CHAPTER 11: COMMERCIAL FISHERIES

Chapter Summary

This chapter of the EIA Report assesses the potential impacts upon commercial fisheries of the optimised Seagreen Project throughout the construction, operation and decommissioning phases.

The scope of this assessment has been informed by the outputs of the 2017 Scoping opinion and additional consultation carried out with fisheries stakeholders and their representatives.

Consideration has been given to the potential impacts on commercial fisheries, taking account of the current fisheries baseline and the optimised project design.

The predominant fishing activity within the boundaries of Project Alpha and Project Bravo is scallop dredging. Trawling for squid and creeling for lobster and crabs also occurs in the immediate area of the sites however to a much lesser extent. The wider area around Project Alpha and Project Bravo also supports *Nephrops* and whitefish fisheries.

With the application of environmental measures incorporated into the Project and additional mitigation where required, the assessment has identified potential for impacts on commercial fisheries of minor significance (and therefore not significant in EIA terms) for all commercial fisheries receptors.

Additional mitigation is proposed in respect of local scallop dredgers during the construction phase to minimise potential loss or restricted access to fishing grounds within Projects Alpha and Bravo. In addition, in the case of the lobster and crab fishery, it is recognised that there may be occasions when certain vessels may need to relocate their gear as a result of construction activity in Project Alpha and Project Bravo. In these instances, Seagreen will follow policy as specified in the FLOWW Guidelines (2015) of appropriate evidence based mitigation.

Mitigation measures will be included in the Fisheries Management and Mitigation Strategy of the optimised Seagreen Project following consultation with relevant stakeholders.

INTRODUCTION

11.1. As set out in Chapter 1 (Introduction), the original Seagreen Project (herein referred to as the originally consented Project) received development consents from Scottish Ministers in 2014. This was confirmed in November 2017, following legal challenge to the consent award decision. Seagreen is now applying for an additional consents for an optimised design (herein referred to as the optimised Seagreen Project), based on fewer, larger, higher capacity wind turbines that have become available, since the 2014 consent decision and inclusion of monopiles as a foundation option.

11.2. This Environmental Impact Assessment (EIA) Report provides an assessment of the potential environmental impacts of the optimised Seagreen Project, to support a new application for development consent. This chapter of the EIA Report assesses the potential impacts upon commercial fisheries throughout the construction, operation and decommissioning phases of the Project.

11.3. The originally consented project comprises the Seagreen Alpha Offshore Wind Farm (OWF) (herein referred to as 'Project Alpha'), Seagreen Bravo OWF (herein referred to as 'Project Bravo') and the Offshore Transmission Asset. It is noted that the Offshore Transmission Asset has been separately licensed, no changes are proposed and therefore this is not considered further within this assessment. A full description of the optimised Seagreen Project is provided in Chapter 5 (Project Description) of this EIA Report.

11.4. The structure of this chapter is as follows:

- Legislation, policy and guidance: sets out key legislation, policy context and guidance with reference to latest updates in guidance and approaches;
- Consultation: provides details of consultation undertaken to date and how this has informed the assessment;
- Scope of assessment: sets out the scope of the impact assessment for commercial fisheries in line with the 2017 Scoping Opinion and further consultation;
- Methodology: sets out the study area, data collection undertaken and approach to the assessment of impacts for commercial fisheries;
- Baseline Conditions: describes and characterises the baseline environment for commercial fisheries and information used to inform the baseline;
- Assessment of impacts: confirms the project design parameters to be assessed (the Worst Case Scenario [WCS]) and presents the impact assessment for commercial fisheries throughout the construction, operation and decommissioning phases and concludes on the likely significance of impacts. The assessment includes the consideration of any mitigation measures (both embedded and additional) and sets out any monitoring proposals for potentially significant effects, if required;
- Cumulative impact assessment: presents the cumulative impact assessment for commercial fisheries throughout the construction, operation and decommissioning phases and concludes on the likely significance of impacts with consideration of mitigation measures;
- Interrelationships: Assesses the potential interrelated impacts on any given receptor scoped into the assessment;
- Transboundary impacts: Considers the potential for any transboundary impacts in relation to commercial fisheries; and
- Assessment summary: provides a summary of the impact assessment undertaken.

11.5. Appendix 11A (Commercial Fisheries Technical Report) supports this chapter and is provided in Volume III: Appendices.

11.6. All figures supporting this chapter can be found in Volume II: Figures.

11.7. This chapter was produced by Brown and May Marine Limited (BMM).

LEGISLATION, POLICY AND GUIDANCE

11.8. The following sections identify the overarching policy context and legislation relevant to the assessment on commercial fisheries.

Policy Context

11.9. This assessment of the potential impacts on commercial fisheries has been undertaken with reference to the Scottish National Marine Plan (NMP) (Scottish Government, 2015).

11.10. The plan covers the management of Scottish inshore waters (out to 12nm) and offshore waters (12 to 200nm). It sets out the strategic policies for which management decisions will be made across the main marine sectors, including specific policies for offshore wind and marine renewable energy and sea fisheries. Policies outlined in the NMP that are relevant to this assessment are outlined in Table 11.1.

Table 11.1 Policies outlined in the NMP that are relevant to the assessment on commercial fisheries

Policy	Description
4. General Policies	• GEN1 General Planning Principle: There is a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of this Plan; • GEN4 Co-existence: Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision making processes, when consistent with policies and objectives of the Plan; • GEN 17 Fairness: All marine interests will be treated with fairness and in a transparent manner when decisions are being made in the marine environment.
6. Sea Fisheries, Part 1 objectives and marine planning policies, Marine planning policies	Fisheries 1: Marine plans and decision makers should aim to ensure: • Existing fishing opportunities and activities are safeguarded wherever possible; and • Mechanisms for managing conflicts between fishermen and between the fishing sector and other users of the marine environment. Fisheries 2: The following factors should be taken into account when deciding on uses of the marine environment and potential impact on fishing: • The potential impact (positive and negative) of marine developments on the sustainability of fish and shellfish stocks and resultant fishing opportunities in any given area; • The environmental impact on fishing grounds (such as nursery, spawning areas), commercial fisheries species, habitats and species more generally; • The potential effect of displacement on: fish stocks; the wider environment; use of fuel; socio-economic costs to fishers and their communities and other marine users. Fisheries 3: • Where existing fishing opportunities or activity cannot be safeguarded, a Fisheries Management and Mitigation Strategy should be prepared by the proposer of development or use, involving full engagement with local fishing interests (and other interests as appropriate) in the development of the Strategy. All efforts should be made to agree the Strategy with those interests. Those interests should also undertake to engage with the proposer and provide transparent and accurate information and data to help complete the Strategy. The Strategy should be drawn up as part of the discharge of conditions of permissions granted.
Section 6 Sea Fisheries, Part 3 key issues for marine planning, Interactions with other users	Paragraphs 6.22 to 6.26: There are some key emerging issues concerning the interactions between the fishing industry and other interests which should be borne in mind in any proposed marine development and factored into marine planning processes. In respect of Developments this includes: • Energy developments can displace fishing. The cabling arrays associated with energy and telecoms developments, and other physical infrastructure associated with development, have the potential for short-term displacement of fishing activity during the installation phase; • There is also potential for damage to occur to both infrastructure and fishing equipment as a result of interactions, with obvious safety implications; • New developments should take into account the intensity of fishing activity in the proposed development area and any likely displacement which the development and associated activity could precipitate, with resultant increased pressure on remaining, often adjacent, fishing grounds; • There may be potential for some infrastructure or development areas to act as nursery grounds for fish and, if appropriately protected, these may lead to an increase in fish stocks in the surrounding areas. This possibility should be considered on a case by case basis; • Where relevant, Fisheries Liaison with Offshore Wind and Wet renewables (FLOWW) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison should be followed.

Legislative Requirements

11.11. Commercial fisheries are subject to a wide range of constraints and legislation. The main bodies regulating fishing activity in Scotland are the EU through the Common Fisheries Policy (CFP), Marine Scotland through national and regional regulations and the Regional Inshore Fisheries Groups (RIFGs).

11.12. Key legislative requirements and regulations relevant to commercial fishing in the Firth of Forth are outlined below:

- The CFP was reformed in 2014 with the latest CFP changes placing an emphasis on achieving long-term environmental sustainability. These policy changes included a ban on discarding (phased in to all EU fisheries by 2019) and new mandatory rules on the labelling of fisheries products on sale to consumers. There were also measures implemented to reduce overcapacity, with an obligation to report on the balance between fleet capacity and fishing opportunities and to implement plans to address imbalances;
- RIFGs are non-statutory bodies that aim to improve the management of Scotland's inshore fisheries out to 6nm, and to give commercial inshore fishermen a strong voice in wider marine management developments. This regional structure was introduced in April 2016 succeeding the Inshore Fisheries Groups (IFGs) which were formerly in place. The RIFG in closest proximity to Project Alpha and Project Bravo is the North and East Coast RIFG. Amongst the duties of the RIFG, is the enforcement of local byelaws such as those relating to the minimum landings size (MLS) of fish and shellfish species, maximum number of dredges that can operate and fishing permits for shellfish species. It should be noted, however, that Project Alpha and Project Bravo are located beyond the 6nm limit and therefore, local byelaws of the North and East Coast RIFG are not directly applicable to commercial fishing activity within the sites;
- Conservation measures associated with the designation of Nature Conservation Marine Protected Areas (MPAs): The Project Alpha and Project Bravo sites overlap with the Forth Banks complex MPA (Figure 11.1) which was designated by Marine Scotland in July 2014. Management measures for achieving the conservation objectives of this MPA are yet to be implemented, however, amongst the options under consideration (specifically in relation to the protection of ocean quahog), is the potential for restrictions to be introduced on mobile fishing gear that interacts with the bottom (otter trawling, demersal seine netting, and scallop dredging). In the case of static gear (creeling and potting), it is considered unlikely that additional management measures may be required as static gear fishing activities pose minimal risk to the conservation objectives set for quahog aggregations (JNCC, 2014).

11.13. Further detailed information on fisheries controls and regulations is provided in Appendix 11A (Commercial Fisheries Technical Report) of this EIA Report.

11.14. Legislative requirements relevant to fish and shellfish species (i.e. species protected under national and international legislation) are discussed in Chapter 9 (Natural Fish and Shellfish Resource) of this EIA Report.

11.15. A discussion of legislative requirements in respect of shipping and navigation is provided in Chapter 12 (Shipping and Navigation) of this EIA Report.

Guidance

11.16. The following guidance documents have been used to inform the assessment of potential effects on commercial fisheries:

- Centre for Environment, Fisheries and Aquaculture Science (Cefas) (2012) Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Contract report: ME5403, May 2012;
- Cefas, Marine Consents and Environment Unit (MCEU), Department for Environment, Food and Rural Affairs (DEFRA) and Department of Trade and Industry (DTI) (2004) Offshore Wind Farms - Guidance note for Environmental Impact Assessment In respect of FEPA and CPA requirements, Version 2;
- RenewableUK (2013) Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms;
- Sea Fish Industry Authority and UK Fisheries Economic Network (UKFEN) (2012) Best practice guidance for fishing industry financial and economic impact assessments;
- Blyth-Skyrme, R.E. (2010) Options and opportunities for marine fisheries mitigation associated with wind farms. Final report for Collaborative Offshore Wind Research into the Environment contract FISHMITIG09. COWRIE Ltd, London;
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison: FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) (2014);
- FLOWW Best Practice Guidance for Offshore Renewables: Recommendations for Fisheries Disruptions Settlements and Community Funds. FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) (2015);
- UK Oil and Gas (2015) Fisheries Liaison Guidelines – Issue 6;
- International Cable Protection Committee (2009) Fishing and Submarine Cables – Working Together. A concise summary of assessment methodology;
- Economic Assessment of Short Term Options for offshore Wind Energy in Scottish Territorial Waters: Costs and Benefits to other Marine Users and Interests (Marine Scotland, 2011); and
- SeaPlan. Options for Cooperation between Commercial Fishing and Offshore Wind Energy Industries. A Review of Relevant Tools and Best Practices (2015).

CONSULTATION

11.17. As part of the EIA process Seagreen has consulted with a number of statutory and non-statutory organisations to inform the approach to assessment on commercial fisheries.

11.18. A Scoping Report was submitted by Seagreen in May 2017. This considered the proposed changes to the optimised Seagreen Project and identified potential requirements for assessment. A Scoping Opinion was issued by Marine Scotland Licencing and Operations Team (MS-LOT) on behalf of Scottish Ministers in September 2017. This considered the information presented within the Scoping Report and set out key issues to be addressed within the impact assessment.

11.19. Table 11.2 sets out a summary of the issues raised in the Scoping opinion relevant to commercial fisheries and how these have been addressed within this EIA Report.

11.20. In addition to the formal scoping exercise, consultation specific to commercial fisheries was carried out as follows:

- Conference calls with Marine Scotland Licensing Operations Team (MS-LOT) on 12 December 2017 and on 9 May 2018;
- Two consultation meeting held with MS-LOT, the Scottish Fishermen's Federation (SFF) and Fishing Industry Representatives (FIRs) on 27 June 2017 and 11 January 2018, to discuss the assessment requirements applicable to the changes in design proposed and the current fisheries baseline; and
- A meeting with local fishermen held on 26 February 2018 to present and discuss the content and conclusions of the Commercial Fisheries Technical Report (Appendix 11A).

11.21. Further to the above, consultation was also carried out by two FIRs contracted through the SFF with a representative sample of fishermen operating from ports considered to be local to the Seagreen Project (Table 11.3). This included:

- Phone calls and email liaison with the Scottish White Fish Producers Association (SWFPA) inshore policy officer for information on trawlers and visiting scallopers;
- Face to face meetings with vessel owners fishing from Stonehaven to Arbroath; and
- Questionnaires and charts for drawing fishing grounds distributed to, and collected from, fishermen.

11.22. MS-LOTs formal acceptance of the approach taken by Seagreen in respect of consultation with commercial fisheries stakeholders was confirmed on 10 May 2018 (MS-LOT letter, 10 May 2018).

SCOPE OF ASSESSMENT

11.23. With reference to the 2017 Scoping Opinion the scope of the assessment for commercial fisheries considers the following impacts on commercial fisheries taking account of the current commercial fisheries baseline and the optimised project design:

- Potential impacts on commercially exploited fish and shellfish populations;
- Loss of, or restricted access to, traditional fishing grounds;
- Displacement of fishing activity into other areas;
- Safety issues for fishing vessels;
- Increased steaming times to fishing grounds; and
- Interference with fishing activities.

