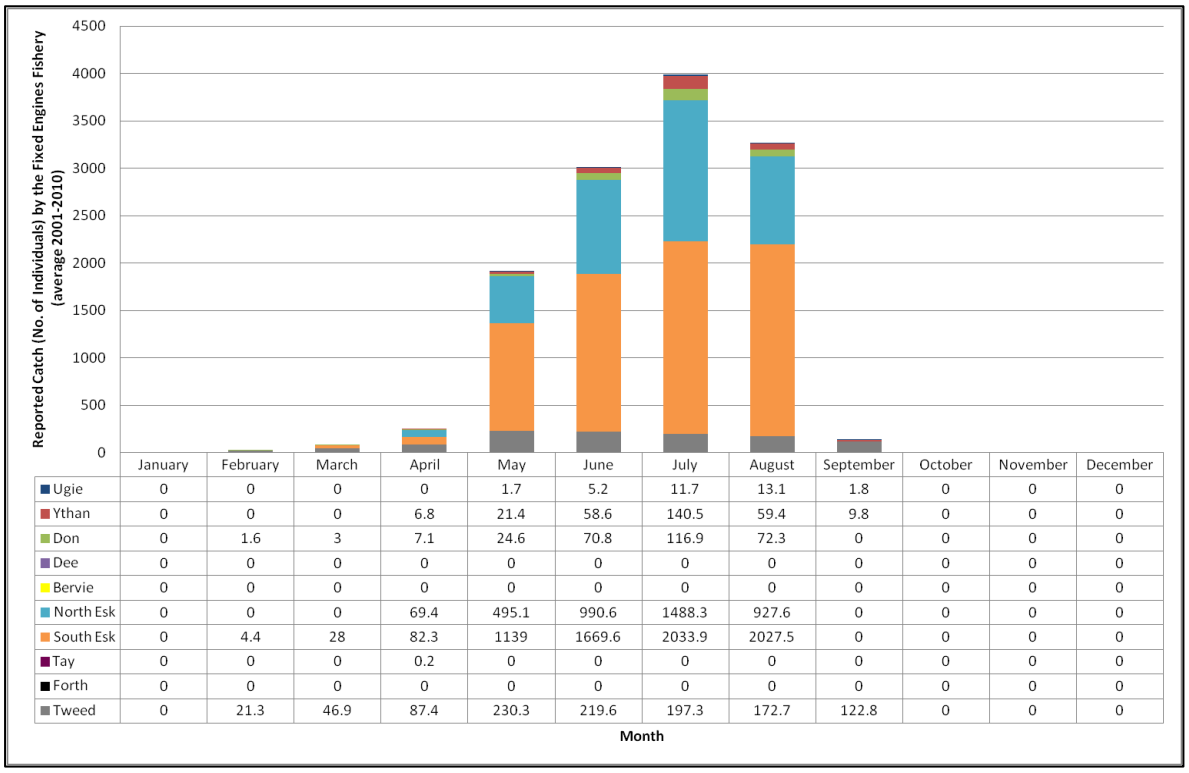
14.118. An indication of the seasonality of the net-and-coble and fixed engines fisheries within the regional study area by month and district are given in Plot 14.6 and Plot 14.7, respectively (Source MSS). Detailed information about the seasonality of the net fishery by method, species and district is provided in Appendix I2: Salmon and Sea Trout Fisheries Technical Report.

Plot 14.6 Seasonality of the Catch (Average 2001-2010) by the Net-and-Coble Fishery



	January	February	March	April	May	June	July	August	September	October	November	December
Ugie	0	0	0	0	39.1	221	160.6	18.7	0	0	0	0
Ythan	0	0	0	0	3	4	7.9	10.7	4.7	0	0	0
Don	0	0	0	0	0	0	0	0	0	0	0	0
Dee	0	0	0	0	0	0	0	0	0	0	0	0
Bervie	0	0	0	0	0	0	0	0	0	0	0	0
North Esk	0	0	0	89.4	877.1	981	1163	964.6	0	0	0	0
South Esk	0	0	0	0	0	0	0	0	0	0	0	0
Tay	0	0	0	0	6.4	24.7	27.3	15.4	0	0	0	0
Forth	0	0	0	4.6	72.7	67	101.1	52.4	0	0	0	0
Tweed	0	0	0	8.6	92.6	1052.5	1022.8	1322.3	1503.6	0	0	0

Plot 14.7 Seasonality of the Catch (Average 2001-2010) by the Fixed Engines Fishery



	January	February	March	April	May	June	July	August	September	October	November	December
Ugie	0	0	0	0	1.7	5.2	11.7	13.1	1.8	0	0	0
Ythan	0	0	0	6.8	21.4	58.6	140.5	59.4	9.8	0	0	0
Don	0	1.6	3	7.1	24.6	70.8	116.9	72.3	0	0	0	0
Dee	0	0	0	0	0	0	0	0	0	0	0	0
Bervie	0	0	0	0	0	0	0	0	0	0	0	0
North Esk	0	0	0	69.4	495.1	990.6	1488.3	927.6	0	0	0	0
South Esk	0	4.4	28	82.3	1139	1669.6	2033.9	2027.5	0	0	0	0
Tay	0	0	0	0.2	0	0	0	0	0	0	0	0
Forth	0	0	0	0	0	0	0	0	0	0	0	0
Tweed	0	21.3	46.9	87.4	230.3	219.6	197.3	172.7	122.8	0	0	0

14.119. Net and coble principally takes place in the North Esk and the 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.

14.120. Similarly, fixed engine catches in the North Esk and South Esk are highest from May to August, peaking in both districts in July. In the Tweed, catches are highest from May to September, peaking in September.

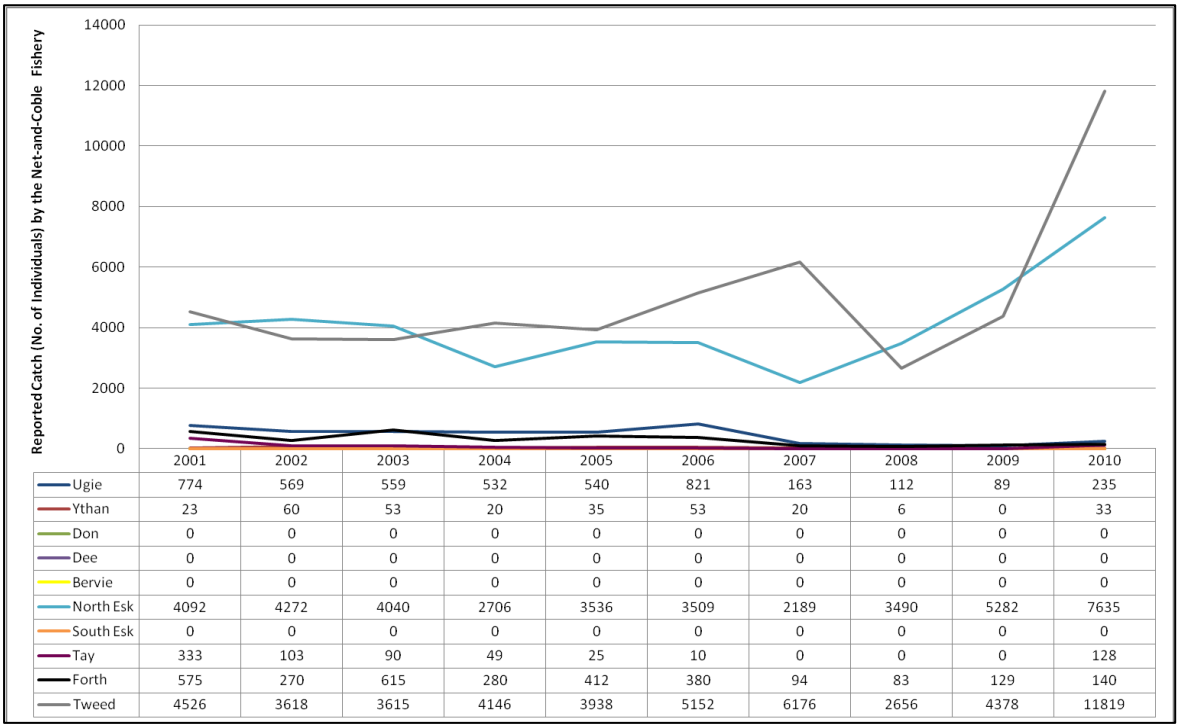
Annual Variation of the Fishery

14.121. 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 Plot 14.8 and Plot 14.9, respectively (Source MSS). Detailed information about annual variations of the net fishery by method, species and district is provided in Appendix I2: Salmon and Sea Trout Fisheries Technical Report.

14.122. Catches by net and coble in the North Esk have fluctuated over the years, increasing after a low in 2007 to highest values in 2009 to 2010. In the Tweed catches show a marked increase since 2008, with 2,656 fish caught in 2008 and 11,819 in 2010.

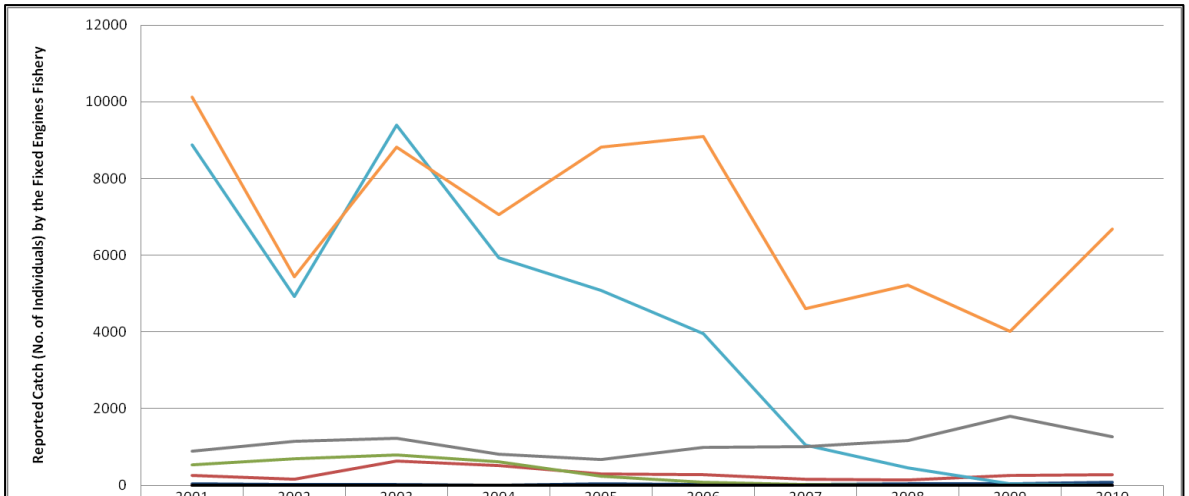
14.123. Catches by fixed engines in the North Esk show a marked decrease since 2003, with zero catches recorded in 2010. In the South Esk, catches have fluctuated over the ten year period.

Plot 14.8 Annual Variations in Catches by the Net-and-Coble Fishery



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	774	569	559	532	540	821	163	112	89	235
Ythan	23	60	53	20	35	53	20	6	0	33
Don	0	0	0	0	0	0	0	0	0	0
Dee	0	0	0	0	0	0	0	0	0	0
Bervie	0	0	0	0	0	0	0	0	0	0
North Esk	4092	4272	4040	2706	3536	3509	2189	3490	5282	7635
South Esk	0	0	0	0	0	0	0	0	0	0
Tay	333	103	90	49	25	10	0	0	0	128
Forth	575	270	615	280	412	380	94	83	129	140
Tweed	4526	3618	3615	4146	3938	5152	6176	2656	4378	11819

Plot 14.9 Annual Variations in Catches by the Fixed Engines Fishery



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ugie	45	13	18	8	44	28	14	41	44	80
Ythan	248	167	630	513	297	276	157	139	257	281
Don	536	683	786	614	242	89	13	0	0	0
Dee	0	0	0	0	0	0	0	0	0	0
Bervie	0	0	0	0	0	0	0	0	0	0
North Esk	8877	4921	9394	5927	5075	3956	1054	458	48	0
South Esk	10130	5436	8811	7051	8814	9092	4608	5219	4011	6675
Tay	0	0	0	0	0	0	0	0	2	0
Forth	0	0	0	0	0	0	0	0	0	0
Tweed	897	1157	1229	817	675	986	1006	1161	1795	1260

Project Alpha

14.124. Site specific characteristics for salmon and sea trout fisheries do not apply, because all salmon fisheries are in-river, or to a lesser extent, coastal. The ecology of the species in the marine environment and the potential use they make of the Project Alpha site is described in Chapter 12: Natural Fish and Shellfish Resource.

Project Bravo

14.125. Site specific characteristics for salmon and sea trout fisheries do not apply, because all salmon fisheries are in-river, or to a lesser extent, coastal. The ecology of the species in the marine environment and the potential use they make of the Project Bravo site is described in Chapter 12: Natural Fish and Shellfish Resource.

Transmission Asset Project

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.126. The OSPs which form part of the Transmission Asset Project will be located within the boundaries of Project Alpha and/ or Project Bravo. As such the OSPs are assessed within the assessment of Project Alpha and Project Bravo and hence are excluded from the Transmission Asset Project to avoid duplication. The baseline environment in relation to the OSPs is therefore as described above in relation to Project Alpha and Project Bravo.

Export Cable Route (ECR) Corridor

14.127. The location of the Seagreen Project and its export cable landfall option are shown in Figure 14.19. The landfall is located within the Tay district, at Carnoustie. As mentioned previously, salmon has been a primary feature for SAC site selection of the river Tay and the South Esk.

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

14.129. It should be noted that whilst both salmon and sea trout make an important contribution to the fishery in these districts, the relative importance of each species may vary depending on the river under consideration. The Tay for example is primarily a salmon river, but the river Earn, located within the Tay District, has a significant sea trout run (Consultation, 2011b). In addition, the times and relative importance of different runs may also vary between different rivers within the districts.

The Esk District

14.130. The North East is the principal region in terms of netting activity within a national context. The majority of the catches in this region concentrate in the Esk district (North and South Esk). The Esk Rivers were originally sea trout rivers, but numbers have declined, and the rivers are now both salmon and sea trout rivers (Consultation, 2011a).

14.131. Salmon and sea trout fishing in the Esk District is principally undertaken by fixed engines. Catches by net and coble also constitute a relatively high percentage of the catch within the North Esk District (38.0%). 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.

14.132. Usan's fishing rights extend between Scurdie Ness lighthouse to the north and Auchmithie harbour in the south, extending into coastal waters of both districts; the South Esk and the Tay. They operate eight netting stations in total. Bag nets are predominantly set, although jumper nets (a type of stake nets) are used in Lunan Bay. A total of 18 fixed engines were employed in 2010. Nets are set up to 1,300m from the shore, in lines. Between 10 and 12 fixed engines can be set per line. Although heritable rights extend to the 12nm limit, fixed engines are not currently permitted to extend more than 1,300m from the mean low water mark by virtue of current gear restrictions.

