

16 WIND FARM COMMERCIAL FISHERIES

16.1 INTRODUCTION

1. This Section of the ES evaluates the likely significant effects of the Wind Farm on commercial fishing activities. Commercial fishing is defined as any legal fishing activity undertaken for declared taxable profit. The assessment has been undertaken by Brown and May Marine Ltd and includes an assessment of cumulative effects.
2. For the purpose of this assessment, commercial fisheries/fishing describes all commercial fishing activities with the exception of salmon and sea trout fisheries. Due to the distinct nature of salmon and sea trout fisheries from other commercial fisheries, they are assessed independently in this Section.
3. The following technical reports support this Section:
 - Annex 16A: Commercial Fisheries Baseline; and
 - Annex 16B: Salmon and Sea Trout Ecology and Fisheries Technical Report.
4. This Section includes the following elements:
 - Assessment Methodology and Significance Criteria;
 - Baseline Conditions;
 - Assessment of Potential Effects;
 - Mitigation Measures and Residual Effects;
 - Summary of Effects;
 - Assessment of Cumulative Effects;
 - Statement of Significance; and
 - References.

16.1.1 POLICY AND PLANS

16.1.1.1 Commercial Fisheries

5. The commercial fishing baseline and assessment for the Wind Farm has taken account of the following legislation and guidance:
 - Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009;
 - British Wind Energy Association 2004 Recommendations;
 - Offshore Wind Farms, Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements – Version 2; CEFAS, MCUE, Defra, DTI, June 2004;
 - SEA of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Volume 1: Environmental Report; Marine Scotland 2010;
 - UK Offshore Energy – Strategic Environmental Assessment; DECC, January 2009;
 - Recommendations for Fisheries Liaison: FLOW, May 2008;
 - Fisheries Liaison Guidelines – Issue 5: UK Oil and Gas, 2008;
 - Guidelines to Improve Relations between Oil and Gas Industries and Near-shore Fishermen, UKOOA (renamed UK Oil and Gas), August 2006;

- Fishing and Submarine Cables – Working Together, International Cable Protection Committee (CPC), February 2009;
- Options and Opportunities for Marine Fisheries Mitigation Associated with Wind Farms, COWRIE 2010; and
- EIA scoping responses.

16.1.1.2 *Salmon and Sea Trout Fisheries*

6. The salmon and sea trout fisheries baseline and assessment for the Wind Farm takes account of the following guidance documents.

- Offshore Wind Farms, Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements – Version 2; CEFAS, MCUE, Defra, DTI, June 2004;
- Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Volume 1: Environmental Report; Marine Scotland 2010;
- UK Offshore Energy – Strategic Environmental Assessment: DECC, January 2009;
- Recommendations for Fisheries Liaison: FLOW, May 2008; and
- EIA scoping responses.

16.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7. This Section sets out the methodology used establishing the baseline conditions, determining the scope of the assessment and the methodology used in the assessment of significant effects.

16.2.1 CONSULTATION

16.2.1.1 *Commercial Fisheries*

8. Consultation was undertaken with the organisations and individuals listed below:

- Marine Scotland (MS);
- Marine Scotland Science (MSS);
- Scottish Fishermen’s Federation (SFF);
- Scallop Association (SA);
- Moray Firth Inshore Fisheries Group (MF IFG);
- Fishermen’s Association Limited (FAL);
- Caithness Static Gear Fishermen’s Association;
- Scrabster Fishery Office;
- Buckie Fishery Office;
- Aberdeen Fishery Office; and
- A representative sample of regional fishermen.

16.2.1.2 *Salmon and Sea Trout Fisheries*

9. Consultation was undertaken with the organisations and individuals listed below:

- MS and MSS;
- ASFB;

- Salmon Net Fishing Association of Scotland (SNFAS);
- DSFBs;
- Salmon Fishery Trusts and netsmen;
- Moray and Pentland Firths Salmon Protection Group (MPFSPG); and
- The Moray Firth Sea Trout Project (MFSTP).

10. Table 16.1 below provides a summary of written consultation responses received during the scoping phase of the development. Responses relating to fish or shellfish ecology are separately discussed in Section 11: Wind Farm Fish and Shellfish Ecology.

Table 16.1 Summary of Scoping Responses

Consultee	Summary of Scoping Responses	Addressed in the EIA
MS	<p>Consideration of the impact by the displacement of fishing effort, and a consideration of the smaller fleets operating in the inshore area of the Moray Firth.</p> <p>Additional sources of information highlighted.</p> <p>Contact should be made with the Inshore Fisheries Group to discuss any concerns of fishermen.</p> <p>Consideration of the cumulative and in-combinations effects, particularly on the scallop fleet.</p>	<p>Effects of displacement are considered in the predicted effects (Section 16.4).</p> <p>Information considered.</p> <p>Contact established with MF IFG.</p> <p>Cumulative effects are considered in the assessment (Section 16.7).</p>
MF IFG	<p>Wind Farm EIA should recognise that the offshore transmission cables are one of the main potential cumulative effects.</p> <p>Fishing vessel passage through the Wind Farm Site during construction appears extremely limited.</p> <p>Where is consideration given to installation of met mast.</p> <p>Consider exclusion zones during the construction and operational phases.</p> <p>Consider impacts arising from installation of subsea cables.</p> <p>Limitations of datasets should be recognised.</p>	<p>OfTW fully assessed in the cumulative assessment.</p> <p>Considered in assessment.</p> <p>Met mast is subject to a separate application and assessment but is recognised as part of the infrastructure in this assessment.</p> <p>Safety exclusion zones during the construction and operational phases considered in the assessment.</p> <p>Considered in the assessment phase.</p> <p>Limitations of information and data sources are fully discussed in Annex 16A: Commercial Fisheries Baseline.</p>

16.2.2 SCOPE OF ASSESSMENT

16.2.2.1 *Commercial Fisheries*

11. Establishing a commercial fisheries baseline upon which a robust assessment of effects can be made requires utilising a number of different data and information sources. It should be noted that the various data and information sources are subject to varying sensitivities and limitations which have been taken into account in the following assessment. The aim has been to provide a detailed account of commercial fishing activities using all sources currently available.
12. Responses relating to commercial fisheries arising from the scoping exercise, as well as any subsequent issues and concerns raised during the course of consultation have informed the following assessments.
13. Consultation with fisheries interests has been ongoing throughout the EIA and includes all known relevant bodies, associations and individuals. The appointment of Fishing Industry Representatives (FIRs) at an early stage of the project has assisted with the assessment.

16.2.2.2 *Salmon and Sea Trout*

14. For the purposes of the baseline assessment, due to the migratory behaviour of salmon and sea trout, fisheries have been assessed for all rivers flowing into the Moray Firth. It is recognised that salmon is a qualifying feature or primary reason for SAC site selection for the following rivers in the Moray Firth:
 - Berriedale and Langwell Waters SAC (primary reason);
 - River Moriston SAC (qualifying feature);
 - River Oykel SAC (qualifying feature); and
 - River Spey SAC (primary reason).

16.2.3 GEOGRAPHICAL SCOPE

16.2.3.1 *Commercial Fisheries*

15. The study area for the assessment of commercial fishing intensity is shown in Figure 16.1. The approach has been to provide a brief national overview (national study area), to provide context for the fishing grounds identified within the general area of the Wind Farm. The regional study area has subsequently been defined to ensure sufficient coverage of the areas surrounding the Wind Farm, and the local study area is the smallest available spatial unit used for the collation of fisheries statistics. When possible, fishing activities within the Wind Farm Site have been further described.

16.2.3.2 *Salmon and Sea Trout Fisheries*

16. The study area for assessment of salmon and sea trout fisheries was defined at the national, regional and local level (Figure 16.2). The local study area focuses on the salmon fishery districts in closest proximity to the Wind Farm; the Wick, Dunbeath and Berriedale Districts, whilst the regional study area includes all salmon fishery districts with rivers flowing into the Moray Firth. Given the migratory behaviour of salmon and sea trout and the importance of their fisheries across the country, a

national scale has also been briefly described. The study areas defined for the salmon and sea trout fisheries assessment are given in Figure 16.2.

16.2.4 BASELINE METHODOLOGY

16.2.4.1 Commercial Fisheries

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

- District Fishery Offices;
- Fishermen and their representatives;
- International Council for the Exploration of the Seas (ICES);
- Marine Management Organisation;
- MS;
- North East Inshore Fisheries Group;
- SA; and
- SFF.

18. The sensitivities and limitations of these data sources are described in Annex 16A: Commercial Fisheries Baseline.

Literature Review

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

- ICES Stock Assessment Reports and other ICES publications of relevance;
- EC/National and Local Fisheries Legislation;
- Marine Scotland and Marine Scotland Science publications;
- Oil and Gas UK publications;
- CEFAS publications; and
- Other relevant publications.

Statistical Datasets

20. The following statistical datasets were utilised in the baseline:

- Marine Management Organisation fisheries statistics;
- Marine Management Organisation surveillance sightings;
- Marine Management Organisation UK satellite tracking (VMS - Vessel Monitoring System) data;
- Marine Scotland satellite tracking (VMS) data;
- Marine Scotland data analysis (VMS and landings); and
- Fishery specific information (information provided by fishermen and their representatives).

21. The data analysis methodology for commercial (offshore) fisheries is described in Annex 16A: Commercial Fisheries Baseline.

16.2.4.2 Salmon and Sea Trout Fisheries

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

- MSS; and
 - Consultation with DSFBs, netsmen and other fisheries stakeholders.
23. The principal datasets used to inform the salmon and sea trout fisheries baseline were:
- MSS salmon and sea trout catch data by Fishery Region (1952 to 2009);
 - MSS salmon and sea trout catch data by salmon Fishery District (2000 to 2009);
and
 - MSS salmon and sea trout netting effort data (2001 to 2010).
24. 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).
25. 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, errors may exist within the catch dataset due to misclassification of fish between the grilse and salmon categories. The catch data used are as provided by MSS in October 2010. The effort data used are as provided by MSS in September 2011.
26. 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 which is known as 'catch and release'. As a result, MSS catch data for the rod-and-line fishery is broken down into two categories, 'rod-and-line' and 'catch and release'. Note that the total catch by the rod-and-line fishery is in effect the sum of the catches recorded in both categories. Where appropriate, data from both categories have been combined to give an indication of the total rod-and-line catch. Similarly, the catch by net-and-coble and fixed engines (bag and stake nets) has been combined in some instances to provide an indication of the total catch by the net fishery.
27. The catch data used in this report are Crown copyright, used with the permission of MSS. MSS is not responsible for interpretation of these data by third parties.

16.2.5 ASSESSMENT METHODOLOGY

28. The following section describes the assessment methodology, which has been applied to the baseline situation. In the absence of specific published guidelines by Marine Scotland regarding the assessment of effects of wind farm development upon commercial fishing activities, the aspects requiring assessment for the Wind Farm have been taken from the CEFAS/MCEU (2004) Guidelines:
- Implications for fisheries during the construction phase;
 - Implications for fisheries when the development is completed;
 - Implications for fisheries during the decommissioning phase;
 - Adverse effect on commercially exploited fish and shellfish populations;
 - Adverse effect on recreational fish populations;

- Complete loss or restricted access to traditional fishing grounds;
 - Safety issues for fishing vessels;
 - Interference with fisheries activities;
 - Increased steaming times to fishing grounds;
 - Obstacles on the sea bed post-construction; and
 - Any other concerns raised by local fishermen and fishing organisations.
29. In addition to the above, the following potential effect has been included subsequent to consultation with fishing interests:
- Displacement of fishing activity into other fishing areas.
30. In addition to an assessment of the direct effects to commercial fishing activities arising from the Wind Farm, indirect effects, such as changes to the behaviour of target species, are also assessed and where possible the significance of the effect is identified.
31. An assessment of the above effects will be separately applied to the construction/decommissioning phases and the operational phase in terms of site specific effects. For the purposes of the assessment, and in the absence of detailed information on the decommissioning schedules and methodologies, it is considered that the potential effects associated with the decommissioning phase will be of no greater significance than those of the construction phase. Cumulative effects arising from other marine developments are discussed in Section 16.7.

16.2.6 WORST CASE SCENARIO

32. A worst case scenario for the effects of the Wind Farm upon commercial fishing activities has identified the Wind Farm design parameters which will realistically have the greatest potential effects upon the fishing activities described in the baseline (see Section 7: Project Description).
33. The principal factor in determining the design parameters that will constitute a worst case scenario 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 the Wind Farm to cause adverse effects to fish and shellfish populations of commercial or recreational importance, and hence result in changes to behaviour or a decline in abundance, which may affect the productivity of the fishery. This is an indirect effect and whilst this potential effect is briefly discussed within this Section, it is more fully assessed in Section 11: Wind Farm Fish and Shellfish Ecology. Second, there is the potential for the Wind Farm to constitute a physical obstacle to the continuation of normal fishing activities as described in the baseline. This would result in a direct effect upon commercial fishing activities. Accepting that the Fish and Shellfish Ecology assessment will identify worst case parameters for the first issue, it is the second which determines the parameters of a worst case for commercial fishing activities, and which may result in the identification of design parameters different to those identified as the worst case for incurring effects to species.

34. 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 turbines with the smallest spacing, and the maximum number of metrological masts and OSPs.
35. During the construction phase, safety zones of 500 m may be imposed around construction works, from which all vessels are excluded. The area of the Wind Farm Site considered to be a construction zone may vary throughout the project if a phased construction approach is adopted, which is the most likely situation. However in the worst case there is the potential for an exclusion zone to be established that will temporarily exclude all traffic from the entire site during construction. It is also likely that 500 m safety zones will also be required during major maintenance and repair operations.
36. It should be noted that existing legislation does not currently prohibit fishing from within operational wind farm sites. It is likely that 50 m exclusion zones, around individual turbines, will be applied to the Wind Farm during its operational phase but given the minimum distance between turbines (642m), it is considered that normal fishing operations will be able to resume post-construction. The feasibility of undertaking normal fishing practices, as identified in the baseline, should however be considered with regard to inter-array cables: inter-array cables will be buried or protected where feasible, however due to the uncertainty regarding seabed and underlying geological conditions it is not possible to specify what proportion of inter-array cables will be buried or protected. There may be areas where it is necessary to surface lay inter-array cables but this will be minimised. In the event that there are surface laid, unprotected inter-array cables, as a result of the high potential risk of interaction, it is considered that bottom towed gear fishing activities will not be able to safely operate in the immediate vicinity of these areas.
37. The parameters of the Wind Farm design considered to provide the worst case for commercial fishing activities are summarised in Table 16.2.
38. 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 that this assumes fishing activities could be resumed to some degree within the operational Wind Farm. Furthermore, it is considered that the risks of potential negative interactions between fishing vessels and construction activities are increased over a longer construction period. A maximum construction period of up to five years is therefore taken as the worst case.

Table 16.2 Summary of Worst Case Parameters for Commercial Fishing

Realistic Worst Case Parameters	Specifications
Wind Farm Site area	131.5 km ²
WTG output	3.6 MW
WTGs and indicative layout	
Total no of WTGs for site layout	277
Minimum downwind spacing	642 m

Minimum crosswind spacing	642 m
Foundations and Substructure	
Foundation Type	Tubular jacket and gravity base
Footprint of individual turbine	1,963 m ²
Combined footprint of all WTGs	543,751 m ² (0.54 km ²)
Permanent zone of influence of each turbine	11,690 m ²
Combined zone of influence of all turbines	3.238 km ²
Meteorological Masts	
Maximum number of meteorological masts	3x5 m diameter monopoles
Inter-array Cables	
Estimated total length	350 km
Cable post installation status	Buried and protected where feasible
Additional Offshore Infrastructure	
Maximum number of OSPs	3 OSPs: 2x AC OSPs (24,230 m ²) 1x DC Converter Station (45,100 m ²)
Combined loss of area from OSPs	69,330 m ²

16.2.7 ASSESSMENT LIMITATIONS

39. The principal limitation of an assessment of effects upon commercial fishing activities is the potential of the established baseline to change over time. This may be for a number of reasons, such as fluctuations in landings, changes in legislation and management policies, economic constraints such as fuel costs and crew availability, environmental restrictions such as weather, etc. As a result, the scope of the assessment undertaken is limited by the baseline identified.
40. Although it is noted that individual vessels may spend more time in certain regional areas such as the Moray Firth, it is not possible within the scope of this assessment to consider the extent of an effect on a vessel by vessel basis. This is particularly the case with the king scallop fishery, with the exception of several smaller and predominantly inshore vessels, which is largely nomadic, and vessels may variously targeting grounds around the UK. Instead, scallop grounds affected by the Wind Farm have been considered within the context of their relative importance to the Moray Firth, as well as to available scallop grounds around the UK.
41. There is currently no established model for assessing the economic value of commercial fisheries in discrete sites such as offshore wind farms. National commercial fisheries datasets provide statistics of landings, values and effort for UK licensed fishing vessels of all lengths (and non-UK vessels landing into UK ports), however these are recorded by ICES rectangle, which are large relative to the

Wind Farm. Whilst additional data and information sources further contribute to describing fishing activities, it is not possible to ascribe a specific economic value to fisheries. Instead, activity is described as low, medium or high density, with a corresponding low, medium or high value.

42. As stated above, an assessment of salmon and sea trout fisheries describes the nature of the fisheries by Salmon Fishery District, principally using MSS catch data. Values are not ascribed within the dataset as the 'catch' for the most part (the rod-and-line fishery) has no direct saleable value (with the exception of net-caught fish). It is recognised, however, that rod-and-line fisheries on the east coast of Scotland generate significant economic value on both on a regional and local scale.