11.24. In respect of the assessment on commercially exploited species, a detailed assessment of the potential impacts associated with underwater noise from pile driving during construction of the optimised Seagreen Project is provided in Chapter 9 (Natural Fish and Shellfish Resource). Chapter 9 also provides a review of the sensitivity of scallops and Nephrops to suspended sediment deposition.

Table 11.2 Summary of Consultee Responses

Consultee	Summary of issues raised	How issues have been addressed
Scoping Opinion 2017		
East Lothian Council	Impact on fishing interests in East Lothian. Fisheries baseline information should include information what fish are actually being caught and where, as noted in the Scoping Report. This information could be supported by surveys of the industry as well as commercial fisheries data.	The commercial fisheries baseline used to inform this assessment describes the current fisheries baseline based on available up to date fisheries data and information. In addition to analysis of fisheries data, the baseline characterisation takes account of the information obtained during consultation with fisheries stakeholders.
Scottish Fishermen's Federation (SFF)	The SFF would expect that the Seagreen proposal, if citing Scottish planning policy, should recognise there are specific policies which guide their relationship with the commercial fishing industry.	Reference has been made in the chapter to Scottish planning policy relevant to commercial fishing (Table 11.1).
SFF	Although not a wind farm the SFF considers the development of anchorages and moorings, amongst other items, by Forth Ports, should be included in the assessment of cumulative impacts on the fishing industry.	The potential impacts included for assessment within the cumulative section are in line with those considered in the assessment of the impact of the optimised Seagreen Project alone. The development of anchorages and mooring by Forth Ports, and other items such anchoring of oil rigs, has no potential to contribute cumulatively to any of the impacts requiring assessment as there is no impact pathway. Therefore, this aspect has not been included within the cumulative assessment.
SFF MS-LOT	The baseline for scallops should be updated to as recently as possible, but additional to the already existing dataset, to give a clear understanding of the lengthy cyclical nature of the fishery.	Data on scallop fishing has been analysed for recent years to provide information on the current baseline (2012 to 2016). In addition, in order to reflect the cyclical nature of the scallop fishery, data for the period 2000 to 2016 has also been analysed (Table 11.4 and Appendix 11A).
SFF MS-LOT	The squid fishing has, in the time since the original EIA, grown in significance in the area from Aberdeen to the Bass Rock, so should be assessed in detail.	The most recent available fisheries data and information gathered through consultation with fishermen have been used to describe the current levels of activity by the squid fishery (Table 11.4).
SFF MS-LOT	It is understood that creel fisheries may have increased in the general area and should be carefully examined. The evidence base for impacts of renewables developments is quite sparse, but the Crown Estate report on the effects on the fishery in the Irish Sea, post development would suggest that the impacts are much more serious than the developers claim in the beginning. Therefore the SFF would expect that the fisheries data baseline is verified, preferably using the apparatus of the Commercial Fisheries Working Group, to give it stakeholder credibility.	A meeting with local fishermen was held on 26 February 2018, to present and discuss the fisheries baseline. MS-LOT formal acceptance to the approach taken by Seagreen in respect of consultation with commercial fisheries stakeholders was confirmed on 10 May 2018 (MS-LOT letter, 10 May 2018). A detailed description of the fisheries baseline is provided in Appendix 11A (Commercial Fisheries Technical Report).
SFF MS-LOT	The SFF believe that the Commercial Fisheries Working Group should agree officially any form of mitigation prior to the development being consented as this will help the developer to assure the engagement and continued co-operation of the fishing industry. This is particularly relevant to areas lost to fishing but also included all the other subjects, which infringe on fishing, such as (but not confined to) vessel movements during construction and cable works.	Mitigation options to minimise potential impacts on commercial fisheries are outlined within this Chapter where appropriate. These will be discussed and further refined in consultation with fisheries stakeholders post-consent and included in the Fisheries Management and Mitigation Strategy. The Vessel Management Plan to be implemented will include provisions to minimise potential interference with fishing activities.

Consultee	Summary of issues raised	How issues have been addressed
SFF MS-LOT	The SFF do not believe, given the dynamic nature of the environment and the commercial fishing industry, that there is sufficient reason to scope out commercial fisheries.	All the potential impacts of the Seagreen Project on commercial fisheries have been included for assessment within this chapter.
SFF MS-LOT	Consideration should be given to the potential effect of sediments and smothering for shellfish, scallops, Nephrops, crabs and lobsters	Potential impacts on fish and shellfish species, including shellfish species of commercial importance, are described in detail in Chapter 9 (Natural Fish and Shellfish Resource). The findings of Chapter 9 (Natural Fish and Shellfish Resource) have been used to inform this chapter where relevant.
MS-LOT	Other topics raised were that the EIA Report includes information regarding shelter areas located outwith the Revised Development site during the construction period to ensure that, should consent be granted, fishing equipment is not damaged when construction vessels need to shelter. Further discussion regarding this topic will take place at the post-consent stage (if consented).	Consultation between Seagreen and the commercial fishing industry is ongoing and will include shelter areas amongst other topics. This will be included in the Vessel Management Plan to be completed post consent and when further details around construction vessel transit routes to and from fabrication sites and construction ports are known.
MS-LOT	The EIA Report should also include information regarding safety zones during construction, maintenance and operation – particularly any schedule for 'rolling safety zones' during construction, to support any future safety zone application(s) in relation to the proposed Revised Development. Seagreen should consider where best to deal with these issues, it may be more efficient to deal with them in the Shipping and Navigation assessment.	Where relevant, reference has been made to the implementation of safety zones within this chapter. Navigation and associated safety issues are described in detail in Chapter 12 (Shipping and Navigation), including information on safety zones.
Marine Scotland Science (MSS)	MSS provided information on data sources at the scoping consultation meeting (on 27 June 2017) and Seagreen are advised to consider these and use them to inform the baseline: • Kafas, A., McLay, A., Chimienti, M., Scott, B. E., Davies, I., and Gubbins, M. 2017. ScotMap: Participatory mapping of inshore fishing activity to inform marine spatial planning in Scotland. Marine Policy, 79. • ScotMap report http://marinedata.scotland.gov.uk/dataset/scotmap-inshore-fisheries-mapping-scotland-recording-fishermen%E2%80%99s-use-sea/resource/2dd86dfa Plotter data from the Crown Estate's Fishermen's Information Mapping database: • "Evidence Gathering in Support of Sustainable Scottish Inshore Fisheries" http://www.masts.ac.uk/research/sustainable-scottish-inshore-fisheries/ • "Scottish Inshore Fisheries Integrated Data System (SIFIDS)" http://www.masts.ac.uk/research/emff-sifids-project/ • Interpolated VMS fishing tracks can assist with direction of fishing. MSS has a paper in preparation by a former student placement (Mailys Bilett) that might be useful. Available on request.	Due consideration has been given to the sources of data suggested by MSS to characterise the current fisheries baseline. Key sources of data and information used are outlined in Table 11.4, with a further detailed description of information and data sources provided in Appendix 11A (Commercial Fisheries Technical Report).

Consultee	Summary of issues raised	How issues have been addressed
MS-LOT	The need to consider all vessels, including those under 15m in length, in any assessment.	The characterisation of the current baseline has considered fishing by all category vessels (i.e. under 10m, 10 to 15m, over 15m).
MS-LOT	The need for adequate spacing between structures, MSS recommend 1km and requested Seagreen provide information in their EIA Report to support using less than this.	The minimum spacing between turbines considered for the optimised Seagreen Project is 1km.
MS-LOT	The need for cable burial to be carried out in a way that the seabed is left in a safe condition for fishing and the need to take the most up to date information into account.	Where possible all array cables will be buried to sufficient depth to protect them from fishing activity. Cable burial depths and any protection measures will be confirmed post installation to assist fishing vessel skippers in their assessments in respect of their fishing within Project Alpha and Project Bravo.
MS-LOT	The need to consider anchorages and queuing of vessels. Seagreen could consider including this in the Vessel Management Plan	Consideration will be given to the inclusion of anchorages and queuing of vessels within the Vessel Management Plan.
MSS	MSS noted the Fisheries Liaison with Offshore Wind and Wet Renewables ('FLOWW') guidance in reference to disruption payments should be referenced in the EIA Report	Reference to FLOWW guidance has been made within this chapter as appropriate.
MS-LOT	The Scottish Ministers recommend inclusion of a number of projects located off the east coast of Scotland and in English waters for consideration within the cumulative assessment. The Scottish Ministers also note the concerns raised by SFF in relation to anchoring of oil rigs and the development of anchorages and moorings by Forth Ports and the potential cumulative impact these could have and advise Seagreen to consider whether these will have a significant impact.	The projects suggested by the Scottish Ministers have been included for assessment of cumulative impacts (Table 11.16). The potential impacts included for assessment within the cumulative section are in line with those considered in the assessment of the impact of the optimised Seagreen Project alone. The development of anchorages and mooring by Forth Ports, and other items such anchoring of oil rigs, has no potential to contribute cumulatively to any of the impacts requiring assessment as there is no impact pathway. Therefore, this aspect has not been included within the cumulative assessment.

Table 11.3 Summary of consultation undertaken with local fishermen by SFF FIRs

Consultee	Role/Organisation	Date of consultation
Fisherman 1	Arbroath and District Creel Association (AMSGA)	5/12/17
Fisherman 2	AMSGA	23/11/17
Fisherman 3	AMSGA	23/11/17
Fisherman 4	Scottish White Fish Producers Association (SWFPA)	19/12/17
Fisherman 5	SWFPA	19/12/17
Fisherman 6	SWFPA	19/12/17
Fisherman 7	AMSGA	5/12/17
Fisherman 8	AMSGA	5/12/17
Fisherman 9	Anglo-Scottish Fishermen's Association (ASFA)	1/12/17
Fisherman 10	ASFA	1/12/17
Fisherman 11	ASFA	22/11/17
Fisherman 12	ASFA	22/11/17
Fisherman 13	ASFA	1/12/17
Fisherman 14	ASFA	1/12/17
Fisherman 15	ASFA	22/11/17
Fisherman 16	ASFA	22/11/17
Fisherman 17	Not known	5/12/17
Fisherman 18	Not known	23/11/17
Fisherman 19	Not known	22/11/17
Fisherman 20	ASFA	5/12/17
Fisherman 21	Dunbar Fishermen's Association	22/11/17
Fisherman 22	SWFPA	19/12/17
Fisherman 23	SWFPA	19/12/17
Fisherman 24	SWFPA	19/12/17
Fisherman 25	AMSGA	10/12/17
Fisherman 26	AMSGA	10/12/17
Fisherman 27	AMSGA	10/12/17
Fisherman 28	AMSGA	9/12/17
Fisherman 29	AMSGA	18/12/17
Fisherman 30	AMSGA	18/12/17

11.25. As agreed during Scoping and confirmed through further consultation, the remaining potential impacts on natural fish and shellfish ecology have been scoped out of assessment in Chapter 9 (Natural Fish and Shellfish Resource). Within this chapter, in order to assess the potential for impacts on commercial species to result in impacts on the commercial fisheries that target them, reference has been made to the outcomes of the assessment presented in Chapter 9 (Natural Fish and Shellfish Resource) in respect of underwater noise. The remaining potential impacts on commercially exploited fish and shellfish species were assessed as not significant in the 2012 Offshore ES as summarised in Chapter 17 (Summary of Impacts), and are therefore not considered further in this chapter.

11.26. In respect of safety issues, the focus of the assessment included within this chapter is on issues associated with potential manoeuvrability and snagging risks associated with array cables and other project infrastructure as well as seabed obstacles. Safety issues in respect of potential risks of collision and allision are discussed in Chapter 12 (Shipping and Navigation).

METHODOLOGY

11.27. This section presents the impact assessment methodology applied to assess the potential environmental impacts associated with the construction, operation and decommissioning phases of the optimised Seagreen Project.

Study Area

11.28. The study area used for assessment of commercial fishing activities is shown in Figure 11.2. It encompasses ICES rectangle 42E8, where Project Alpha and Project Bravo are located, and extends over a wider regional area (ICES rectangles 44E7, 44E8, 44E9, 43E7, 43E8, 43E9, 42E7, 42E8, 42E9, 41E7, 41E8 and 41E9) to provide context in respect of the overall distribution of fishing activity for each of the fisheries considered in the assessment.

11.29. In the particular case of nomadic scallop dredgers, a UK wide study area has been used, as their grounds extend over the North Sea, Irish Sea and English Channel and Western Approaches.

Data Collection

11.30. The key sources of data used to describe the commercial fisheries baseline and to inform the impact assessment are described in Table 11.4. Detailed information on the limitations and sensitivities of each dataset is provided in Appendix 11A (Commercial Fisheries Technical Report).

11.31. In addition to the data outlined in Table 11.4, information gathered through consultation with fishermen and their representatives, has also been used to inform this assessment (Table 11.2 and Table 11.3).

Impact Assessment

11.32. The impact assessment follows the principles of the approach set out within Chapter 6 (EIA Process). This includes consideration of Project Alpha alone; Project Bravo alone; Project Alpha and Project Bravo combined (the Seagreen Project) and Project Alpha and Bravo in a cumulative scenario.

11.33. The significance of potential impacts has been evaluated using a systematic approach, based upon identification of the sensitivity to the project activity, together with the predicted magnitude of the impact. An exception to this is the assessment in respect of safety issues for fishing vessels which, in line with the methodology described in Chapter 12 (Shipping and Navigation), has been carried out using a risk assessment approach.