Seasonality of the Fishery

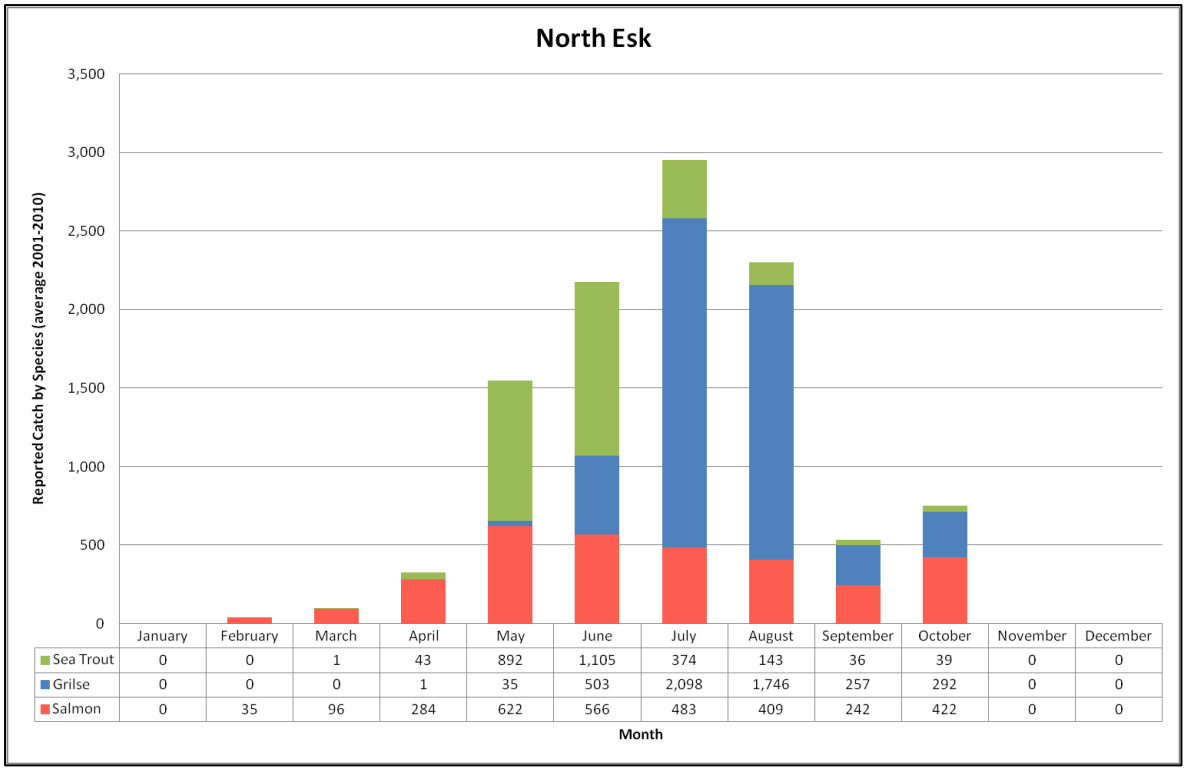
14.133. In the Esk District, rod and lining runs from the 16th February to 31st October and netting runs from the 16th February to the 30th of August. However, there is currently a voluntary agreement in place which bans netting in the Esk District up to the 1st May (EDSFB, 2012).

14.134. An indication of the seasonality of the fishery in the North Esk and South Esk is provided in Plot 14.10 and Plot 14.11.

14.135. During the 2001-2010 period, grilse have been caught from May to October, with highest catches recorded in July and August. Salmon catches are recorded from February to October and peak in May and June. Sea trout catches have been highest from May to August, peaking in May and June. Overall combined salmon and sea trout catches are highest from May to August, indicating the importance of late spring and summer runs to the Esk fishery.

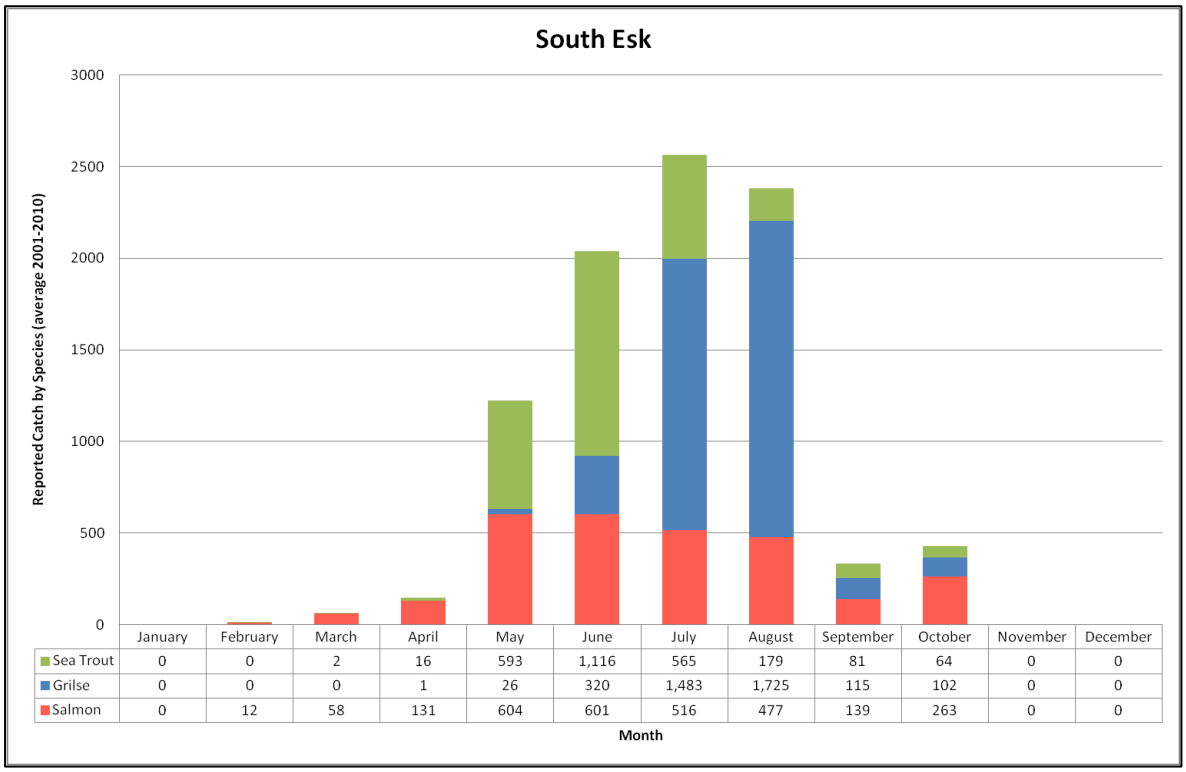
14.136. No catches are recorded from November to mid-February as a result of the annual fishing closure which extends in the Esk District from the 1st November to the 15th February.

Plot 14.10 Seasonality (Average 2001-2010) of the Salmon and Sea Trout Fishery in the North Esk District



	January	February	March	April	May	June	July	August	September	October	November	December
Sea Trout	0	0	1	43	892	1,105	374	143	36	39	0	0
Grilse	0	0	0	1	35	503	2,098	1,746	257	292	0	0
Salmon	0	35	96	284	622	566	483	409	242	422	0	0

Plot 14.11 Seasonality (Average 2001-2010) of the Salmon and Sea Trout Fishery in the South Esk District



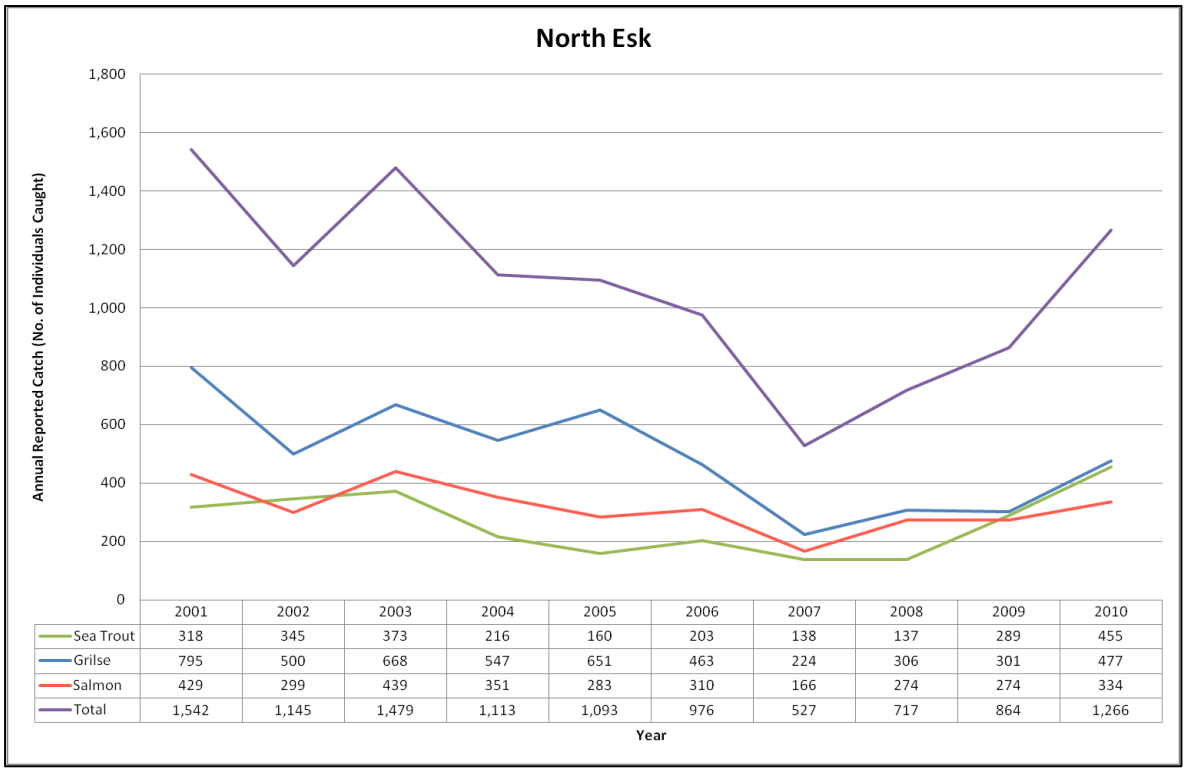
	January	February	March	April	May	June	July	August	September	October	November	December
Sea Trout	0	0	2	16	593	1,116	565	179	81	64	0	0
Grilse	0	0	0	1	26	320	1,483	1,725	115	102	0	0
Salmon	0	12	58	131	604	601	516	477	139	263	0	0

14.137. Information gathered through consultation confirmed that salmon enter the rivers of the Esk District throughout the year, with the principal run of salmon occurring from May to October. Grilse arrive in rivers at the end of May, with the main run of grilse taking place from July to October. Whilst the principal runs of sea trout extend from April to June (EDSFB, 2012).

Annual Variation of the Fishery

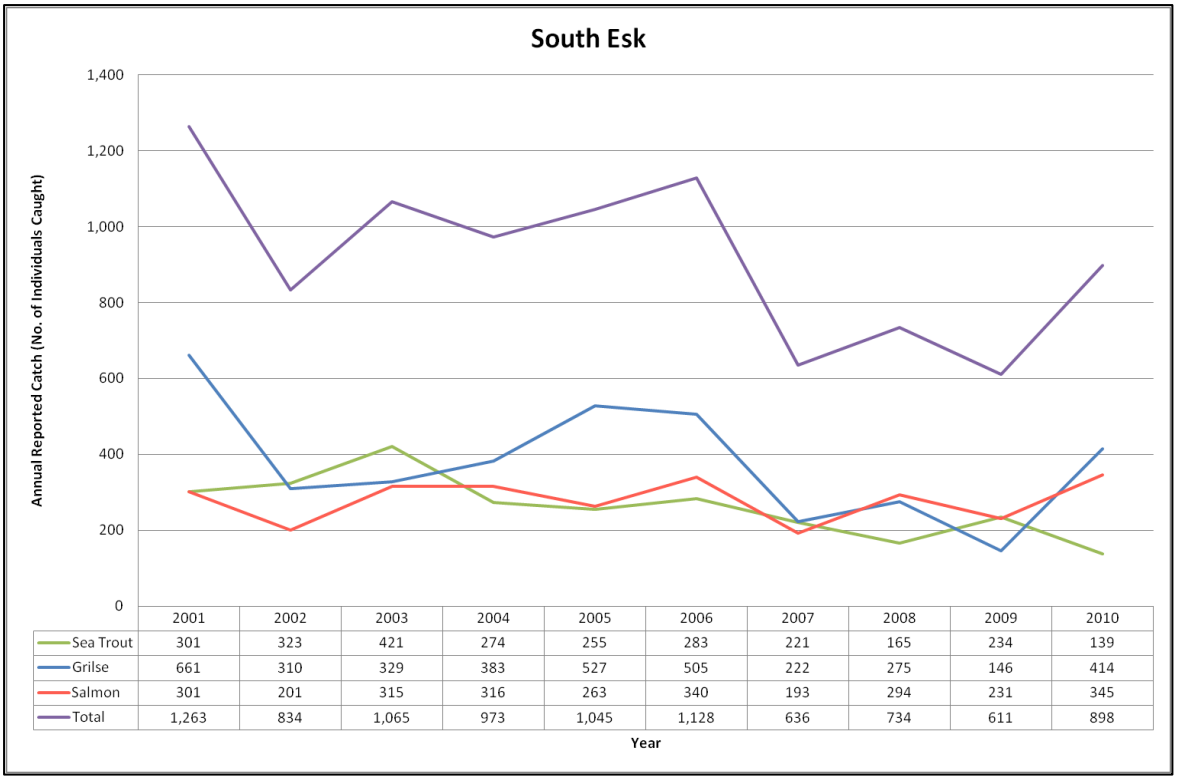
14.138. Salmon and grilse catches have fluctuated during the ten year period in the North and South Esk. The annual variation of salmon, grilse and sea trout catches in the North and South Esk District is shown in Plot 14.12 and Plot 14.13 respectively. As seen in Plot 14.12, overall catches in the North Esk decreased to a low in 2007, when coastal netting stations were bought out by the Board.

Plot 14.12 Annual Variation (2001-2010) in the Report Catch by Species in the North Esk District



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sea Trout	318	345	373	216	160	203	138	137	289	455
Grilse	795	500	668	547	651	463	224	306	301	477
Salmon	429	299	439	351	283	310	166	274	274	334
Total	1,542	1,145	1,479	1,113	1,093	976	527	717	864	1,266

Plot 14.13 Annual Variation (2001-2010) in the Reported Catch by Species in the South Esk District



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sea Trout	301	323	421	274	255	283	221	165	234	139
Grilse	661	310	329	383	527	505	222	275	146	414
Salmon	301	201	315	316	263	340	193	294	231	345
Total	1,263	834	1,065	973	1,045	1,128	636	734	611	898

The Tay District

14.139. Salmon fishing is the most important fishery on the River Tay and its tributaries. Compared to some other rivers sea trout fishing in the Tay is of much lesser importance to salmon. The Tay itself has only a modest sea trout run. The best tributary for sea trout is the River Earn, which historically has been an excellent sea trout river (TDSFB, 2012).

14.140. Salmon and sea trout fishing in the Tay District is principally undertaken by rod-and-line (including catch and release).

14.141. Netting in this district is limited to a few hobby net-and-cobles which operate upstream of Dundee and to coastal nets in the northern reaches of the district, where the Usan Salmon Ltd. has rights (Consultation, 2011b).