16.2.8 SIGNIFICANCE CRITERIA

43. The significance criteria as defined in Section 4: EIA Process and Methodology of this ES have been used for this assessment. It should however be noted that the effects of offshore wind farm developments upon commercial fishing activities cannot be easily categorised and the application of the significance criteria to an assessment of effects is, as a result, subjective. Effects which are moderate or major are considered to be significant in relation to the EIA Regulations.
44. In the instances whereby the potential effect of the Wind Farm poses a risk to the health and safety of a fishing vessel and crew, the significance criteria used for the assessment cannot be applied. Instead, the risk is assessed to be within or outside acceptable limits. The parameter used to define acceptable limits follow the risk matrix provided in Section 18: Wind Farm Shipping and Navigation and given in Table 16.3 below. It is considered that Intermediate Risk criteria falls within acceptable limits.

Table 16.3 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.

45. It should however be noted that the assessment of risks provided below are evaluative and for the purposes of the EIA only. For further details see Section 18: Wind Farm Shipping and Navigation.
46. As previously stated, an assessment of the potential effects of the Wind Farm has been undertaken on a fishery by fishery basis. The sensitivity of the fishery (receptor) relative to the location of the Wind Farm is described in the baseline

summary. The assessment subsequently considers the predicted effects on each fishery. Ascribing sensitivity to a receptor takes into account the following characteristics (effects upon the ecology of commercial species are described in Section 11: Wind Farm Fish and Shellfish Ecology):

- Adaptability: the ability of the fishing vessels (by fishery) to avoid or adapt to the effect;
- Tolerance: the ability of fishing vessels to be temporarily and/or permanently affected;
- Recoverability: how well fisheries recover following exposure to an effect; and
- Value: the scale of importance, rarity and relative worth of the fisheries affected.

47. The magnitude of an effect is considered for each predicted effect on a fishery by fishery basis. In each instance, the following characteristics are taken into account (effects upon the ecology of commercial species are described in Section 11: Wind Farm Fish and Shellfish Ecology):

- Spatial extent: the area that fishing vessels (by fishery) are unable to undertake normal fishing activities within as a result of the construction/decommissioning and operation of the Wind Farm and OfTW, relative to available fishing grounds;
- Duration: the temporal extent that fishing vessels (by fishery) are unable to resume normal fishing activities as a result of the construction/decommissioning and operation of the Wind Farm and OfTW; and
- Severity: the degree of change.

16.3 BASELINE CONDITIONS

48. ICES rectangle¹ 45E7, within which the Wind Farm is located, records landings values (all species) that are of moderate importance on a national and regional scale (Figure 16.3, £1,681,287). Landings values for all species from rectangle 45E7 are generally at their highest between May and September, although moderate catches have also been recorded in April and October.

49. The majority of landings in 45E7 are into ports in the regional study area. Fraserburgh is the principal landing port in the area, with the highest proportion of landings (values) from 45E7 being landed at this port (43.0%). Landings from 45E7, however, only contribute 1.8% of the Fraserburgh's total annual landings values. Buckie port records 24.0% of the total landings values, Wick, 12.7%, and Whitehills, 0.6%, although rectangle 45E7 represents a relatively larger proportion of these ports' total annual landings values (12.6%, 16.0% and 14.7%, respectively).

50. The majority of vessels operating in rectangle 45E7 are over 15 m in length (92.3%, see Figure 16.4) and therefore the activity of these vessels will be included within

¹ ICES rectangles are the smallest spatial unit used for the collation of fisheries statistics. They boundaries align to 1° of longitude and 30' of latitude. ICES rectangle 45E7 covers an area of approximately 948.4km².

the VMS datasets. Vessels between 10 and 15 m in length account for a lower proportion of the vessels operating in 45E7 (6.5%), with under 10 m and non-UK vessels recording low values (0.9% and 0.3%, respectively).

16.3.1 SCALLOP FISHERY

51. The principal species targeted in the immediate area of the Wind Farm is king scallop. Rectangle 45E7 records the highest scallop landings in the regional study area, with a total value of medium importance on a national scale, (Figure 16.5), at £957,355 per annum (averaged 2000 to 2009), representing 57% of the total value of landings of that rectangle.
52. King scallops are mainly targeted by boat dredges. Scallop vessels generally tow one or more commonly two beams onto which dredges are attached, the number of dredges being dependent upon vessel size, engine power and winch capacity. Scallop vessels are restricted by the number of dredges that can be operated: within the 6 NM limit no more than eight dredges per side are permitted and between the 6 and 12 NM limits this increases to up to ten dredges a side being permitted. Outside 12 NM vessels are allowed to operate up to 14 dredges per side (maximum limit in Scottish waters).
53. The main 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 penetrate the seabed to a depth of approximately 20 cm. 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 Wind Farm at the present time.
54. The majority of vessels targeting scallops in the Moray Firth are over 15 m in length and as a result, analysis of VMS data is considered appropriate for the assessment of their activities. Figure 16.6, Figure 16.7 and Figure 16.8 indicate that scallop dredging activity occurs in areas throughout the Moray Firth: on the Smith Bank and in inshore areas along the Caithness and Moray coasts. There is limited activity recorded in the within the development. Annual fluctuations in activity should be noted.
55. Larger category scallop vessels are capable of fishing in difficult weather conditions and continuously for several days at a time. These vessels are often described as nomadic due to their wide geographical range. Scallop fishing for the nomadic fleet is often cyclical, and grounds are intensively targeted for a period and then left to recover. Scallop fishing grounds around the UK are located on the Scottish east and west coasts, in the Irish Sea and the English Channel. Vessels may variously target grounds with these areas depending upon their productivity. The number of vessels scallop dredging within the Moray Firth will therefore vary between years.
56. In addition to the over 15 m fleet, several of the smaller category of vessel with home ports in the Moray Firth operate full time in the area. Due to the limited operational range of these vessels, it is considered that their activity is restricted to grounds within the Moray Firth.

57. Scallop stock levels in the Moray Firth are considered to be stable, however other grounds around the UK, such as those located in Cardigan Bay and waters of the Isle of Man, have been subject to restrictions and closures as a result of concerns over stock levels. Whilst this is currently not the case in the Moray Firth, it is nevertheless a possibility that future restrictions may be applied.
58. As a result of the limited level of scallop dredging activity recorded within the Wind Farm relative to available grounds in the Moray Firth and grounds elsewhere in the UK, the sensitivity of the scallop fishery is considered to be low.

16.3.2 NEPHROPS FISHERY

59. Nephrops (Norway lobster) are the highest value shellfish species in the Moray Firth, with the highest recorded landings in rectangles in the south and north east. They constitute 14% (£236,890) of the total value in 45E7 (averaged 2000 to 2009), which is of relatively low importance on a regional scale.
60. Nephrops inhabit muddy substrates and are principally targeted by demersal otter trawlers. Vessels can employ either single or twin rig demersal gears with 70 mm mesh cod ends. Vessels target nephrops all year round although there are seasonal fluctuations in landings values, with a marked peak recorded during the summer months (June to August). Weather conditions are a significant factor in determining levels of activity in the winter months, particularly in the case of smaller, local vessels.
61. The majority of vessels targeting nephrops in 45E7 are over 15 m in length (82.0%, see Figure 16.4) and, as a result, the activities of these vessels can be identified using VMS data (see Figure 16.9). The data indicate that activity carried out by the over 15 m nephrops fleet in 2009 occurred in areas outwith of the Wind Farm, to the north east and south of the regional study area. Consultation with nephrops fishermen, the majority of which operate vessels under 15 m, confirmed this (see Figure 16.10).
62. The Moray Firth nephrops fishery is currently considered to be exploited sustainably. It is however possible, in line with commitments to reduce overall fishing pressure, that further restrictions may affect the current baseline in the future.
63. As a result of nephrops activity being located outwith of the Wind Farm boundary, the sensitivity of the fishery is considered to be very low.

16.3.3 WHITEFISH FISHERY

64. The principal commercial whitefish species targeted in the Moray Firth is haddock. They constitute 12% of the landings in 45E7 (£204,154). There are relatively low recorded levels of landings of other commercial whitefish species such as cod (1.2%, £19,848) and monkfish (7%, £112,427).
65. Haddock is targeted throughout the year by Scottish seine nets (on clean ground to the immediate north west of the proposed development) and demersal trawlers (offshore of Fraserburgh in the south east) (see Figure 16.11). There is a decline in landings during the summer months. Marine Scotland data (see Figure 16.12)

- shows relatively low landings of cod in the same area, likely as a result of the mixed fishery.
66. Whitefish are principally targeted by the over 15 m fleet and VMS data indicates that landings are relatively low in the Moray Firth, with a slight increase to the north of the proposed development (Figure 16.13).
67. UK whitefish landings have declined significantly in recent years, as a result of concerns about sustainability and subsequent reductions in fishing capacity. Fisheries management policies have had the effect of reducing both fleet numbers and time spent at sea by those remaining vessels. A number of whitefish vessels have since diversified into targeting nephrops and scallops. The majority of vessels that currently target whitefish will spend most of the year fishing in productive grounds outwith of the Moray Firth.
68. It is possible that stocks may recover to a sufficient extent to see increased effort in the fishery, and restrictions may be reduced to reflect this. In light of the current trend in fisheries management policies, however, this is currently not considered likely.
69. As a result of the majority of whitefish activity in the northern area of the Wind Farm occurring outwith of the Wind Farm Site, and given the availability of productive whitefish grounds elsewhere, the sensitivity of the fishery is considered to be low.

16.3.4 SQUID FISHERY

70. Squid has become an increasingly important fishery in the Moray Firth. It is currently unregulated and vessels which are constrained by restrictions on other pressure stocks target the species. Annual landings values vary significantly as the fishery is dependent upon the arrival of the species in the area to spawn. Peak landings for squid occur in August and September, although fishermen have reported the fishery to be lengthening, with vessels beginning to target the species in June and continuing into February.
71. Bottom otter trawlers targeting nephrops or whitefish reconfigure gear to target squid, operating nets with a smaller mesh size and higher headline heights. The species is often targeted on rough ground and vessels may employ protective gear, such as rockhoppers. As mentioned previously, the majority of nephrops and whitefish vessels are in 45E7 over 15 m and are therefore satellite tracked. The VMS data indicates that activity is predominantly recorded in inshore areas parallel to the Moray coast and in an offshore area including the southern section of the Wind Farm Site (see Figure 16.14). Further analysis identified that for the same period (2009) squid fishing recorded in the vicinity of the southern boundary of the Wind Farm was outwith of the site (Figure 16.15). Consultation with squid fishermen identified grounds throughout the Moray Firth, and highlighted that the fishery is also important for the under 15 m fleet (see Figure 16.16).
72. Squid have a short lifespan and stock levels depend on the survival success rates from individual breeding seasons. Although squid grounds are often located in

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

73. In addition to local vessels, there are a number of vessels from the east and west coasts of Scotland and the Shetland Islands who will seasonally target squid in the Moray Firth.
74. At present, squid is considered to be resistant to fishing pressure (Caddy 1983). It is however considered (Young et al 2006) 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.
75. In light of the limited squid fishing activity recorded in the vicinity of the southern section of the site, the short seasonality and annual variability of the fishery, and the availability of productive squid fishing grounds in the Moray Firth, the sensitivity of the fishery is considered to be low.

16.3.5 CRAB AND LOBSTER FISHERY

76. The crab and lobster fishery in the Moray Firth is principally located in inshore waters inside of 6 NM. Crustaceans such as crab and lobster are the main species targeted. Crab and lobster are mainly targeted by full time static gear vessels setting pots/creels. Crabs are targeted on a variety of substrates, lobsters are generally found on rocky, uneven ground and around wreck sites. Fishing for crab and lobster is year around, although peak activity occurs between June and September. As a result of the limited size of vessels in the area, weather conditions are a significant factor in determining levels of activity in the winter months. In addition to full time vessels, there are also a number of part time vessels that will set a small number of creels in inshore areas during the summer months.
77. Whelk landings are recorded inshore along the Caithness coast, by the under 15 m fleet, in areas outwith of the development.
78. Fishing grounds are located along the Caithness coast and to a lesser extent in areas along the Moray coast. There are no identified static gear grounds within the Wind Farm Site (Figure 16.17).
79. Due to static gear fishing for crab, lobster and whelk not occurring within the Wind Farm, the sensitivity of the fishery is considered to be very low.

16.3.6 ARTISINAL FISHERIES

80. There are currently small scale, artisanal fisheries in the inner Moray Firth for bivalves (razor clams, mussels and cockles) and mackerel. These fisheries are targeted by small vessels in inshore areas, such as the Cromarty and the Dornoch Firths, and not within the boundary of the proposed development.
81. Sandeels were historically targeted by the Danish fleet on the Smith Bank in the Moray Firth. Sandeel fishing grounds in the North Sea were closed in 2000 as a result of concerns over stocks and the effects on predator species. Although parts of the North Sea fishery were reopened in 2009, there is still a moratorium on sandeel

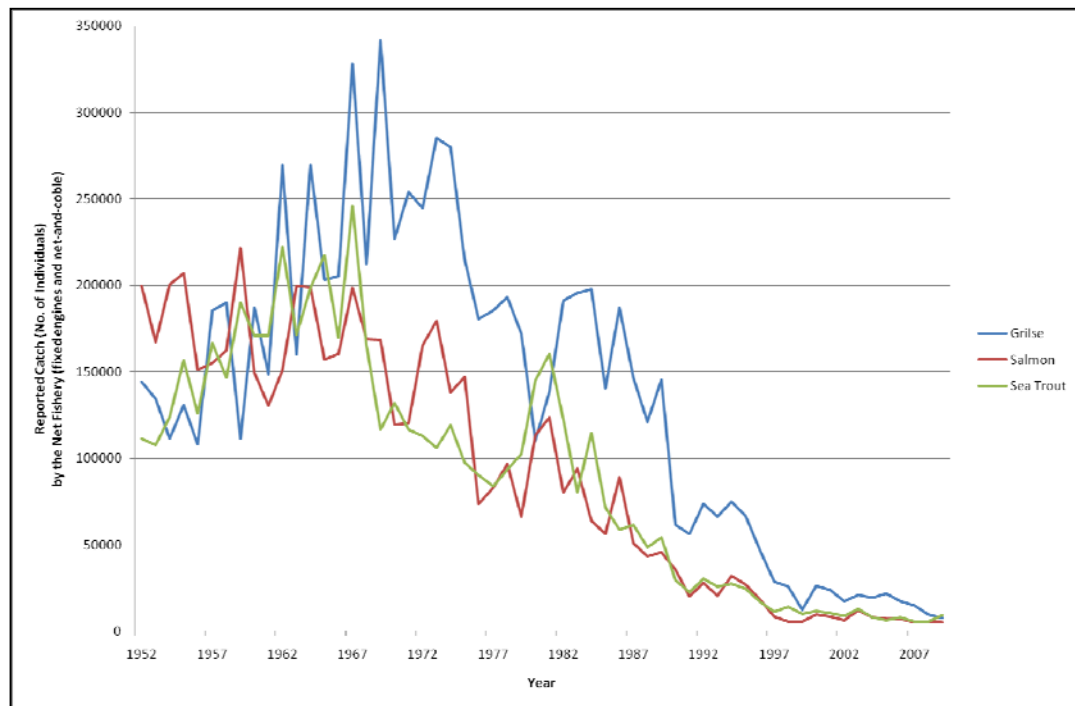
trawling along the east coast of Scotland. It is possible however that the species may recover to sufficient levels for the fishery on the Smith Bank to open again in the future. It should however be noted that there is no historic access for the Danish fleet to waters between 6 NM and 12 NM and therefore no Danish sandeel trawling will occur within the proposed Wind Farm Site.

16.3.7 SALMON AND SEA TROUT FISHERIES BASELINE DESCRIPTION

16.3.7.1 *Overview*

82. The right to fish for salmon in Scotland, whether inland or at sea, is a heritable right. The taking of salmon without the right or written permission to do so is prohibited under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act, 2003.
83. 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.
84. 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.
85. Salmon fisheries are saleable and netsmen or companies may acquire fishing rights over relatively large areas. Coastal heritable rights extend out to 12 NM 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 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.
86. An indication of the contribution of each fishing method to the total reported catch by salmon fishery region in Scotland is given in Figure 16.18, expressed as annual (average 2000 to 2009) fish caught by method.
87. 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 proportion of the total catch.
88. It should be noted that the national trend is a decrease in netting effort and therefore the contribution of netting to the annual catch shown in Figure 16.18 may, depending on the fishery region and district under consideration, overestimate the current levels of exploitation.
89. The decrease in catches by the net fishery from historic levels is illustrated in Plate 16.1. This shows the number of fish caught by net-and-coble and fixed engines from 1952 to 2009 in Scotland.

Plate 16.1 Annual Catch in Scotland by Net Fisheries (Fixed Engines and Net and Coble) for the period 1952-2009



163.72 *Salmon and Sea Trout Fisheries in the Regional and Local Study Areas*

90. An indication of the annual reported catch by species and method in the regional study area is given in Figure 16.19 and Figure 16.20 respectively, expressed as the number of individuals caught by district (average 2000 to 2009).
91. Salmon and grilse account for the majority of the catch in all the districts within the regional study area, with the exception of the Lossie, where sea trout is the principal species caught.
92. The principal fishing method in the regional study area is rod-and-line, being the only method used in a number of districts (e.g. Spey and Deveron districts). Netting by both fixed engines and net-and-coble, however, occurs at varying degrees in a number of districts.
93. 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 Plate 16.2 and Plate 16.3 respectively (2001 to 2010).