Table 11.4 Key sources of data used to inform the commercial fisheries baseline characterisation

Data	Description	Supplier/ Data Source
Fisheries surveillance sightings data	• Sighting of fishing vessels recorded by surveillance aircraft and surface vessels; • The data provide information on vessel location, nationality and gear type; • Data were analysed for the period 2012 to 2016.	Marine Management Organisation
Fisheries landings data value (£)	• This data provides information on the value of landings by fishing method, vessel category (under 10m, 10 to 15m, over 15m), species and landing port; • Data include landings of UK vessels (irrespective of landing port) and non-UK vessels landing into UK ports; • Data are provided by ICES rectangle; • Data from 2012 to 2016 were included for analysis, to describe the current baseline, as well as data from 2000 to 2016, to describe annual fluctuation in the fisheries.	Marine Management Organisation
Fisheries effort (days at sea) data	• This data provides information on fishing effort (days at sea) by fishing method, vessel category (under 10m, 10 to 15m, over 15m) and landing port; • Data include landings of UK vessels (irrespective of landing port) and non-UK vessels landing into UK ports; • Data are provided by ICES rectangle; • Data from 2012 to 2016 were included for analysis, to describe the current baseline, as well as data from 2000 to 2016, to describe annual fluctuation in the fisheries.	Marine Management Organisation
Vessel Monitoring System (VMS) Data	• Satellite tracking data of vessels of over 15m in length; • Data are cross-referenced with landings and effort values, to provide information in a 0.05° by 0.05° grid; • Data are provided for UK vessels; • Data were analysed for the period 2012 to 2016.	Marine Management Organisation
Fisheries Information Network (FIN) VMS Data	• Multi-year VMS data for UK fishing vessels sourced through the Scottish fisheries administration database; • Data includes all forms of dredge fishing; • Data was analysed for the period 2012 to 2016.	Fisheries Information Network
ScotMap Data	• Data provides spatial information on fishing activity of Scottish commercial fishing vessels under 15m in length by fishing method; • Data includes information for the period 2007 to 2011.	Marine Scotland Science
ScotMap Report	ScotMap Inshore Fisheries Mapping in Scotland: Recording Fishermen's use of the Sea. Scottish Marine and Freshwater Science Vol. 5, No. 17.	Kafas *et al.* (2014)
ScotMap Report	ScotMap: Participatory mapping of inshore fishing activity to inform marine spatial planning in Scotland. Marine Policy 79, 8 to 18.	Kafas *et al.* (2017)

Developments in Assessment Methods

11.34. The assessment carried out for commercial fisheries follows the same overall key principles used for assessment in the 2012 Offshore ES. A number of developments have however been introduced in terms of assessment methods. These are outlined below:

- The receptors included in the assessment are the same as identified previously. In the current chapter, however, recognising the different sensitivities of smaller local scallop dredgers and nomadic vessels, the assessment of impacts on the scallop fishery has been undertaken separately for each category of vessels, where relevant (i.e. in respect of loss or restricted access to fishing grounds and associated displacement);
- In order to provide a fit for purpose and clear assessment, the definitions of sensitivity and magnitude have been refined and simplified, to take account of key parameters relevant to commercial fisheries. Receptor sensitivity has been defined avoiding the use of terms such as adaptability, tolerance and recoverability (all terms relevant to biological receptors rather than commercial fishing). In addition, in order to provide context in terms of impact magnitude, where appropriate, account has been taken of the relative importance to each fishery of the area affected by each potential impact.

11.35. It should be noted that there is no guidance currently available in relation to the definition of receptor sensitivity and impact magnitude, specific to the assessment of impacts on commercial fisheries receptors. Whilst the application of a systematic receptor sensitivity and impact magnitude approach to determine impact significance helps guide the assessment, it is difficult to apply standard definitions of sensitivity and magnitude consistently across the range of impacts requiring assessment in respect of commercial fisheries. Furthermore, impacts of offshore wind farm developments upon commercial fishing activities cannot be easily categorised following this approach. Therefore, to a large extent, commercial fisheries assessments are qualitative and need to rely on expert judgement.

Significance Criteria

11.36. The significance criteria used for assessment of the impacts on commercial fisheries are described below. Definitions of receptor sensitivity and impact magnitude are provided in Table 11.5 and Table 11.6, respectively.

11.37. Taking into account the sensitivity of the fishery and the magnitude of the impact the significance of an impact is then assessed as Major, Moderate, Minor or Negligible using the significance criteria matrix shown in Table 11.7.

11.38. Impacts which are assessed as of Moderate or Major significance are considered to be significant in EIA terms with impacts assessed as Negligible or Minor considered to be not significant.

11.39. As previously mentioned, the impacts of offshore wind farm developments upon commercial fishing activities cannot be easily categorised and as a result, the application of significance criteria to the assessment, whilst guided by the significance criteria matrix (Table 11.7), is largely qualitative and based upon professional judgement.

11.40. Where the project poses a potential health and safety risk to fishing vessels and their crews, the significance criteria outlined in Table 11.7 are not considered adequate. In these instances, impacts are assessed in terms of potential risk in line with the parameters used in Chapter 12 (Shipping and Navigation) (Table 11.8).

11.41. Following this approach, risks which are defined to be within acceptable limits are not considered significant in EIA terms, whilst risks deemed to be outside acceptable limits are considered to be significant.

Table 11.5 Definition of receptor sensitivity levels for commercial fisheries receptors

Sensitivity Level	Description
High	Limited operational range and/or limited gear/target species versatility. High dependence upon a single fishing ground.
Medium	Moderate extent of operational range and/or limited gear/target species versatility. Dependence upon a limited number of fishing grounds.
Low	Extensive operational range and/or some gear/target species versatility Ability to fish a number of fishing grounds.
Negligible	Extensive operational range and high gear/target species versatility. Vessels are able to exploit a large number of fishing grounds.

Table 11.6 Definition of magnitude of potential impacts on commercial fisheries receptors

Magnitude Level	Description
High	The area affected by the impact sustains high levels of activity by the fishery and covers a large or moderate extent of its grounds; and/or The impact is permanent.
Medium	The area affected by the impact sustains medium/high levels of activity by the fishery and covers a moderate extent of its grounds; and/or The impact is long term.
Low	The area affected by the impact sustains medium/low levels of activity by the fleet and covers a small extent of its grounds; and/or The effect is short to medium term.
Negligible	The fleet has very little or no history of fishing in the area affected; and/or The impact is short term.

Table 11.7 Significance Criteria Matrix

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

Table 11.8 Significance Rankings (Source [Chapter 12 Shipping and Navigation])

	No Impact	No impact on shipping and navigation.
	Broadly Acceptable	Risk As Low As Reasonably Practicable (ALARP) with no additional mitigations or monitoring required above embedded mitigations. Includes impacts that have no perceptible impact (impact would not be noticeable to receptors).
	Tolerable (with or without mitigation)	Risk acceptable but may require additional mitigation measures and monitoring in place to control and reduce to ALARP.
	Unacceptable	Significant risk mitigation or design modification required to reduce to ALARP.

Assessment Limitations and Uncertainty

11.42. Commercial fishing is a dynamic industry which is subject to change over time. This may be for a number of reasons, for example fluctuations in landings, the distribution of target species and status of targeted stocks, changes in legislation and management policies, economic constraints such as fuel costs and crew availability, or weather restrictions. As a result, the assessment undertaken is constrained by the existing baseline.

11.43. In addition, it should be noted that the assessment provided within this chapter is given on a fishery by fishery basis. Whilst it is recognised that the distribution of fishing activity and dependence on fishing grounds in areas relevant to Project Alpha and Project Bravo would vary between individual vessels within the same fishery, it is not possible within the scope of this assessment to consider the extent of impacts on a vessel by vessel basis.

BASELINE CONDITIONS

Overview

11.44. Analysis of landings values and surveillance sightings in ICES rectangle 42E8 indicates that the predominant fishing activity in the immediate area of Project Alpha and Project Bravo is boat dredging for scallops *Pecten maximus*, with smaller values attributed to bottom otter trawls targeting squid *Loligo sp*., as well as creelers targeting lobster *Homarus gammarus* and crabs *Cancer pagurus* and *Necora puber* (Figure 11.3, Figure 11.4 and Figure 11.5). The vast majority of activity is by vessels over 15m in length with vessels in the 10 to 15m and under 10m category accounting for a very small proportion of the overall landings values in rectangle 42E8 (Figure 11.6).

11.45. Activity by scallop dredgers occurs across the regional study area with relatively high landings values recorded in rectangles 44E8, 43E8, 42E8 and 42E7 (Figure 11.7). Squid landings are considerably higher in inshore rectangles, particularly in 44E7 (Figure 11.5 and Figure 11.8). Highest lobster and crab landings are also recorded inshore, more importantly in rectangle 42E7 and 41E7 (Figure 11.5).

11.46. Of importance within the regional study area is also the Nephrops fishery. This targets Nephrops *Nephrops norvegicus* using bottom otter trawlers and concentrates for the most part within rectangles 41E7, 44E7 and 44E9 (Figure 11.9). Landings of whitefish (predominantly haddock *Melanogrammus aeglefinus*) are primarily recorded offshore of Project Alpha and Project Bravo, with the inshore section of the regional study area and the area where Project Alpha and Project Bravo are located, recording negligible landings of whitefish species (Figure 11.5).

11.47. A summary of commercial fishing activity in the regional study area is given in the sections below for each of the identified key fisheries:

- Scallop fishery;
- Squid fishery;
- Lobster and crab fishery;
- Nephrops fishery; and
- Whitefish fishery.

Scallop Fishery

Current baseline

11.48. Scallops are principally targeted by boat dredges. Scallop vessels generally tow either one or two beams, onto which a number of dredges are attached, depending upon vessel size, engine power and winch capacity.

11.49. The principal type of dredge used is the English 'Springer' type, whereby the scallops are raked from the seabed by a series of steel teeth that are attached along the leading edge of the dredges and which can penetrate the seabed to a depth of approximately 20cm.

11.50. The majority of vessels targeting scallops in the immediate area of Project Alpha and Project Bravo are over 15m in length and as a result VMS data provide a good overview of the distribution and level of fishing activity by the scallop fishery in this area. Analysis of data for the period 2012 and 2016 shows relatively high levels of scallop dredging across the regional study area, including the area where Project Alpha and Project Bravo are located (Figure 11.10 and 11.11).

11.51. Fishing activity in the regional study area is predominantly by larger category scallop vessels (i.e. over 20m in length). These vessels are capable of fishing continuously for several days and of working in difficult weather conditions. They are described as nomadic due to their wide operational range, having the ability to target grounds around the UK, including the North Sea, Irish Sea, English Channel and Western Approaches. Scallop fishing for the nomadic fleet is generally cyclical and grounds are intensively targeted for a period and then left to recover. Therefore, the number of vessels dredging in the regional study area will vary annually, depending upon productivity and access to grounds (Figure 11.12, Figure 11.13 and Figure 11.14).

11.52. It is recognised, however, that in addition to nomadic vessels, activity by a limited number of smaller local vessels also occurs in the regional study area. By virtue of their size, these vessels are more limited in their operational range.

11.53. In terms of seasonality, scallop dredging occurs throughout the year. Analysis of landings values for the period 2012 to 2016 in rectangle 48E2 indicates that during this period highest landings have been recorded between February and April, peaking in April (Plate 11.1).

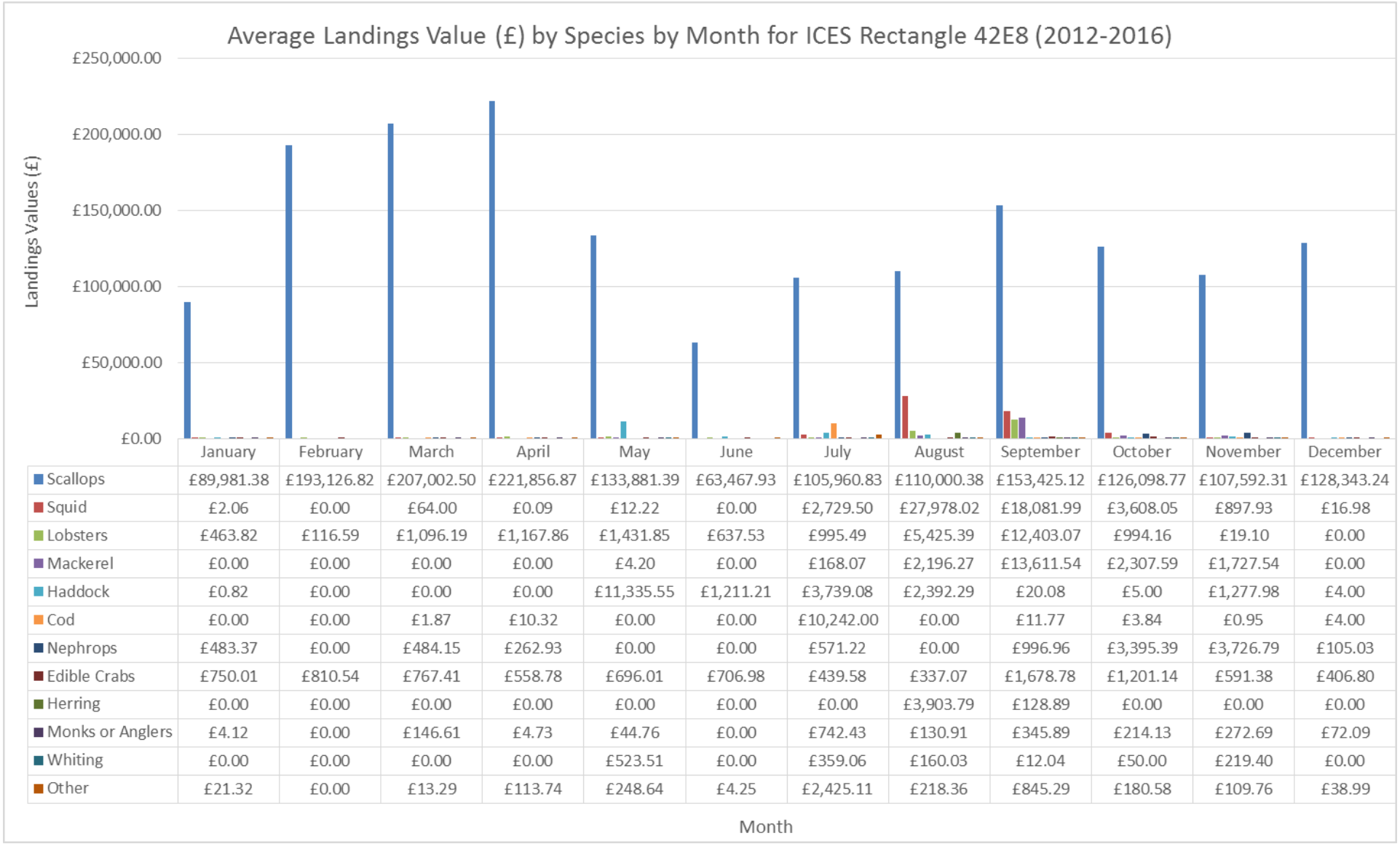
11.54. Scallop landings generally follow a pattern of increase and decrease over approximately ten-year periods. Analysis of landings values in ICES rectangle 42E8, where Project Alpha and Project Bravo are located (2000 to 2016), indicates this to be the case, with peaks recorded in 2006 and again in 2016 (Plate 11.2).