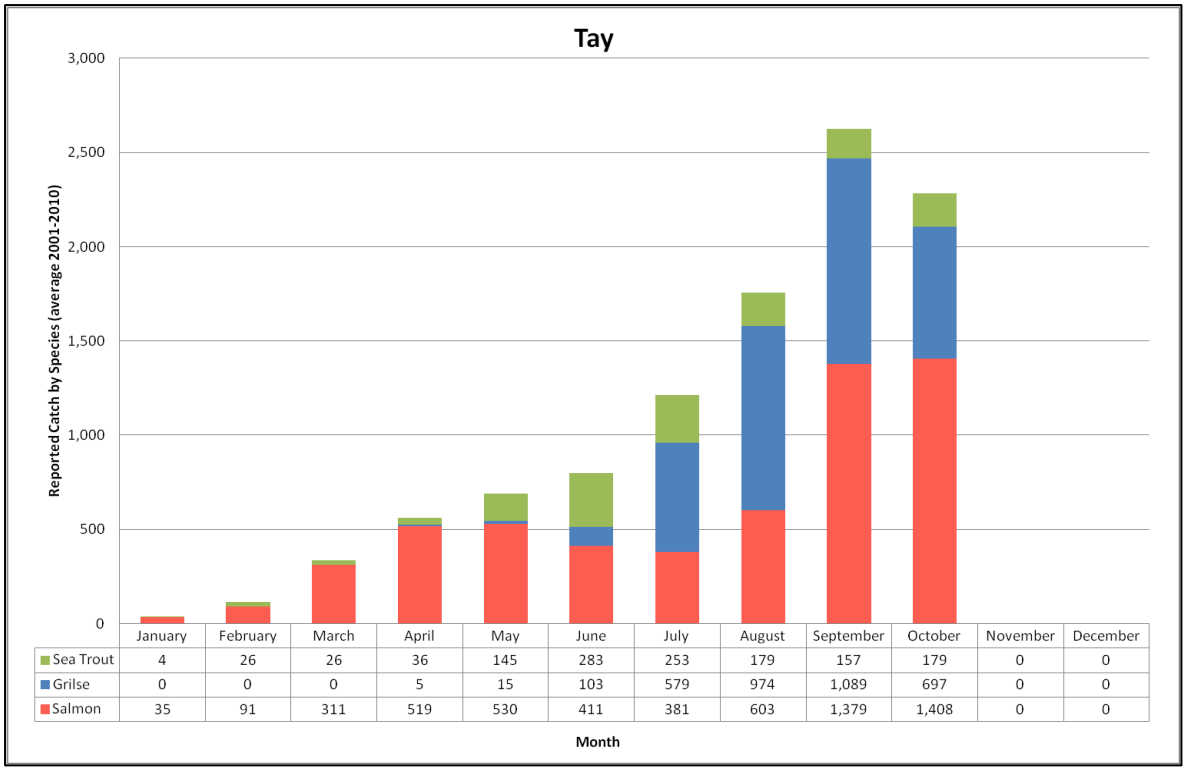
Seasonality of the Fishery

14.142. The salmon and sea trout fishery runs from the 15th January to the 15th October and extends to the 31st October in the Earn (Consultation, 2011b)

14.143. During the 2001-2010 period the highest grilse catches have been recorded from July to October. Peak salmon catches have been recorded in autumn in September and October. Sea trout catches have been highest from May to October, peaking in June and July (Plot 14.14).

14.144. As indicated by the catch distribution in Plot 14.14 the autumn run is the mainstay of the Tay salmon fishery. It provides the largest catches, the biggest rents and ultimately provides most of the revenue for the Board to conduct its activities throughout the entire district (TDSFB, 2012).

Plot 14.14 Seasonality (Average 2001-2010) of the Salmon and Sea Trout Fishery in the Tay District



	January	February	March	April	May	June	July	August	September	October	November	December
Sea Trout	4	26	26	36	145	283	253	179	157	179	0	0
Grilse	0	0	0	5	15	103	579	974	1,089	697	0	0
Salmon	35	91	311	519	530	411	381	603	1,379	1,408	0	0

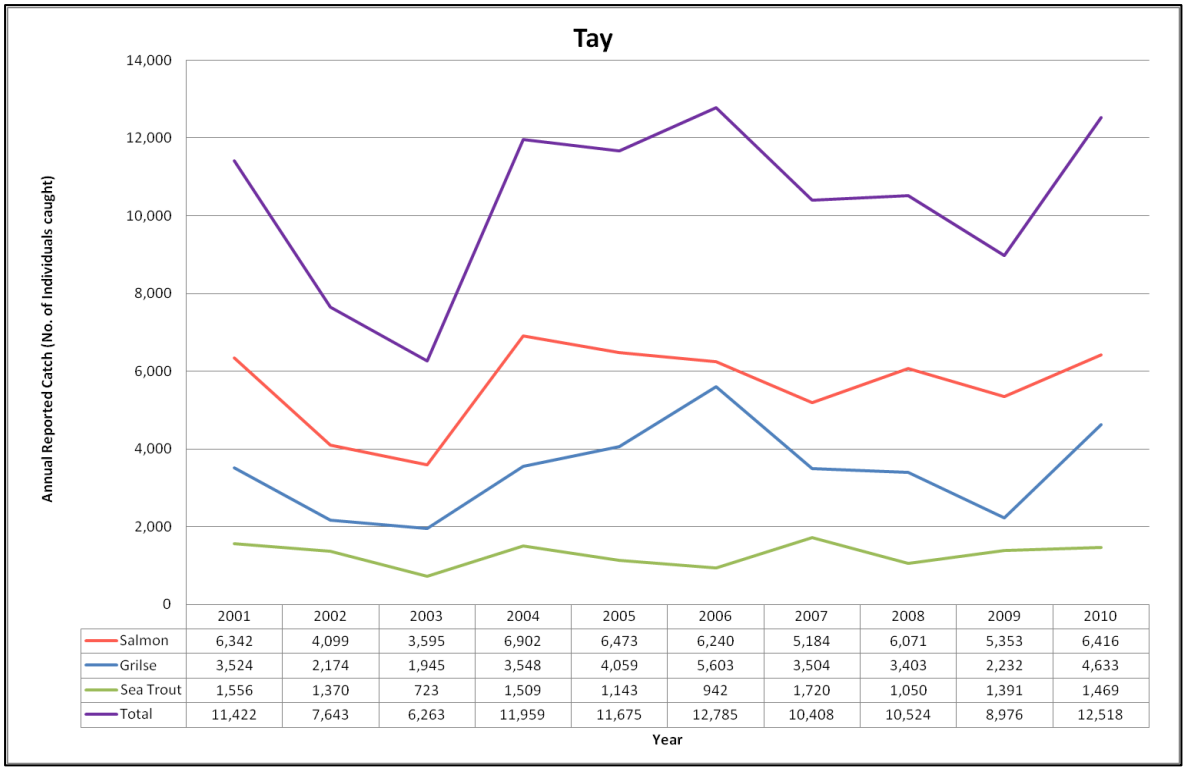
14.145. Information gathered through consultation confirmed that salmon enter the River Tay all year round. The main first significant runs of "spring salmon" into the River Tay take place from late February/ March and continue through April and May. Autumn salmon start to appear around August and fresh run fish can continue to enter the river right to the end of the season and beyond (TDSFB, 2012).

14.146. Summer grilse begin to arrive in May, with grilse numbers building up in June and usually reaching a peak in July. Autumn grilse appear from August onwards through to October and beyond (TDSFB, 2012).

Annual Variation of the Fishery

14.147. The annual variation of catches in the Tay District is shown in Plot 14.15. Salmon, grilse and sea trout catches have fluctuated during the ten year period, with lowest catches being recorded in 2003. Overall catch values of salmon, grilse and sea trout remained relatively stable, with catches in 2010 representing similar catch values like those recorded at the beginning of the time series.

Plot 14.15 Annual Variation (2001-2010) in the Reported Catch by Species in the Tay District



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Salmon	6,342	4,099	3,595	6,902	6,473	6,240	5,184	6,071	5,353	6,416
Grilse	3,524	2,174	1,945	3,548	4,059	5,603	3,504	3,403	2,232	4,633
Sea Trout	1,556	1,370	723	1,509	1,143	942	1,720	1,050	1,391	1,469
Total	11,422	7,643	6,263	11,959	11,675	12,785	10,408	10,524	8,976	12,518

ASSESSMENT OF IMPACTS – WORST CASE SCENARIO

14.148. A realistic worst case scenario for the impacts of the Seagreen Project upon commercial fishing activities has identified the Rochdale Envelope parameters described in Chapter 5: Project Description of this ES which will realistically have the greatest potential impact upon the fishing activities described in the baseline above.

14.149. The principal factor in determining the parameters that will constitute a realistic worst case is the consideration of how the fishing activities described in the baseline will be most affected. This could occur in two ways: the first is the potential for offshore wind farm developments to cause adverse impacts to fish and shellfish populations of commercial importance for example, through increased sediment concentrations and smothering of commercial species, and hence result in a decline in abundance. Whilst this potential impact is stated within this section, it is assessed in Chapter 12: Natural Fish and Shellfish Resource. Second, there is the potential for the Seagreen Project to constitute a physical obstacle or risk to the continuation of normal fishing activities as described in the baseline. Accepting that the assessment given in Chapter 12: Natural Fish and Shellfish Resource will identify the worst case parameters for the first issue, the realistic worst case for commercial fishing activity has been defined based on the physical obstacle and/ or risk created by Alpha, Bravo and the Transmission Asset.

14.150. It should be noted that commercial fishing is not expected to be excluded during construction, with the exception of locations where safety zones are in operation. Further, it should be noted that existing legislation does provide a mechanism to prohibit fishing within operational wind farm sites. It is likely, however, that 50m safety exclusion zones, extending from the centre point of individual WTGs, will be applied to WTGs installed in the Seagreen Project. It is also likely that exclusion zones of a sufficient size to safely encompass the footprint of Offshore Substation Platforms (OSPs) will be in place.

14.151. In light of the above, it is therefore considered that infrastructure with the combined biggest footprint poses the most significant physical obstacle to fishing activities. This includes the highest number of WTGs with the smallest spacing, and the maximum number of metrological masts and OSPs. Additional infrastructure, including array cables, will also be assessed in terms of the feasibility of undertaking normal fishing practices.

14.152. Consultation with fishing interests identified that a more concentrated, shorter construction period was generally preferred to a longer term construction schedule. It should be noted however that this assumes fishing activities can be resumed to some degree within the operational Seagreen Project.

14.153. The parameters of the Project Alpha and Project Bravo design which constitute a realistic worst case for commercial fishing activities are summarised in Table 14.8 below.

14.154. The parameters of the Offshore Transmission Asset Project which constitute a realistic worst case for commercial fishing activities are summarised in Table 14.9 below.

Table 14.8 Worst case scenario for Project Alpha and Project Bravo assessments

Effect	Worst case scenario (individual project)	Justification of Selected Rochdale Envelope Parameter
Construction		
Adverse Impacts upon Commercially Exploited and Recreational Fish and Shellfish Populations	See Chapter 12: Natural Fish and Shellfish Resource	Chapter 12: Natural Fish and Shellfish Resource provides an assessment of the potential effects of the development upon fish and shellfish species and the findings are summarised in this chapter.
Complete Loss or Restricted Access to Fishing Grounds	Area of Project Alpha: 197 km² (Area of Project Bravo: 194 km²) Gravity base foundations; Project Alpha - 75 WTGs; 3 OSPs; 3 meteorological masts, (Project Bravo – 75 WTGs; 2 OSPs; 3 meteorological masts) Minimum spacing between WTGs: 610 m Maximum array cable length: 355 km; Progressive installation of array cables across the site for the duration of construction (i.e. fishing activities cannot be undertaken in the area of array cable installation); 'Rolling' construction safety zones within the site; and Maximum duration of construction activities: 3 years	Infrastructure resulting in the maximum loss of fishing grounds
Safety Issues for Fishing Vessels	See Chapter 15: Shipping and Navigation. In addition, the assessment also recognises the safety risks posed by the array cables based upon: Maximum array cable length (355 km); and incomplete installation of array cables (i.e. fishing activities cannot resume in the area of array cable installation).	Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume
Increased Steaming Times	Maximum number of safety/ exclusion zones in the site	Resulting in the maximum disruption to established steaming routes and potential increases in operating costs
Displacement of Fishing activity	As per 'Complete Loss or Restricted Access to Fishing Grounds'	As above

Effect	Worst case scenario (individual project)	Justification of Selected Rochdale Envelope Parameter
Interference with Fishing Vessels	Location of construction port and maximum number of works vessels	Will result in the highest number of works vessels transiting identified fishing grounds
Operation		
Adverse Impacts on Commercially Exploited and Recreational Fish and Shellfish Populations	See Chapter 12: Natural Fish and Shellfish Resource	Chapter 12: Natural Fish and Shellfish Resource provides an assessment of the potential effects of the development upon fish and shellfish species and the findings are summarised in this chapter.
Complete Loss or Restricted Access to Fishing Grounds	Gravity base foundations; Project Alpha - 75 WTGs; 3 OSPs; 3 meteorological masts (Project Bravo – 75 WTGS; 2 OSPs; 3 meteorological masts) Maximum number of safety zones around infrastructure; Minimum spacing between WTGs: 610 m; Maximum array cable length: 355 km; Maximum unburied sections of array cables protected by mattresses; 35.5 km; and Minimum burial depth of array cables; 0.5 m	Infrastructure resulting in the maximum loss of fishing ground
Safety Issues for Fishing Vessels	See Chapter 15: Shipping and Navigation. In addition, the assessment also recognises the safety risks posed by the array cables based upon: Maximum array cable length; 355 km; Maximum unburied sections of array cables protected by mattresses; 35.5 km; and Minimum burial depth of array cables; 0.5 m	Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume
Increased Steaming Times	Maximum number of safety/ exclusion zones in the site	Resulting in the maximum disruption to established steaming routes
Displacement of Fishing activity	As per 'Complete Loss or Restricted Access to Fishing Grounds'	As above
Interference with Fishing Vessels	Location of operation and maintenance port and maximum number of operation and maintenance works vessels	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
Decommissioning		
In the absence of detailed methodologies and schedules, decommissioning works and the implications for commercial fisheries are considered analogous with or likely less than, construction.		
Cumulative and in-combination		
The specifications of developments in addition to the Seagreen Project are provided in Section: Cumulative and in-combination Impact Assessment		

Table 14.9 Worst case scenario for Transmission Asset Project assessment

Effect	Worst case scenario	Justification
Construction		
Adverse Impacts upon Commercially Exploited and Recreational Fish and Shellfish Populations	See Chapter 12: Natural Fish and Shellfish Resource	Chapter 12: Natural Fish and Shellfish Resource provides an assessment of the potential effects of the development upon fish and shellfish species and the findings are summarised in this chapter.
Temporary Loss or Restricted Access to Fishing Grounds	OSPs are located within the boundary of Project Alpha and Project Bravo and hence have not been included in the assessment of the Transmission Asset Project. Total offshore export cable length to landfall: 530 km; Maximum no. of export cables: 6; Maximum no. of export cable trenches: 6; Maximum length of export cable protected by mattresses: 26.5 km; Incomplete installation of export cables (i.e. fishing activities cannot resume in the area of cable installation); Maximum area of construction safety zones within the site; and Maximum total duration of construction activities: 9 months within a 2 year period	Infrastructure resulting in the maximum loss of fishing grounds
Safety Issues for Fishing Vessels	See Chapter 15: Shipping and Navigation and the realistic worst case scenario identified in 'Temporary Loss or Restricted Access to Fishing Grounds'.	Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume
Increased Steaming Times	Maximum area of construction safety zones within the site	Resulting in the maximum disruption to established steaming routes
Displacement of Fishing Activity	See Temporary Loss or Restricted Access to Fishing Grounds	As above
Interference with Fishing Vessels	Location of port of construction and maximum number of construction works vessels	Will result in the highest number of works vessels transiting identified fishing grounds
Operation		
Adverse Impacts upon Commercially Exploited and Recreational Fish and Shellfish Populations	See Chapter 12: Natural Fish and Shellfish Resource	Chapter 12: Natural Fish and Shellfish Resource provides a full assessment of the potential effects of the development upon all fish and shellfish species and the findings are summarised in this chapter.
Complete Loss or Restricted Access to Fishing Grounds	Minimum burial depth of export cables: 0.5 m Maximum length of cable protection: 26.5 km	Infrastructure resulting in the maximum loss of fishing grounds
Safety Issues for Fishing Vessels	See Chapter 15: Shipping and Navigation Post installation status of the export cables	Unacceptable safety risks to fishing vessels assume that fishing activities cannot be safely undertaken or resume
Increased Steaming Times to Fishing	None	

Effect	Worst case scenario	Justification
Grounds		
Obstacles on the Seabed Post-construction	Any construction related obstacles and changes to seabed conditions, including cable burial and protection	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
Interference with Fishing Vessels	None foreseen in addition to operational effects above	
Decommissioning		
In the absence of detailed methodologies and schedules, decommissioning works and the implications for commercial fisheries are considered analogous with construction.		
Cumulative		
The specifications of developments in addition to the Seagreen Project are provided in Section: Cumulative and in-combination Impact Assessment		

IMPACT ASSESSMENT – CONSTRUCTION PHASE

14.155. An assessment of the potential effects of Project Alpha, Project Bravo and offshore transmission infrastructure in the construction stage is provided below. In each instance, a description of the mitigation options and residual effects are separately described.