Plate 16.2 Annual Fixed Engines Effort (Max. No. of Traps) by SFD (2001-2010)

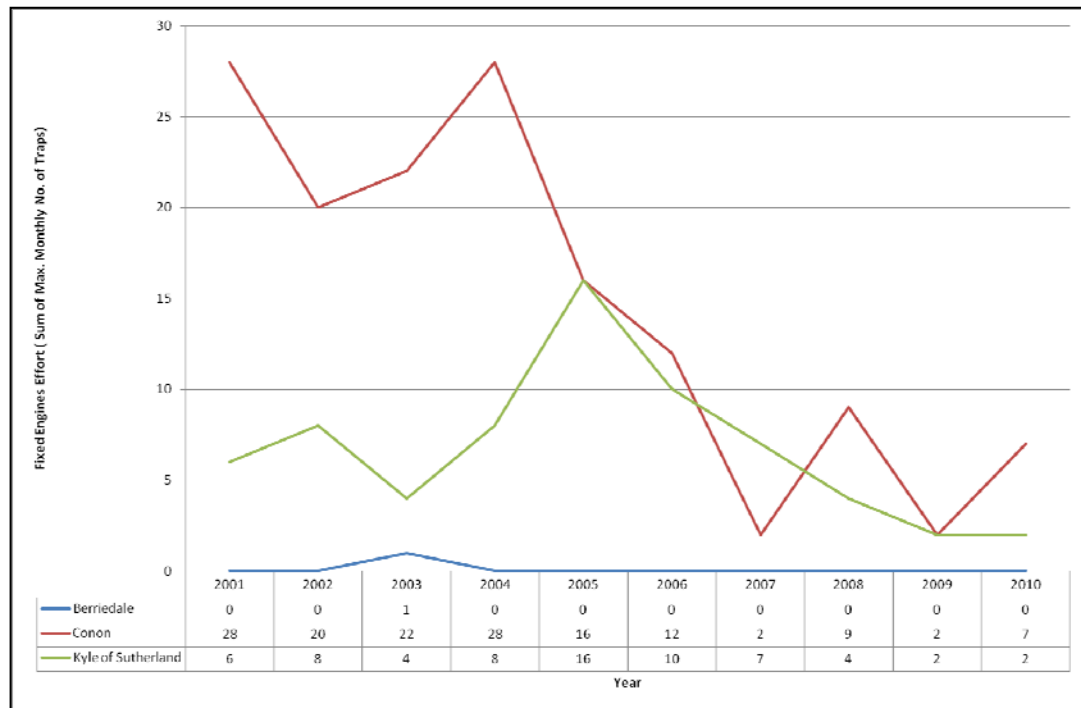
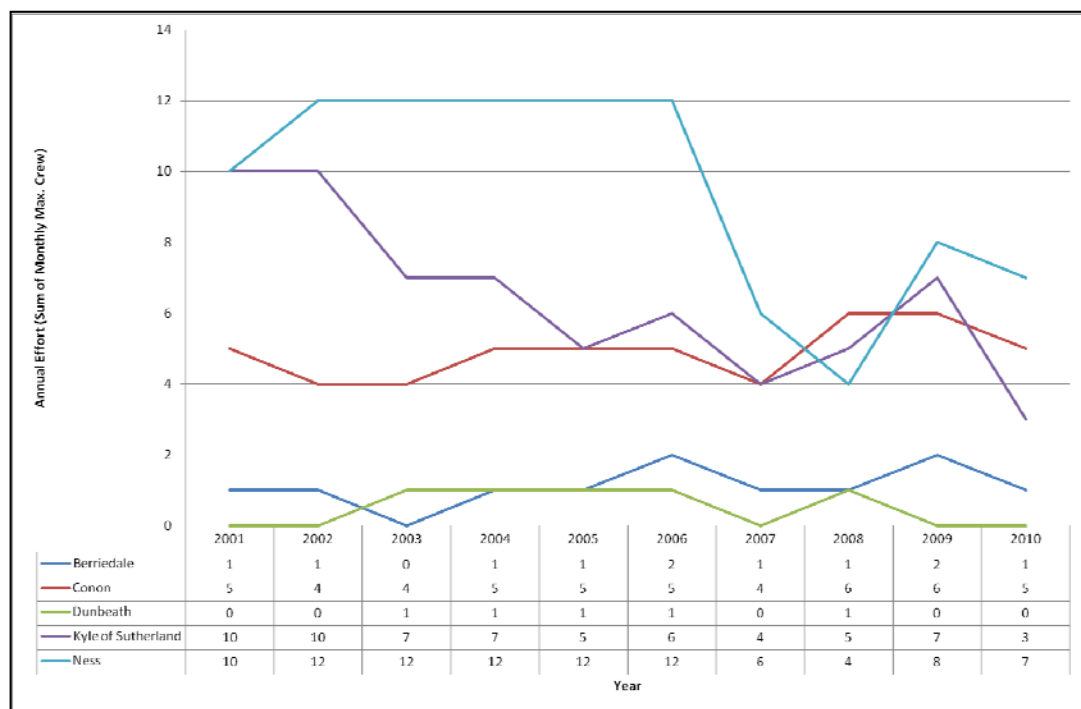


Plate 16.3 Annual Net and Coble Effort (Max. Crew) by SFD (2001-2010)



94. An overview of the salmon and sea trout fishery by district within the regional study area is given below. In the following Sections the rod-and-line reported catches given include, in all cases, catch and release.

The Deveron

95. The Deveron is mainly a salmon river although sea trout is of importance during the summer months. Rod-and-line is the only method currently used in this district.
96. The seasonality of the catch by species is given in Plate 16.4 (average reported catch 2000 to 2009). Overall (all species combined) the highest catches are recorded from August to October. Sea trout are caught in highest numbers in June and July. Grilse catches peak in August, although July, September and October also record relatively high catches. Salmon are caught throughout the season, however comparatively higher catches are recorded in September and October.

The Spey

97. The Spey district records the largest salmon and sea trout catches in the regional study area, and is the most commercially important in the Moray Firth. Salmon has been a primary reason for the selection of the river Spey SAC, where the salmon population is considered to be of high quality.
98. Rod-and-line is currently the only fishing method used in the Spey. Overall, the highest catches in the district (all species) are recorded from June to August with May and September also recording relatively high catches.
99. The seasonality of the catch by species is given in Plate 16.5 (average reported catch 2000 to 2009). Salmon are principally caught from May to September, although March and April also record relatively high salmon catches reflecting the variety of salmon runs in the district. Grilse catches are highest in July and August. The sea trout season starts on 30th April and runs until the end of September. Within this period the highest sea trout catches are recorded in June and July.

Plate 16.4 Seasonality of the Rod-and-line Reported Catch by Species in the Deveron District (average 2000-2009)

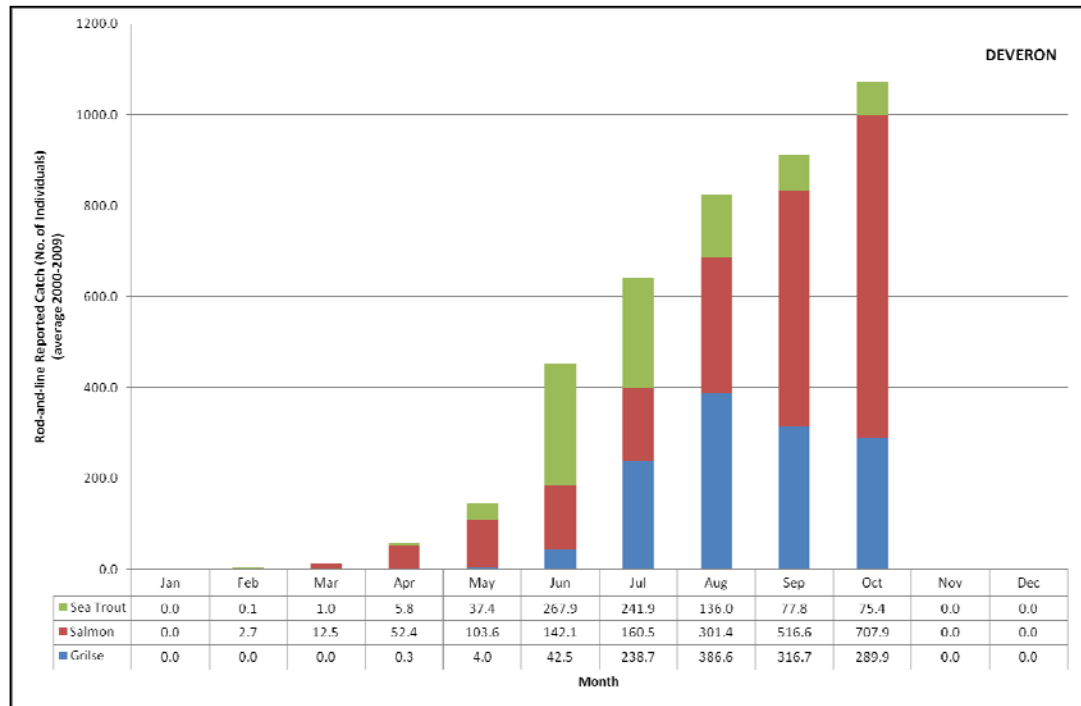
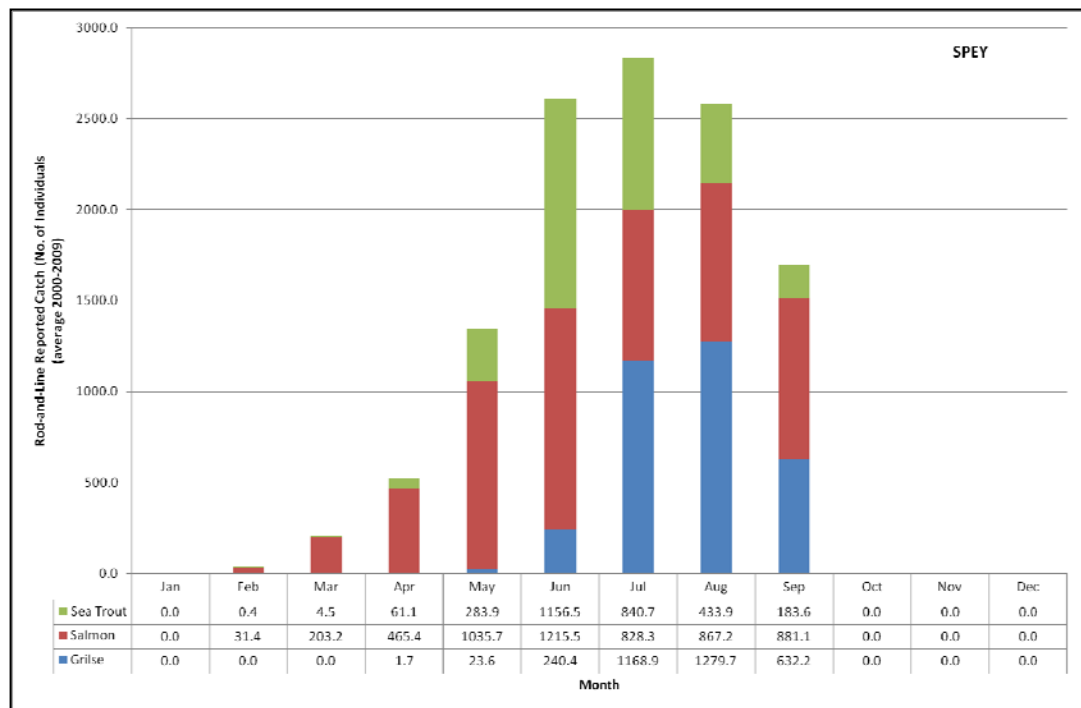


Plate 16.5 Seasonality of the Rod-and-line Reported Catch by Species in the Spey District (average 2000-2009)



Source: MSS 2010

Nairn, Lossie and Findhorn

100. Rod-and-line is currently the only fishing method used in the three districts. An indication of the seasonality of the fishery in the Nairn, Lossie and Findhorn districts is given in Plate 16.6, Plate 16.7 and Plate 16.8 respectively, based on monthly reported catches by species (average 2000 to 2009).
101. In the Nairn the highest salmon and grilse catches are recorded from July to September. Sea trout are caught in greatest numbers from June to August.
102. In the Lossie sea trout catches are highest from May to October peaking in July and August. Salmon and grilse are principally caught from August to October.
103. In the Findhorn salmon catches are highest from May to September. Grilse are principally caught from July to September whilst sea trout are caught from June to September.

Plate 16.6 Seasonality of the Rod-and-line Reported Catch by Species in the Nairn District (average 2000-2009)

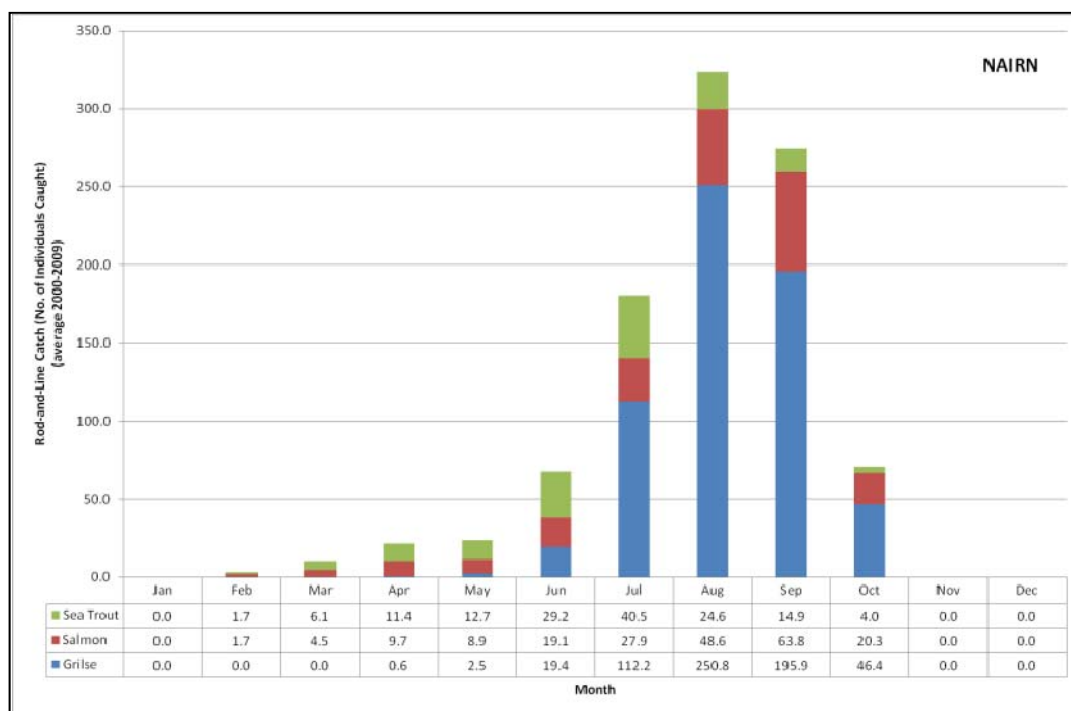


Plate 16.7 Seasonality of the Rod-and-line Reported Catch by Species in the Lossie District (average 2000-2009)