Predicted future baseline

11.55. Taking into account the past patterns, the cyclical nature of the scallop fishery and the high catches in recent years (Plate 11.2), it may be that in the next years a relative decline in scallop fishing activity takes place due to the need for a recovery period.

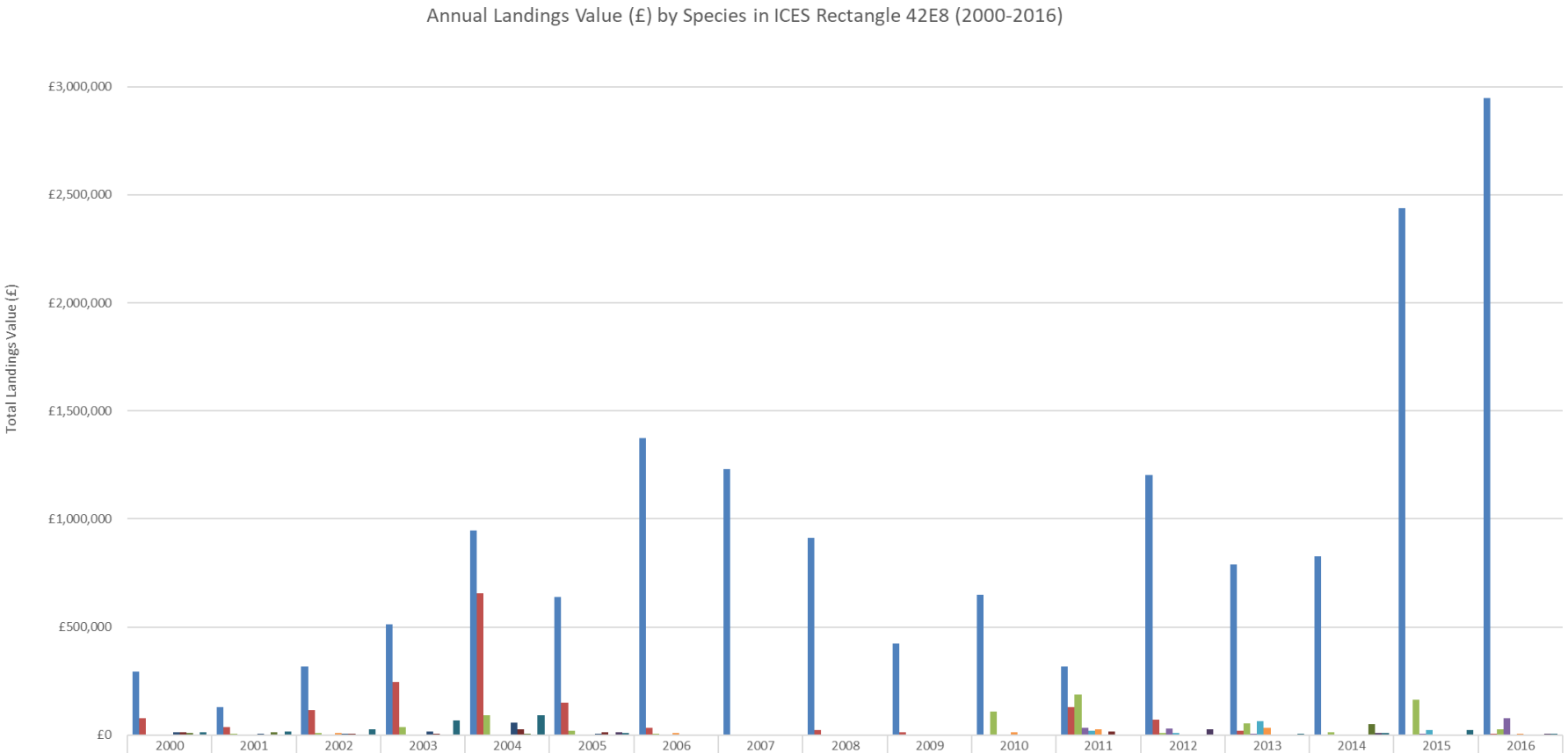
11.56. In the context of the future baseline in relation to scallop dredging in Project Alpha and Project Bravo, consideration should be given to the potential for restrictions to be applied on this fishery, as a result of the implementation of conservation measures in the Firth of Forth Banks Complex MPA. In addition, the current uncertainty over how much of the CFP regulations and controls will remain in place, following the end of any transition period after the UK withdrawal from the EU in 2019, and how this may affect this fishery should also be considered.

Plate 11.1 Average Landings Value (£) by species and month in ICES Rectangle 42E8 (2012-2016) (Source: MMO, 2018)



	January	February	March	April	May	June	July	August	September	October	November	December
Scallops	£89,981.38	£193,126.82	£207,002.50	£221,856.87	£133,881.39	£63,467.93	£105,960.83	£110,000.38	£153,425.12	£126,098.77	£107,592.31	£128,343.24
Squid	£2.06	£0.00	£64.00	£0.09	£12.22	£0.00	£2,729.50	£27,978.02	£18,081.99	£3,608.05	£897.93	£16.98
Lobsters	£463.82	£116.59	£1,096.19	£1,167.86	£1,431.85	£637.53	£995.49	£5,425.39	£12,403.07	£994.16	£19.10	£0.00
Mackerel	£0.00	£0.00	£0.00	£0.00	£4.20	£0.00	£168.07	£2,196.27	£13,611.54	£2,307.59	£1,727.54	£0.00
Haddock	£0.82	£0.00	£0.00	£0.00	£11,335.55	£1,211.21	£3,739.08	£2,392.29	£20.08	£5.00	£1,277.98	£4.00
Cod	£0.00	£0.00	£1.87	£10.32	£0.00	£0.00	£10,242.00	£0.00	£11.77	£3.84	£0.95	£4.00
Nephrops	£483.37	£0.00	£484.15	£262.93	£0.00	£0.00	£571.22	£0.00	£996.96	£3,395.39	£3,726.79	£105.03
Edible Crabs	£750.01	£810.54	£767.41	£558.78	£696.01	£706.98	£439.58	£337.07	£1,678.78	£1,201.14	£591.38	£406.80
Herring	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£3,903.79	£128.89	£0.00	£0.00	£0.00
Monks or Anglers	£4.12	£0.00	£146.61	£4.73	£44.76	£0.00	£742.43	£130.91	£345.89	£214.13	£272.69	£72.09
Whiting	£0.00	£0.00	£0.00	£0.00	£523.51	£0.00	£359.06	£160.03	£12.04	£50.00	£219.40	£0.00
Other	£21.32	£0.00	£13.29	£113.74	£248.64	£4.25	£2,425.11	£218.36	£845.29	£180.58	£109.76	£38.99

Plate 11.2 Annual landings value by species in ICES rectangle 42E8 (source: MMO, 2018)



Target Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Scallops	£294,797	£130,119	£318,017	£513,406	£945,306	£638,747	£1,375,376	£1,230,625	£912,752	£422,123	£648,451	£318,602	£1,202,580	£789,692	£827,987	£2,437,500	£2,945,929
Haddock	£79,509	£35,523	£114,556	£245,360	£655,689	£150,145	£32,270	£3,538	£24,368	£13,319	£3,093	£128,917	£71,625	£20,616	£2,295	£50	£5,344
Squid	£2,025	£5,339	£11,002	£35,898	£91,812	£19,105	£7,294	£28	£498	£2,165	£107,583	£186,706	£9,995	£54,885	£13,648	£162,684	£25,742
Lobsters	£0	£0	£57	£8	£0	£842	£2,506	£0	£396	£55	£735	£33,687	£30,983	£6,980	£1,455	£6,272	£78,065
Mackerel	£0	£0	£0	£0	£12	£0	£0	£0	£0	£90	£2,606	£18,713	£10,989	£63,000	£272	£24,612	£1,186
Nephrops	£1,575	£2,339	£10,611	£205	£1,687	£2,467	£9,011	£0	£0	£0	£12,224	£26,421	£2,116	£34,831	£4,171	£3,103	£5,909
Lemon Sole	£11,463	£6,844	£5,236	£16,770	£56,552	£6,674	£1,304	£258	£463	£0	£260	£2,917	£716	£557	£2,166	£9	£18
Whiting	£11,813	£2,906	£7,536	£5,292	£26,150	£14,405	£3,569	£1,014	£913	£13	£785	£16,990	£2,375	£2,607	£2,311	£0	£45
Cod	£10,382	£12,290	£1,670	£3,809	£5,503	£934	£115	£12	£94	£247	£0	£3,536	£6	£21	£51,260	£0	£86
Edible Crabs	£0	£2	£0	£0	£0	£14,332	£1,756	£0	£849	£0	£100	£4,465	£26,187	£2,407	£8,417	£1,653	£6,058
Other	£13,547	£18,103	£25,082	£66,928	£91,726	£8,293	£2,617	£353	£787	£103	£1,028	£3,237	£2,284	£5,409	£10,169	£23,816	£6,009

Squid Fishery

Current baseline

11.57. Bottom otter trawlers target squid on a variety of seabed substrates. The majority of vessels operating in 42E8 are over 15m in length and are therefore VMS tracked. A proportion of the fleet will however be under 15m, particularly in areas closer inshore, and their activity is therefore not included within the VMS datasets.

11.58. A description of the squid fishery in the regional study area is given below. It should be recognised, however, that the operational range of same of the vessels targeting squid may extend beyond the regional study area.

11.59. VMS data for over 15m demersal trawlers (2012 to 2016) (Figure 11.15 and Figure 11.16) show a patch of relatively high intensity of demersal trawling activity along the edge of the western boundary of Project Alpha. Relatively high activity is also apparent in discrete inshore areas across rectangle 42E7 and more significantly in rectangles 44E7 and 44E9. It should be noted that in these areas (particularly in rectangle 41E7 and 44E9), a significant proportion of demersal trawling activity recorded in the VMS dataset likely corresponds with vessels targeting Nephrops rather than squid. Demersal trawling activity in the rest of the regional study area, including Project Alpha and Project Bravo, is comparatively low.

11.60. In line with the distribution of activity identified in VMS data, squid landings values are highest in rectangles 44E7 and to a lesser extent in rectangle 42E7, with comparatively lower values recorded in rectangle 42E8, where Project Alpha and Project Bravo are located (Figure 11.8).

11.61. Although squid grounds are often located in inshore areas, they vary each year and activity generally moves further offshore as the season progresses, to target the species in deeper waters. The level of activity within Project Alpha and Project Bravo will consequently vary depending on the year and the season. Fishing grounds provided by fishermen during consultation carried out in 2011, to inform the 2012 Offshore ES and those collected during consultation, to inform this chapter are illustrated in Figure 11.17 and Figure 11.18, respectively.

11.62. In terms of seasonality, analysis of landings values (2012 to 2016) indicates that squid is mainly targeted between July and October, with landings values peaking in August (Plate 11.1).

11.63. Squid landings fluctuate considerably on an annual basis. Over the 2000 to 2016 period, relatively high landings values have been recorded in rectangle 42E8 in 2010, 2011 and 2015, with the remaining years recording comparatively lower values (Plate 11.2).

Predicted future baseline

11.64. Squid is reported to be an increasingly important fishery in the regional study area. It is currently unregulated and demersal vessels that are constrained by restrictions on other pressure stocks are able to reconfigure gear to target the species. Annual landings values vary significantly as the fishery is dependent upon the arrival of the species in the area.

11.65. As described above for the scallop fishery, when describing the potential future baseline, consideration should be given to the potential for restrictions to be applied on this fishery in areas relevant to Project Alpha and Project Bravo, as a result of the implementation of conservation measures in the Firth of Forth Banks Complex MPA. Similarly, potential changes in fisheries legislation and controls after the UK withdrawal from the EU should also be considered.

Lobster and Crab Fishery

Current baseline

11.66. Lobster and crab are principally targeted by full time static gear vessels setting pots/creels, although there are also a number of part time vessels who will set a small number of creels in inshore areas during the summer months. Lobsters are targeted on rocky, uneven ground and around wreck sites. Crab species (including edible and velvet crabs) are targeted on a variety of substrates. Vessels targeting lobster and crabs are generally under-15m in length and as a result, weather conditions are a significant factor in determining levels of activity in the winter months.

11.67. The highest creeling landings values in the regional study area (2012 to 2016) are recorded predominantly inshore of Project Alpha and Project Bravo, in rectangles 42E7 and 41E7 (Figure 11.4, Figure 11.5). Although considerably smaller than in inshore areas, landings have also been recorded from rectangle 42E8 in recent years (particularly in 2011, 2012 and more significantly in 2016) (Plate 11.2). This was noted during consultation undertaken with fishing interests, which highlighted the growth in the lobster and crab fleet in the last years, including increasing activity in areas as far offshore as the area of Project Alpha and Project Bravo (Figure 11.19, Figure 11.20 and Figure 11.21). Whilst in general terms creeling vessels are limited in their operational range by their size (i.e. for the most part under 10m), it is understood that in recent years a number of vessels with greater steaming speeds have entered the local fleet and as a consequence they have extended operational ranges. It was also noted during consultation that vessels from further afield (i.e. Eyemouth and Stonehaven) are now targeting this area (Consultation meeting, 27 June 2017).

11.68. Creeling in the regional study area is a year round activity, although there is a significant peak in activity in the summer months (Plate 11.1).

Predicted future baseline

11.69. Analysis of landings data for the period 2000 to 2016 in ICES rectangle 42E8 and the information gathered through consultation indicates a trend to an increase in creeling activity in the immediate area of Project Alpha and Project Bravo. It is therefore possible that this trend may continue in the coming years, subject to the ability of vessels to reach these offshore areas.

11.70. As noted above for other fisheries, when describing the potential future baseline, consideration should be given to potential changes in fisheries legislation and controls after the UK withdrawal from the EU. With regards to potential restrictions associated with conservation measures for the Firth of Forth Banks Complex MPA, in the case of creeling, it is considered unlikely that measures specific to this fishery will be applied.

Nephrops Fishery

Current baseline

11.71. Nephrops is an important species to commercial fisheries in the regional study area. They inhabit muddy substrates and are principally targeted by demersal otter trawlers. Vessels can employ either single or twin rig demersal gear with a 70mm mesh cod end to target the species.

11.72. Fishing activity within the regional study area is concentrated in ICES rectangle 41E7 and to a lesser extent in rectangles 44E7 and 44E9, with minimal landings values recorded from rectangle 42E8, where Project Alpha and Project Bravo are located (Figure 11.9). Consultation with fishing interests further corroborates the lack of any significant activity by this fishery within the boundaries of Project Alpha and Project Bravo (Figure 11.18 and Figure 11.22).