14.156. It should be noted that only those fisheries sensitive to an effect are assessed under each individual effect heading.

14.157. Due to the location of the OSPs within the Project Alpha (3 OSPs) and Project Bravo (2 OSPs) boundaries, this infrastructure has been assessed within the wind farm assessments.

Project Alpha

Potential Impact

Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

14.158. There is the potential for construction 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. The principal commercial species targeted within the Project Alpha site are scallops by boat dredge, and to a lesser extent, squid by bottom otter trawl.

14.159. In addition to the species above, there are additionally coastal and in-river fisheries for salmon and sea trout which are of regional and national importance both commercially and recreationally. Although there is no recorded activity in the Project Alpha site, and hence no direct impacts from the development upon the prosecution of the fisheries, it is likely that these species use the Project Alpha site during their marine phase and construction may therefore indirectly affect the fisheries.

14.160. Impacts from construction upon species are assessed in Chapter 12: Natural Fish and Shellfish Resource and adverse impacts are summarised in Table 14.10 below. The sensitivity of the fisheries should be considered analogous with the sensitivities ascribed in this chapter.

Table 14.10 Adverse impacts upon commercial and recreational fish and shellfish populations

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Effect of noise – death or injury	Herring	Med	Low	Minor adverse and **not significant** (Negligible all other commercial species)
Effect of noise – behaviour	Herring	High	Low	Moderate adverse and **significant** (Negligible all other commercial species)

Temporary Loss or Restricted Access to Traditional Fishing Grounds

14.161. The principal impacts of construction considered to result in temporary loss or restricted access to fishing grounds during the construction phase are:

- exclusion zones around construction activities; and
- installed offshore infrastructure in addition to construction exclusion zones, including turbines, OSPs and array cables.

14.162. There will be rolling safety zones of up to 500m around each major construction activity, from which all non-construction associated vessels would be excluded for the duration of the construction phase (up to 3 years). The seasonality of fishing activity and location of safety zones will render these exclusion zones more sensitive, depending upon the time of year.

14.163. Infrastructure already partially or completely installed on the seabed during the construction phase, in addition to ongoing construction works, will further restrict access to, and could result in complete loss of, fishing grounds. It is likely that safety zones of 50m may be applied around infrastructure such as WTGs (maximum of 75), meteorological masts (maximum of three) and OSPs (maximum of three). It therefore follows that there will be an increasing number of such safety zones as the construction schedule advances, which will have the effect of limiting normal fishing practices.

14.164. Up to 355km of array cables will be installed within the Project Alpha site as the construction stage advances (up to 3 years). For the majority of this length cables will be buried, with approximately 10% being protected by other means (i.e. rock placement or concrete mattresses). It is considered that fishing vessels will not be able to safely operate in the vicinity of these cables, subject to the successful burial of the cables, to be confirmed by post-installation surveys as appropriate, and if necessary, corrective measures where target burial depth has not been achieved. It therefore follows that access to fishing grounds within the Project Alpha site will be progressively restricted as array cables are laid, which could result in a worst case of the entirety of the site being restricted towards the latter stages of construction.

14.165. The fisheries affected by the temporary loss or restricted access to fishing grounds in the Project Alpha site are the scallop and, to a much lesser extent, squid fisheries.

14.166. The sensitivity of the scallop fishery to the temporary loss or restricted access to fishing grounds has been identified as low at a regional level, taking account of the scallop fishing grounds the Project Alpha site encompasses, but recognising the low level of adaptability required by scallop vessels due to the availability of grounds in areas outside of the site and the nomadic nature of a large number of scallop vessels who will potentially variously target grounds around the UK.

14.167. Due to the significant annual fluctuations in squid landings and the principally inshore nature of the fishery, the adaptability, tolerance and value of the fishery is low. The sensitivity of the squid fishery is low at a regional level. This takes into account the increase in squid landings in 2010, as well as the wider distribution of squid vessels during this period.

14.168. Additional fisheries have not been assessed under this effect, due to the negligible level of recorded activity within the boundary of the Project Alpha site.

14.169. The magnitude of effect takes into account that the duration of effect is temporary, i.e. limited to the construction phase of a maximum of three years, and recognises that access to fishing grounds within the site will be increasingly restricted as the construction phase progresses. The magnitude of effect is therefore medium.

14.170. The significance of the effect of temporary loss or restricted access to fishing grounds during the construction phase is given in Table 14.11 below.

Table 14.11 Temporary Loss or Restricted Access to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**

Safety Issues for Fishing Vessels

14.171. An assessment of the safety issues for fishing vessels during the construction phase principally focuses on the risks to fishing vessels undertaking normal fishing activities in the area of the development: boat dredge fishing for scallops and bottom otter trawling for squid. It is, however, recognised that fishing vessels may also be affected by impacts occurring outside of the boundaries of the development, such as potential collision risks between wind farm construction vessels and fishing vessels. This issue, including a wider assessment of the safety risks to navigation is fully described in Chapter: 15 Shipping and Navigation.

14.172. As previously stated, there will be rolling safety zones across Project Alpha site throughout the construction phase (up to three years) from which all fishing vessels will be excluded. Infrastructure that is partially installed or completed will be marked and it is also likely that safety zones of 50m will be established. Risks to fishing vessels would only occur if infringements of these safety zones occurred. It should also 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 the safety zones during the construction phase would put the safety risk within acceptable limits.

14.173. 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.

14.174. 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.

14.175. In addition to areas included within the rolling safety zones, as well as those safety zones likely to be applied to partially or completed infrastructure, a maximum of 355 km of array cables will be installed during the construction phase which will potentially fall outside of safety zones. Due to the potential safety risks associated with fishing in the vicinity of these cables (either by snagging on cables or as a result of changes to the seabed conditions), it is considered that until the appropriate post construction measures have been completed, the safety risks to fishing vessels arising from the installation of array cables throughout the Project Alpha site are outside of acceptable limits. This is **significant** in terms of the EIA Regulations.

Increased Steaming Time to Fishing Grounds

14.176. The implementation of safety exclusion zone during the construction phase could result in some short term increases in steaming distances and times, and therefore higher operational costs for vessels. As previously stated, there will be rolling safety zones across the Project Alpha site from which all vessels will be excluded. In addition, it is likely that additional safety zones will be applied to partially installed or completed infrastructure within the site.

14.177. The sensitivity of the scallop fishery takes into account the operational range of the vessels fishing in the site and the limited scallop grounds in areas offshore of the site, that is the adaptability and tolerance of the fisheries, which could potentially be impacted by safety zones and increases to steaming times. As a result, the sensitivity is considered to be low.

14.178. Based on the significant annual fluctuations in squid landings and the principally inshore nature of the fishery the sensitivity of the squid fishery is considered to be low.

14.179. The magnitude of effect is considered to be low due to the temporary duration of construction (up to three years), and the limited spatial extent of the change associated with the discreet locations of safety zones across the site relative to the fishing grounds identified for scallop and squid.

14.180. The significance of the effect of increased steaming times to fishing grounds during the construction phase is provided in Table 14. 12 below.

Table 14.12 Increased Steaming Times to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Increased Steaming Times to Fishing Grounds	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**

Displacement of Fishing Vessels into other Areas

14.181. Concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of wind farm development could result in increased competition for grounds outside of the site. 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).

14.182. The extent of displacement will be a direct function of the temporary loss or restricted access to traditional fishing grounds during the construction period as assessed in paragraphs 14.161 to 14.170 above. As such the assessment of sensitivity, magnitude and significance is as per the assessment of the Temporary Loss of Access to Traditional Fishing Grounds and is presented in Table 14.13 below.

Table 14.13 Displacement of Fishing Vessels into other Areas

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Displacement of fishing vessels into other areas	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**

Interference with Fishing Activities

14.183. 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 site. This could include the fouling of static gear markers buoys and dhans, or towed gear vessels being required to alter towing direction. This interference has the potential to impact more fishing vessels than those operating in the immediate vicinity of the site, depending upon the location of the construction port. As a result, the nephrops, whitefish and crab and lobster fisheries are also sensitive receptors for this effect, as well as scallop and squid.

14.184. Taking into account the mobility of towed gear vessels targeting the scallop, squid, whitefish and nephrops, these fisheries are highly adaptable and tolerant and therefore of low sensitivity. However, recognising the static nature of creel gear, set in the water for periods of several days, the crab and lobster fishery located inshore of the Project Alpha site is considered to have less tolerance and adaptability to Project Alpha and therefore is considered to be of medium sensitivity.

14.185. The magnitude of effect is largely be determined by the location of the construction port and transit routes to site as this influences the spatial extent of change in relation to the fishing grounds, which at the current time is unknown. As a result, a conservative assumption has been made that construction and works vessel transits will be in the vicinity of static and towed gear grounds. In addition, expected magnitude is higher for static gear than for towed gear, due to the relatively larger spatial extent of effect relative to their more discrete fishing grounds, as well as the fishery being more limited in its ability to adapt.

14.186. The significance of effect is provided in Table 14.14 below.

Table 14.14 Interference to Fishing Activities (Navigational Conflict))

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Interference to Fishing Activities (Navigational Conflict)	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Whitefish Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Medium	Medium	Moderate Adverse and **significant**

Mitigation for the Construction Phase of Project Alpha

Mitigation

Dialogue will be ongoing with fishermen prior to and during the construction phase to ensure that project information is effectively disseminated to fishermen, as well as allowing for issues to be raised by the fishing community (in line with standard industry practice).

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities.

14.187. Working practices will be agreed to achieve any possible reduction in interference. A construction management plan will be defined in consultation with fishing interests which clearly establishes protocol for engagement between the Applicant and fishermen throughout the construction period. In order that the various fishing sectors are appropriately represented, as well as the Applicant and the regulatory body, a Working Group will be established that facilitates the following:

- ongoing dialogue between the fishing community and the applicant throughout the pre-construction and construction phase;
- protocol for the navigation of wind farm construction and works vessels to and from the site (i.e. agreement of transit lanes to minimise interference to fishing activities);
- established procedures in the event of interactions between wind farm construction and fishing activities (i.e. claims for lost and/ or damaged gear); and
- protocol for removal of seabed obstacles post-construction.

14.188. Array cables will be buried to a target depth of between 0.5 and 2 m, where it is technically practicable to do so, which will reduce the risk to fishing vessels from snagging. In instances where adequate burial cannot be achieved an appropriate cable protection will be used.

14.189. Consultation with the fishing industry and relevant stakeholders will be ongoing in the pre-construction phase to ensure that all safety risks to fishing vessels during the construction phase are brought within acceptable limits. Once this occurs, these effects are **not significant** in terms of the EIA Regulations.

14.190. All infrastructure installed during the construction phase will be marked and lit, in line with standard industry practice, and as further described in Chapter 15: Shipping and Navigation. The information will be distributed to fishermen through the agreed channels as defined in the construction management programme.

Residual Impact for the Construction Phase of Project Alpha

14.191. Following the application of mitigation, the moderate impact identified for the static gear fishery (crab and lobster) as a result of interference through navigational conflict has been reduced to minor and **not significant**, as a result of the protocols defined for the navigation of works vessels.

14.192. In addition, those safety risks which have been identified as being outside of acceptable limits will be brought within acceptable limits, making them **not significant** in terms of EIA Regulations.

14.193. The significance levels ascribed to the remaining effects for the construction phase of Project Alpha are minor and are **not significant** in terms of the EIA Regulations.

Project Bravo

14.194. Although slight variations in baseline characteristics between the Project Alpha and Project Bravo sites have been identified during the period of analysed data, annual fluctuations in the level and location of activity of the principal two fisheries, the scallop and squid fisheries, has required the conservative assumption that activity is broadly uniform across the two sites. It should be noted that two OSPs will be constructed within the Project Bravo site, whereas the Project Alpha site will have three.

14.195. An assessment of the impacts of Project Bravo in the construction phase, and associated mitigation and resulting residual impacts is therefore considered analogous with that described for the Project Alpha assessment, see Table 14.15 below.

Table 14.15 Summary of Impacts during Construction for Project Bravo

Effect	Receptor	Sensitivity of Receptor	Magnitude of Effect	Significance of Effect
Adverse impacts upon commercial and recreational fish and shellfish populations (see Chapter 12)	Commercial species	-	-	Minor (**not significant**) to Moderate (**significant**) Adverse for herring (Negligible all other commercial species)
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
Safety Issues for Fishing Vessels (see Chapter 15)	All fishing vessels	-	-	Within acceptable limits for construction activities within applied safety zones and **not significant** Outside of acceptable limits for array cables and **significant**
Increased Steaming Times to Fishing Grounds	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
Displacement of Fishing Vessels into other Areas	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
Interference to Fishing Activities (Navigational Conflict)	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Whitefish Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Medium	Medium	Moderate Adverse and **significant**

Mitigation for the Construction Phase of Project Bravo

Mitigation

Dialogue will be ongoing with fishermen prior to and during the construction phase to ensure that project information is effectively disseminated to fishermen, as well as allowing for issues to be raised by the fishing community (in line with standard industry practice).

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities.

14.196. The mitigation described for the construction phase of Project Alpha will also be applied to Project Bravo. This will have the effect of reducing the moderate adverse impact to the crab and lobster fishery to minor and therefore **not significant** in terms of the EIA Regulations. Consultation with the fishing industry and relevant stakeholders will be ongoing in the pre-construction phase to ensure that all safety risks to fishing vessels during the construction phase are brought within acceptable limits. Once this occurs, these effects will be **not significant** in terms of the EIA Regulations.

Transmission Asset Project

Potential Impacts

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.197. There will be a maximum of five offshore platforms located within the Project Alpha or Project Bravo site boundaries. As these are located within Project Alpha and Bravo they have not been included in this assessment of the Transmission Asset project to avoid duplication.

Export Cable Route (ECR) Corridor

Adverse Impacts upon Commercial and Recreational Fish Populations

14.198. There is the potential for 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 summarized within this section and fully assessed in Chapter 12: Natural Fish and Shellfish Resource.

14.199. The principal commercial species targeted along the ECR corridor are scallops by boat dredges, squid and nephrops by bottom otter trawls, and crab and lobster by static gear (creel) vessels. Negligible impacts on these species due to Transmission Asset construction activities are predicted as a result of the assessment described in Chapter 12.