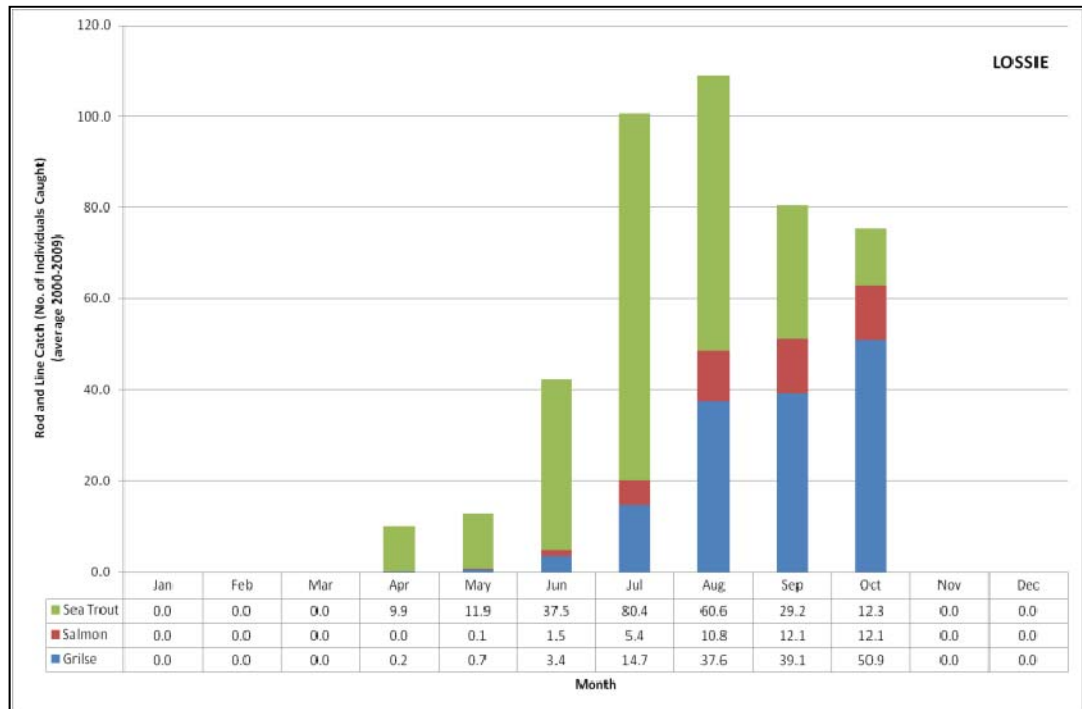
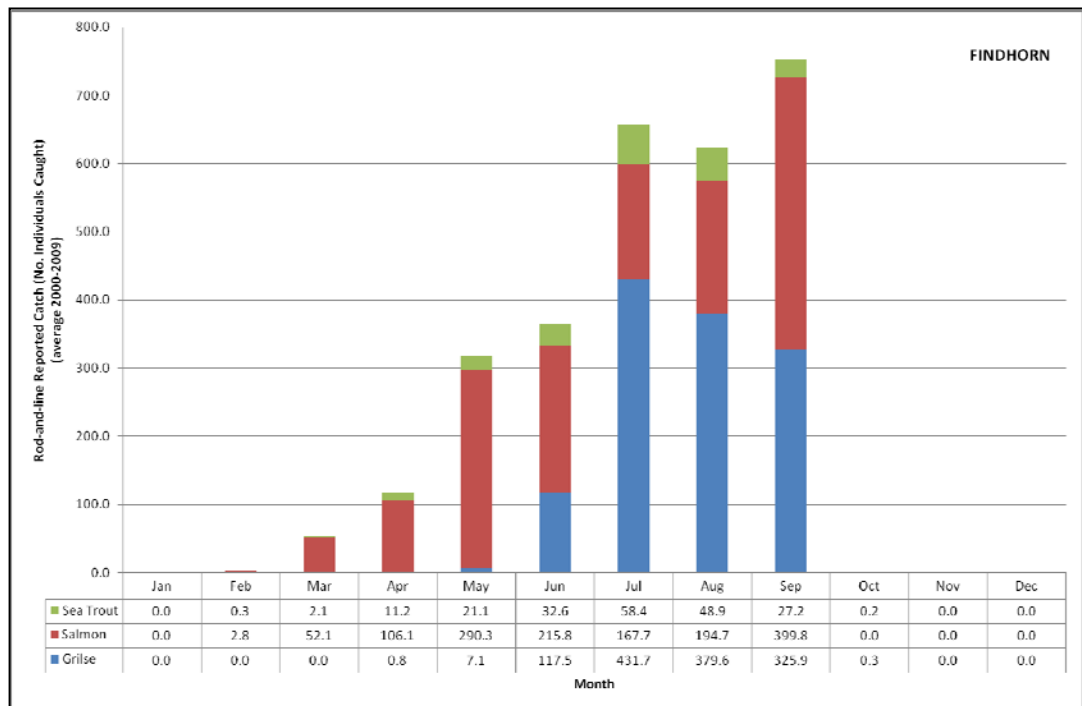


Plate 16.8 Seasonality of the Rod-and-line Reported Catch by Species in the Findhorn District (average 2000-2009)



Ness and Beaully

- 104. The Ness and Beaully districts have both important salmon and sea trout fisheries, although there has been a marked decline in sea trout catches over the past two decades. The river Moriston, which flows into the northern side of Loch Ness, has been designated as an SAC and lists salmon as a qualifying feature.
- 105. Rod-and-line is the principal method used in both districts and is undertaken in coastal areas and in freshwater. Net-and-coble fishing takes place to a limited extent in coastal areas in the Ness district whilst rod-and-line is the only fishery currently active in the Beaully.
- 106. The seasonality of the rod-and-line catch by species in the Beaully and the Ness is shown Plate 16.9 and Plate 16.10 respectively.
- 107. Salmon and grilse are principally caught from July to October in both districts. Salmon are however also caught in relatively high numbers earlier in the season (from April to June in the Beaully and from March to June in the Ness).
- 108. Sea trout are principally caught from July to September, but are also caught in some numbers earlier in the season generally from March onwards.
- 109. In the Ness the net fishery (net-and-coble) is open from 28th February to 26th August. An indication of the seasonality of the fishery is given in Table 16.4. The majority of reported catches are recorded from June to August, peaking in July.

Plate 16.9 Seasonality of the Rod-and-line Reported Catch by Species in the Beaully District (average 2000-2009)

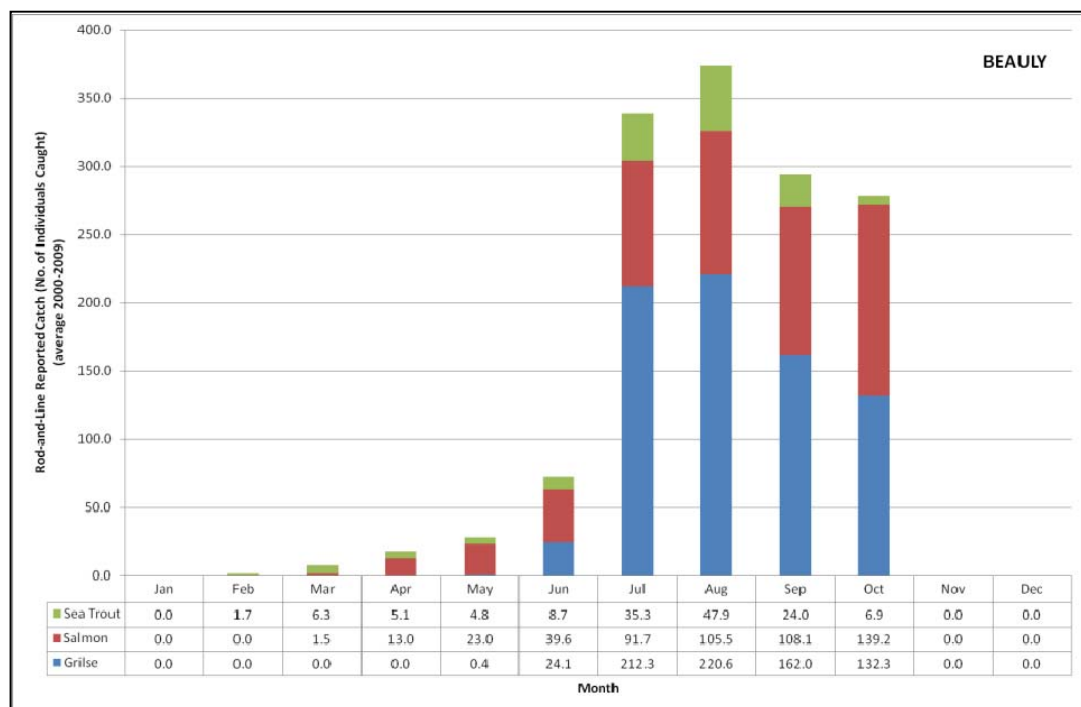


Plate 16.10 Seasonality of the Rod-and-line Reported Catch by Species in the Ness District (average 2000-2009)

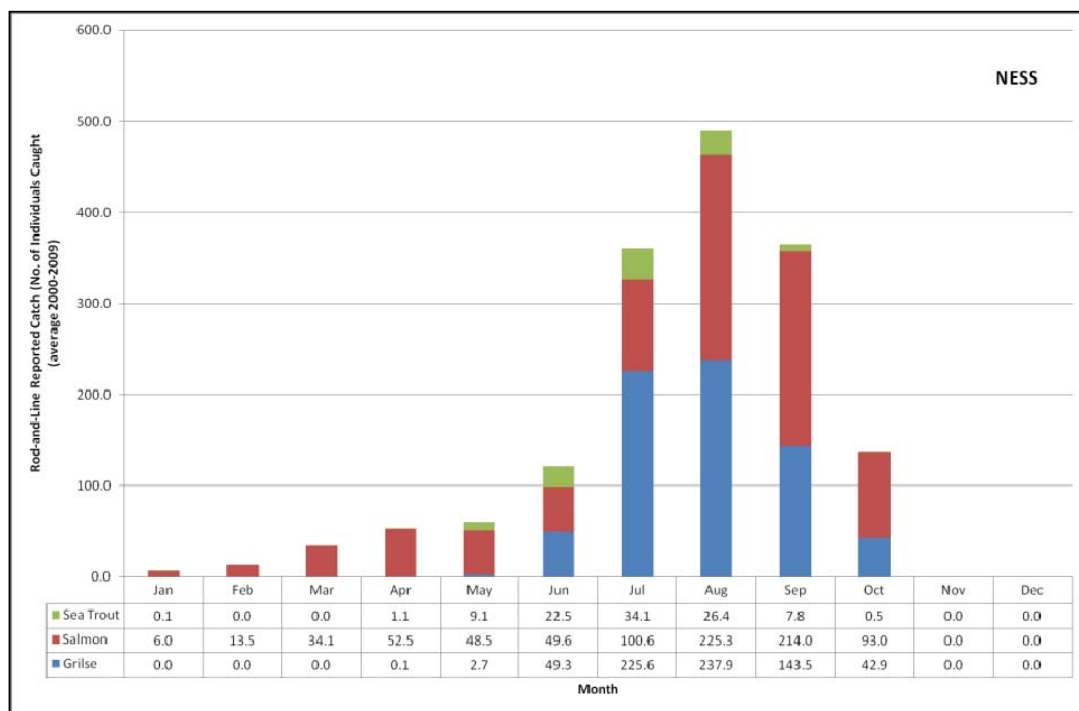


Table 16.4 Seasonality of Catch (No. of Individuals Caught) by the Net-and-coble Fisheries in the Ness District (average 2000 to 2009)

Ness	Month				
	April	May	June	July	August
Net-and-coble	0.5	0.9	64.5	189.7	84.5

Source: MSS 2010

Conon and Alness

- 110. Most rivers in the Conon and Alness districts have a combination of both salmon and sea trout. Rod-and-line is the main fishery in the two districts. Rod-and-line is used in the river, but also in the estuary for sea trout. In the Conon district, fixed engines are used in coastal areas and net-and-coble in the estuary, although to a limited extent.
- 111. The seasonality of the rod-and-line fishery (including catch and release) is given in Plate 16.11 and Plate 16.12 for the Alness and Conon districts respectively.
- 112. In the Alness, salmon are principally caught from July to October. Grilse are caught in highest numbers from August to October whilst sea trout are principally caught from June to August, peaking in July.
- 113. In the Conon, salmon are caught from May to September peaking around June. Grilse are principally caught from July to September whilst sea trout are caught from June to September, peaking in July.

Plate 16.11 Seasonality of the Rod-and-line Reported Catch by Species in the Alness District (average 2000-2009)

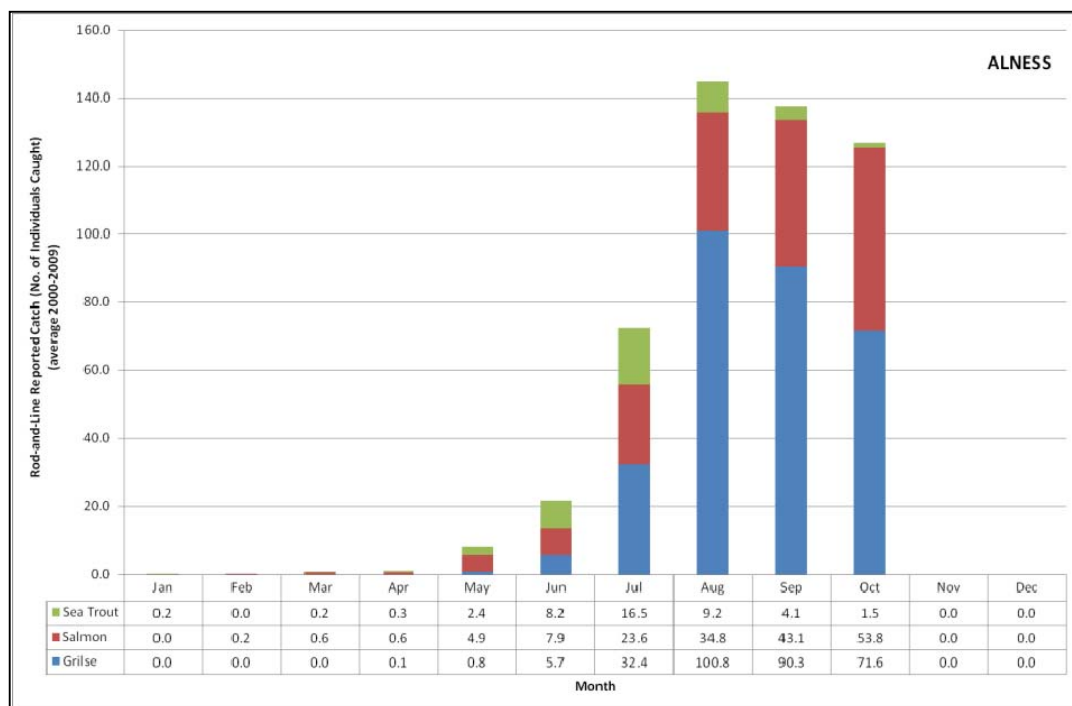
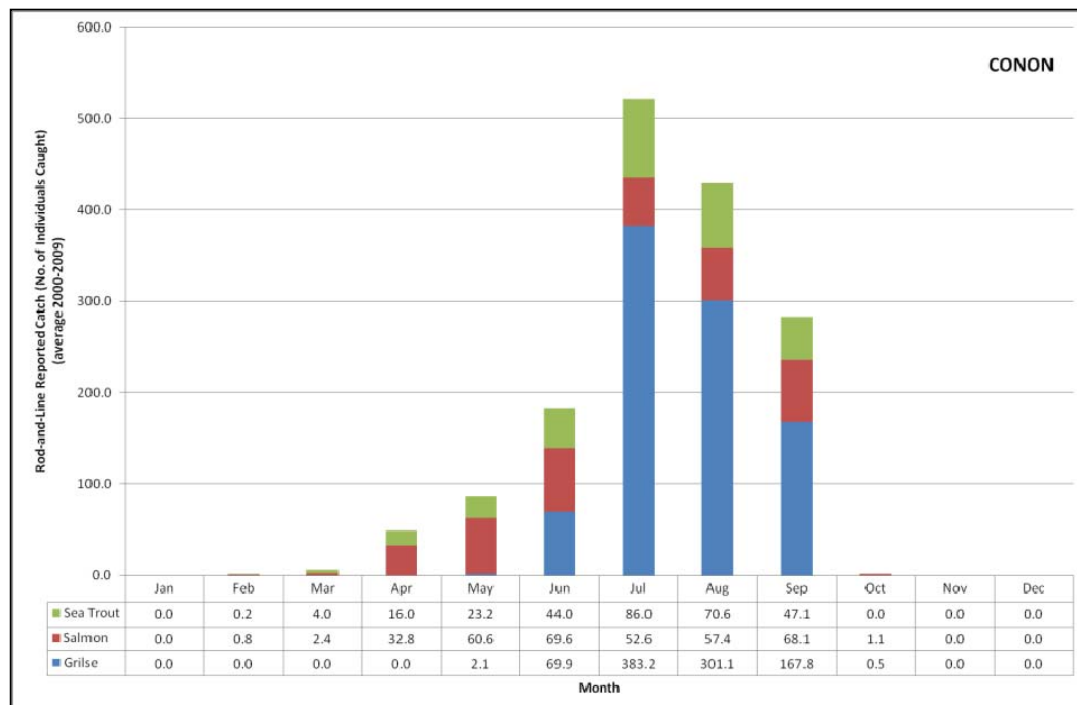


Plate 16.12 Seasonality of the Rod-and-line Reported Catch by Species in the Conon District (average 2000-2009)



114. The seasonality of the net fishery in the Conon district is given in Table 16.5 based on monthly catches (averaged 2000 to 2009) by net-and-coble and fixed engines. Both fixed engines and net-and-coble record highest catches in July. The netting season runs from 11th February to 26th August.

115. Active coastal netting stations in the Conon are located from Tarbat Ness and further inland: stations are currently operational off Balintore and Hilton and from Tarbat Ness Lighthouse south to Ballone Castle.

Table 16.5 Seasonality of Catch (No. of Individuals Caught) of the Net Fisheries in the Conon District (average 2000 to 2009)

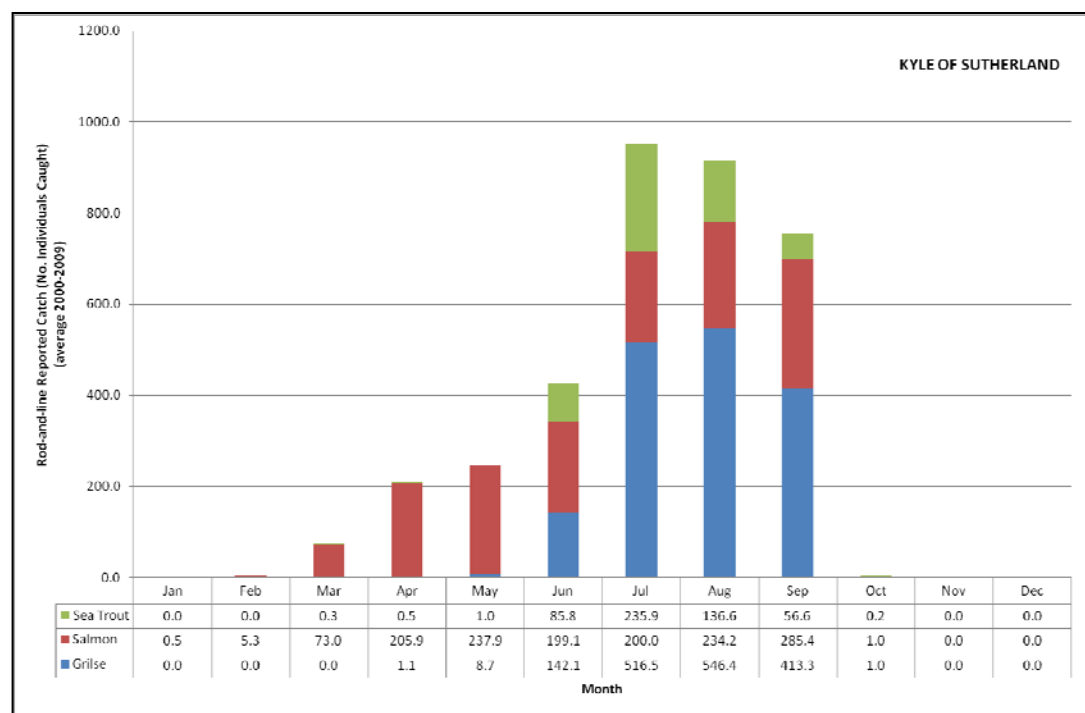
Conon	Month				
	April	May	June	July	August
Fixed Engines	1.4	17.3	55.9	106.9	9.5
Net-and-coble	0.0	0.0	5.5	110.3	11.9

Source: MSS 2010

Kyle of Sutherland

116. The river Oykel, which flows into the Kyle of Sutherland, has been designated as an SAC and lists salmon as a qualifying feature.
117. The majority of the catch in the Kyle of Sutherland district comes from the rod-and-line fishery although there are a limited number of active net fisheries (both net-and-coble and fixed engines) which account for comparatively low catches.
118. The seasonality of the rod-and-line fishery (including catch and release) based on reported catches by species (averaged 2000 to 2009) is shown in Plate 16.13. Overall (all species combined), the highest reported catches are recorded from July to September.