11.73. A large proportion of Nephrops vessels operating in the regional study area are from local home ports and are under 15m in length, therefore not monitored by VMS. Analysis of ScotMap data for Nephrops trawlers under 15m in length also suggests that activity by this fishery in the regional area concentrates in rectangle 41E7, with negligible levels of fishing in the immediate area of Project Alpha and Project Bravo (Figure 11.23 and Figure 11.24). In this context it is important to note that the ScotMap dataset only covers the period from 2007 to 2011, and therefore may not be fully representative of the current levels of activity by under 15m vessels.

11.74. Vessels target Nephrops year round although there are seasonal fluctuations in landings. Weather conditions, particularly for the smaller category vessels, are a significant factor in determining levels of activity in the winter months.

Predicted future baseline

11.75. For the time period under consideration (2000 to 2016) Nephrops landings have been shown to be low, or negligible in rectangle 42E8, including in recent years (Plate 11.2) and would be expected to remain low in the future.

11.76. As described for the other fisheries, when predicting the future baseline, consideration should be given to potential changes in fisheries legislation and controls after the UK withdrawal from the EU. Similarly, potential limitations to the fishery implemented as a result of conservation measures for the Firth of Forth Banks Complex MPA should also be considered.

Whitefish Fishery

Current baseline

11.77. In the regional study area, whitefish species (particularly haddock) are targeted in offshore grounds with negligible activity by this fishery in the immediate area of Project Alpha and Project Bravo (Figure 11.5).

11.78. During consultation undertaken by the FIRs to inform this chapter (0), no local vessels were identified as targeting whitefish species (Appendix 11A [Commercial Fisheries Technical Report]). It is understood that fishing for whitefish in offshore grounds within the regional study area is generally carried out by larger vessels with home ports along the Scottish east coast and further afield.

Predicted future baseline

11.79. Historically, there was a whitefish fishery in the Forth and Tay region, however, fisheries management policies and availability of resource have had the effect of making the fishery unviable. It is not considered likely that vessels will resume the fishery in the immediate area of Project Alpha and Project Bravo in the future, largely due to ongoing restrictions on cod and other whitefish species. As described for the other fisheries, when predicting the future baseline of the whitefish fishery, consideration should be given to potential changes in fisheries legislation and controls after the UK withdrawal from the EU. Similarly, potential limitations to the fishery implemented as a result of conservation measures for the Firth of Forth Banks Complex MPA should also be considered.

ASSESSMENT OF IMPACTS – WORST CASE SCENARIO

11.80. As identified within the 'Scope of Assessment', the impact assessment for commercial fisheries considers all the potential impacts of the optimised Seagreen Project.

11.81. The assessment considers the potential impacts of Project Alpha alone; Project Bravo alone; Project Alpha and Project Bravo combined (the optimised Seagreen Project) and Project Alpha and Project Bravo in a cumulative scenario. The following sections set out the assessment of potential impacts during construction, operation and decommissioning phases of the Project. As set out in Chapter 6 (EIA Process), impacts reported are adverse unless stated otherwise.

Worst Case Scenario

11.82. To inform the impact assessment on commercial fisheries, a worst case scenario has been defined using the information contained within the optimised design envelope for the Seagreen Project, Chapter 5 (Project Description). The worst case represents, for any given impact, the scenario within the range of options in the design envelope that would result in the greatest potential for change to the receptors assessed.

11.83. Table 11.9 identifies the worst case scenario (WCS) in relation to potential impacts on commercial fisheries and provides justification as to why no other scenario would result in a greater impact on the receptors considered. It should be noted that, while the WCS is defined for each impact for the Project Alpha and Project Bravo in isolation, the WCS would be consideration of the projects combined (the optimised Seagreen Project). The impact assessment undertaken therefore considers the impacts of each project in isolation as well as the projects combined.

Table 11.9 Worst Case Scenario Justification

Type of Impact	Worst Case Scenario	Justification/Rationale of Selected Design Envelope Parameter
Individual Project (Project Alpha or Project Bravo)		
Construction		
Potential impacts on commercially exploited fish and shellfish populations	Details of the worst case scenario used for assessment on fish and shellfish species and its rationale are provided in Chapter 9 (Natural Fish and Shellfish Resource)	

Temporary loss of, or restricted access to, traditional fishing grounds	• Maximum number of safety zones at a given time as a result of the following:
	  ○ Installation of the maximum number of wind turbine generators (WTGs): 70; and
	  ○ Installation of the maximum length of array cables: 325km.
	• Presence of surface laid cables awaiting burial or protection;
	• The above would result in access to fishing grounds being progressively restricted as Project infrastructure is installed, leading to a theoretical worst case, in which fishing would be excluded from the entirety of the individual project towards the latter stages of construction;
	• Anticipated approximate duration of construction activities: 3 years.
		This would result in the maximum extent and duration of potential exclusion from fishing during the construction phase.

Displacement of fishing activity into other areas	As described above in respect of temporary loss of, or restricted access to, traditional fishing grounds.	This would result in the maximum extent and duration of potential exclusion from fishing during the construction phase and therefore in potential for associated displacement of activity.

Type of Impact	Worst Case Scenario	Justification/Rationale of Selected Design Envelope Parameter
Safety issues for fishing vessels (manoeuvrability, snagging risks and safety issues associated with seabed obstacles)	• Installation of the maximum number of WTGs: 70; • Installation of the maximum length of array cables: 325km; • Array cables buried to a minimum depth of 0.5m; • Assumes that approximately 10% (32.5km) of the length of the array cables may need to be protected; • Minimum spacing between turbines of 1km; • Presence of construction related obstacles.	Potential to result in unacceptable risks to fishing vessels.
Increased steaming times to fishing grounds	ximum number of safety zones at a given time as a result of the following: • Installation of the maximum number of WTGs: 70; • Installation of the maximum length of array cables: 325km.	Resulting in the maximum disruption to established steaming routes to fishing grounds.
Interference with fishing activities (navigational conflict)	Maximum number of vessel transits during construction.	Resulting in the maximum potential for interference/conflict between construction vessels and fishing activity,
Operation		
Complete loss of, or restricted access to, traditional fishing grounds	• Presence of the maximum number of WTGs: 70 and potential for 50m safety zones to be applied around them during operation; • 500m safety zones around major maintenance activities; • Maximum length of array cables: 325km; • Minimum spacing between turbines of 1km; • Minimum array cables burial depth: 0.5m; and • Up to 10% of cables protected (32.5km).	This would result in the maximum extent of potential exclusion from fishing throughout the operation phase.
Displacement of fishing activity into other areas	As described above in respect of complete loss of, or restricted access to, traditional fishing grounds.	This would result in the maximum extent of potential exclusion from fishing throughout the operation phase and therefore in potential for associated displacement of activity.
Safety issues for fishing vessels (manoeuvrability, snagging risks and safety issues associated with seabed obstacles)	• Presence of the maximum number of WTGs: 70; • Installation of the maximum length of array cables: 325km; • Array cables buried to a minimum depth of 0.5m; • Assumes that approximately 10% (32.5km) of the length of the array cables may need protection; • Minimum spacing between turbines of 1km; • Presence of seabed obstacles post-construction.	Potential to result in unacceptable risks to fishing vessels.
Increased steaming times to fishing grounds	• Presence of installed infrastructure (70 WTGs) and potential for 50m safety zones to be applied around them. • Safety zones around major maintenance work.	Resulting in the maximum disruption to established steaming routes to fishing grounds.

Type of Impact	Worst Case Scenario	Justification/Rationale of Selected Design Envelope Parameter
Interference with fishing activities (navigational conflict)	Maximum number of vessel movements during operation/maintenance per annum (1,760).	Resulting in the maximum potential for interference/conflict between operation/maintenance vessels and fishing activity.

Decommissioning

In the absence of detailed methodologies and schedules, decommissioning works and the implications for commercial fisheries are considered similar to, or likely less than those of the construction phase. Therefore, the worst case parameters defined for the construction phase also apply to decommissioning.

Project Alpha and Project Bravo Combined

In general terms the worst case scenarios identified above for individual projects also apply when considering Project Alpha and Project Bravo combined.

Exceptions to this are as follows:

- Maximum number of WTGs: 120 (with up to 70 in each project)
- Maximum extent of array cables: 650km (325km in each project)
- Assumes up to 10% (65km) of the length of array cables may need protection (32.5km in each project)
- Indicative duration of the construction phase: 4 years
- Maximum number of vessel movements during operation/maintenance per annum: 3,520 (1,760 in each project).

Cumulative Assessment (optimised Seagreen Project cumulatively with other projects)

The specifications of projects considered for assessment of cumulative impacts are provided at the end of this chapter under the Cumulative Impact Assessment section (Table 11.16).

Projects included for assessment have been identified through Scoping and further consultation and include the following:

- Seagreen Offshore Transmission Asset Project;
- Neart na Gaoithe (2014 as consented) ;
- Inch Cape (2014 consented) ;
- Kincardine Offshore Wind Farm;
- Forthwind Offshore Wind Farm (2016 consent);
- Forthwind Offshore Wind Demonstration Project;
- Offshore Renewable Energy Catapult Levenmouth;
- European Offshore Wind Deployment Centre;
- Hywind Scotland Pilot Park;
- Blyth Offshore Wind Farm – 2 turbines;
- Blyth Offshore Wind Farm – Demonstration Project – 15 turbines;
- Beatrice Offshore Wind Farm;
- Moray Offshore East Development ;
- Moray Firth Offshore Wind Western Development Area;
- Rampion Offshore Wind Farm;
- Caithness to Moray Interconnector; and
- Northconnect Interconnector.

Environmental Measures Incorporated into the Project

11.84. Throughout the design evolution process and with consideration of the findings of the 2012 Offshore ES, measures have been taken to avoid potentially significant impacts wherever possible and practical to do so. Mitigation measures that are incorporated into the design of the project are referred to as 'Environmental Measures Incorporated into the Project'. These measures are intended to prevent, reduce and where possible offset any significant adverse impacts on the environment. These are effectively 'built in' to the impact assessment and as such, the assessment includes consideration of these measures.

11.85. Measures relevant to this assessment on commercial fisheries are detailed below:

- The minimum spacing between turbines will be 1km, and the maximum spacing between WTG rows will be 3km;
- Application for and use of safety zones during construction, major maintenance work during operation and during decommissioning;
- Implementation of temporary advisory safety zones over vulnerable sections of array cables (i.e. sections of cables awaiting burial or protection);
- Buoyed construction and decommissioning area;
- Development Specification and Layout Plan (DSLP) to be developed post consent;
- A Fisheries Management and Mitigation Strategy will be implemented. This will include a description of Seagreen's support for and participation in the Forth and Tay Commercial Fisheries Working Group (CFWG);
- A Fisheries Liaison Officer (FLO) will be appointed;
- Guard vessels and Offshore Fisheries Officers (OFLOs) will be employed where appropriate;
- A dedicated Marine Coordination Centre will be established. This will coordinate project vessel operations and will monitor and record vessel Automatic Identification System (AIS) information indicating the movement of shipping traffic in an around the Project Alpha and Project Bravo sites;
- Where possible all array cables will be buried to sufficient depth to protect from fishing activity. Cable burial depths and any protection measures will be confirmed post installation to assist fishing vessel skippers in their assessments in respect of their fishing within Project Alpha and Project Bravo;
- The majority of array cables will be buried with approximately 10% being protected by other means (i.e. rock dumping, concrete mattresses);
- In line with standard practice in the North Sea offshore oil and gas industry, measures will be undertaken to ensure that where cable protection is required, the protection methods used are as far as practically possible, compatible with fishing activities;
- Timely and efficient Notice to Mariners (NtMs), Kingfisher notifications and other navigational warnings (of the position and nature of works) will be issued to the fishing community;
- Appropriate liaison will be undertaken with all relevant fishing interests to ensure that they are fully informed of development planning, construction and maintenance activities and items which may accentuate risk;

- Adherence to FLOWW Guidelines (2014; 2015);
- A Vessel Management Plan will be implemented. This will draw on lessons learned during construction at the Beatrice Offshore Wind Farm, to minimise potential for interference with fishing activities;
- All contractors undertaking site works will be contractually obliged, and monitored by client representatives, to ensure compliance with standard offshore policies, such as the Convention for the Prevention of Collisions at Sea (COLREGs) (IMO, 1972), and the Convention of the Prevention of Marine Pollution by Dumping of Wastes and other matter (IMO, 1996);
- Array cable post installation surveys will be undertaken to confirm the achievement of target burial depth and to inform any mitigation requirements if sufficient burial is not achieved. In addition to burial status, these will help to identify the condition of the seabed, following completion of installation works; and
- The UK Hydrographic Office (UKHO) will be informed of both the progress and the completion of Project Alpha and Project Bravo.

11.86. A number of consent conditions were attached to the original consents received for the Seagreen Project in 2014. These were defined to manage the environmental risk of the Project. Any future consents issued to Seagreen may include similar conditions to manage the risk to commercial fisheries where necessary. Consent conditions applied to the originally consented project are provided within Chapter 7 (Scope of EIA Report).

11.87. Consent conditions relevant to the management of commercial fisheries are set out below:

- Development and implementation of a Vessel Management Plan;
- Development and implementation of a Navigational Safety Plan;
- Development and implementation of a Lightings and Marking Plan;
- Development and implementation of a Fisheries Management and Mitigation Strategy and participation in the Forth and Tay CFWG;
- Appointment of a Fisheries Liaison Officer (FLO);
- Notify the UK Hydrographic Office ("UKHO") of the proposed Works to facilitate the promulgation of maritime safety information and updating of nautical charts and publications through the national Notice to Mariners (NtMs) system;
- Ensure that local mariners, fishermen's organisations and HM Coastguard, in this case Maritime Rescue Coordination Centre Aberdeen, are made fully aware of any Licensable Marine Activity through local NtMs or any other appropriate means; and
- Ensure that details of the Works are promulgated in the Kingfisher Fortnightly Bulletin, and inform the Sea Fish Industry of the vessel routes, the timings and the location of the Works and of the relevant operations.

IMPACT ASSESSMENT – CONSTRUCTION PHASE

Project Alpha

Potential impacts on commercially exploited fish and shellfish populations

Potential Impacts

All Fisheries

11.88. There may be potential for underwater noise from pile driving at Project Alpha to result in adverse impacts on fish and shellfish populations. This could in turn affect the productivity of the fisheries that target them. Key species to commercial fisheries in the regional study area include scallops, squid, Nephrops, crabs, lobster and some species of whitefish.