14.200. In addition to the species listed above, there are additionally coastal and in-river fisheries for salmon and sea trout which are of regional and national importance. Although the construction of the transmission asset will not directly impede salmon and sea trout fishing activities, it is recognised that there may be changes to the species in the marine environment which could have an indirect effect. Negligible impacts on these species due to Transmission Asset construction activities are predicted as a result of the assessment described in Chapter 12.

Temporary Loss or Restricted Access to Fishing Grounds

14.201. The principal effects of offshore transmission construction works along the ECR corridor considered to incur temporary loss or restricted access to fishing grounds during the construction phase are: exclusion zones of up to 500m around construction activities, and installed infrastructure which does not allow for normal fishing activities to be safely resumed.

14.202. Rolling safety zones will likely be applied during the installation phase of the export cables, from which all non-construction associated vessels would be excluded for the duration of the construction phase. The total duration of construction activity all export cables will be up to 9 months within a two year period. The seasonality of fishing activity and location of safety zones will render these exclusion zones more sensitive, depending upon the time of year.

14.203. The corridor from landfall to the site is 70km in length will be 1km in width. A maximum of six cables in six trenches, totalling 530km length, will be installed between the Project Alpha and Bravo sites and landfall at Carnoustie. The majority of export cables will be buried, although approximately 5% of each which may be protected by other means (i.e. rock placement or concrete mattresses). Due to the potential safety risks associated with fishing in the vicinity of these cables (either by snagging on cables or as a result of changes to the seabed conditions), it is considered that temporary loss of access to fishing grounds applies to the length of the corridor (70km by 1km), subject to the successful burial of the export cables, to be confirmed by post-installation surveys as appropriate, and if necessary, corrective measures where target burial depth has not been achieved. The fisheries identified along the ECR corridor are:

- boat dredging for scallops in the offshore section;
- seasonal bottom otter trawling for squid at varying levels along the corridor;
- bottom otter trawling for nephrops in the mid-section of the corridor; and
- creeling for crab and lobster in the inshore and mid–section of the corridor.

14.204. The seasonality of the fisheries should be considered relevant to the installation schedule of the export cables: generally the pattern is for landings for all species to peak in the summer months, although activity is year round. In addition, the limited seasonality of the squid fishery is noted, with the large majority of landings recorded between June and September. In the case of smaller category vessels, whose activity is predominantly focussed in local fishing grounds, the limited operational range of these boats is noted.

14.205. The sensitivities of the fisheries arising from the temporary loss or restricted access to fishing grounds take into account the loss of a 1km x 70 km corridor along the entirety of the cable route in the installation phase of the export cables until the appropriate post-installation measure have been completed. The mobility of towed gear fishing vessels, particularly larger category vessels and the availability of fishing grounds in the wider and regional area has been taken into account when defining sensitivity as this is a key factor in the adaptability and tolerance of these fisheries to the Transmission Asset Project. In the case of the scallop fishery, the sensitivity is therefore low. In the case of the squid and nephrops fisheries, the sensitivities of each is also low, due to the limited area of fishing grounds within the export cable corridor. It should be noted however that the nephrops and squid fisheries may be prosecuted by the same vessels, thereby increasing the impact in these instances.

14.206. With regard to static gear vessels for crab and lobster fisheries, their limited operational range, seasonality and the limited availability of fishing grounds, limits their adaptability and tolerance. This has resulted in the fishery being assigned a medium sensitivity.

14.207. The magnitude of effect takes into account that the impact is temporary (i.e. limited to the installation phase), and limited in spatial extent (i.e. 1km corridor). The precautionary assumption however assumes that the installation period will encompass the peak seasonal landings for all of the affected fisheries. The magnitude is therefore medium.

14.208. The significance of the effect of temporary loss or restricted access to fishing grounds during the construction phase is given in Table 14.16 below.

Table 14.16 Temporary Loss or Restricted Access to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Medium	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Medium	Medium	Moderate Adverse **and significant**

Safety Issues for Fishing Vessels

14.209. Rolling safety zones will be will likely be applied during the installation phase of the export cables, from which all non-construction associated vessels would be excluded for the duration of the construction phase, a maximum duration of 2 years. Risks to fishing vessels would only occur if infringements of these safety zones occurred. In line with standard maritime practice, the ultimate responsibility with regard to safety lies with the master of a vessel. Compliance with these safety zones during the installation phase of the export cables would put the safety risk within acceptable limits.

14.210. There is the potential for obstacles to be left on the seabed during the installation of the 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.

14.211. 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.

14.212. As has been previously stated, there is however additionally the potential for export cables (in the same way as array cables) to pose a risk to fishing vessels as a result of potentially hazardous interactions with fishing gear. A maximum of six cables in six trenches, being a maximum 530km length in total for all cables, will be installed between the Project Alpha and Bravo sites and landfall at Carnoustie. The corridor from landfall to the site is 70km in length and will comprise 1 km in width. Export cables will be buried, with approximately 5% of each which may be protected by other means (i.e. rock placement or concrete mattresses). Until the successful burial of the export cables can be confirmed by post-installation surveys as appropriate and, if necessary, corrective measures completed where target burial depth has not been achieved, it is considered that the safety risks during the installation phase to fishing vessels will be outside of acceptable limits. This therefore a **significant** impact in terms of the EIA Regulations.

Increased Steaming Time to Fishing Grounds

14.213. The implementation of safety zones during the installation phase could result in some increases in steaming distances and times, and therefore higher operational costs for the vessel. The safety zones implemented during the installation phase of the export cables will however be discrete and in transitory locations along the export cable route resulting in limited spatial extent and duration of effect and as a result the magnitude of effect is considered to be low.

14.214. Further, taking into account the discrete nature of safety zones relative to available fishing grounds and the adaptability and tolerance of the fisheries in question, the sensitivity of all fisheries is considered to be low.

14.215. The significance of the effect of increased steaming times to fishing grounds during the construction phase is given in Table 14.17 below.

Table 14.17 Increased Steaming Time to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Increased Steaming Time to Fishing Grounds	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Low	Low	Minor Adverse and **not significant**

Displacement of Fishing Vessels into other Areas

14.216. As has been previously stated in the assessment of impacts for the Project Alpha site, the extent of the displacement of fishing vessels as a result of cable installation activities will be a direct function of the temporary loss or restricted access to fishing grounds during the construction phase. As such the assessment of the effects on the Temporary Loss or Restricted Access to Fishing Grounds (paragraphs 14.201 to 14.208) also applies to this effect. The sensitivity, magnitude and significance is summarised in Table 14.18 below.

Table 14.18 Table 14.18 Displacement of Fishing Vessels into other Areas

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Medium	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Medium	Medium	Moderate Adverse and **significant**

Interference with Fishing Vessels

14.217. As previously stated, the principle additional impact upon commercial fishing activities arises from the potential for navigational conflict between fishing vessels and installation vessels transiting to and from site. The magnitude of impact depends upon the location of the construction port, which at the current time is unknown. As a result, a conservative assumption has been made that transit routes will be in the vicinity of static and towed gear grounds. The magnitude of effect is however low, given the limited duration of the construction schedule, a maximum of nine months within a 2 year period, and the relatively lower level of works vessel transits for export cable installation activities than for the wind farm sites.

14.218. The sensitivity of the fisheries, including crab and lobster fisheries is also low, given the low tolerance and adaptability of vessels.

14.219. The significance of the interference to fishing vessels identified is provided in Table 14.19.

Table 14.19 Interference to Fishing Vessels (navigational conflict)

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Interference to Fishing Vessels (navigational conflict)	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Low	Low	Minor Adverse and **not significant**

Mitigation for the Construction Phase of the Transmission Asset

Mitigation

Dialogue will be ongoing with fishermen prior to and during the construction phase to ensure that project information is effectively disseminated to fishermen, as well as allowing for issues to be raised by the fishing community (in line with standard industry practice).

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities.

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.220. The mitigation measures for infrastructure within the Project Alpha and Project Bravo site boundaries are the same as those which have been described for the construction phase of the Project Alpha assessment.

Export Cable Route (ECR) Corridor

14.221. The proposed mitigation measures within the ECR corridor are the same as those which have been described for the Project Alpha and Project Bravo assessment of construction impacts. In line with standard industry practice, dialogue will be ongoing with fishermen prior to and during the construction phase to ensure that project information is effectively disseminated to fishermen, as well as allowing for issues to be raised by the fishing community. Working practices will also be agreed to achieve any possible reduction in interference. A construction management plan will be defined in consultation with fishing interests which clearly establishes protocol for engagement between the Applicant and fishermen throughout the construction period. In order that the various fishing sectors are appropriately represented, as well as the Applicant and the regulatory body, a Working Group will be established that facilitates the following:

- ongoing dialogue between the fishing community and the applicant throughout the pre-construction and construction phase;
- protocol for the navigation of wind farm construction and works vessels to and from the site (i.e. agreement of transit lanes to minimise interference to fishing activities);

- established procedures in the event of interactions between wind farm construction and fishing activities (i.e. claims for lost and/ or damaged gear); and
- protocol for removal of seabed obstacles post-construction.

14.222. Export cables will be buried to a target depth of between 0.5 and 3m, where it is technically practicable to do so, which will reduce the risk to fishing vessels from snagging. In instances where adequate burial cannot be achieved an appropriate cable protection will be used.

14.223. Consultation with the fishing industry and relevant stakeholders will be ongoing in the pre-construction phase to ensure that all safety risks to fishing vessels during the construction phase are brought within acceptable limits. Once this occurs, these effects are **not significant** in terms of the EIA Regulations.

Residual Impact for the Construction Phase of the Transmission Asset

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.224. Residual impacts for infrastructure within the Project Alpha and Project Bravo site boundaries are included in those which have been described for the Project Alpha assessment.

Export Cable Route (ECR) Corridor

14.225. Residual impacts for the export cable corridor are the same as those described in the assessment, with the exception of unacceptable safety risks, which will be brought within acceptable limits and result in an impact that is **not significant** in terms of the EIA Regulations.

14.226. The impact arising from the temporary loss or restricted access to fishing grounds during the installation phase for the crab and lobster fishery remains moderate at this point, as does the associated displacement of activity, which is **significant** in terms of EIA Regulations. Consultation will be ongoing with relevant fishing interests to ensure that these impacts can be reduced to within acceptable limits.

IMPACT ASSESSMENT – OPERATION

14.227. An assessment of the potential effects of Project Alpha, Project Bravo and Transmission Asset project in the operational stage is provided below. In each instance, a description of the mitigation options and residual effects are separately described.

14.228. The effect described below should be considered in the context of the operational life of the OWFs, currently estimated to be 25 years. Trends in fishing activities are difficult to establish on a yearly basis, and an assessment of the potential scale of an effect over this period is therefore unrealistic. The impact assessment below is based upon the current baseline and the limitations of this are recognised.

14.229. It should be noted that only those fisheries sensitive to a specific impact are assessed under that impact heading.

Project Alpha

Potential Impact

Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

14.230. There is the potential for the operation of Project Alpha 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 Chapter 12: Natural Fish and Shellfish Resource.

14.231. The principal commercial species targeted within the Project Alpha site are scallops by boat dredge, and to a lesser extent, squid by bottom otter trawl.

14.232. In addition to the species above, there are additionally coastal and in-river fisheries for salmon and sea trout which are of regional and national importance both commercially and recreationally. Although there is no recorded activity in the Project Alpha site, and hence no direct impacts upon the fisheries, it is possible that these species may use the Project Alpha site during their marine phases, which may indirectly affect the fisheries.

14.233. Impacts arising from operation upon fish and shellfish species are fully assessed in Chapter 12: Natural Fish and Shellfish Resource and adverse impacts are summarised in Table 14.20 below. The sensitivity of the fisheries should be considered analogous with the sensitivities ascribed in this chapter.

Table 14.20 Adverse impacts upon commercial and recreational fish and shellfish populations

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Disturbance effects of Electromagnetic Fields (EMF)	Salmon and sea trout	Moderate	Low	Minor adverse and **not significant** (Negligible for non-sensitive species)

Complete Loss or Restricted Access to Fishing Grounds

14.234. Existing legislation does not currently prohibit fishing from occurring within operational wind farm sites. It is likely however that safety zones of 50m will be applied around infrastructure such as WTGs, meteorological masts and OSPs which would result in a permanent loss of fishing ground in these areas (note that safety zones around OSPs will be sufficient to include the footprint of the infrastructure).

14.235. There will be a maximum of 75 WTGs installed in the Project Alpha site, three meteorological masts and up to three OSPs. Taking into account the 50m safety zones, this accounts for a relatively very small percentage area of the total site.

14.236. The installed array cables will be buried where feasible and protected elsewhere (up to 5% unburied and protected by rock placement or mattresses). 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, it is considered that where feasible fishing activities will be able to resume in these areas once the cables are operational.

14.237. As identified in the worst case parameters, the minimum spacing distance between WTGs is estimated to be 610m. Specifications of scallop gear provided by a sample of fishermen have estimated a maximum of 60m total gear width during normal fishing practices (pers. comm. Scallop fisherman, 2011). The maximum gear width of the largest recorded demersal trawler targeting squid has identified a maximum gear spread between otter doors of 92m (pers. comm. Whitefish and squid fisherman, 2011). Given these parameters, and taking into account the minimum spacing, it is considered that some degree of access will be regained within the operational sites, particularly in the case of the smaller vessels in the fleet.

14.238. It is however noted that individual skippers, particularly those operating bottom towed gear, may consider it unsafe to continue fishing within the operational wind farm sites

because of the presence of infrastructure, which would result in a complete loss of area from within the site for these vessels.

14.239. The fisheries affected by the complete loss or restricted access to fishing grounds in the Project Alpha site are the scallop and, to a much lesser extent, squid fisheries. The sensitivity of these fisheries is low, taking into account the degree of access regained to fishing grounds within the site, and the availability of fishing grounds in the regional and wider study areas which results in low adaptability and tolerance.

14.240. The magnitude of effect takes into account the permanent nature of the operational wind farm (25 years) but recognises low spatial extent due to the relatively small area of fishing grounds permanently lost as a result of infrastructure and associated safety zones. The magnitude is therefore medium.

14.241. The significance of effect for complete loss or restricted access to fishing grounds is provided in Table 14.21 below.

Table 14.21 Complete Loss or Restricted Access to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Temporary Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**

Safety Issues for Fishing Vessels

14.242. An assessment of the safety issues for fishing vessels during the operational phase principally focuses on the risks to fishing vessels undertaking normal fishing activities in the area of the development: boat dredges fishing for scallops and bottom otter trawling for squid. It is however recognised that other fishing vessels may be affected by impacts occurring outside of the boundaries of Project Alpha, such as potential collision risks between wind farm operation and maintenance vessels and fishing vessels. This issue, including a wider assessment of the safety risks to navigation is fully described in Chapter: 15 Shipping and Navigation.

14.243. It is likely that safety zones of 50m will be applied to operational infrastructure such as WTGs, meteorological masts and OSPs. Risks to fishing vessels would only occur if infringements of these safety zones occurred. It should also 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 the safety zones during the operational phase would put the safety risk within acceptable limits and therefore **not significant** in terms of EIA Regulations.

14.244. 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.

14.245. 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.

14.246. Post-construction the array cables will be buried for approximately 90% of their total length and protected elsewhere. 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, it is considered that where feasible fishing activities will be able to resume in these areas once the cables are operational (see Mitigation, below). As a result, the safety risks to fishing vessels, including from array cables, is considered to be within acceptable limits and therefore **not significant** in terms of EIA Regulations.

Increased Steaming Times to Fishing Grounds

14.247. Chapter 15: Shipping and Navigation considers that there is good prospect for fishing vessels to navigate within the operational wind farm site. In addition, the limited fishing grounds offshore of the Project Alpha site are recognised. As a result, all fisheries are considered to have low tolerance and adaptability and are therefore of low sensitivity.