Plate 16.13 Seasonality of the Rod-and-line Reported Catch by Species in the Kyle of Sutherland District (average 2000-2009)



119. Salmon are caught in relatively high numbers from April to September and grilse from July to September. Sea trout are predominantly caught from June to August, peaking in July.
120. During the 2000 to 2009 period, catches by fixed engines and net-and-coble were only recorded from April to August, with the highest catches by both methods corresponding to the month of July (see Table 16.6).

Table 16.6 Seasonality of Catch (No. of Individuals Caught) by the Net Fisheries in the Kyle of Sutherland District (average 2000 to 2009)

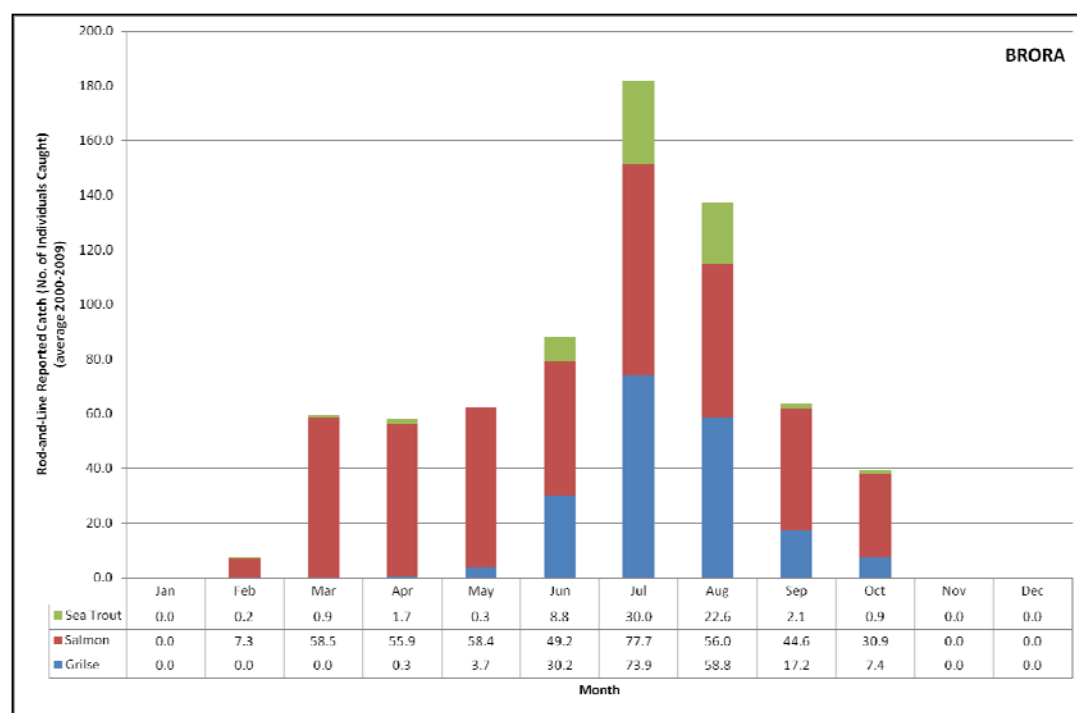
Kyle of Sutherland	Month				
	April	May	June	July	August
Fixed Engines	0.6	0.0	19.2	115.4	37.2
Net-and-coble	1.2	4.7	63.5	107.3	12.5

Source: MSS 2010

Brora

121. Rod-and-line is the only method used in the Brora district. Netting rights are held by Sutherland Estates at the mouth of the River Brora, however these are no longer exploited. Netting activity stopped in the late 1970s. An indication of the seasonality of the fishery in the district is given Plate 16.14 expressed as monthly catches by species (average 2000 to 2009).

Plate 16.14 Seasonality of the Rod-and-line Reported Catch by Species in the Brora District (average 2000-2009)



122. Salmon are caught throughout the season principally from March to October. Catches are relatively consistent throughout this period with July recording peak catches. Sea trout are principally caught from June to August peaking in July. Similarly, grilse are caught in greatest numbers from June to August, also peaking in July. Overall, the greatest catches (all species combined) are recorded in July and August.

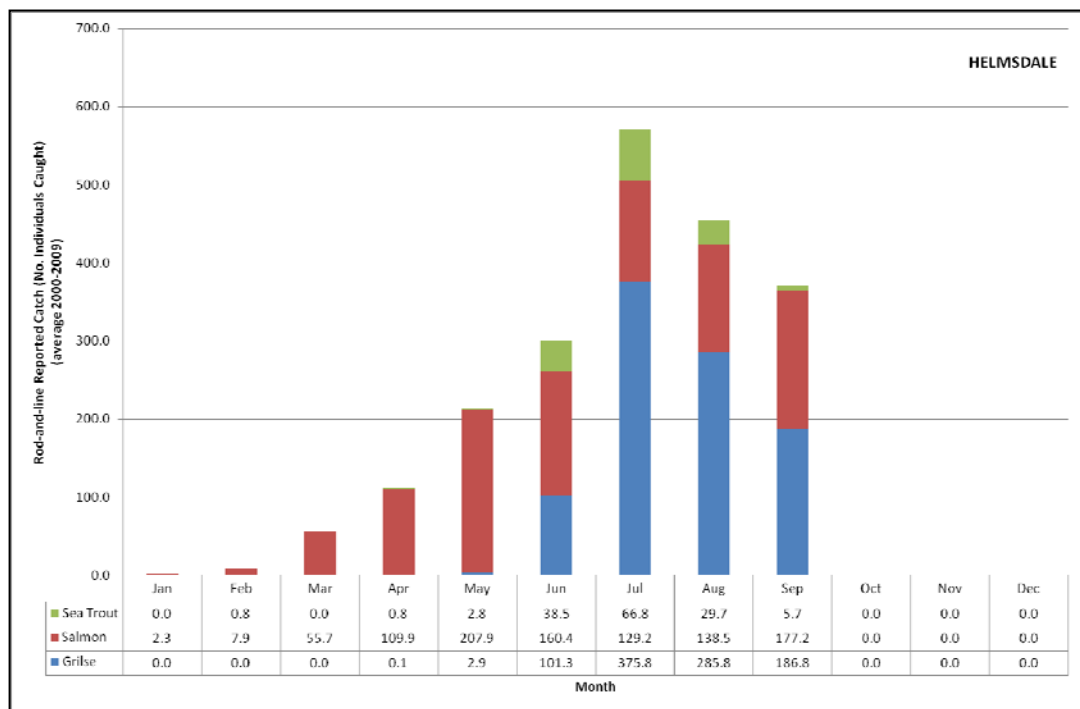
Helmsdale

123. In the Helmsdale district, rod-and-line is currently the only method used. Netting activity ceased approximately 20 years ago.

124. The fishing season runs from 11th January until the end of September. An indication of the seasonality of the fishery is shown in Plate 16.15, based on monthly catches by species (average 2000 to 2009). Overall (all species combined) the highest catches in the district are recorded in July and August.

125. Salmon catches are relatively consistent throughout the season with high catches being recorded during the periods April to May, June to August and August to September. Grilse are principally caught from June to September with catches peaking in July. Similarly, sea trout are principally caught from June to August also peaking in July.

Plate 16.15 Seasonality of the Rod-and-line Reported Catch by Species in the Helmsdale District (average 2000-2009)



Wick, Dunbeath and Berriedale (Caithness) (Local Study Area)

126. Salmon is a primary reason for the SAC site selection of the Berriedale and Langwell waters.
127. As previously mentioned, the Wick, Dunbeath and Berriedale are the salmon fishery districts located in closest proximity to the Wind Farm. It should be noted that these three districts (together with the Forss and Thurso) were superseded by the Caithness district and abolished in 1990.
128. Caithness is primarily a salmon district. The principal method currently used is rod-and-line although a small amount of netting also takes place in the former Berriedale and Dunbeath districts. Catch and release is practised on a voluntary basis and is generally about 60 to 70% of the fish caught.
129. The rod-and-line season opens as early as the 12th January and is closed by the 5th October in most rivers within the district. Net fisheries, whilst determined by the Scottish statutory Close Season, tend to operate only during June, July and August.
130. The location of the Wind Farm Site relative to the Wick, Dunbeath and Berriedale district is given in Figure 16.21. The Berriedale and Langwell Waters SAC, for which salmon is a primary reason for selection of the site, is located in the Berriedale district at a distance of approximately 29 km from the Wind Farm.
131. An indication of the seasonality of the rod-and-line fishery (including catch and release) in the Wick, Dunbeath and Berriedale districts is given in Plate 16.16, Plate 16.17 and Plate 16.18, respectively.

Plate 16.16 Seasonality of the Rod-and-line Reported Catch by Species in the Wick District (average 2000-2009)

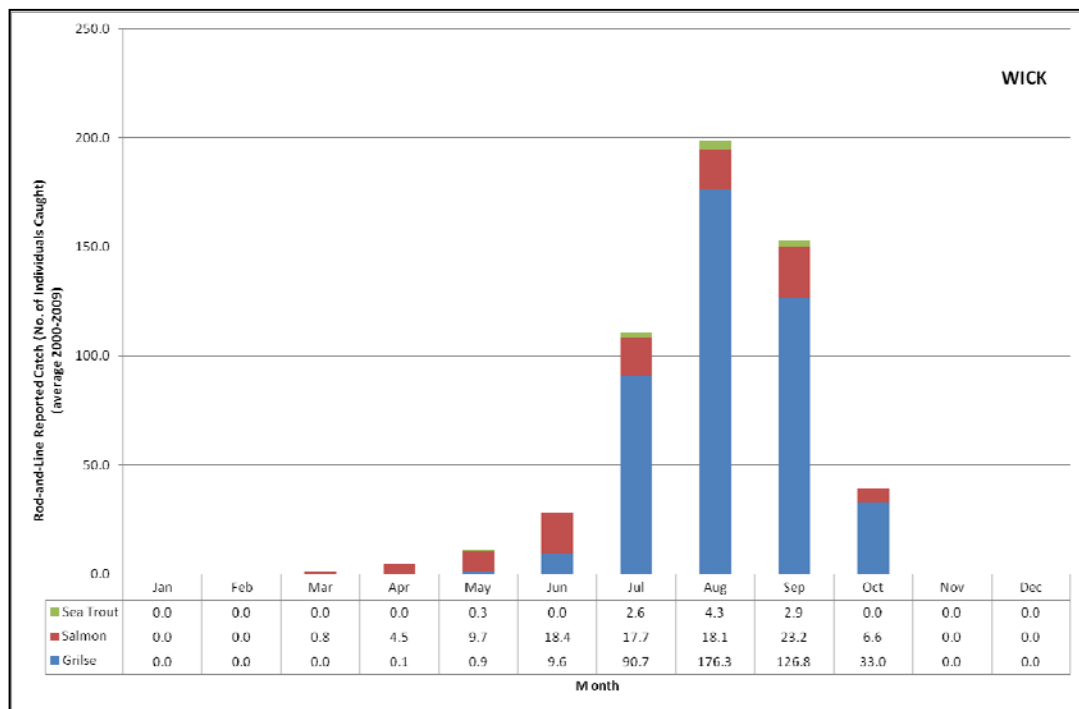


Plate 16.17 seasonality of the Rod-and-line Reported Catch by Species in the Dunbeath District (average 2000-2009)

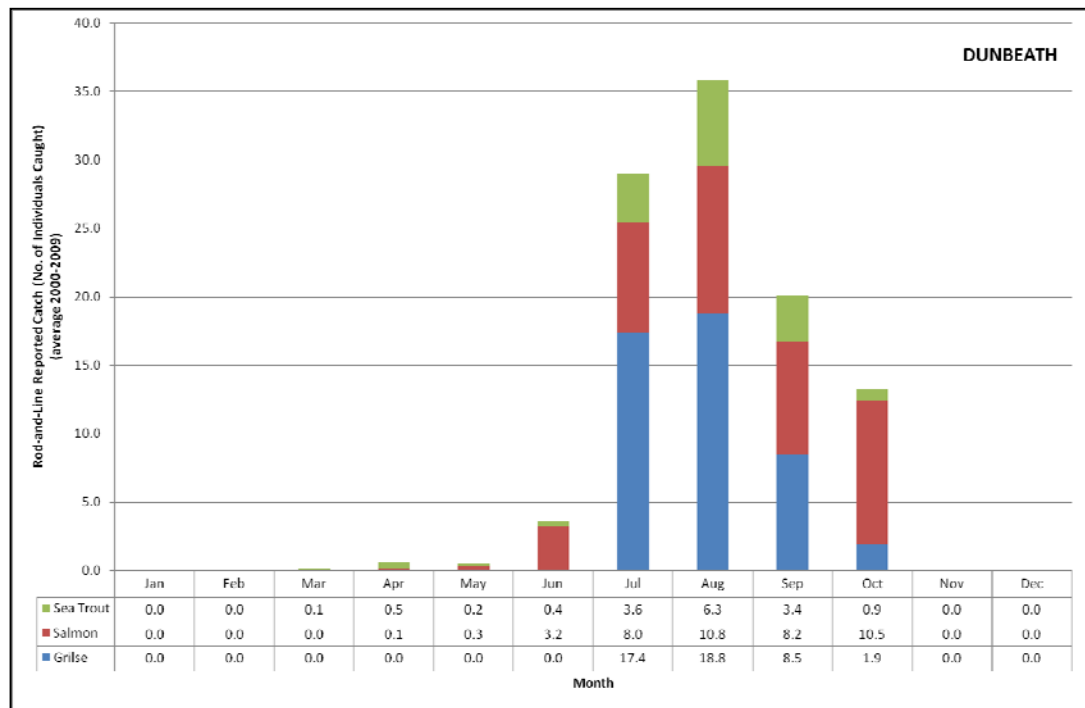
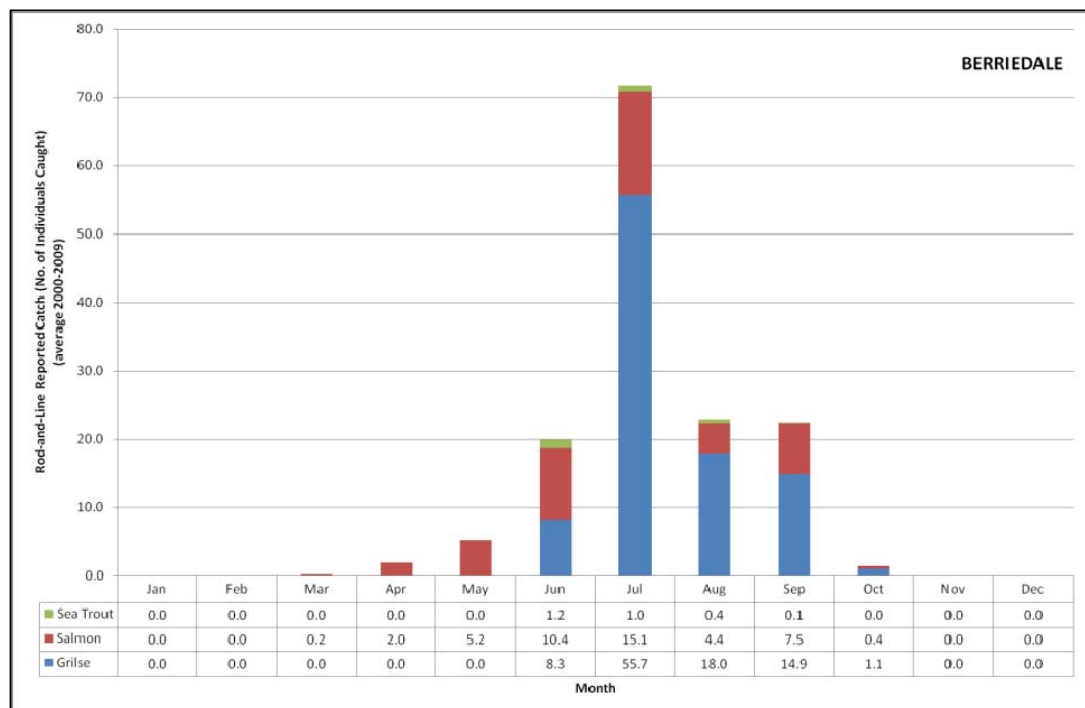


Plate 16.18 Seasonality of the Rod-and-line Reported Catch by Species in the Berriedale District (average 2000-2009)



132. Overall (all species combined), the highest catches are recorded in July and August. Salmon catches are highest from June to September in Wick, July to October in Dunbeath and June to September in Berriedale.