11.89. The potential effects of underwater noise from pile driving on fish and shellfish species, including those of commercial importance, have been assessed in Chapter 9 (Natural Fish and Shellfish Resource). This predicted impacts not exceeding minor significance. Consequently, the resulting impact on commercial fisheries is also predicted to not exceed **Minor** and is therefore **Not Significant** in EIA terms.

Additional Mitigation

11.90. No additional mitigation is either required or proposed in relation to impacts on commercially exploited fish and shellfish populations as no adverse significant impacts are predicted.

Residual Impact

11.91. The impact of Project Alpha on commercially exploited fish and shellfish populations, and any subsequent impact on the fisheries that target them, is predicted to be, at worst, **Minor** and therefore **Not Significant** in EIA terms.

Temporary loss of, or restricted access to, traditional fishing grounds

Potential Impacts

11.92. During construction, it is anticipated that there will be temporary safety zones of up to 500m around major construction activities from which all non-construction vessels would be excluded. Similarly, Seagreen will apply for 50m safety zones around partially installed and complete infrastructure such as WTGs (maximum of 70).

11.93. In addition, temporary advisory safety zones will be implemented around vulnerable sections of the array cables (i.e. where cables are awaiting burial or protection).

11.94. The area occupied by safety zones will therefore increase as construction progresses, leading to the theoretical worst case scenario that fishing may be excluded of the entirety of Project Alpha towards the latter stages of construction.

11.95. The fisheries affected by temporary loss of, or restricted access to fishing grounds associated with construction of Project Alpha are the scallop, squid and lobster and crab fisheries. The remaining fisheries active in the regional study area, namely the Nephrops and whitefish fishery, show negligible levels of activity in the area of Project Alpha and therefore would remain unaffected in terms of temporary loss of, or restricted access to traditional fishing grounds during construction. The assessment provided below is therefore focused on the scallop, squid and lobster and crab fisheries only.

Scallop Fishery

11.96. Scallop dredging occurs at relatively high levels across the regional study area. Whilst a significant proportion of this activity is understood to be carried out by nomadic vessels, there are also a limited number of local, smaller, vessels that target scallops in the area. These have reduced operational ranges and are able to exploit a limited extent of fishing grounds compared to nomadic vessels. With this in mind they are considered of **medium** sensitivity to loss of fishing grounds.

11.97. In the case of nomadic vessels, taking account of their wide operational ranges and fishing opportunities they are considered of **low** sensitivity.

11.98. As previously mentioned, the area occupied by Project Alpha (and that over which safety zones may be in place at any one time) supports scallop dredging activity at relatively high levels. Considering this, but also the temporary nature of the construction phase (approximately three years), and the relatively small area that the Project Alpha site represents in the context of the overall extent of fishing grounds available to nomadic vessels and to local vessels (Figure 11.10, Figure 11.11, Figure 11.13 and Figure 11.14), the magnitude of the impact is assessed as **low**.

11.99. Taking the above into account, the impact of temporary loss of, or restricted access to, traditional fishing grounds on the scallop fishery (both in the case of local smaller vessels and nomadic vessels) is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Squid Fishery

11.100. Vessels targeting squid have relatively wide operational ranges and exploit a range of grounds within the regional study area and beyond. In addition, they have the ability to reconfigure gear and target other species (i.e. Nephrops, whitefish). They are therefore considered of **low** sensitivity in respect of loss of fishing grounds.

11.101. Considering the relatively low levels of activity by this fishery within Project Alpha and the relatively small area that Project Alpha represents in the context of the overall grounds available to this fishery, and the temporary nature of the construction phase (approximately three years), the magnitude of the impact is assessed to be **low.**

11.102. Taking the above into account, the impact of temporary loss or restricted access to traditional fishing grounds on the squid fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Lobster and Crab Fishery

11.103. Creeling vessels have, by virtue of their size (for the most part under 10m in length), relatively small operational ranges and fishing opportunities, compared to larger towed gear vessels. They are therefore considered to be of **medium** sensitivity to loss of fishing grounds.

11.104. The majority of creeling activity in the regional study area occurs inshore of Project Alpha, particularly in rectangles 42E7 and 41E7 (Figure 11.3, Figure 11.4 and Figure 11.5). Vessels operating in these areas would remain unaffected in terms of loss of, or restricted access to traditional fishing grounds, during construction of Project Alpha. It is recognised, however that in recent years a number of vessels have entered the local fleet and as a consequence of their high steaming speeds have extended operational ranges. This has resulted in parts of their fishing areas overlapping the boundaries of Project Alpha (Figure 11.20 and Figure 11.21).

11.105. It is therefore appreciated that there may be occasions when certain vessels may need to relocate their gear as a result of construction activity in Project Alpha. In these instances, Seagreen will follow the policy as specified in FLOWW Guidelines (2015) of appropriate evidence based mitigation. With the above considerations in mind, the magnitude of the impact on the creel fishery is considered to be **low**.

11.106. Taking this and the low sensitivity of the receptor, the impact of temporary loss of, or restricted access to, traditional fishing grounds on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.107. No additional mitigation is either required or proposed in relation to temporary loss or restricted access to fishing grounds on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.108. The impact of temporary loss of, or restricted access to, traditional fishing grounds on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.109. The potential loss of, or restricted access to, fishing grounds associated with the construction phase could result in fishing activity being displaced to other areas, resulting in increased competition for fishing grounds and/or conflicts between vessels (i.e. towed gear and static gear vessels).

11.110. As previously discussed, fishing activity within Project Alpha is predominantly by scallop dredgers, with activity by the lobster and crab and the squid fisheries occurring to a much lesser extent.

11.111. It is therefore apparent that conflicts associated with potential displacement would primarily be a result of scallop dredgers moving into areas where other fisheries are currently active. In addition, there could also be potential for increased competition between scallop dredgers for grounds outside of Project Alpha to occur.

11.112. Considering that the majority of fishing activity in Projects Alpha is by nomadic scallop vessels, and that these are able to exploit a wide range of grounds around the UK, the potential for noticeable effects associated with displacement would however be limited. In respect of potential conflicts between static gear vessels (lobster and crab fishery) and towed gear vessels, the limitations of the larger nomadic vessels to operate within the 12 and 6nm limits under the Scallop Fishing (Scotland) Order 2017 should be noted. Furthermore, creel vessels place their fishing grounds on the SWFPA website under an agreement whereby these will be as far as possible avoided by scallop dredgers.

11.113. Whilst it is difficult to predict where fishing activity may be displaced to and how this may affect individual vessels, in all cases the level of displacement would be a function of the level of temporary loss or restricted access to fishing grounds.

11.114. With the above in mind, it is considered that the sensitivity, magnitude and impact significance identified for the assessment of temporary loss or restricted access to fishing grounds also applies in respect of displacement. This is summarised in Table 11.10.

Table 11.10 Summary of assessment of Displacement of Fishing Activity during Construction

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Low	Minor (not significant)
Nomadic Scallop Dredgers	Low	Low	Minor (not significant)
Squid fishery	Low	Low	Minor (not significant)
Lobster and crab fishery	Medium	Low	Minor (not significant)

Additional Mitigation

11.115. No additional mitigation is either required or proposed in relation to the effect of displacement of fishing activity into other areas on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.116. The impact displacement of fishing activity into other areas on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Safety issues for fishing vessels

Potential Impacts

All vessels

11.117. An assessment specific to safety issues associated with fishing activity in terms of potential risk of gear snagging and the manoeuvrability of vessels is given below. Safety risks associated with potential for collision with construction vessels and allision with project infrastructure are addressed in Chapter 12 (Shipping and Navigation).

11.118. The progressive installation of WTG foundations during the construction phase would result in increasing potential for manoeuvrability risks to fishing vessels. In addition, snagging risks may arise during the construction phase, as a result of sections of array cables remaining exposed on the seabed for short periods of time whilst awaiting burial or remedial protection measures.

11.119. It should be noted, however, that safety zones will be in place around construction works and partially installed and completed infrastructure. In addition, in instances where sections of cables are exposed, localised advisory safety zones over such vulnerable cables would be implemented, to prevent fishing gear snagging and the consequential risks to both the cables and fishing vessels and their gears.

11.120. A dedicated Marine Coordination Centre will be established. This will coordinate project vessel operations and will monitor and record vessel Automatic Identification System (AIS) information indicating the movement of shipping traffic in an around Project Alpha.

11.121. Pre-construction, Seagreen will undertake an array cable burial risk assessment when ground investigation results are available. This will determine the appropriate target cable burial depth to achieve sufficient protection of cables from any activity within the wind farm site that may pose a risk to cable integrity, including scallop dredging. Cable installation will seek to achieve, or better the target burial depth, and where this is not feasible, for example due to unsuitable ground conditions, cable protection, such as rock placement, will be used. Cable burial depths and any protection measures will be confirmed post installation to assist fishing vessel skippers in their assessments in respect of their fishing within Project Alpha.

11.122. It is recognised, that in addition to the above, the presence of obstacles on the seabed during construction could also potentially cause damage to, or complete loss of, fishing gears. Similarly activities associated with construction works, such as vessel anchoring, jack up legs or cable trenching could produce spoil or mounds onto which fishing gears could fasten.

11.123. Offshore policy (IMO, 1996), prohibits the discarding of objects or waste at sea. The reporting and recovery of any accidentally dropped object is also required. This will follow requirements of the Marine Scotland's notification procedure for reporting dropped material from the offshore wind/marine renewables industry at sea.

11.124. In addition, post-installation surveys would be undertaken. These would confirm foundation installation requirements are met and confirm array cable target burial depth has been achieved. The surveys would also confirm the seabed condition post installation and identify any presence of sediment mounds and berms or relocated boulders. The survey results will inform consideration of the need and type of rectification measures that might be necessary.

11.125. In order to minimise potential safety risks to fishing vessels, the required levels of information distribution would be undertaken through the channels of the Kingfisher Information System, NtMs, as well as direct liaison with fishermen and their representatives. The primary purpose of this would be to ensure amongst fishing vessel owners and crews, the required level of awareness of potential construction related risks and the locations and periods of safety zones. In addition guard vessels will be on site during construction and OFLOs employed where required.

11.126. In conclusion, with the application of the measures, liaison and information distribution discussed above and the required compliance by fishermen, safety issues for fishing vessels should be **within acceptable limits** and would therefore be **Not Significant** in EIA terms.

Additional Mitigation

11.127. No additional mitigation is either required or proposed in relation to safety issues for fishing vessels during construction as no adverse significant impacts are predicted.

Residual Impact

11.128. The impact of safety issues on commercial fisheries receptors is predicted to remain **within acceptable limits** and therefore is **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.129. The implementation of safety zones during the construction phase could result in some short term increases in steaming distances and times to fishing vessels, and therefore higher operational costs for vessels. As previously stated, safety zones will be in place around construction works and partially installed and completed infrastructure.

11.130. In the case of the scallop, creel, Nephrops and squid fishery, their activity for the most part does not extend in the areas offshore of the boundaries of Project Alpha. It is therefore expected that there would only be few occasions when there would be a requirement to change existing steaming routes to avoid temporary safety zones. The sensitivity of these receptors is therefore considered **low**.

11.131. In the case of the whitefish fishery, the grounds targeted are located offshore of Project Alpha. Depending on the location of base ports of specific vessels, there may be instances when they may need to deviate from preferred steaming routes. Considering this but also the wide ranging and offshore nature of this fishery and the wide operational range of the vessels involved, the sensitivity is also considered to be **low**.

11.132. Considering the temporary duration of construction (three years) and the relatively small spatial extent of safety zones across Project Alpha, the potential deviation of fishing vessels from traditional steaming routes would be minimal and short term. The magnitude of the impact is therefore considered to be **low** for all the fisheries.

11.133. With the above in mind, the significance of the impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.134. No additional mitigation is either required or proposed in relation to the impact of increased steaming times on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.135. The impact of increased steaming times is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

11.136. During the construction phase there may be potential for transiting construction vessels to cause interference with fishing activities.

11.137. The level of potential interference would vary depending on the type of gear deployed (static or towed gear). The assessment of the potential impact of interference is therefore provided separately for the crab and lobster fishery (static gear fishery) and for the scallop, squid, Nephrops and whitefish fishery (towed gear fisheries).

Lobster and crab fishery

11.138. For the lobster and crab fishery, the main potential cause of interference (conflict) would be the fouling of static gear surface marker lines by construction vessels. At present, the surface markers used by local fishermen operating gears within the 12nm are not visible at all states of visibility, being unlit without radar reflectors. Surface markers may be five litre plastic bottles, footballs or small spherical buoys or dhans. Considering this and the static nature of the gear used by creelers, the sensitivity of the crab and lobster fishery to interference is considered to be **medium**.

11.139. It should be noted that a Vessel Management Plan will be produced and will include provisions for appropriate liaison enabling awareness of construction vessels crews of the locations of static gears and fishermen's awareness of construction vessel transit routes. Furthermore, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. With the implementation of the above, the magnitude of the impact is considered to be **low**.

11.140. Taking this and the medium sensitivity of the receptor, the impact of interference with fishing practices on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, squid, Nephrops and whitefish fisheries

11.141. In the case of fisheries operating towed gears, namely the scallop, squid, Nephrops and whitefish fishery, taking account of their mobility, their sensitivity to interference is considered to be **low**.

11.142. It should be noted that construction vessels will fully comply as required under the International Regulations for Preventing Collisions at Sea (COLREGS) (IMO, 1972). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course or pose any risk to fishing gears being towed. In addition, as previously mentioned, a Vessel Monitoring Plan will be produced and the Marine Coordination Centre will monitor and coordinate vessel traffic on site. With the above in mind the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.143. Taking this and the low sensitivity of the receptor, the impact of interference with fishing practices on the scallop, squid, Nephrops and whitefish fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.144. No additional mitigation is either required or proposed in relation to interference with fishing activities on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.145. The impact of interference with fishing activity is predicted to be **Minor** for all fisheries and therefore **Not Significant** in EIA terms.

Project Bravo

Potential Impacts

11.146. The types and levels of fishing activity are broadly uniform across Project Alpha and Project Bravo and the worst case parameters considered for assessment are the same for both sites (Table 11.9). Therefore, the impact of the construction phase of Project Alpha described above is considered to also apply to the construction phase of Project Bravo. The outcomes of the assessment are summarised in Table 11.11 below.