14.248. The magnitude of effect is also considered to be low, taking into account the low spatial extent and severity.

14.249. The significance of effect for increased steaming times to fishing grounds is provided in Table 14.22 below.

Table 14.22 Increased Steaming Time to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Increased Steaming Time to Fishing Grounds	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**

Displacement of Fishing Activity into other Areas

14.250. As has been previously stated, concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result Project Alpha could result in increased competition for grounds outside of the site. 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).

14.251. The extent of displacement will be a direct function of the loss or restricted access to traditional fishing grounds as a result of the presence of the Project Alpha infrastructure. The assessment and significance of Temporary Loss or Restricted Access to Fishing Grounds during cable installation (paragraphs 14.201 to 14.208) therefore applies, as shown in Table 14.23 below.

Table 14.23 Displacement of Fishing Activity in other Areas

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Displacement of fishing activity into other areas	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**

Interference with Fishing Activities

14.252. 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 partly determined by the location of the operations and maintenance port(s), which at the current time are unknown. 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 magnitude of effect is low.

14.253. The sensitivity of all fisheries, including the crab and lobster fishery is also low, taking into account the low adaptability and tolerance of all vessels.

14.254. The significance of interference to fishing vessels identified is provided in Table 14.24 below.

Table 14.24 Interference to Fishing Activities (navigational conflict)

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Interference to Fishing Activities (navigational conflict)	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Low	Low	Minor Adverse and **not significant**

Mitigation for the Operational Phase of Project Alpha

Mitigation

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities during the operation phase.

14.255. In addition to the mitigation measures described for the construction phase, dialogue between the fishing community and the Applicant will be ongoing throughout the operational phase. It is anticipated that the Working Group will provide a forum for ongoing operational engagement, including:

- Protocol for the navigation of wind farm operations and maintenance vessels to and from the site (i.e. agreement of transit lanes to minimise interference to fishing activities); and
- Established procedures in the event of interactions between wind farm operation activities and fishing activities (i.e. claims for lost and/ or damaged gear).

14.256. All infrastructure installed will be marked and lit, in line with standard industry practice, and as further described in Chapter 15: Shipping and Navigation. The information will be distributed to fishermen through the agreed channels.

14.257. Investigations are ongoing within the offshore renewables industry, and in consultation with the fishing industry, to explore potential modifications to bottom towed fishing gear which may better enable fishing activities within and around operational wind farms. These investigations may result in mitigation to certain of the impacts described above.

Residual Impact

14.258. Following the application of mitigation, the residual impacts during the operational phase are currently the same as those previously described and will not be significant in terms of EIA Regulations. In addition, whilst the mitigation described above will not currently reduce impacts upon commercial fisheries, investigations are being undertaken to further understand and assist interactions between the offshore renewable and fishing industries.

Project Bravo

Potential Impact

14.259. Although slight variations in baseline characteristics between the Project Alpha and Project Bravo sites have been identified during the period of analysed data, annual variations in the level and location of activity of the principal two fisheries, the scallop and squid fisheries, has required the conservative assumption that activity is broadly uniform across the two sites. It should be noted that two OSPs will be constructed within the Project Bravo site, whereas the Project Alpha site will have three.

14.260. An assessment of the impacts of Project Bravo in the operational phase, and associated mitigation and resulting residual impacts is therefore considered analogous with that described for the Project Alpha assessment, see Table 14.25 below.

Mitigation for the Operational Phase of Project Bravo

Mitigation

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities during the operation phase.

14.261. The mitigation described for the construction phase of Project Alpha will also be applied to Project Bravo. This will not reduce any of the impacts given in Table 14.25 below, which are **not significant** in terms of EIA Regulations.

Table 14.25 Summary of Impacts during Operation for Project Bravo

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Complete Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
Safety Issues for Fishing Vessels	All fishing Vessels	-	-	Within acceptable limits for all operational infrastructure if safety zones are applied Within acceptable limits for array cables providing post installation measures are completed
Increased Steaming Time to Fishing Grounds	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
Displacement of fishing activity into other areas	Scallop Fishery	Low	Medium	Minor Adverse and **not significant**
	Squid Fishery	Low	Medium	Minor Adverse and **not significant**
Interference to Fishing Activities (navigational conflict)	Scallop Fishery	Low	Low	Minor Adverse and **not significant**
	Squid Fishery	Low	Low	Minor Adverse and **not significant**
	Nephrops Fishery	Low	Low	Minor Adverse and **not significant**
	Crab and Lobster Fishery	Low	Low	Minor Adverse and **not significant**

Transmission Asset Project

Potential Impacts

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.262. There will be a maximum of five offshore platforms located within either the Project Alpha or Project Bravo site boundaries. As these are located in the OWF sites they have been assessed as part of Project Alpha and Bravo and hence are not included in the Transmission Asset Project.

Export Cable Route (ECR) Corridor

Adverse Impacts upon Commercial and Recreational Fish Populations

14.263. There is the potential for the operation of the export cable 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 in Table 14.26 below and fully assessed in Chapter 12: Natural Fish and Shellfish Resource.

14.264. The principal commercial species targeted along the export cable route are scallops by boat dredges, squid and nephrops by bottom otter trawls, and crab and lobster by static gear (creel) vessels.

14.265. In addition to the species listed above, there are additionally coastal in in-river fisheries for salmon and sea trout which are of regional and national importance, and although the operation of the transmission asset will not directly impede salmon and sea trout fishing activities, it is recognised that there may be changes to the species in the marine environment which could have an indirect effect.

Table 14.26 Adverse impacts upon commercial and recreational fish and shellfish populations

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Disturbance effects of Electromagnetic Fields (EMF)	Salmon and sea trout	Moderate	Low	Minor adverse and **not significant** (Negligible for non-sensitive species)

Complete Loss or Restricted Access to Fishing Grounds

14.266. Subject to the successful burial of the export cables, to be confirmed by post-installation surveys as appropriate and if necessary, corrective measures where target burial depth has not been achieved, it is considered that fishing activities will be able to resume in these areas once the cables are operational.

14.267. In areas where cables are required to be protected by other means, such as concrete mattresses or rock placement (up to 5% of the total length), appropriate measures will be undertaken in consultation with the fishing industry to ensure that cable protection is satisfactory and able to facilitate continued fishing activities.

14.268. In light of the measures above, the operational export cables are not considered to have a discernible effect on any fishing activities, and magnitude of effect is therefore negligible. In the same way, fishing vessels will have negligible impacts in terms of adaptability and tolerance as normal fishing activities will be undertaken. The significance of effect will therefore be negligible. The significance of complete loss or restricted access to fishing grounds is provided in Table 14.27 below.

Table 14.27 Complete Loss or Restricted Access to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Complete Loss or Restricted Access to Fishing Grounds	Scallop Fishery	Negligible	Negligible	Negligible
	Squid Fishery	Negligible	Negligible	Negligible
	Nephrops Fishery	Negligible	Negligible	Negligible
	Crab and Lobster Fishery	Negligible	Negligible	Negligible

Safety Issues for Fishing Vessels

14.269. There is the potential for obstacles to be left on the seabed during the installation of the 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.

14.270. 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.

14.271. Provided that cable protection measures are satisfactorily completed and post-installation surveys (and if necessary, seabed rectification procedures) confirm that fishing activities can safely resume, the safety risks to fishing vessels are considered to be within acceptable limits and therefore **not significant** in terms of EIA Regulations.

Increased Steaming Times to Fishing Grounds

14.272. The operational export cables are not considered to have any discernible effect upon the steaming times of vessels to fishing grounds and the magnitude of effect is therefore **negligible**. In the same way, the operational cables will have negligible impact on fishing vessels in terms of adaptability and tolerance as normal fishing activities will be undertaken and therefore sensitivity will be negligible. The significance of effect will therefore be negligible. . The significance of effect is provided in Table 14.28 below.

Table 14.28 Increased Steaming Time to Fishing Grounds

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Increased Steaming Time to Fishing Grounds	Scallop Fishery	Negligible	Negligible	Negligible
	Squid Fishery	Negligible	Negligible	Negligible
	Nephrops Fishery	Negligible	Negligible	Negligible
	Crab and Lobster Fishery	Negligible	Negligible	Negligible

Displacement of Fishing Vessels into other Areas

14.273. As previously stated, the displacement of fishing vessels is a function of complete loss or restricted access to fishing grounds during the operational phase. Provided that the appropriate measures are satisfactorily completed, there is not considered to be a discernible impact upon commercial fishing activities, and magnitude of effect is therefore negilgible. In the same way, the operational export cable will have negligible impact on fishing vessels in terms of adaptability and tolerance as normal fishing activities will be undertaken, and therefore sensitivity will be negligible. The significance of effect will therefore be negligible (Table 14.29).

Table 14.29 Displacement of Fishing Vessels into other Areas

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Displacement of fishing vessels into other areas	Scallop Fishery	Negligible	Negligible	Negligible
	Squid Fishery	Negligible	Negligible	Negligible
	Nephrops Fishery	Negligible	Negligible	Negligible
	Crab and Lobster Fishery	Negligible	Negligible	Negligible

Interference to Fishing Activities

14.274. As previously stated, there is the potential for interference to fishing activities in addition to the effects described above as a result of navigational conflict caused by transiting works vessels. It is considered that this effect will be considerably reduced in the operational phase of the export cables. 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 therefore negligible. In the same way, the operational export cable will have negligible impact on fishing vessels in terms of adaptability and tolerance as normal fishing activities will be undertaken, and therefore sensitivity will be negligible. The significance of effect will therefore be negligible (Table 14.30).

Table 14.30 Interference to Fishing Activities (navigational conflict)

Impact	Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Impact
Interference to Fishing Activities (navigational conflict)	Scallop Fishery	Negligible	Negligible	Negligible
	Squid Fishery	Negligible	Negligible	Negligible
	Nephrops Fishery	Negligible	Negligible	Negligible
	Crab and Lobster Fishery	Negligible	Negligible	Negligible

Mitigation for the Operational Phase of the Transmission Asset

Mitigation

A Fisheries Working Group will be established to enable dialogue and facilitate agreement on measures to reduce interference with fishing activities during the operation phase.

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.275. The mitigation measures for infrastructure within the Project Alpha and Project Bravo site boundaries are the same as those which have been described for the operational phase of the Project Alpha assessment.

Export Cable Route (ECR) Corridor

14.276. In addition to the mitigation measures described for the construction phase, dialogue between the fishing community and the Applicant will be ongoing throughout the operational phase. It is anticipated that the Working Group will provide a forum for ongoing operational engagement, including:

14.277. Protocol for the navigation of wind farm operations and maintenance vessels to and from the site (i.e. agreement of transit lanes to minimise interference to fishing activities); and

14.278. Established procedures in the event of interactions between wind farm operation activities and fishing activities (i.e. claims for lost and/ or damaged gear).

Residual Impact

Infrastructure within the Project Alpha and Project Bravo site boundaries

14.279. Residual impacts for infrastructure (i.e. 5 OSPs) within the Project Alpha and Project Bravo site boundaries are included in those which have been described for the Project Alpha assessment.

Export Cable Route (ECR) Corridor

14.280. The mitigation described above will not reduce the impacts described, which have been assessed to be negligible, and **not significant** in terms of EIA Regulations. They will however ensure that the significance of the impacts upon commercial fisheries remains negligible throughout the operation of the export cables.

IMPACT ASSESSMENT – DECOMMISSIONING

14.281. In the absence of a detailed decommissioning programme at this stage, it is assumed that decommissioning activities will be commensurate with, or likely less than, those effects identified in the construction phase of the Project Alpha and Project Bravo site and the Transmission Asset Project. The assessments provided previously under construction therefore apply.

IMPACT ASSESSMENT – CUMULATIVE AND IN-COMBINATION

14.282. In addition to identifying the potential impacts of Project Alpha, Project Bravo and the Transmission Asset Project upon commercial fisheries in isolation, the cumulative impacts of these elements of the Seagreen Project together with other existing, consented and/ or proposed development/ activity in the Firth of Forth region and beyond are considered below.

Seagreen Cumulative Impacts

14.283. The cumulative impact of the Seagreen Project, which comprises Project Alpha, Project Bravo and the Transmission Asset Project has been derived taking into account the following assumption: although slight variations in the baseline characteristics of the scallop and squid fisheries undertaken in the Project Alpha and Project Bravo sites have been identified during the period of analysed data, the proximity of the projects combined with annual variations in the level and location of activity have required the conservative assumption that activity is broadly uniform across the sites.

14.284. As described in the individual assessments, scallop fishing is recorded in the Project Alpha and Bravo sites, and along the offshore and mid-section of the export cable route. Combined, these elements encompass a moderate proportion of scallop grounds in the RSA. The operational range and nomadic nature of a large proportion of the fleet are however recognised.

14.285. Fishing for squid has been identified to a low level in the Project Alpha and Bravo sites, and to a greater extent along the export cable route. The significant annual fluctuations in the level and location of activity are recognised.

14.286. The crab and lobster fishery is located along the export cable corridor, with activity concentrated in inshore areas. There is no recorded activity within the Project Alpha and Bravo sites and as a result the fishery will only be cumulatively affected by the potential for interference as a result of navigational conflict arising from the Seagreen Project.

14.287. A low level of nephrops fishing is identified along the mid-section of the export cable corridor. As with the crab and lobster fishery, there is no recorded activity within the Project Alpha and Bravo sites and as a result the fishery will only be cumulatively affected by the potential for interference as a result of navigational conflict.

14.288. A summary of the cumulative impacts of the Seagreen Project during construction/ decommissioning and operation is provided in Table 14.31.

Adverse Impacts upon Commercial and Recreational Fish and Shellfish

14.289. There is the potential for the Seagreen Project 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 briefly summarised within this section and fully assessed in Chapter 12: Natural Fish and Shellfish Resource.

14.290. For non-noise sensitive commercial species the cumulative impact due to construction noise have been assessed as negligible. For noise sensitive species such as herring the cumulative impact has been assessed as major adverse if a piled substructure/ foundation option is used and negligible for a non-piled option.

14.291. The cumulative effects on commercial species that are sensitive to EMF are assessed as minor adverse for demersal species or for migratory species in shallow waters.

14.292. All other cumulative impacts on commercial species are assessed as negligible.

Temporary/Complete Loss or Restricted Access to Fishing Grounds

Construction

14.293. The cumulative effect of the construction of the Seagreen Project elements would result in an increase in the temporary loss or restricted access to fishing grounds for the scallop and squid fisheries. The magnitude of effect reflects an increase in the spatial extent of construction activities, and potentially also an increase in the duration of construction works, relative to scallop and squid fishing activities, and is therefore medium. It does however recognise that the effect is limited to the construction phase and hence temporary.

14.294. The magnitude of effect takes into account the larger combined spatial extent of effect, and the potential increase in the duration of effect. The magnitude of effect for the scallop and squid fisheries is therefore medium,

14.295. The sensitivity of the scallop fishery to the cumulative effect of the construction of the Seagreen Project elements reflects the extent of grounds affected by the project elements, and the potentially extended period of construction, which results in increased levels for adaptability and tolerance, which would in turn affect value. The availability of grounds in the RSA and WSA are however taken into account. The sensitivity of the scallop fishsery is therefore considered to be medium.

14.296. In the case of the squid fishery, although the increase in the area of fishing grounds potentially impacted is recognised, the significant annual variation in the levels and location of activity is taken into account, which results in levels of adaptability and tolerance which are low for the fishery.