133. Grilse are principally caught from July to September in Wick, July to August in Dunbeath and in July in Berriedale.
134. Sea trout reported catches are comparatively low and principally recorded from July to September.
135. An indication of the seasonality of the net fishery (net-and-coble and fixed engines) in the Berriedale and Dunbeath districts is given Figure 16.18.
136. In the Berriedale district, the month of July records the highest catches both by fixed engines and net-and-coble.
137. Similarly, in Dunbeath the highest catches by net-and-coble are recorded in July and August

16.4 ASSESSMENT OF POTENTIAL EFFECTS

138. In the case of each predicted effect, the implications for fisheries during the construction and operational phases are separately described.

16.4.1 CONSTRUCTION PHASE

16.4.1.1 Adverse Effects on Commercially Exploited Fish and Shellfish Populations

139. As previously stated, there is the potential for wind farm development to cause adverse effects on fish and shellfish populations of commercial importance, and hence result in changes to behaviour or a decline in abundance, which may affect the productivity of the fishery. This is an indirect effect and whilst this potential effect is briefly discussed within this Section, it is fully assessed in Section 11: Wind Farm Fish and Shellfish Ecology and summarised below.
140. It should be noted that the methodology used to assess effects on fish and shellfish species (including significance criteria) differs slightly from the one used to assess commercial fisheries, as it takes account of the IEEM (2010) Guidelines for Ecological Impact Assessment.
141. The effects of the construction phase on the principal species targeted in areas relevant to the Wind Farm (scallops, squid and haddock) are summarised in Table 16.7 below. Effects on these species are predicted to be minor (see Section 11: Wind Farm Fish and Shellfish Ecology for further details).

Table 16.7 Summary of Assessment on Haddock, Scallops and Squid (Construction)

Effect	Receptor	Predicted Significance	Mitigation Proposed	Residual Effect Significance	Probability
Increased SSC and sediment re-deposition	All	Negative Minor	None proposed	Minor	Probable
Noise	Scallops/Squid	Negative Minor	None proposed	Minor	Probable
	Haddock	Negative Minor	None proposed	Minor	Probable

142. Taking into account the findings of Section 11: Wind Farm Fish and Shellfish Ecology, and accepting that there may be short term species displacement effects which may have a limited indirect effect upon catch rates, it is reasonable to assume that the indirect effects upon commercial fishing will not be greater than those identified in the table above.

16.4.1.2 *Adverse Effects on Recreational Fish Populations*

143. There is not considered to be a regular or directed recreational fishing activity occurring within the boundary of the Wind Farm. It is however recognised that there is the potential for wind farm development to cause adverse effects to fish and shellfish populations of recreational importance, such as salmon and sea trout, and hence result in changes to behaviour or a decline in abundance. Salmon and sea trout fisheries have significant socio-economic importance as recreational fish species and adverse effects to salmon and sea trout could indirectly affect the fisheries. An assessment of effects upon the species is summarised in Section 16.4.4 and fully assessed in Section 11: Wind Farm Fish and Shellfish Ecology.

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

144. The principal commercial species targeted by gear type within the Wind Farm are: king scallop by boat dredge and to a lesser extent, haddock by seine nets and squid by demersal trawls.

145. The Wind Farm Site constitutes a relatively small proportion of the scallop fishing grounds currently available in the Moray Firth and a very small proportion of scallop grounds on a national scale (Figures 16.5 – 16.8).

146. Discrete haddock grounds to the north of the Wind Farm include a small proportion of the site. Although the fishery is of relative importance in the Moray Firth, grounds within the site constitute a very small proportion of haddock grounds which are currently targeted.

147. The squid fishery in the Moray Firth is targeted by a range of demersal trawl vessels with reconfigured gear. As the baseline indicates, the fishery is highly variable annually, depending upon productivity. Principal fishing grounds are currently inshore along the Moray coast and in an offshore area to the south of the development. Although the squid fishery in the Moray Firth is important on a national scale, the baseline indicates that there is not currently a significant level of squid fishing within the Wind Farm Site.

148. In the case of the fishing activities described above, the Wind Farm Site records relatively low levels of activity compared to activity elsewhere in the Moray Firth, and very low levels when compared to fishing grounds elsewhere. The principal effects of construction considered to incur complete loss or restricted access to these fishing grounds during the construction phase are:

- Exclusion zones around construction activities; and
- Installed offshore infrastructure in addition to construction exclusion zones.

149. Safety zones of 500 m may be imposed around construction works, from which all vessels are excluded. The area of the Wind Farm Site considered to be a

construction zone may vary throughout the project if a phased construction approach is adopted, which is the most likely situation. However in the worst case there is the potential for an exclusion zone to be established that will exclude all traffic from the entire site during construction. The maximum period of construction is estimated to be up to five years. It is likely that there will be temporary and phased loss of fishing grounds within the site, although there is the potential for the entire site to have an exclusion, which would result in temporary loss of grounds within the site throughout the construction phase. The seasonality of the fisheries will render these exclusion zones more sensitive, depending upon the time of year; broadly, the summer months record the highest levels of activity for scallops, haddock landings are peak in the winter months, and squid landings are highest August and September.

150. In the event that phased construction safety zones are applied, it is likely that exclusion zones of 50 m will apply to fully operational turbines, met masts and OSPs in completed areas.
151. There will be a maximum of 350 km of inter-array cables installed within the Wind Farm Site as the construction phase progresses. The cables will be buried or protected wherever feasible. There may be areas where it is necessary to surface lay cables although this will be minimised. Post construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed. If phased safety zones are applied during construction and fishing activities can be safely resumed in those zones, there is the potential that access to areas within the site will be regained, prior to the completion of construction works.
152. Relative to the area of fishing grounds in the Moray Firth, and the area of exclusion for the period that the construction of the Wind Farm will occur, it is considered that the loss of fishing grounds as a result of ongoing construction activities will occur on a receptor of low sensitivity, the effect of medium magnitude, and therefore the effect is assessed to be minor.

16.4.1.4 *Safety Issues for Fishing Vessels*

153. Safety zones of 500 m may be imposed around construction works, from which all vessels are excluded. The area of the Wind Farm Site considered to be a construction zone may vary throughout the project if a phased construction approach is adopted, which is the most likely situation. However in the worst case there is the potential for an exclusion zone to be established that will exclude all traffic from the entire site during construction.
154. In the event that phased construction safety zones are applied, it is likely that exclusion zones of 50 m will apply to fully operational turbines, met masts and OSPs in completed areas.
155. Risks to fishing vessels would therefore 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. These issues are considered further within Section 18: Wind Farm Shipping and Navigation. Compliance with the safety zones would put the safety risk within acceptable limits.

156. There will be a maximum of 350 km of inter-array cables installed within the Wind Farm Site as the construction phase progresses. The cables will be buried or protected wherever feasible. There may be areas where it is necessary to surface lay cables although this will be minimised. It is considered that fishing vessels will not be able to safely fish in the vicinity of these cables until burial and protection measures are complete.
157. Post construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed. Subject to these measures being satisfactorily undertaken, the risks to the safety of fishing vessels as a result of towed gear interactions with inter-array cables progressively installed during the construction phase would result in risks considered to be within acceptable limits.

16.4.15 Increased Steaming Time to Fishing Grounds

158. As previously stated, the implementation of safety exclusion zones will likely be phased during the construction phase, although there is the potential for an exclusion zone to be established that will exclude all traffic from the entire site during construction. This will result in some short-term increases in steaming distances and times, and therefore higher operational costs for fishing vessels. In the event that phased safety zones were applied, these increases would be relatively lower than if the entire site were designated an exclusion zone throughout the construction phase.
159. As stated in the Section 18: Wind Farm Shipping and Navigation, because of the generally smaller size of the vessels it was considered that there is good prospect for fishing vessels to navigate within the Wind Farm itself. In the event that completed areas of the site are accessible during the construction phase, it is considered that, subject to infrastructure being clearly marked in line with standard industry practice, vessels will be able to safely navigate through.
160. The effect of the construction of the Wind Farm Site upon steaming distances and times of fishing vessels will be dependent upon the steaming direction of individual vessels and the safety zones implemented during the construction phase. In general terms, however, in light of the location of the development being greater than 6 NM from the coast and fishing ports and not located along principal routes for fishing vessels steaming to and from fishing grounds, the receptor is considered to occur on a receptor of low sensitivity, the effect of medium magnitude, and therefore the effect is assessed to be minor.

16.4.1.6 Displacement of Fishing Vessels into other Areas

161. 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 outwith of the site. This might result in either conflict between vessels competing for the same resource, or between different fishing methods (ie static and towed gear vessels).
162. The scale of potential displacement as a result of construction of the Wind Farm is a function of the loss of fishing ground during this period. As previously stated, the seasonality of the fisheries will render the loss of fishing grounds, and subsequent displacement more sensitive. Given the relatively low percentage of fishing grounds within the Wind Farm Site it is considered that the displacement of fishing vessels into other areas as a result of construction activities occurs on a receptor of low sensitivity, the effect of medium magnitude, and is therefore assessed to be minor.

16.4.1.7 Interference with Fishing Activities

163. All of the potential effects included in this assessment could cause interference to fishing activities. An additional effect 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 marker buoys and dhan bouys, or towed gear vessels being required to alter towing direction. This interference has the potential to affect more fishing vessels than those operating in the immediate vicinity of the site, depending upon the location of the construction port. The potential for interference to fishing activities as a result of navigational conflicts between construction vessels and fishing boats could therefore range between low/medium sensitivity, the effect to be either small or medium magnitude, and is therefore assessed to be either minor or moderate, depending upon the location of the construction port.

16.4.2 OPERATIONAL PHASE

164. The effects described below should be considered in the context of the operational life of the Wind Farm. 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 assessment provided below is therefore based upon the current baseline, the limitations of which are recognised.

16.4.2.1 Adverse Effects on Commercially Exploited Fish and Shellfish Populations

165. As previously stated, there is the potential for wind farm development to cause adverse effects on fish and shellfish populations of commercial importance, and hence result in changes to behaviour or a decline in abundance, which may affect the productivity of the fishery. This is an indirect effect and whilst briefly discussed within this Section, it is fully assessed in Section 11: Wind Farm Fish and Shellfish Ecology and summarised below.
166. A summary of the effects on the principal target species in areas relevant to the Wind Farm (haddock, scallops and squid) is given in Table 16.8 below. As

mentioned above for the operational phase, it should be noted that the methodology used to assess effects on fish and shellfish species (including significance criteria) differs from that used to assess commercial fisheries, taking account of the IEEM (2010) guidelines for ecological impact assessment (see Section 11: Wind Farm Fish and Shellfish Ecology).

167. Effects on these species during operation are considered to be minor (see Section 11: Wind Farm Fish and Shellfish Ecology for further details).

Table 16.8 Summary of Assessment on Haddock, Scallops and Squid (Operational Phase)

Effect	Receptor	Predicted Significance	Mitigation Proposed	Residual Effect Significance	Probability
Loss of habitat	All	Negligible	None Proposed	Negligible	Probable
Introduction of new habitat	All	Negative minor	None Proposed	Minor	Probable
Electromagnetic Fields	All	Negligible	None proposed	Negligible	Probable
Operational Noise	All	Negative Minor	None Proposed	Minor	Probable

168. Taking into account the findings of Section 11: Wind Farm Fish and Shellfish Ecology, it is reasonable to assume that the indirect effects upon commercial fishing will not be greater than those identified in the table above.

16.4.2.2 Adverse Effects on Recreational Fish Populations

169. As stated previously, there is not currently considered to be a regular or directed recreational fishing activity occurring within the boundary of the Wind Farm. It is however recognised that there may be potential effects upon migratory fish species such as salmon and sea trout, which have significant socio-economic importance as recreational fish species. Effects upon salmon and sea trout fisheries are separately assessed in Section 16.4.4.

16.4.2.3 Complete Loss or Restricted Access to Traditional Fishing Grounds

170. The principal factor in restricting or causing complete loss of access to fishing grounds within operational wind farms is that of infrastructure posing an obstacle and/or safety risk. As previously discussed, the minimum distance between individual turbines is 642 m. It is likely that 50 m exclusion zones around individual turbines, met mast and OPs would apply. On the basis of 277 turbines, each with 50 m exclusion zones, the total area of exclusion would be 2.18 km².

171. Inter-array cables will be buried or protected wherever feasible, however, due to the uncertainty regarding seabed and underlying geological conditions it is not possible to specify what proportion of inter-array cables will be buried or protected. There may also be areas where it is necessary to surface lay inter-array cables but this will be minimised.

172. Post-construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed.
173. It is therefore considered that some level of fishing activity, as described in the baseline, will be able to resume in the operational Wind Farm. It should however be noted that individual skippers, particularly those operating bottom towed gear will assess the risk independently and may conclude that it is unsafe to continue fishing within the operational Wind Farm. This would result in a complete loss of fishing area from the Wind Farm Site (131.5 km²) for these vessels.
174. As a result of the relatively low proportion of fishing grounds the Wind Farm currently comprises, and the potential for some degree of fishing to be resumed within the site, but considering the operational life of the Wind Farm, the complete loss of access is considered to occur on a receptor of low sensitivity, the effect of medium magnitude, and is therefore assessed to be minor.

16.4.2.4 Safety Issues for Fishing Vessels

175. It is likely that individual turbines, met mast and OSPs will have safety zones of 50 m, from which all vessels including fishing vessels will be excluded. As stated above, provided these zones are respected, the risks will be within acceptable limits (see Section 18: Wind Farm Shipping and Navigation).
176. Inter-array cables will be buried or protected wherever feasible, however, due to the uncertainty regarding seabed and underlying geological conditions it is not possible to specify what proportion of inter-array cables will be buried or protected. There may also be areas where it is necessary to surface lay inter-array cables but this will be minimised. Post-construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed. In areas where the inter-array cables are satisfactorily buried or protected, the risks are considered to be within acceptable limits.
177. In the event that sections of inter-array cables remain surface laid in the operational phase, the risks to fishing vessels operating in the immediate vicinity of these will be outside of acceptable limits.

16.4.2.5 Increased Steaming Time to Fishing Grounds

178. The Shipping and Navigation assessment considers that there is good prospect for fishing vessels to navigate within the operational Wind Farm. As a result, the effect upon steaming distances and times of fishing vessels is considered to occur on a receptor of low sensitivity, the effect of small magnitude, and is therefore assessed to be negligible.

16.4.2.6 Obstacles on the Seabed Post-construction

179. There is the potential for obstacles to be left on the seabed post construction which could result in damage to or loss of fishing gears, as well as representing a safety

hazard. Offshore works such as construction vessel anchoring, jack up legs or cable laying can produce seabed obstructions which can cause fishing net fastenings and damage to fishing gears.

180. Legal obligations (London Convention, 1996) prohibit the discarding of objects or waste at sea. The reporting and recovery of any accidentally dropped objects is also required.
181. In the event that sections of inter-array cables remain surface laid in the operational phase, they pose an obstacle to fishing vessels. The risks to fishing vessels operating in the immediate vicinity of these will therefore be outside of acceptable limits.

16.4.2.7 *Displacement of Fishing Vessels into other Areas*

182. The scale of potential displacement as a result of construction of the Wind Farm is a function of the loss of fishing ground. In light of the relatively small amount of fishing grounds the Wind Farm comprises, and the potential for some degree of access for fishing vessels to be regained, but taking into account the operational life of the Wind Farm, it is considered that the displacement of fishing vessels into other areas as a result of the Wind Farm will occur on a receptor of low sensitivity, the effect of medium magnitude and is therefore assessed to be minor.

16.4.2.8 *Interference to Fishing Activities*

183. All of the potential effects included in this assessment could cause interference to fishing activities. An additional effect to be considered is the potential for navigational conflicts arising between fishing vessels and operations and maintenance vessels transiting to and from site. This could include the fouling of static gear marker buoys and dhans, or towed gear vessels being required to alter towing direction. This interference has the potential to affect more fishing vessels than those operating in the immediate vicinity of the site, depending upon the location of the operations and maintenance port.
184. Activity by operations and maintenance vessels will be less than that incurred during the construction phase. 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. Interference to fishing activities as a result of navigational conflict between operations and maintenance works is therefore considered to occur on a receptor of low sensitivity, the effect of small magnitude, and is therefore assessed to be negligible.

16.4.3 **DECOMMISSIONING PHASE**

185. In the absence of detailed information on the decommissioning schedules and methodologies, it is considered that the potential effects associated with the decommissioning phase will be of no greater significance than those of the construction phase.

16.4.4 **SALMON AND SEA TROUT FISHERIES ASSESSMENT**

186. As a result of salmon and sea trout fisheries being either in-river, or to a lesser extent, coastal, direct effects arising from the construction/decommissioning and

operation of the Wind Farm will not occur. It is possible, however that indirect effects on the fisheries may occur if the ecology of these species is adversely affected in the offshore marine environment as a result of the development of the Wind Farm.

187. The effects on fish and shellfish ecology, including salmon and sea trout, are described in Section 11: Wind Farm Fish and Shellfish Ecology.

188. It should be noted that due to the lack of current knowledge in relation to the migratory behaviour and the use that salmon and sea trout make of the Wind Farm area, a number of conservative assumptions had to be made for the undertaking of the assessment on these species.