Additional Mitigation

11.147. No additional mitigation is either required or proposed in relation to the impacts of Project Bravo on commercial fisheries receptors during the construction phase as no adverse significant impacts are predicted.

Residual Impact

11.148. The construction phase of Project Bravo is predicted to result in impacts not exceeding **Minor** on commercial fisheries receptors and safety issues for fishing vessels are expected to remain **within acceptable limits**. Therefore the impacts of Project Bravo on commercial fisheries receptors are **Not Significant** in EIA terms.

Table 11.11 Potential impacts of Project Bravo on commercial fisheries receptors during construction

Potential impact	Receptor	Sensitivity	Magnitude	Significance
Potential impacts on commercially exploited fish and shellfish populations	See Chapter 9 (Natural Fish and Shellfish Resource)			Minor (not significant)
Temporary loss of, or restricted access tom, traditional fishing grounds	Scallop fishery (local/smaller vessels)	Medium	Low	Minor (not significant)
	Scallop fishery (nomadic fleet)	Low	Low	Minor (not significant)
	Squid fishery	Low	Low	Minor (not significant)
	Lobster and crab fishery	Medium	Low	Minor (not significant)
Displacement of fishing activity into other areas	As above for the assessment of temporary loss or restricted access to traditional fishing grounds.			
Safety issues for fishing vessels	All vessels	n/a	n/a	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	Low	Low	Minor (not significant)
Interference with fishing activity	Crab and lobster fishery (static gear vessels)	Medium	Low	Minor (not significant)
	Scallop, squid, Nephrops and whitefish fishery (towed gear vessels)	Low	Low	Minor (not significant)

Project Alpha and Project Bravo Combined

11.149. The assessment provided within this section takes account of the worst case scenario for Project Alpha and Project Bravo Combined (Table 11.9).

11.150. The same receptor sensitivities identified for the construction phase for Project Alpha and Project Bravo individually apply to the assessment of Project Alpha and Project Bravo combined.

Potential impacts on commercially exploited fish and shellfish populations

Potential Impacts

All Fisheries

11.151. There may be potential for underwater noise from pile driving during construction of Project Alpha and Project Bravo combined to result in impacts on fish and shellfish populations. This could in turn affect the productivity of the fisheries that target them. Key species to commercial fisheries in the regional study area include scallops, squid, Nephrops, crabs, lobster and haddock.

11.152. The potential impact of pile driving during construction of Project Alpha and Project Bravo combined on fish and shellfish species, including those of commercial importance, has been assessed in Chapter 9 (Natural Fish and Shellfish Resource). This predicted impacts no exceeding minor significance. Consequently the resulting impact on commercial fisheries is also predicted to not exceed Minor and is therefore Not Significant in EIA terms.

Additional Mitigation

11.153. No additional mitigation is either required or proposed in relation to impacts on commercially exploited fish and shellfish populations as no adverse significant impacts are predicted.

Residual Impact

11.154. The impact of Project Alpha and Project Bravo combined on commercially exploited fish and shellfish populations, and any subsequent impact on the fisheries that target them, is predicted to not exceed **Minor** and therefore is **Not Significant** in EIA terms.

Temporary loss of, or restricted access to, traditional fishing grounds

Potential Impacts

Scallop Fishery

11.155. As previously described for Project Alpha and Project Bravo individually, the sensitivity of the scallop fishery to loss of fishing grounds is considered to be **medium** for local smaller vessels and **low** for nomadic vessels.

11.156. In the case of smaller local vessels, construction of Project Alpha and Project Bravo could result in exclusion from a moderate extent of the fishing grounds available to them (Figure 11.10 and Figure 11.11). Considering this and the increased duration of construction associated with both projects (four years) the magnitude of the impact is considered to be **medium**.

11.157. In the case of nomadic vessels, whilst the increased potential loss of fishing area and duration of the impact is recognised, taking the relatively small area that Project Alpha and Project Bravo combined represent in the context of the overall extent of equally productive fishing grounds available to these vessels, the magnitude of the impact is considered to be **low** (Figure 11.13 and Figure 11.14).

11.158. With the above in mind, the impact of temporary loss of, or restricted access to, traditional fishing grounds on local smaller scallop dredging vessels is predicted to be **Moderate** and therefore **Significant** in EIA terms and **Minor** in the case of nomadic vessels and therefore **Not Significant** in EIA terms.

Squid Fishery

11.159. Whilst the increase in the total extent of area of fishing grounds potentially lost and the duration of the impact as a result of the construction of Project Alpha and Project Bravo combined in comparison to that of an individual project is recognised, in view of the relatively low levels of activity by this fishery within the boundaries of both projects and the extent of grounds available to them, the magnitude of the impact is considered to be **low**.

11.160. Taking this and the **low** sensitivity of this fishery (described above for assessment of Project Alpha and Project Bravo individually), the impact of temporary loss or restricted access to traditional fishing grounds is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Lobster and Crab Fishery

11.161. As described for assessment of Project Alpha alone, the majority of creeling activity in the regional study area occurs inshore of Project Alpha and Project Bravo, particularly in rectangles 42E7 and 41E7 (Figure 11.3, Figure 11.4 and Figure 11.5). Vessels operating in these areas would remain unaffected in terms of loss of, or restricted access to traditional fishing grounds during construction of Project Alpha and Project Bravo. It is recognised, however that in recent years a number of vessels have entered the local fleet and as a consequence of their high steaming speeds have extended operational ranges. This has resulted in parts of their fishing areas overlapping the boundaries of Project Alpha and Project Bravo (Figure 11.20 and Figure 11.21).

11.162. It is therefore appreciated that there may be occasions when certain vessels may need to relocate their gear as a result of construction activity in Project Alpha and Project Bravo. In these instances, as described for Project Alpha alone, Seagreen would follow policy as specified in FLOWW Guidelines (2015) of appropriate evidence based mitigation and therefore the magnitude of the impact would remain **low**.

11.163. Taking this and the **medium** sensitivity of the fishery to loss of fishing grounds (previously identified for assessment of Project Alpha and Project Bravo individually) the impact of temporary loss of, or restricted access to traditional fishing grounds on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.164. No additional mitigation is either required or proposed in relation to temporary loss or restricted access to fishing grounds on commercial fisheries receptors as no adverse significant impacts are predicted.

11.165. An exception to this is the impact on local smaller scallop dredgers for which a **Moderate** impact and therefore **Significant** in EIA terms has been predicted. In order to mitigate loss of fishing grounds for these vessels during the construction phase provisions will be made to agree appropriate mitigation measures in line with FLOWW Guidelines. These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders.

Residual Impact

11.166. Considering the additional mitigation outlined above, the impact of loss of, or restricted access to, traditional fishing grounds as a result of Project Alpha and Project Bravo combined on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.167. As described for assessment of Project Alpha and Project Bravo individually, the level of potential displacement would be a function of the level of temporary loss or restricted access to fishing grounds that each fishery is subject to. Therefore, it is considered that the sensitivity, magnitude and impact significance identified for assessment of temporary loss or restricted access to fishing grounds also applies in respect of displacement. The outcomes of the assessment are summarised in Table 11.12.

Table 11.12 Summary of assessment of Displacement of Fishing Activity during Construction

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Medium	Moderate (significant)
Nomadic Scallop Dredgers	Low	Low	Minor (not significant)
Squid fishery	Low	Low	Minor (not significant)
Lobster and crab fishery	Medium	Low	Minor (not significant)

Additional Mitigation

11.168. No additional mitigation is either required or proposed in relation to the effect of displacement of fishing activity into other areas on commercial fisheries receptors as no adverse significant impacts are predicted.

11.169. An exception to this is the impact on local smaller scallop dredgers for which a **Moderate** impact and therefore **Significant** in EIA terms has been predicted. In order to mitigate loss of fishing grounds for local scallop dredgers and consequently potential associated displacement during the construction phase, provisions will be made to agree appropriate mitigation measures in line with FLOWW Guidelines. These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders.

Residual Impact

11.170. Considering the additional mitigation outlined above, the impact of displacement into other areas as a result of Project Alpha and Project Bravo combined is predicted to be **Minor** for all the commercial fisheries receptors and therefore **Not Significant** in EIA terms.

Safety issues for fishing vessels

Potential Impacts

11.171. The potential safety issues for fishing vessels would be the same regardless of whether consideration is given to one individual project or to Project Alpha and Project Bravo combined, as the same measures to address safety risks would be applied across both projects.

11.172. Therefore, in line with the assessments carried out for each individual project in respect of the construction phase, the impact of safety issues on commercial fisheries receptors as a result of Project Alpha and Project Bravo combined is predicted to remain **within acceptable limits** and would therefore be **Not Significant** in EIA terms.

Additional Mitigation

11.173. No additional mitigation is either required or proposed in relation to safety issues for fishing vessels during construction as no adverse significant impacts are predicted.

Residual Impact

11.174. The impact of safety issues on commercial fisheries receptors is predicted to remain **within acceptable limits** and would therefore be **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.175. As described for assessment of Project Alpha and Project Bravo individually, the sensitivity of the scallop, creel, Nephrops, squid and whitefish fishery to increased steaming times is considered to be **low**.

11.176. Whilst the increase in the duration of the construction phase and in the number of safety zones potentially in place across Project Alpha and Project Bravo combined compared to that of each individual project is recognised, considering the small, temporary and discrete nature of safety zones, the magnitude of the impact is considered to be **low** for all the fisheries.

11.177. In light of the above, the significance of the impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.178. No additional mitigation is either required or proposed in relation to the impact of increased steaming times on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.179. The impact of increased steaming times is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

11.180. The construction of Project Alpha and Project Bravo would result in an increase in the overall duration of the construction phase and in the number of construction vessel transits, compared to that required for each individual project. This could in turn result in increasing potential for interference with fishing activities.

Lobster and Crab Fishery

11.181. As described in the assessment of each individual project, the sensitivity of the lobster and crab fishery to interference is considered to be **medium**.

11.182. As outlined for assessment of individual projects, a Vessel Management Plan will be produced and will include provisions for appropriate liaison enabling awareness of construction vessels crews of the locations of static gears and fishermen's awareness of construction vessel transit routes. Furthermore, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. This would apply to both Project Alpha and Project Bravo. With the implementation of the above, the magnitude of the impact is considered to remain **low**.

11.183. Taking the medium sensitivity of the receptor and low magnitude of the impact, the impact of interference with fishing practices on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, Squid, Nephrops and Whitefish Fisheries

11.184. In the case of fisheries operating towed gears, namely the scallop, squid, Nephrops and whitefish fishery, as described in the assessment of each individual project, their sensitivity to interference is considered to be **low**.

11.185. Transiting construction vessels will fully comply as required under the International Regulations for Preventing Collisions at Sea (COLREGS). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course or pose any risk to fishing gears being towed. In addition, as previously mentioned a Vessel Management Plan will be produced and the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. With the above in mind, the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.186. Taking the low sensitivity of the receptor and low magnitude of the impact, the impact of interference with fishing practices on the scallop, squid, Nephrops and whitefish fisheries is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.187. No additional mitigation is either required, or proposed in relation to interference with fishing activities on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.188. The impact of interference with fishing activity is predicted to be **Minor** for all fisheries and therefore **Not Significant** in EIA terms.

IMPACT ASSESSMENT – OPERATIONAL PHASE

Project Alpha

11.189. The impacts described below should be considered in the context of the design life of Project Alpha (25 years).

11.190. The same receptor sensitivities identified for the construction phase apply to the assessment of the operational phase.

Complete loss of, or restricted access to, traditional fishing grounds

Potential Impacts

11.191. Existing legislation does not prevent fishing from occurring in operational wind farm sites. There would therefore be potential for fishing to resume within Project Alpha once the construction phase is completed.

11.192. During operation, Seagreen may apply for safety zones of 50m around installed infrastructure such as WTGs. There would only be a maximum of 70 WTGs in Project Alpha and therefore the potential loss of fishing area associated with this would account for a relatively small proportion of the site. In addition, temporary safety zones of up to 500m will be in place around major maintenance activities.

11.193. Array cables would be buried where feasible and protected elsewhere (approximately 10% of the length of the cables [32.5km] may require protection). In addition, in line with standard practice in the North Sea offshore oil and gas industry, measures would be undertaken to ensure that protection methods used are as far as practically possible, compatible with fishing activities.

11.194. As identified in Table 11.9, under the WCS the minimum spacing between turbines would be 1km. It is understood that the maximum total gear width during normal fishing practices for scallop dredgers is 60m and 92m for demersal trawlers operating in the area under consideration. Given these parameters and considering the minimum spacing between turbines (1km), it is considered that some degree of fishing access will be regained within Project Alpha once operational, particularly in the case of the smaller vessels in the fleet.

11.195. It is recognised, however, that in some instances, individual skippers, particularly those operating towed gear, may consider it impracticable to resume fishing within operational wind farms sites because of the presence of infrastructure.

Scallop Fishery

11.196. In addition to the potential loss of fishing area associated with the presence of WTGs (and the potential for 50m safety zones be implemented around them) and temporary safety zones around major maintenance works, the principal concern in relation to potential loss of fishing grounds, or restricted access for scallop dredgers would be the risk of interactions with array cables, as a consequence of the gear substrate penetration depths. In the case of large nomadic vessels a further constraint could be the manoeuvrability and minimum turning cycles between turbines.

11.197. As described previously (paragraph 11.121), the appropriate target burial depth to achieve sufficient protection of array cables will be determined through a cable burial risk assessment. Cable burial depths and any protection measures will be confirmed post installation to assist fishing vessel skippers in their assessments in respect of their fishing within Project Alpha.

11.198. As described for the construction phase, local smaller scallop dredgers are considered of **medium** sensitivity to loss of fishing grounds. The impact during operation would be long term (25 years). However, these vessels would be able to regain access to the Project Alpha site once operational. Considering this and the fact that the area permanently lost to fishing would be small (i.e. that associated with the footprint of WTGs and safety zones), in the context of the extent of grounds available to these vessels (Figure 11.10 and Figure 11.11), the magnitude of the impact is assessed to be **low**.

11.199. Taking the above into account the impact of complete loss or restricted access to traditional fishing grounds on local smaller scallop dredgers is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

11.200. In the case of nomadic vessels, taking a conservative worst case, it has been assumed that these vessels would elect not to fish within Project Alpha once operational. Whilst the long term nature of the impact (25 years) is recognised, considering the relatively small area that Project Alpha represents in the context of the extent of equally productive grounds available to these vessels, the magnitude of the impact is considered to be **low (**Figure 11.13 and Figure 11.14). As described for the construction phase the sensitivity of nomadic vessels to loss of fishing grounds is considered to be **low**.