14.297. The cumulative impact of the loss or restricted access to fishing grounds for the scallop fishery is therefore moderate. This impact is therefore **significant** in terms of the EIA regulations.

14.298. The cumulative impact of the loss or restricted access to fishing grounds for the squid fishery is therefore minor and **not significant**.

Operation

14.299. The cumulative effect of the operation of the Seagreen Project elements would result in a spatial increase in the complete loss or restricted access to fishing grounds for the scallop and squid fisheries for the duration of the operation of the infrastructure. As has been previously stated, however, it is considered that the residual effects of the export cable route will be negligible once operational, as a result of the cable burial and protection measures undertaken to ensure

that normal fishing activities can be safely resumed. The cumulative impact is therefore limited to the operation of the Project Alpha and Project Bravo sites.

14.300. The magnitude of the effect takes into account the permanent duration of the developments (25 years), but recognises the reduced spatial extent of effect due to the degree of access regained within the operational sites, and is therefore medium.

14.301. The sensitivity of the scallop fishery has been defined taking into account the larger extent of grounds encompassed by the Project Alpha and Project Bravo sites, but recognising that some degree of access will be regained to fishing grounds within the sites once operational, which determines the adaptability of the fishery. The sensitivity of the scallop fishery is therefore considered to be medium. The cumulative impact is therefore moderate for the scallop fishery, and the impact is **significant** in terms of the EIA regulations.

14.302. The sensitivity of the squid fishery is considered to be low, taking account of the proportion of grounds impacted and the significant annual fluctuations in the level and location of activity (adaptability). The cumulative impact is therefore minor and **not significant** for the squid fishery.

Safety Issues for Fishing Vessels

14.303. An assessment of the safety issues for fishing vessels does not use the standard application of significance criteria, instead assessing whether risks are considered to be within or outside of acceptable safety limits (see paragraphs 14.42 to 14.44).

Construction

14.304. The safety issues for fishing vessels during construction will be within acceptable limits with regard to activities and infrastructure within applied safety zones.

14.305. The safety issues for fishing vessels during construction will be outside of acceptable limits in the vicinity of array cables (Project Alpha and Project Bravo sites) and export cables (1km ECR corridor between landfall and site), until the appropriate post installation measures have been completed to ensure that, where feasible, fishing activities can safely resume. This impact is **significant** in terms of EIA regulations.

Operation

14.306. The safety issues for fishing vessels will be within acceptable limits for all operational infrastructure due to the application of safety zones.

14.307. The safety issues for fishing vessels will be within acceptable limits for array and export cables providing appropriate post installation measures are completed.

Increased Steaming Times to Fishing Grounds

Construction

14.308. Rolling safety zones will be applied in the Project Alpha, Project Bravo and export cable corridor during construction, from which all vessels will be excluded. In addition, it is likely that additional safety zones will be applied to partially installed or completed infrastructure within the site.

14.309. The sensitivity of the scallop fishery takes into account the operational range of the vessels fishing in the site, and the limited scallop grounds in areas offshore of the sites which could potentially be impacted by safety zones and increases to steaming times. As a result, the sensitivity is considered to be low.

14.310. Based on the significant annual fluctuations in squid landings and the principally inshore nature of the fishery the sensitivity of the squid fishery is considered to be low.

14.311. The magnitude of effect is considered to be low, due to the temporary nature of construction (up to three years for each site) and the discreet locations of safety zones across the site relative to the fishing grounds identified for scallop and squid. The cumulative impact upon increased steaming times to fishing grounds is for both the scallop and squid fisheries is therefore considered to be minor and **not significant**.

Operation

14.312. There will be no discernible effect from the operation of the export cable upon steaming times. The cumulative effect therefore arises only from Project Alpha and Project Bravo.

14.313. Chapter 15: Shipping and Navigation considers that there is good prospect for fishing vessels to navigate through the operational wind farms. In addition, the limited fishing grounds located offshore of the Project Alpha site are recognised. As a result, all fisheries are considered to be of low sensitivity, and the magnitude of effect is also considered to be low.

14.314. Taking into account the proximity of the projects and the increase in infrastructure, but recognising the discrete locations of the infrastructure, as well as the limited fishing grounds offshore of Project Bravo, the cumulative impact is considered to be minor and **not significant**.

Displacement of Fishing Vessels into other Areas

Construction

14.315. The extent of displacement will be a function of the temporary loss or restricted access to fishing grounds as a result of the construction of the Seagreen Project. The assessment and significance of this effect therefore applies a moderate and potentially **significant** impact for the scallop fishery and a minor and **not significant** impact for the squid fishery have been identified (see paragraph 14.293 above).

Operation

14.316. The extent of displacement will be a function of the complete loss or restricted access to fishing grounds as a result of the operation of the Seagreen Project. The assessment and significance of this effect therefore applies: a moderate and **significant** impact for the scallop fishery and a minor and **not significant** impact for the squid fishery have been identified.

Interference to Fishing Activities (Navigational Conflict)

Construction

14.317. The individual assessments for Project Alpha and Bravo identified that the static nature of the crab and lobster fishery rendered it more sensitive (medium) to interference than towed gear. However, the application of mitigation (establishing protocols to agree transit lanes) reduced this impact to minor. It is considered that this mitigation is applicable on a cumulative scale and the impact remains at minor and **not significant** for all fisheries.

Operation

14.318. As stated in the individual assessments, the protocols and working practices defined in the pre-construction and construction phases will ensure that the cumulative impact remains at minor and **not significant** for all fisheries.

Mitigation and Residual Impacts for the Cumulative Assessment

14.319. The cumulative impact from the construction of the Seagreen Project identifies a moderate adverse impact upon the scallop fishery, resulting in loss or restricted access to fishing grounds during construction and operation. The displacement of fishing vessels into other areas will be a function of the temporary loss of area and the same significance of effect therefore applies. These effects are **significant** in terms of EIA Regulations.

14.320. The remainder of the assessment concludes that the impacts of the Seagreen Project are minor and **not significant** in terms of the EIA Regulations, taking into account mitigation applied in the site specific impact assessments and the limited sensitivities of the fisheries.

14.321. Consultation with the fishing industry and relevant stakeholders will be ongoing in the pre-construction phase to ensure that all safety risks to fishing vessels during the construction phase are brought within acceptable limits. Once this occurs, these effects will not be significant in terms of the EIA Regulations.

14.322. No additional mitigation has been defined to reduce the cumulative effects of the Seagreen Project in addition to those described in the site specific assessments; however investigations are being undertaken to further understand and assist interactions between the offshore renewable and fishing industries.

14.323. Table 14.31 below summarises the cumulative impacts of the Seagreen Project, taking into account the mitigation applied in the site specific assessments.

Table 14.31 Cumulative impacts of Seagreen projects (Project Alpha, Project Bravo and the Transmission Asset Project)

Impact	Alpha	Bravo	Transmission Asset	Impact	Justification
Construction					
Effect of noise – death or injury	Minor adverse (for herring) Negligible (all other species)	Minor adverse (for herring) Negligible (all other species)	Negligible (all species)	Minor adverse (for piled foundation / substructure option) and not significant Negligible (all other species)	The potential effect of piling noise from both sites being developed at one time
Effect of noise – behaviour	Moderate adverse (for herring) Negligible (all other species)	Moderate adverse (for herring) Negligible (all other species)	Negligible (all species)	Major adverse (for piled foundation / substructure option) and significant Negligible (all other species)	The potential effect of piling noise from both sites being developed at one time
Temporary Loss or Restricted Access to Fishing Grounds	Minor Adverse	Minor Adverse	Minor Adverse	Moderate Adverse for the scallop fishery and significant Minor Adverse for the squid fishery and not significant	The cumulative impact has an increased effect spatially and temporally, the temporary loss of fishing grounds is limited to the construction phase and the availability of fishing grounds in the RSA and WSA are recognised.
Safety Issues for Fishing Vessels (all fishing vessels)	See justification	See justification	See justification	See justification	Within acceptable limits for construction activities within applied safety zones Outside of acceptable limits for array and export cables

Impact	Alpha	Bravo	Transmission Asset	Impact	Justification
Increased Steaming Times for Fishing Vessels	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse and not significant	Discrete area of safety zones and limited grounds offshore of the Project Alpha and Bravo sites
Displacement of Fishing Vessels into other Areas	Minor Adverse	Minor Adverse	Minor Adverse	Moderate Adverse for the scallop fishery and significant Minor Adverse for the squid fishery and not significant	Function of the temporary loss or restricted access
Interference to Fishing Activities (navigational conflict)	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse and not significant	Mitigation proposed in the individual assessments (establishing protocols to define transit lanes) applies to cumulative assessment
Operation					
Disturbance effects of Electromagnetic Fields (EMF)	Minor adverse (for sensitive species)	Minor adverse (for sensitive species)	Minor adverse (for migratory species)	Minor adverse (for sensitive species) and not significant	Increased levels of disturbance due to EMF with all cables active
Complete Loss or Restricted Access to Fishing Grounds	Minor Adverse	Minor Adverse	Negligible	Moderate Adverse for the scallop fishery and significant Minor Adverse for the squid fishery and not significant	Although the cumulative impact has an increased spatial effect, the availability of fishing grounds in the RSA and WSA are recognised, as is the degree of access that will be regained to fishing grounds within the sites
Safety Issues for Fishing Vessels	See justification	See justification	See justification	See justification	Within acceptable limits for all operational infrastructure if safety zones are applied Within acceptable limits for array and export cables providing appropriate post installation measures are completed
Increased Steaming Times for Fishing Vessels	Minor Adverse	Minor Adverse	Negligible	Minor Adverse and not significant	Good prospect for navigating through the operational sites
Displacement of Fishing Vessels into other Areas	Minor Adverse	Minor Adverse	Negligible	Moderate Adverse for the scallop fishery and significant Minor Adverse for the squid fishery and not significant	Function of the complete loss or restricted access
Interference to Fishing Activities (navigational conflict)	Minor Adverse	Minor Adverse	Negligible	Minor Adverse and not significant	Protocols and working practices established in the pre-construction and construction phases apply to the cumulative assessment
Decommissioning					
In the absence of detailed methodologies or schedules for the decommissioning of the Seagreen Project elements, the potential cumulative impacts are considered to be analogous, or likely less than, those incurred during construction					

Seagreen Cumulative Impact including Phases 2 and 3

14.324. Seagreen Phases 2 and 3 encompass five potential offshore wind farm sites and connection to the National Grid via three export cables running from the south-western boundary of the Round 3 Zone and coming together at a single landing point near Torness. Connection agreements, which are in place, indicate that the power generated is to be connected to the electricity transmission network at a location near Branxton, East Lothian. Phases 2 and 3 are planned to have a combined output target of 2.6 GW.

14.325. It is anticipated that applications for the necessary consents for development of wind farms within Phase 2 and Phase 3 will be submitted in 2014 and 2016 respectively. The Applicants believe that the design and development within Phases 2 and 3 of the Zone must be adaptive and take into account the lessons learned from both Round 1 and Round 2 offshore wind farm projects that have gone through the consenting and construction processes, alongside lessons from the Seagreen Project (as discussed in this ES) and other projects currently under development in the STW.

14.326. The status of Phases 2 and 3 is that an environmental scoping exercise has been undertaken (Seagreen, 2011) based upon current best-available evidence for those areas. It is anticipated that substantial further detailed work will be undertaken in the period leading up to submission of applications for the necessary consents in 2014 and 2016. Such work will include:

- detailed geophysical work to determine the surface topography and underlying geology of the Phases which will inform pile driving parameters;
- further consultation with commercial fishing interests in the RSA; and
- desk based assessment and some ISA specific surveys to determine the baseline conditions.

14.327. From the above, it can be seen that either large amounts of data relevant to Phases 2 and 3 have yet to be obtained and analysed or indeed have yet to be collected. Any assessment of the baseline for these Phases would therefore be assigned a low level of confidence when included in this ES.

14.328. There have been considerable changes to the original design and location of the Phase 1 projects during the detailed development work as environmental concerns (both ecological and human) have emerged that have shaped the projects going forward within the EIA. Given the size of the Zone and the development process Seagreen intends to follow, an optimal layout and approach will be developed in order to deliver as close to the target power output (2.6GW) as possible without causing a significant impact upon the receiving environment and in particular on commercial fishing interests. Seagreen will consider the use of all areas within the Zone not necessarily restricted to the Phase 2 and Phase 3 indicative boundaries and is committed to progressing the development of Phases 2 and 3 to ensure environmental impacts and in particular cumulative environmental impacts can be minimised and significant impacts avoided.

14.329. As a responsible developer, Seagreen wishes to use best available evidence and best practice in order to follow a responsible approach to the development of Phases 2 and 3. Therefore, to a great extent, the design refinement for Phases 2 and 3 will be dependent upon the on-going process with regard to Phase 1, the STW Projects and other offshore wind developments in Scotland. Given the data gaps and further work required cited above, any assessment of the baseline conditions of Phases 2 and 3 required for the cumulative assessment of the Seagreen Project would have to be assigned a low confidence level with regard to overall accuracy in particular with respect to capacity, developable

area and layout. Given this, the Applicants do not consider that for this assessment it is reasonable to present detailed analysis of the potential impacts of Phases 2 and 3 for inclusion within this assessment.

Seagreen In-combination Impact with other Schemes

14.330. The following section addresses the cumulative impacts upon commercial fisheries of the Seagreen Project (Alpha, Bravo and offshore Transmission Asset Project) in conjunction with other planned marine and coastal developments and activities.

14.331. The following receptors have been identified for the cumulative impact assessment:

- dredging for scallops is the principal fishery occurring in the Project Alpha and Bravo sites, as well as in the offshore section of the export cable route;
- seasonal trawling for squid occurs to a lesser degree in the area of the Project Alpha and Bravo sites, and along the export cable route;
- some trawling for nephrops along the mid-section of the cable route; and
- creeling for crab and lobster along the mid and inshore section of the cable route.

14.332. The assessment principally focusses on cumulative impacts in the Forth and Tay area, specifically the Inch Cape and Neart na Gaoithe offshore wind farms and associated transmission infrastructure. It is however recognised that fishing vessels may spend varying proportions of time in the Forth and Tay area. This is most apparently the case for the scallop fishery, which is targeted by vessels that are largely nomadic, variously targeting grounds around the UK. As stated previously, although individual vessels may spend more time in certain regional areas such as the Forth and Tay, it is not possible within the scope of this assessment to consider the extent of an effect on a vessel by vessel basis.

14.333. In certain instances, the wide operational range of vessels may result in their being affected by the development of offshore marine development around the UK, such as other offshore wind farms and/ or Marine Protected Areas. This is particularly the case with the nomadic scallop fishery, where there is the potential for temporary and/ or complete loss of access to fishing grounds as a result of multiple developments. The scale of these impacts will depend upon the importance of scallop grounds in the vicinity of the developments, as well as the nature of each development. Detailed information is not currently available for projects outwith of the Forth and Tay area, and it is not therefore possible to quantify the scale of effect upon the nomadic scallop fishery. Instead, a short commentary is provided on developments where there is insufficient information to permit an assessment of impacts. With regard to offshore wind farms, however, it is considered that in each instance the scale of effect will be largely defined by the engineering design and construction schedules of the individual developments, as well as the ability of vessels to regain access to fishing grounds once the sites are operational.

Impact Assessment for Developments in the Forth and Tay Area

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

- Neart na Gaoithe offshore wind farm and offshore transmission infrastructure
- Inch Cape offshore wind farm and offshore transmission infrastructure
- Phase 1 Seagreen Meteorological Mast (in addition to Seagreen Project infrastructure)

14.335. The Phase 1 Seagreen Meteorological Mast project is a single structure in addition to the infrastructure assessed for the Seagreen Project, previously. The location of the

meteorological mast is 1.2 km west of the Project Alpha site. Due to the very discrete location of the structure and the very short construction period, the resulting impacts upon all commercial fishing activities are considered to be negligible and it is not therefore further considered in this assessment.