16.4.5 PREDICTED EFFECTS, MITIGATION AND RESIDUAL EFFECTS

189. A summary of the effects on salmon and sea trout populations derived from the construction/operational and decommissioning phase of the Wind Farm is given in Table 16.9 based on information provided in Section 11: Wind Farm Fish and Shellfish Ecology.

190. Effects on salmon and sea trout are, in general terms, expected to be of minor significance and mitigation measures have not been proposed.

Table 16.9 Summary of Assessment on Salmon and Sea Trout

Residual Effects	Sensitivity of the Receptor	Magnitude of Effect	Nature	Significance of Effect	Probability
Construction					
Increased SSC and sediment re-deposition	Low	Small	-	Negligible	Probable
Noise	Medium	Small	Negative	Minor	Probable
Operation					
Loss of Habitat	Low	Negligible	-	Negligible	Probable
Introduction of New Habitats	-	-	Negative/Positive	Minor	Probable
EMFs	Medium	Small	Negative	Minor	Probable
Operational Noise	-	-	Negative	Minor	Unlikely
Changes to Fishing Activity	Low/medium	Negligible	-	Negligible	Probable

16.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

16.5.1 CONSTRUCTION AND OPERATION

191. BOWL will develop an approach in consultation with the fishing industry to ensure that the safety risks posed to fishing vessels as a result of the installation and

operation of inter-array cables are within an appropriate and reasonable standard determined in consultation with the fishing industry, and remain within, acceptable limits throughout the construction/decommissioning and operation phases of the development.

192. 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 developer and fishermen throughout the construction period. In order that the various fishing sectors are appropriately represented, as well as the developer and the regulatory body, if a Working Group will be established that facilitates the following:
- Ongoing dialogue between the fishing community and BOWL 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.
193. In order that there is ongoing dialogue between BOWL and the fishing industry throughout the operational phase of the Wind Farm, the Working Group will continue to provide a forum for ongoing engagement.
194. All infrastructure installed during the construction phase will be marked and lit, in line with standard industry practice, and as further described in the Section 18: Wind Farm Shipping and Navigation. The information will be distributed to fishermen through agreed channels as defined in the construction management programme.
195. The developer will apply for safety zones during the construction phase. The area of the Wind Farm Site considered to be a construction zone may vary throughout the project if a phased construction approach is adopted, which is the most likely situation. However there is the potential for an exclusion zone to be established that will exclude all traffic from the entire site during construction.
196. The developer may apply for safety zones of 50 m around installed infrastructure in the operational phase. It is also likely that 500 m safety zones will also be required during major maintenance and repair operations.
197. Cables will be buried to a target depth of one metre, where it is reasonably practicable to do so. In instances where alternative protection is required, then the developer will seek where feasible to install appropriate and reasonable protection.

198. Post-construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry.
199. 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 facilitate fishing activities within and around operational wind farms. These investigations will continue during the pre-construction phase and may result in mitigation to certain of the effects described above.
200. There are no mitigation measures to reduce adverse effects upon commercial and recreational fish populations during the construction phase of the Wind Farm, as described in Section 11: Wind Farm Fish and Shellfish Ecology.

16.5.2 RESIDUAL EFFECTS

201. The residual effects after taking into account the mitigation proposed above are not considered to be different to those described for predicted effects, with the exception of 'Interference to Fishing Activities' during the construction phase, as a result of the implementation of the construction management programme. The residual effect during the construction phase for 'Interference to Fishing Activities' would therefore change from minor or moderate to minor.
202. It should be noted that the purpose of the construction management programme is to ensure that the effects described are kept within the significance levels ascribed throughout both the construction and operational phases of the development.

16.5.3 MONITORING AND ENHANCEMENTS

203. No monitoring in addition to those which are obligatory to identify the status of the seabed and, if necessary, to ensure the removal of objects or waste is proposed with regard to commercial fishing activities.

1653.1 Salmon and Sea Trout

204. BOWL will work with key stakeholders and Marine Scotland to identify any future monitoring programmes considered necessary.

16.6 SUMMARY OF EFFECTS

16.6.1 COMMERCIAL FISHERIES

205. As described in the commercial fisheries baseline (and supported in Annex 16A: Commercial Fisheries Baseline), the Wind Farm Site records relatively low levels of fishing activity compared to grounds elsewhere in the Moray Firth, and relatively very low on a larger scale. In general terms, it is considered that the construction and operation of the Wind Farm will result in loss of fishing grounds which is assessed to be minor.
206. There is the potential that a safety exclusion zone will cover the whole of the site during part of the construction period (up to five years) which would result in loss

- of access to fishing grounds during this period. It is however likely that phased safety zones will be applied.
207. It is considered that some degree of access will be regained to fishing grounds within the operational Wind Farm Site.
208. BOWL will establish a Working Group which will facilitate ongoing dialogue throughout the pre-construction, construction and operational phases of the Wind Farm.
209. Table 16.10 below provides a summary of the key findings and residual effects of the Wind Farm upon commercial fisheries.

Table 16.10 Summary Table of Effects to Commercial Fisheries

Residual Effects	Sensitivity of the Receptor	Magnitude of Effect	Nature	Significance of Effect
Construction				
Adverse effects to commercial fish and shellfish populations	See Section 11: Wind Farm Fish and Shellfish Ecology			
Adverse effect on recreational fish populations	See Section 11: Wind Farm Fish and Shellfish Ecology			
Complete loss or restricted access to traditional fishing grounds	Low	Medium	Negative	Minor
Safety Issues for fishing vessels	N/A	N/A	Negative	N/A
Increased steaming times to fishing grounds	Low	Medium	Negative	Minor
Displacement of fishing vessels into other areas	Low	Medium	Negative	Minor
Interference with fishing activities	Low/medium	Small/ medium	Negative	Minor
Operation				
Adverse effects to commercial fish and shellfish populations	See Section 11: Wind Farm Fish and Shellfish Ecology			
Adverse effect on recreational fish populations	See Section 11: Wind Farm Fish and Shellfish Ecology			
Complete loss or restricted access to traditional	Low	Medium	Negative	Minor

Residual Effects	Sensitivity of the Receptor	Magnitude of Effect	Nature	Significance of Effect
fishing grounds				
Safety Issues for fishing vessels	N/A	N/A	Negative	N/A
Increased steaming times to fishing grounds	Low	Small	Negative	Negligible
Obstacles on the sea bed post construction	N/A	N/A	Negative	Ongoing consultation to reduce risks to acceptable limits
Displacement of fishing vessels into other areas	Low	Medium	Negative	Minor
Interference with fishing activities	Low	Small	Negative	Negligible

16.6.2 SALMON AND SEA TROUT FISHERIES

210. Effects on salmon and sea trout fisheries may occur if the ecology of the species is negatively affected as a result of the construction/decommissioning and operational phases of the Wind Farm. In summary, effects on salmon and sea trout are expected to be minor.
211. BOWL will work with key stakeholders and MS to identify future monitoring programmes as necessary.

16.7 ASSESSMENT OF CUMULATIVE EFFECTS

212. Given below is the assessment of cumulative effects upon Commercial Fisheries arising from the Wind Farm in conjunction with other existing or foreseeable planned project/development activities.
213. A CIADD (MROWDG, 2011) was produced which set out the developments to be considered and the assessment method for each technical assessment and is the basis of this assessment. The CIADD is presented in Annex 5B.

16.7.1 SCOPE OF ASSESSMENT

214. The methodology and assessment criteria for the cumulative assessment are as described in Section 16.2.

16.7.1.1 Geographical Scope

215. The geographical scope of the assessment is the same as that described previously, but focuses principally on cumulative effects to commercial fishing activities in the Moray Firth. An exception to this is potential effects upon the scallop fishery: as a result of the nomadic nature of the majority of the fleet and their ability to variously target grounds around the UK in addition to those in the Moray Firth, it is necessary to consider project/development activities around the UK.

16.7.2 DEVELOPMENTS CONSIDERED IN ASSESSMENT

216. An assessment of cumulative effects upon commercial fishing activities arising from the consideration of the Wind Farm in conjunction with other existing or foreseeable planned project/ development activities takes into account the following elements:

- BOWL OfTW;
- Moray Firth Round 3 Zone and export cable(s);
- The SHETL cable;
- The SHELTL offshore hub;
- Shipping;
- Relevant oil and gas activities; and
- Marine Protected Areas (MPAs) and other closed or restricted areas.

217. The developments or activities scoped out for further assessment are described in Table 16.11 below.

Table 16.11 Developments and Activities Scoped out of the Commercial Fisheries Assessment

Development	Reason for Scoping Out	
	Not considered to affect commercial fishing activities and vessels identified in the baseline	No information available
Aberdeen Bay Offshore Wind Farm	✓	
Methil Offshore Windfarm	✓	
SHEFA telecoms cable	✓	
Port and Harbour Developments in the Moray Firth		✓
Dredging and sea disposal in the Moray Firth	✓	
Onshore wind farms	✓	

218. It is considered that a number of developments located around the UK have the potential to add to a cumulative effect on the scallop fishery, due to the nomadic nature of the fleet. These include:

- Beatrice Offshore Wind Farm;
- Beatrice OfTW;
- Moray Firth Round 3 Zone;
- Moray Firth Round 3 Zone transmission cables;
- SHETL cable (and potentially offshore hub, although the location is presently unknown);
- Firth of Forth Round 3 Zone;
- Inch Cape;

- Neart na Gaoithe;
- Rampion Round 3 Zone (English Channel);
- Irish Sea Round 3 Zone; and
- Argyll Array.

219. It is recognised that fishing vessels may not spend all, or indeed a significant proportion, of their time in the Moray Firth and hence certain other offshore renewable developments may also affect them. 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 in paragraph 40, although individual vessels may spend more time in certain regional areas such as the Moray Firth, it is not possible within the scope of this assessment to consider the extent of an effect on a vessel by vessel basis. Instead, scallop grounds affected by the Wind Farm have been considered within the context of available scallop grounds around the UK relevant to other offshore renewable developments, as listed in paragraph 218 above.

16.7.3 CONSULTATION

220. The CIADD (MFOWDG, 2011) was presented to Marine Scotland for review in April 2011 for comment.

221. A summary of consultation relating to cumulative effects is included in Table 16.1.

222. Following these initial comments on the CIADD, scoping opinions were received from Marine Scotland in regard to the Wind Farm (Marine Scotland, 2011) and for the transmission works (Marine Scotland, 2011). A revised methodology was then developed. Subsequent telephone discussions and written responses confirmed that the proposed methodology was considered appropriate and fit for purpose.

16.7.4 ASSESSMENT LIMITATIONS

223. In certain instances it has not been possible to assign the likely significance of cumulative effect, as a result of the absence of detailed construction and operation schedules and methodologies of various developments. Where this has not been possible, it is noted.

16.7.5 PREDICTED EFFECTS

16.7.5.1 Offshore Wind Farms and Renewable Developments

224. The assessment of the potential cumulative effects of offshore wind farm development focuses primarily on the Wind Farm in conjunction with the proposed Moray Firth Round 3 Zone development as a result of their proximity. The worst case parameters of wind farm design for the Moray Firth Round 3 Zone development in terms of commercial fisheries are provided in Table 16.12 below.

Table 16.12 Summary of Moray Firth Round 3 Zone Worst Case Parameters for Commercial Fishing

Realistic Worst Case Parameters	Specifications
Wind Farm Sites	
Telford (EDA)	145 x 3.0 - 3.6MW turbines
MacColl (EDA)	87 x 5MW turbines
Stevenson (EDA)	88 x 5MW turbines
Western Development Area (WDA)	100 x 5MW turbines*
The following information is applicable to all of the wind farm sites listed above:	
Turbine Layout	
Minimum spacing (crosswind)	625 m
Minimum spacing (downwind)	1000 m
Foundations and Substructure	
Foundation Type	Gravity base foundations
Width at base	65 - 70 m
Met Masts	
Maximum number of met masts	1 x 4.5 m monopile in EDA 1 x 4.5 m monopile in WDA
Inter-array Cables	
Estimated total length	482 km of AC cables
Additional Offshore Infrastructure	
Foundation type	Semi-submersible (floating)
Maximum number of OSPs	8 x AC OSPs in the EDA 2 x DC OSPs in the EDA 2 x AC OSPs in the WDA

* The number of turbines exceeds the capacity for the site. However, if Moray Offshore is unable to develop the expected number of turbines in the Telford, MacColl and Stevenson sites, up to 500 MW may be developed in the WDA.

16.75.2 *Adverse Effects on Commercially Exploited Fish and Shellfish Populations*

225. Cumulative effects on fish and shellfish populations arising from the construction and operation of the Wind Farm and other offshore developments/activities are described in Section 11: Wind Farm Fish and Shellfish Ecology, and summarised in Table 16.13 below.

Table 16.13 Summary of Cumulative Assessment on Commercial Species

Effect	Receptor	Nature	Assessment of Cumulative Effect	Significant Effect (Y/N)
Increased SSC and sediment re-deposition	All (General)	Negative	Minor	N

Effect	Receptor	Nature	Assessment of Cumulative Effect	Significant Effect (Y/N)
Construction Noise	Noise	Scallops/Squid	Negative Minor	N
		Haddock	Negative Minor	N
Loss of habitat	All (General)	-	Negligible	N
Introduction of new habitat	General (All)	Negative/Positive	Minor	N
EMFs	All (General)	Negative	Minor	N
Operational Noise	General	Negative	Minor	N
Changes to Fishing Activity	All (General)	-	Negligible	N

16.753 *Adverse Effects on Recreational Fish Populations*

226. There is not currently considered to be a regular or directed recreational fishing activity occurring within the boundary of the Wind Farm. It is however recognised that there may be potential cumulative effects upon migratory fish species such as salmon and sea trout, which have significant socio-economic importance as recreational fish species. As previously stated, effects upon salmon and sea trout fisheries are separately assessed at the end of this Section.

16.754 *Complete Loss or Restricted Access to Fishing Grounds*

227. The principal fishing activity occurring within the Wind Farm is dredging for scallops. This activity occurs elsewhere in the Moray Firth, including the Moray Firth Round 3 Zone site. The Moray Firth Round 3 Zone site records a higher density of scallop fishing activity, as well as encompassing a greater proportion of fishing grounds.

228. Analysis of fisheries statistical datasets demonstrates that the squid fishery in the Moray Firth is important on a national scale. There is also a squid fishery in the Firth of Forth, although this is considerably less productive on a consistent annual basis. A cumulative effect to the fishery will therefore predominantly arise from the Moray Firth Round 3 Zone development, which records a limited level of squid fishing activity. The relatively lower level of activity for squid fishing within the Wind Farm Site should however be noted.

229. Although whitefish such as haddock may be caught within other offshore wind farm developments outside of the Moray Firth, there is a very low level occurring within the Moray Firth Round 3 Zone site and it is therefore not considered that there is a significant cumulative effect above that identified in the site specific assessment.

230. In the Moray Firth, there is the potential for all fishing activities to be progressively excluded during the construction phases of both the Wind Farm and Moray Firth Round 3 Zone, as a result of the safety zones implemented during the construction

- phase, as well as the safety risks associated with infrastructure such as inter-array cabling.
231. Although it is assumed that the entire Wind Farm Site will be developed (131.5 km²), it is at this stage uncertain what percentage of the Moray Firth Round 3 Zone will be developed. The possible overlap of construction activities and resulting combined loss of area will determine the level of fishing activity excluded and potentially displaced into other areas. Furthermore, consecutive construction schedules will determine the duration of effect. It is likely that a larger proportion of fishing grounds will be temporarily lost for a longer period of time as a result of the construction of the Wind Farm and the Moray Firth Round 3 Zone development. Fishing vessels will not be able to access grounds during the construction phase until the safety risks associated with wind farm infrastructure are within acceptable limits. The receptor is therefore considered to be of medium sensitivity, the effect of medium magnitude, and the cumulative effect is therefore assessed to be moderate.
232. Post-construction surveys will be undertaken in the Wind Farm and the Moray Firth Round 3 Zone to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed. Subsequently, it is expected that current fishing practices will be able to resume to some degree within the operational wind farm sites in the Moray Firth. It is however noted that individual skippers, particularly those operating bottom towed gear will assess the risk independently and may conclude that it is unsafe to continue fishing within the operational site. In light of the moderate importance of the fishing grounds the Moray Firth Round 3 Zone site comprises, and the restricted access to fishing grounds as a result of the operational developments the receptor is of medium sensitivity, the effect of medium magnitude and the cumulative effect is therefore moderate.
233. In the case of the nomadic scallop fishery, there are not currently any operational wind farms or wind farms under construction in the UK that are situated in productive scallop fishing grounds. As previously stated, there are, however, a number of proposed developments which could affect scallop grounds.
234. The cumulative effect upon the nomadic scallop fishery is dependent upon the productivity of grounds affected and the scale of effect, which will depend upon construction schedules of individual developments and the ability of the vessels to regain access to grounds once the sites are operational. The Wind Farm will contribute to the cumulative effect of loss or restricted access to scallop fishing grounds as a result of offshore wind farm development around the UK. The limited contribution of the Wind Farm Site should however be noted, as a result of the relatively low level of activity occurring within the site and its comparatively small size. Due to a lack of information on the programmes and design parameters of the relevant wind farms around the UK, it is not possible to assess the cumulative effect of offshore wind farm developments upon the nomadic scallop fishery.

16.755 *Safety Risks to Fishing Vessels*

235. The cumulative safety risks to fishing vessels as a result of offshore wind farm development are difficult to quantify as they are determined by the fishing patterns of individual vessels: vessels travelling greater distances to fishing grounds have the potential to be affected by multiple developments. It is however recognised that the proximity of Moray Firth Round 3 Zone to the Wind Farm Site poses the greatest cumulative risk to the safety of fishing vessels in the Moray Firth, and an assessment of the cumulative safety risks posed by these developments is described below.
236. Table 16.12 provides the worst case parameters of the Moray Firth Round 3 Zone development relevant to the cumulative risks of offshore wind farm development in the Moray Firth to the safety of fishing vessels.
237. It is considered that there will be some overlap in the construction schedules of the Wind Farm and the Moray Firth Round 3 Zone development. Safety zones of 500 m may be imposed around construction works, from which all vessels are excluded. In the Wind Farm, the area of the Wind Farm Site considered to be a construction zone may vary throughout the project if a phased construction approach is adopted, which is the most likely situation. It is uncertain at this stage what the construction approach on the Moray Firth Round 3 Zone development will be. Risks to fishing vessels would only occur if there are infringements of these safety zones. 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 would put the safety risk within acceptable limits.
238. In addition to construction safety zones, there are safety risks associated with other infrastructure installed during the construction phase, such as inter-array cabling. Until post-construction surveys are undertaken in the Wind Farm and the Moray Firth Round 3 Zone to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed, it is considered that the safety risks will be outside of acceptable limits.
239. During the operational phase all infrastructure installed on the Wind Farm and the Moray Firth Round 3 Zone will be required to be appropriately marked, in line with standard industry practice. Furthermore, it is likely that operational safety zones will be implemented in the immediate area of infrastructure, excluding cables.
240. Post-construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed.
241. Provided there is compliance with the operational safety zones, it is expected that current fishing practices, as identified in the baseline, will be able to safely resume to some degree within the operational sites.

16.75.6 *Increased Steaming Time to Fishing Grounds*

242. There may be increases in steaming times to fishing grounds in addition to those incurred during the construction of the Wind Farm, depending upon the scale of safety zones applied in the Moray Firth Round 3 Zone. It is uncertain at this stage what the construction approach on the Moray Firth Round 3 Zone development will be.
243. The Shipping and Navigation assessment considers that there is good prospect for fishing vessels to navigate within the Wind Farm and the Moray Firth Round 3 Zone development once infrastructure is operational.

16.75.7 *Obstacles on the Seabed Post-construction*

244. There is the potential for obstacles to be left on the seabed post construction which could result in damage to or loss of fishing gears, as well as representing a safety hazard. Offshore works such as construction vessel anchoring, jack-up legs or cable laying and trenching can produce seabed obstructions which have caused fastenings and damage to fishing gears. The cumulative effect of the Wind Farm and Moray Firth Round 3 Zone development will be an increase in the scale of potential effect.
245. Legal obligations policy prohibits the discarding of objects or waste at sea. The reporting and recovery of any accidentally dropped objects is also required.
246. Post-construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed.

16.75.8 *Interference to Fishing Activities*

247. All of the predicted cumulative effects included in this assessment would cause interference to fishing activities. An additional effect to be considered, however, is the potential for navigational conflicts arising between fishing vessels and construction, operations and maintenance vessels transiting to and from site. This could include the fouling of static gear marker buoys and dhans, or towed gear vessels being required to alter towing direction. This interference has the potential to affect more fishing vessels than those operating in the immediate vicinity of the site, depending upon the location of the operations and maintenance port.
248. The cumulative effect of the Wind Farm and Moray Firth Round 3 Zone developments will be an increase in the scale of potential effect. It is not possible to assess the cumulative effect due to uncertainties about the locations of construction and maintenance ports.

16.75.9 *Displacement of Fishing Activity*

249. 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 outwith of the site. This might result in either potential conflict between vessels competing for the same

- resource, or between different fishing methods (ie static and towed gear vessels). The scale of potential displacement as a result of construction of the cumulative effect of offshore wind farm development will be a function of the loss of fishing grounds from these areas.
250. As previously stated, in the Moray Firth there is the potential for a progressive increase in the loss of fishing grounds in the Wind Farm and Moray Firth Round 3 Zone during their respective construction phases. The scale of displacement is dependent upon the fishery: nomadic scallop vessels have the potential to target grounds around the UK. The Moray Firth squid fishery will likely be limited to grounds elsewhere in the Moray Firth.
251. The combined loss of area during the construction phases and the duration of construction activities will determine the level of fishing activity excluded and potentially displaced into other areas. Although it is assumed that the entire Wind Farm Site will be developed (131.5 km²), it is at this stage uncertain what percentage of Moray Firth Round 3 Zone will be developed. Fishing vessels will not be able to access grounds during the construction phase until the safety risks associated with wind farm infrastructure are within acceptable limits, resulting in displacement elsewhere. In light of the spatial loss of fishing grounds and combined durations of the construction phases, resulting in displacement of fishing vessels, the receptor is considered to be of medium sensitivity, the effect of medium magnitude, and the cumulative effect is therefore assessed to be moderate.
252. During the operational phase all infrastructure installed on the Wind Farm and Moray Firth Round 3 Zone development will be required to be appropriately marked, in line with standard industry practice. Furthermore, it is likely that operational safety zones will be implemented in the immediate area of infrastructure, excluding cables.
253. Provided there is compliance with the operational safety zones, it is expected that current fishing practices, as identified in the baseline, will be able to safely resume to some degree within the operational sites. The displacement of vessels will be dependent upon the level of access regained to fishing grounds within the boundaries of the developments.
254. Post-construction surveys will be undertaken in the Wind Farm and Moray Firth Round 3 Zone to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed. Subsequently, it is expected that current fishing practices will be able to resume to some degree within the operational wind farm sites in the Moray Firth. It is however noted that individual skippers, particularly those operating bottom towed gear will assess the risk independently and may conclude that it is unsafe to continue fishing within the operational site. In light of the moderate importance of the fishing grounds the Moray Firth Round 3 Zone site comprises, and the restricted access to fishing grounds as a result of the operational developments resulting in displacement of fishing vessels, the receptor

is of medium sensitivity, the effect of medium magnitude and the cumulative effect is therefore moderate

255. In the case of the scallop fishery, there is the potential for displacement from other areas as a result of multiple offshore wind farm development elsewhere in the UK. The scale of displacement will depend upon the area of grounds fishermen are excluded from, as well as the duration of exclusion. The relatively very small proportion of the cumulative total area (all UK wind farms affecting scallop grounds) that the Wind Farm contributes should however be noted. Due to a lack of information on the programmes and design parameters of the relevant wind farms around the UK, it is not possible to assess the cumulative effect of offshore wind farm developments upon the nomadic scallop fishery.

16.75.10 *Beatrice Offshore Transmission Works (OfTW)*

256. The OfTW connecting the Wind Farm onshore follows a route south of the development to a landfall site in the Spey Bay area. The route transects fishing grounds for nephrops, scallops, squid and crab and lobster. The scallop and squid fisheries will potentially be cumulatively affected by the installation of the OfTW in addition to the construction and operation of the Wind Farm.
257. The total offshore cable length is approximately 65 km. The maximum number of cables, constituting the greatest potential loss of fishing ground as well as the greatest potential safety risk, is: three AC cables in individual trenches. Each trench width will be a maximum width of 3 m.
258. Guidance published by the United Kingdom Cable Protection Committee (UKCPC) recommends that cable trenches should be separated by a distance based upon water depth. The total separation distance between the outermost AC cable trenches will be up to 1.5 km.
259. The greatest length of unburied cable(s) has been assumed, whereby 45% of the total cable length will be surface laid and will be protected by either rock placement or concrete mattresses.
260. The indicative duration of the OfTW installation will be approximately 120 days per activity (cable lay and burial/protection constituting individual activities), approximately 240 days in total, although there is the potential for overlap. There will be two offshore works vessels operating simultaneously (cable lay vessel and trenching support vessel), with an additional survey vessel for a limited period. Operations will be 24 hours, seven days a week. The timing of the installation period is not currently known and could potentially occur at any period throughout the year.
261. There will be additional vessels to complete the landfall/near-shore operations; an anchored barge for cable laying, two anchor handlers for positioning the lay barge and a tug for transiting the lay barge.
262. The effect of the OfTW will be restricted to the installation phase, with fishing vessels being temporarily excluded from a limited area.

263. Post construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed.

264. The cumulative effect of the OfTW installation and the Wind Farm, in addition to the Moray Firth Round 3 Zone development, will be limited to the discrete area along the OfTW route during the construction phase. It is therefore considered that the receptor is of medium sensitivity, the effect of medium magnitude and the cumulative effect is therefore moderate.

16.75.11 *Moray Firth Round 3 Zone Export Cable(s)*

265. The export cable route connecting the Moray Firth Round 3 Zone onshore follows a route broadly south east from the Moray Firth Round 3 Zone to a landfall in the Fraserburgh/Peterhead area. The cable route is approximately 89 km in length. The cable(s) pass through the fishing grounds for scallops, nephrops, squid and crab and lobster. The installation of the cable(s), up to 10 in total, has the potential to cumulatively affect fishing scallop and squid fishing activities.

266. Post construction surveys will be undertaken to assess the seabed status in the immediate vicinity of construction and installation activities to ensure that the seabed is at an appropriate and reasonable standard determined in consultation with the fishing industry for fishing activities to be safely resumed.

267. The cumulative effect of the Moray Firth Round 3 Zone export cable and the OfTW will be limited to a discrete area along the routes during the construction phase. It is therefore considered that the receptor is of medium sensitivity, the effect of medium magnitude and the cumulative effect is therefore moderate.

16.75.12 *SHETL Cable and Offshore Hub*

268. As with the OfTW and the Moray Firth Round 3 Zone export cable(s), the installation of the proposed SHETL cable and the construction and operation of the offshore hub have the potential to cumulatively affect fishing activities.

269. Due to uncertainties about installation schedules and methodologies, it is not possible to assess the scale of potential cumulative effect.

16.75.13 *Shipping and navigation*

270. The principal cumulative effect of shipping and navigation upon commercial fishing activities is discussed in Section 18: Wind Farm Shipping and Navigation.

16.75.14 *Offshore Oil and Gas Developments*

271. There is currently oil and gas development at the Greater Beatrice Area in the Moray Firth². This includes Beatrice Field infrastructure and the Jacky platform and corresponding subsea flow lines. All vessels are prohibited from within 500 m of any infrastructure. Included within the oil and gas infrastructure are two

² Greater Beatrice area defined at: <http://www.ithacaenergy.com/beatrice.aspx>

operational demonstrator wind turbines. The existing Beatrice and Jacky infrastructure currently limits fishing activity in the Moray Firth as a result of these exclusion zones. There is currently no planned oil and gas development in the Moray Firth.

272. Although it is recognised that loss of fishing area as a result of oil and gas development elsewhere may apply to certain vessels, it is not considered within the scope of this assessment and hence not considered to contribute a cumulative effect.

16.75.15 *Marine Protected Areas and other Closed/Restricted Areas*

273. MPAs currently in place have, in certain areas, had the effect of restricting fishing activities, particularly those activities affecting the seabed (ie bottom towed gear such as scallop dredging). In Cardigan Bay, for example, a designated SAC and previously a scallop fishing ground, all scallop dredging is prohibited. It is considered that the MCZ announcements in England and Wales and the Nature Conservation MPAs in Scotland will enforce additional limitations upon certain, if not all fishing activities, which will have the effect of further restricting fishing activities.

274. 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 Moray Firth.

275. Management policies around the UK which result in restricted access to grounds have the potential to affect the nomadic scallop fleet, for example the closure in Isle of Man waters. It is possible that additional closed areas may apply in the future.

276. The cumulative effect of the Wind Farm in conjunction with existing and proposed MPAs is noted, although again the contribution will be relatively very low. Due to a lack of definition about the locations and restrictions of proposed MPAs, it is not currently possible to assess the potential cumulative effect.

16.75.16 *Dredging and Sea Disposal in the Moray Firth*

277. There are not currently any licensed aggregate dredging areas in the Moray Firth. Although it is recognised that loss of fishing area as a result of aggregate dredging in areas outwith of the Moray Firth may apply to certain vessels, it is not considered within the scope of this assessment.

16.7.6 CUMULATIVE EFFECTS ON SALMON AND SEA TROUT FISHERIES

278. As a result of salmon and sea trout fisheries being either in-river, or to a lesser extent, coastal, direct cumulative effects arising from offshore development will not occur. It is possible, however, that indirect effects on the fisheries may occur if the ecology of these species is adversely affected in the offshore marine environment.

279. There is potential for a number of offshore developments/activities to cumulatively add to any indirect effects on salmon and sea trout fisheries incurred by the Wind Farm. It should however be noted that the current limited knowledge of the use that salmon and sea trout make of coastal waters around Scotland, their behaviour

and migratory routes, complicate the assessment of cumulative effects on salmon and sea trout fisheries.

280. It has been considered that the following activities have potential to result in cumulative effects on salmon and sea trout and hence indirectly on their fisheries.

- Moray Firth Round 3 Zone;
- Beatrice Offshore Wind Farm OfTW;
- Moray Firth Round 3 Zone OfTW;
- Proposed SHETL cable;
- Proposed SHETL offshore hub;
- Port and harbour developments in the Moray Firth;
- Commercial fisheries;
- Marine energy development in the Pentland Firth and Orkney waters; and
- Relevant military activities.

281. In addition to the above, given the migratory nature of the species, there is potential for offshore wind farms proposed in the Firth of Forth area to also result in cumulative effects, including the following.

- Neart Na Gaoithe;
- Inch Cape; and
- Firth of Forth R3 Area.

282. A full assessment of cumulative effects on salmon and sea trout is given in Section 11: Wind Farm Fish and Shellfish Ecology, and summarised in Table 16.14 below.

Table 16.14 Summary of Cumulative Assessment on Salmon and Sea Trout

Effect	Receptor	Nature	Assessment of Cumulative Effect	Significant Effect (Y/N)
Increased SSC and sediment re-deposition	All (General)	Negative	Minor	N
Construction Noise	Salmon and sea trout	Negative	Moderate	Y
Loss of habitat	All (General)	-	Negligible	N
Introduction of new habitat	General (All)	Negative/Positive	Minor	N
EMFs	All (General)	Negative	Minor	N
Operational Noise	General	Negative	Minor	N
Changes to Fishing Activity	All (General)	-	Negligible	N

16.8 STATEMENT OF SIGNIFICANCE

283. No site specific significant effects upon commercial fishing activities and commercial fisheries have been identified in this assessment.

284. No site specific significant effects upon commercial and recreational fish populations have been identified in this assessment.
285. Cumulative effects arising from offshore development in the Moray Firth have identified moderate significant effects. This relates to complete loss or restricted access to fishing grounds during the construction/decommissioning and operational phases of the Wind Farm and Moray Firth Round 3 Zone developments and displacement of fishing vessels as a result of this. In addition, an assessment of the cumulative effect of the installation of the Moray Firth Round 3 Zone export cable and OfTW in addition to the Wind Farm and Moray Firth Round 3 Zone developments have also identified the same moderate significant effects.
286. Cumulative effects upon commercial and recreational fish and shellfish populations arising from offshore development in the Moray are in general terms considered not significant in relation to EIA regulations. However, an exception is the effect of construction noise upon salmon and sea trout ecology, as indicated in Table 16.14, which is significant in terms of the EIA Regulations. This may have a secondary effect upon salmon and sea trout fisheries, although the likelihood of this is unknown. This takes account of the worst case scenario for the Wind Farm and Moray Firth Round 3 Zone, which assumes that eight piling operations are taking place simultaneously. In addition, in the case of salmon and sea trout, it has been assumed that there is potential for the fish to be affected by piling operations taking place in the Aberdeen Bay and the Firth of Forth.

16.9 REFERENCES

287. British Wind Energy Association 2004 Recommendations.
288. Caddy, J. F. (1983). The Cephalopods. Factors relevant to their population dynamics and to the assessment and management of stocks. In J.F. Caddy, ed. *Advances in assessment of world cephalopod resources*, p. 416-452. FAO Fisheries Technical Paper No. 231. Rome.
289. CEFAS, MCUE, Defra, DTI (2004) Offshore Wind Farms, Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements. Version 2.
290. COWRIE (2010) Options and Opportunities for Marine Fisheries Mitigation Associated with Wind Farms.
291. DECC, January 2009. UK Offshore Energy – Strategic Environmental Assessment.
292. FLOWW, May 2008. Recommendations for Fisheries Liaison.
293. IEEM (2010) Institute of Ecology and Environmental Management. Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal. Final Document.
294. International Cable Protection Committee (CPC) (2009) Fishing and Submarine Cables: Working Together.
295. <http://www.ithacaenergy.com/beatrice.aspx>

296. Marine License requirements (replacing Section 5 Part II of the Food and Environmental Protection Act 1985 and Section 34 of the Coast Protection Act, 1949).
297. Marine Scotland, 2010. Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Volume 1: Environmental Report.
298. Protocol of 1996 to amend the Convention on Limitation of Liability for Maritime Claims of 19 November 1976,
<http://www.admiraltylawguide.com/conven/protolimitation1996.html>
299. UK Oil and Gas. (2008). Fisheries Liaison Guidelines – Issue 5:
300. UKOOA (2006). Guidelines to Improve Relations between Oil and Gas Industries and Near-shore Fishermen.
301. Young, I.A.G., Pierce, G.J., Stowasser, G., Santos, M.B., Wang, J., Boyle, P.R., Shaw, P.W., Bailey, N., Tuck, I. and Collins, M.A. (2006). The Moray Firth directed squid fishery. Fisheries Research, 78: 39-43.

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