14.336. A summary of the basic design specifications of the Neart na Gaoithe and Inch Cape offshore wind farms is provided in Table 14.32.

Table 14.32 Design Specifications of Neart na Gaoithe and Inch Cape Offshore Wind Farms

Worst Case Design Parameters	Neart na Gaoithe Design Specifications	Inch Cape Design Specifications
Wind farm site location	South west of Project Alpha	West of Project Alpha
Maximum number of turbines	128	213
Minimum spacing between turbines	450 m	820 m
Foundation type	Gravity base	Gravity base
Maximum footprint of individual turbine	1600 m² (45m diameter)	3,318 m²
Maximum number of OSPs	2 x 50 by 50 m	3 x 100 by 100 m
Maximum number of meteorological masts	-	3
Maximum length of array cables	220 km buried or protected	353 km
Maximum number of export cables	2 buried or protected	-
Maximum length of export cables	33 km	Approximately 80 km
Landfall of export cable	Thorntonloch	-

14.337. The main cumulative impacts considered for the construction and operational phases of the development include:

- adverse impacts upon commercial and recreational fish populations;
- 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 activities.

14.338. As has been previously stated, in the absence of detailed schedules and methodologies, decommissioning should be considered analogous with, but likely less than, those effects identified during construction.

Adverse Impacts upon Commercial and Recreational Fish and Shellfish Populations

14.339. There is the potential for the Seagreen Project in conjunction with the Neart na Gaoithe and Inch Cape 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 summarized below and fully assessed in Chapter 12: Natural Fish and Shellfish Resource.

14.340. The potential cumulative impacts arising from the Seagreen Project in conjunction with the Inch Cape and Neart na Gaoithe offshore wind farms have been assessed as being the same as for the potential cumulative impacts from the Seagreen Project alone.

Temporary or Complete Loss or Restricted Access to Fishing Grounds

Construction

14.341. There is the potential for fishing activity to be temporarily excluded from localised areas of the Seagreen Project, the Neart na Gaoithe and Inch Cape offshore wind farms during construction as a result of safety zones around construction activities. Cumulatively, the scale of impact will depend upon the construction schedules of each development and the total area of ground temporarily lost. These construction safety zones will apply to both the wind farm sites and their associated export cable corridors.

14.342. 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.

14.343. Taking account of the progressive loss of area during the construction phase, and the proportion of fishing grounds the developments encompass, but recognising the availability of fishing grounds in the RSA, and in the case of the scallop fishery the WSA, the sensitivity of the principal fisheries in the RSA (scallop, squid, nephrops and crab and lobster) is considered to be medium.

14.344. 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 works, and is therefore medium.

14.345. The cumulative impact arising from the Seagreen Project in conjunction with the Neart na Gaoithe and Inch Cape offshore wind farms during construction for all fisheries is therefore considered to the moderate. This is a **significant** impact in terms of EIA Regulations.

Operation

14.346. 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 during the operation of Project Alpha and Bravo in-combination with Neart na Gaoithe and Inch Cape are therefore the scallop and squid fisheries.

14.347. The sensitivity of the scallop and squid fisheries takes in to account the proportion of grounds the developments encompass for the lifetime of the projects, but recognises that some degree of access will be regained within the operational sites. The sensitivity is therefore medium.

14.348. The magnitude of effect reflects the permanent nature (25 years) and spatial extent of the developments, and is therefore medium.

14.349. The impact upon the scallop and squid fisheries during the operation of the Seagreen Project in-combination with the Neart na Gaoithe and Inch Cape sites is therefore expected to be moderate. This is a **significant** impact in terms of EIA Regulations.

Safety Issues for Fishing Vessels

Construction

14.350. During the construction phase of the developments, it is likely that there will be an overlap in the construction schedules of the developments, although it is not at this stage defined what these overlaps will be. However, it is likely that there will be a number of simultaneous construction events which will apply safety zones. Compliance with these safety zones would put the risks within acceptable limits in this instance.

14.351. 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, the safety risks would be outside of acceptable limits and therefore **significant**.

14.352. 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.

14.353. 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.

Operation

14.354. All infrastructure will be required to be appropriately marked, in line with standard industry practice.

14.355. It is considered that fishing vessels will be able to safely resume activities in operational sites, subsequent to the satisfactory completion of appropriate post construction measures. The safety risks would therefore fall within acceptable limits and be **not significant**.

Increased Steaming Times to Fishing Grounds

Construction

14.356. There is the potential for the safety zones applied during the construction phases of the developments to result in increases to steaming times for fishing vessels, particularly in the likely event that construction schedules overlap. In addition, it is likely that additional safety zones will be applied to partially installed or completed infrastructure within the site.

14.357. The sensitivity of commercial fisheries recognises that there a limited regular 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 zones relative to available fishing grounds is recognised. The sensitivity of all fisheries is therefore low.

14.358. The magnitude of effect takes into account the temporary nature of construction works but recognises the likely overlap in construction schedules. The limited spatial extent of the safety zones is however recognised, although these will be proportionally increased. The magnitude of effect is therefore medium.

14.359. The impact of the Seagreen Project in-combination with the Neart na Gaoithe and Inch Cape wind farms is considered to be minor and **not significant**.

Operation

14.360. Chapter 15: Shipping and Navigation concludes that there is good prospect for fishing vessels to navigate within the operational wind farm sites. 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 zones relative to available fishing grounds is recognised. The sensitivity of all fisheries is therefore low.

14.361. The magnitude of effect takes into account the 'good prospect' for navigating through the site, and is therefore low.

14.362. The impact of the Seagreen Project in-combination with the Neart na Gaoithe and Inch Cape wind farms is considered to be minor and **not significant**.

Displacement of Fishing Activity

Construction

14.363. 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 Seagreen Project in conjunction with the Neart na Gaoithe and Inch Cape offshore wind farms during construction for the scallop and squid fisheries is therefore considered to be moderate. This is a **significant** impact in terms of EIA Regulations.

Operation

14.364. 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 Seagreen Project in conjunction with the Neart na Gaoithe and Inch Cape offshore wind farms during operation for the scallop and squid fisheries is therefore considered to the moderate. This is a **significant** impact in terms of EIA Regulations.

Interference to Fishing Vessels (navigational conflict)

14.365. All of the cumulative impacts assessed above could cause interference to fishing activities. An additional effect to be considered 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 (medium) to interference than towed gear (low). 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.

Construction

14.366. The application of mitigation (establishing protocols to agree transit lanes) for the Seagreen Project resulted in a minor residual impact as a result of reducing the magnitude to low. However, until the same mitigation is agreed for the Neart na Gaoithe and Inch Cape sites, the in-combination magnitude of impact is increased to medium. The impact upon the crab and lobster fishery is therefore moderate, and **significant** in terms of EIA Regulations.

14.367. Due to the mobile nature of the towed gear fleet, the sensitivity of the fishery is low. The magnitude of effect, taking into account the increased number of vessels and transits is medium, and the significance of effect is therefore minor and **not significant**.

Operation

14.368. 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 and transiting to and from site. This will reduce the magnitude to low and ensure that the cumulative impact remains at minor and **not significant** for all fisheries.

14.369. It is however considered that the implementation of a construction management plan and the establishment of a regional working group will assist in defining protocols such as agreed transit routes, which will mitigate and manage the significance of the effect.

Mitigation in Respect of Cumulative Effects

14.370. It is proposed that a regional Working Group is established to facilitate future engagement of the fishing industry by the FTOWDG. This will likely include representatives of all the fishing activities identified in the Forth and Tay area, FTOWDG developers, Marine Scotland and The Crown Estates. The objectives of the Working Group 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. This includes addressing risks to safety where this has been assessed as outside of acceptable limits.

14.371. The Working Group will develop, where possible, a strategy to address the in-combination impacts which have been identified as significant in terms of EIA Regulations in the assessment above.

Commentary on other Developments

14.372. In certain instances, the wide operational range of certain fishing vessels (in some instances all around the UK) may result in their 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 planned developments in the WSA which could feasibly affect fishing activities in addition to the Seagreen Project and other planned developments in the Forth and Tay area. Due to insufficient detail on marine projects in the WSA, and recognising that there may be additional projects which have not been recognised, only a commentary on the potential for a cumulative impact is provided below, and an impact assessment has not been undertaken.

14.373. 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 WSA 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 12: Natural Fish and Shellfish Resource.

Other Offshore Wind Farms

14.374. Work undertaken during the EIA process has identified the potential for multiple offshore wind farm developments to cumulatively impact the nomadic scallop fishery. The principal developments located in the vicinity of scallop fishing grounds are:

- Seagreen Phases 2 and 3;
- Beatrice Offshore Wind Farm (STW site);
- Moray Offshore Renewables Round 3 Zone
- Argyll Array (STW site);
- Rampion Round 3 Zone; and
- Irish Sea Round 3 Zone.

14.375. 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 the projects listed above has not been provided and it is not therefore possible to quantify the scale of effect upon the nomadic scallop fishery. It is however 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.

Shipping and Navigation

14.376. 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 15: Shipping and Navigation.

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

14.377. 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 Special Area of Conservation (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.

14.378. 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 I1: Commercial Fisheries Technical Report).

ENVIRONMENTAL STATEMENT LINKAGES

14.379. An assessment of the impacts to commercial fisheries arising from construction (decommissioning) and operation of the Seagreen Project, as well as the detailed cumulative impact of the Seagreen Project in conjunction with developments in the Forth and Tay area and commentary on developments in the wider area, demonstrates that there are inter-relationships between multiple impacts upon individual receptors. Indeed, none of the impacts assessed should be considered in isolation because of the potential for fishing activities to be affected by all of the impacts. For example, it follows that safety risks identified as unacceptable to fishing vessels would result in the loss of fishing area.

14.380. In addition, the assessment has demonstrated the linkages between different chapters in the ES: for example, potential adverse impacts to fish and shellfish species of commercial importance are assessed in Chapter 12: Natural Fish and Shellfish Resource, although they are referenced in this chapter. Where linkages occur, they have been fully referenced. Table 14.33 provides details of where linkages occur in the assessment.

Table 14.33 Linkages

Inter-relationship	Relevant sections	Linked chapter
Adverse impacts upon commercial and recreational fish and shellfish populations	Impact assessment - Construction Phase Impact assessment - Operation Impact assessment - Decommissioning Impact assessment - Cumulative and In-Combination	Chapter 12: Natural Fish and Shellfish Resource
Safety issues for fishing vessels	Impact assessment - Construction Phase Impact assessment - Operation Impact assessment - Decommissioning Impact assessment - Cumulative and In-Combination	Chapter 15: Shipping and Navigation

OUTLINE MONITORING

Seagreen Project

14.381. No monitoring is foreseen for commercial fisheries. In the case of potential impacts upon commercial and recreational fish and shellfish populations and proposed outline monitoring, please see Chapter 12: Natural Fish and Shellfish Resource.

SUMMARY

14.382. A summary of the impacts, including mitigation and residual impacts, for the Project Alpha/ Bravo sites is given in Table 14.34.

14.383. A summary of the impacts, including mitigation and residual impacts, for the Transmission Asset is given in Table 14.35.

Table 14.34 Summary of Project Alpha/Bravo Impacts (single site)

Description of Impact	Impact	Potential Mitigation Measures	Residual Impact
Construction Phase			
Temporary Loss or Restricted Access to Fishing Grounds	Minor Adverse	Ongoing engagement through the forum of the Working Group to enable construction and installation procedures which allow normal fishing activities to safely resume	**Not significant**
Safety Issues for Fishing Vessels (all fishing vessels)	Within acceptable limits for aspects with applied safety zones Outside of acceptable limits for array cable installation	Protocol for the removal of seabed obstacles Completion of post installation survey of array cables to ensure fishing activities can be safely resumed Consultation with fishing interests to ensure that all safety risks are brought within acceptable limits	Residual impacts will be reduced to within acceptable limits and therefore **not significant**
Increased Steaming Times for Fishing Vessels	Minor Adverse		**Not significant**
Displacement of Fishing Vessels into other Areas	Minor Adverse	Ongoing engagement through the forum of the Working Group to enable construction and installation procedures which allow normal fishing activities to safely resume	**Not significant**
Interference to Fishing Activities (navigational conflict)	Minor Adverse – all fisheries exception crab and lobster Moderate Adverse – crab and lobster fishery	Development of protocols, including vessel transit lanes, in consultation with fishing interests to ensure that possible reductions in interference are achieved	**Not significant**
Operation Phase			
Loss or Restricted Access to Fishing Grounds	Minor Adverse	Ongoing engagement through the forum of the Working Group to enable operational procedures which allow normal fishing activities to safely be undertaken Investigations are ongoing within the offshore renewables industry to explore potential modifications to bottom towed gear which may better enable fishing activities within and around operational wind farms. These investigations may result in mitigating the impact identified.	**Not significant**
Safety Issues for Fishing Vessels (all fishing vessels)	Within acceptable limits for infrastructure and array cables	All infrastructures will be marked and lit Application of 50m safety zones around infrastructure	N/ A
Increased Steaming Times for Fishing Vessels	Minor Adverse	N/ A	**Not significant**
Displacement of Fishing Vessels into other Areas	Minor Adverse	N/ A	**Not significant**
Interference to Fishing Activities (navigational conflict)	Minor Adverse	N/ A	**Not significant**

Table 14.35 Summary of Transmission Asset Project Impacts

Description of Effect	Effect	Potential Mitigation Measures	Residual Impact
Construction Phase			
Temporary Loss or Restricted Access to Fishing Grounds	Minor Adverse for all fisheries except crab and lobster Moderate Adverse for crab and lobster fishery	Ongoing engagement through the forum of the Working Group to enable construction and installation procedures which allow normal fishing activities to safely resume	**Not significant** except crab and lobster **Significant** for crab and lobster fishery
Safety Issues for Fishing Vessels (all fishing vessels)	Within acceptable limits for aspects with applied safety zones Outside of acceptable limits for export cable installation	Completion of post installation array cable surveys Protocol for the removal of seabed obstacles Consultation with fishing interests to ensure that all safety risks are brought within acceptable limits All infrastructures will be marked and lit.	Residual impacts will be reduced to within acceptable limits and therefore **not significant**
Increased Steaming Times for Fishing Vessels	Minor adverse	N/ A	**Not significant**
Displacement of Fishing Vessels into other Areas	Minor Adverse for all fisheries except crab and lobster Moderate Adverse for crab and lobster fishery	Ongoing engagement through the forum of the Working Group to enable construction and installation procedures which allow normal fishing activities to safely resume	**Not significant** for all fisheries except crab and lobster **Significant** for crab and lobster fishery
Interference to Fishing Activities (navigational conflict)	Minor Adverse	Development of protocols, including vessel transit lanes, in consultation with fishing interests to ensure that possible reductions in interference are achieved.	**Not significant**
Operation Phase			
Loss or Restricted Access to Fishing Grounds	Negligible	N/ A	**Not significant**
Safety Issues for Fishing Vessels (all fishing vessels)	Within Acceptable limits	N/ A	**Not significant**
Increased Steaming Times for Fishing Vessels	Negligible	N/ A	**Not significant**
Displacement of Fishing Vessels into other Areas	Negligible	N/ A	**Not significant**
Interference to Fishing Activities (navigational conflict)	Negligible	N/ A	**Not significant**

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