11.201. Taking the low sensitivity and low magnitude of the impact, the impact of complete loss or restricted access to traditional fishing grounds on nomadic vessels is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Squid Fishery

11.202. As described for the construction phase, the sensitivity of the squid fishery to loss of fishing grounds is considered to be **low**.

11.203. Whilst the potential impact would be long term (25 years) fishing vessels would be able to regain access to the area of Project Alpha during the operation phase, with the exception of the discrete areas where infrastructure and safety zones may be in place.

11.204. With the above in mind and considering the limited activity of the squid fishery in the area of Project Alpha and the relatively small extent that areas occupied by WTGs (and potential safety zones around them) and safety zones around major maintenance works represent in the context of the overall grounds available to this fishery, the magnitude of the impact is assessed to be **low.**

11.205. Taking the above into account, the impact of temporary loss or restricted access to traditional fishing grounds on the squid fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Crab and Lobster Fishery

11.206. As previously described for the construction phase, the majority of creeling activity in the regional study area occurs inshore of Project Alpha (rectangles 42E7 and 41E7). Vessels operating in these areas would therefore remain unaffected in terms of loss of, or restricted access to traditional fishing grounds. In the case of vessels that due to their high steaming speeds have extended operational ranges and are active in the immediate area of Project Alpha, however, there would be potential for the operation phase to result in loss, or restricted access to fishing grounds.

11.207. The potential impact would be long term (25 years) however fishing vessels would be able to regain access to the area of Project Alpha during operation, with the exception of the discrete areas where infrastructure is located and safety zones are in place. With this in mind and considering the extent of grounds available to these vessels (Figure 11.20 and Figure 11.21) the magnitude of the impact is considered to be **low**.

11.208. As described above for the construction phase, the sensitivity of the lobster and crab fishery to loss or restricted access to fishing grounds is **medium**. Considering this and the low magnitude of the impact the impact is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.209. No additional mitigation is either required or proposed, in relation to temporary loss, or restricted access to fishing grounds on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.210. The impact of temporary loss or restricted access to traditional fishing grounds on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.211. As described for assessment of the construction phase, the level of potential displacement would be a function of the level of loss or restricted access to fishing grounds that each fishery is subject to. Therefore, it is considered that the sensitivity, magnitude and impact significance identified for assessment of loss or restricted access to fishing grounds also applies in respect of displacement. The outcomes of the assessment are summarised in Table 11.13.

Table 11.13 Summary of Assessment of Displacement of Fishing Activity During Operation

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Low	Minor (not significant)
Nomadic Scallop Dredgers	Low	Low	Minor (not significant)
Squid fishery	Low	Low	Minor (not significant)
Lobster and crab fishery	Medium	Low	Minor (not significant)

Additional Mitigation

11.212. No additional mitigation is either required, or proposed in relation to the effect of displacement of fishing activity into other areas on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.213. The impact displacement of fishing activity into other grounds on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Safety issues for fishing vessels

Potential Effects

All vessels

11.214. An assessment specific to safety issues associated with potential risk of gear snagging and manoeuvrability issues for fishing vessels is given below. Safety issues in relation to potential for collision with operation and maintenance vessels and allision with Project infrastructure are described in Chapter 12 (Shipping and Navigation).

11.215. The presence of WTGs in Project Alpha (up to 70), would result in increased potential for manoeuvrability risks for fishing vessels. In addition, snagging risks may arise as a result of interactions between fishing gear and array cables and/or cable protection measures in localised section of cables where these may be required.

11.216. Safety zones will be in place around major maintenance works. In addition safety zones may be applied for around WTGs during the operation phase and the Marine Coordination Centre will monitor and coordinate vessel traffic on site. Array cables would be buried where feasible and protected elsewhere (approximately 10% of the length of the cables (32.5km) may require protection).

11.217. As described previously, (paragraph 11.121), the appropriate target burial depth to achieve sufficient protection of array cables will be determined through a cable burial risk assessment. Cable burial depths and any protection measures will be confirmed post installation to assist fishing vessel skippers in their assessments in respect of their fishing within Project Alpha.

11.218. Furthermore, in line with standard practice in the North Sea offshore oil and gas industry, measures would be undertaken to ensure that where cable protection is required, the protection methods used are as far as practically possible, compatible with fishing activities.

11.219. In order to minimise potential safety risks to fishing vessels, the required levels of information distribution would be undertaken through the channels of the Kingfisher Information System, NtMs, as well as direct liaison with fishermen and their representatives. The primary purpose of this would be to ensure amongst fishing vessel owners and crews the required level of awareness of potential risks during the operation phase.

11.220. In respect of obstacles on the seabed, in instances where objects are accidentally dropped overboard during operation, the standard obligations outlined for assessment of the construction phase would also apply (IMO, 1996). This will follow requirements of the Marine Scotland's notification procedure for reporting dropped material from the offshore wind/marine renewables industry at sea.

11.221. In conclusion, with the application of the measures, liaison and information distribution discussed above and the required compliance by fishermen, safety issues for fishing vessels should remain **within acceptable limits**.

Additional Mitigation

11.222. No additional mitigation is either required or proposed in relation to safety issues for fishing vessels during operation as no adverse significant impacts are predicted.

Residual Impact

11.223. The impact of safety issues on commercial fisheries receptors is predicted to remain **within acceptable limits** and is therefore **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.224. During the operation phase the presence of installed infrastructure could result in some increases in steaming distances and times, and therefore in higher operational costs for fishing vessels.

11.225. As described for the construction phase, the sensitivity in respect of increased steaming times to fishing grounds is considered **low** for all the fisheries.

11.226. Whilst the impact would last for the operational life of the wind farm, provided that weather conditions allow, fishing vessels are expected to be able to transit through Project Alpha (see Chapter 12 (Shipping and Navigation). With this in mind, the magnitude of the impact is considered to be **low**.

11.227. Taking the above into account, the impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.228. No additional mitigation is either required or proposed, in relation to the impact of increased steaming times on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.229. The impact of increased steaming times is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

11.230. During the operation phase there may be potential for transiting operation and maintenance vessels to cause interference with fishing activities.

11.231. As described for the construction phase, the level of potential interference would vary depending on the type of gear deployed (static or towed gear). The assessment of the potential impact of interference is therefore provided separately for the lobster and crab fishery (static gear fishery) and for the scallop, squid, Nephrops and whitefish fishery (towed gear fisheries).

Crab and lobster fishery

11.232. A vessel Management Plan will be produced and will include provisions for appropriate liaison enabling awareness of maintenance vessels crews of the locations of static gears and fishermen's awareness of maintenance vessel transit routes. Furthermore, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. With this in mind, the magnitude of the impact is considered to be **low**.

11.233. Taking the **medium** sensitivity of the receptor (previously described for the construction phase) and low magnitude of the impact, the impact of interference with fishing activity on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, squid, Nephrops and whitefish fisheries

11.234. As described for the construction phase, in the case of fisheries operating towed gears, namely the scallop, squid, Nephrops and whitefish fishery, taking account of their mobility, their sensitivity to interference is considered to be **low**.

11.235. Transiting operation and maintenance vessels will fully comply as required under the International Regulations for Preventing Collisions at Sea (COLREGS). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course, or pose any risk to fishing gears being towed. In addition, as previously mentioned, a Vessel Monitoring Plan will be produced, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. With the above in mind the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.236. The impact of interference with fishing practices on the scallop. Squid, Nephrops and whitefish fishery is therefore predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.237. No additional mitigation is either required or proposed in relation to interference with fishing activities on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.238. The impact of interference with fishing activities is predicted to be **Minor** for all the fisheries and therefore **Not Significant** in EIA terms.

Project Bravo

Potential Impacts

11.239. The types and levels of fishing activity are broadly uniform across Project Alpha and Project Bravo and the worst case parameters considered for assessment are the same for both sites (Table 11.9). Therefore, the impact of the operation phase of Project Alpha described above is considered to also apply to the operation phase of Project Bravo. The outcomes of the assessment are summarised in Table 11.14 below.

Table 11.14 Potential impacts of Project Bravo on commercial fisheries receptors during operation

Potential impact	Receptor	Sensitivity	Magnitude	Significance
Complete loss of, or restricted access to, traditional fishing grounds	Scallop fishery (local/smaller vessels)	Medium	Low	Minor (not significant)
	Scallop fishery (nomadic fleet)	Low	Low	Minor (not significant)
	Squid fishery	Low	Low	Minor (not significant)
	Lobster and crab fishery	Medium	Low	Minor (not significant)
Displacement of fishing activity into other areas	As above for the assessment of temporary loss or restricted access to traditional fishing grounds.			
Safety issues for fishing vessels	All vessels	n/a	n/a	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	Scallop (local and nomadic), Lobster and crab and Nephrops fisheries	Low	Low	Minor (not significant)
	White fish fishery	Low	Low	Low (not significant)
Interference with fishing activity	Crab and lobster fishery (static gear vessels)	Medium	Low	Minor (not significant)
	Scallop, squid, Nephrops and whitefish fishery (towed gear vessels)	Low	Low	Minor (not significant)

Additional Mitigation

11.240. No additional mitigation is either required or proposed, in relation to the impacts of Project Bravo on commercial fisheries receptors during the operation phase, as no adverse significant impacts are predicted.

Residual Impact

11.241. The operation phase of Project Bravo is predicted to result in impacts not exceeding **Minor** on commercial fisheries receptors and safety issues for fishing vessels are expected to remain **within acceptable limits**. Therefore the impacts of the operation phase of Project Bravo on commercial fisheries receptors are **Not Significant** in EIA terms.

Project Alpha and Project Bravo Combined

Complete loss of, or restricted access to, traditional fishing grounds

Potential Impacts

Scallop Fishery

11.242. As described for the construction phase, the sensitivity in respect of loss of fishing grounds is considered to be **medium** for smaller local scallop dredgers, and **low** for nomadic vessels. The impact during operation would be long term (25 years). However, local scallop dredgers would regain access to both Project Alpha and Project Bravo once operational. Considering this and the fact that the area permanently lost to fishing would be small (i.e. that associated with the footprint of WTGs and potential safety zones around them, as well as safety zones around major maintenance works within Project Alpha and Project Bravo) in the context of the extent of grounds available to these vessels (Figure 11.10 and Figure 11.1), the magnitude of the impact is assessed to be **low**.

11.243. Taking the above into account the impact of complete loss or restricted access to traditional fishing grounds on local smaller scallop dredgers is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

11.244. In the case of large nomadic vessels, taking a conservative worst case, it has been assumed that these vessels would elect not to fish within Project Alpha and Project Bravo once operational. Whilst the long term nature of the impact (25 years) is recognised, considering the relatively small area that Project Alpha and Project Bravo represent in the context of the extent of equally productive grounds available to these vessels, the magnitude of the impact is considered to be **low** (Figure 11.13 and Figure 11.14).

11.245. Taking the low sensitivity and low magnitude of the impact, the impact of complete loss or restricted access to traditional fishing grounds on nomadic vessels is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Squid Fishery

11.246. As described for the construction phase, the sensitivity of the squid fishery to loss of fishing grounds is considered to be **low**.

11.247. Whilst the potential impact would be long term (25 years), fishing vessels would be able to regain access to the area of Project Alpha and Project Bravo during the operation phase, with the exception of the discrete areas where infrastructure is located and safety zones are in place.

11.248. With the above in mind and considering the relatively small extent that these areas represent in the context of the overall grounds available to this fishery and the limited level of activity of the squid fishery in Project Alpha and Project Bravo the magnitude of the impact is considered to be **low.**

11.249. Taking the above into account, the impact of temporary loss or restricted access to traditional fishing grounds on the squid fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Crab and Lobster Fishery

11.250. As previously described for the construction phase, the majority of creeling activity in the regional study area occurs inshore of Project Alpha and Project Bravo. Vessels operating in these areas would therefore remain unaffected in terms of loss of, or restricted access to, traditional fishing grounds. In the case of vessels that due to their high steaming speeds have extended operational ranges and are active in the immediate area of Project Alpha and Project Bravo, however, there would be potential for the operation phase to result in loss or restricted access to fishing grounds (Figure 11.20).

11.251. The potential impact would be long term (25 years), however, fishing vessels would be able to regain access to the area of Project Alpha and Project Bravo during operation, with the exception of the discrete areas where infrastructure is located and safety zones are in place. With this in mind and considering the extent of grounds available to these vessels (Figure 11.20) the magnitude of the impact is considered to be **low**.

11.252. As described above for the construction phase, the sensitivity of the lobster and crab fishery to loss or restricted access to fishing grounds is **medium**. Considering this and the low magnitude of the impact, this is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.253. No additional mitigation is either required or proposed, in relation to complete loss or restricted access to fishing grounds on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.254. The impact of complete loss or restricted access to traditional fishing grounds on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.255. As previously described, the level of potential displacement would be a function of the level of loss or restricted access to fishing grounds that each fishery is subject to. Therefore, it is considered that the sensitivity, magnitude and impact significance identified for assessment of loss or restricted access to fishing grounds also applies in respect of displacement. The outcomes of the assessment are summarised in Table 11.15.

Table 11.15 Summary of Assessment of Displacement of Fishing Activity During Operation

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Low	Minor (not significant)
Nomadic Scallop Dredgers	Low	Low	Minor (not significant)
Squid fishery	Low	Low	Minor (not significant)
Lobster and crab fishery	Medium	Low	Minor (not significant)

Additional Mitigation

11.256. No additional mitigation is either required or proposed, in relation to the effect of displacement of fishing activity into other areas on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.257. The impact of displacement of fishing activity into other areas on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Safety issues for fishing vessels

Potential Impacts

All vessels

11.258. The potential safety issues for fishing vessels would be the same regardless of whether consideration is given to one individual project or to Project Alpha and Project Bravo combined, as the same measures to address safety risks would be applied across both projects.

11.259. Therefore, in line with the assessments carried out for each individual project for the operation phase, the impact of safety issues on commercial fisheries receptors as a result of Project Alpha and Project Bravo combined is predicted to remain **within acceptable limits** and would therefore be **Not Significant** in EIA terms.

Additional Mitigation

11.260. No additional mitigation is either required or proposed, in relation to safety issues for fishing vessels during construction, as no adverse significant impacts are predicted.

Residual Impact

11.261. The impact of safety issues on commercial fisheries receptors is predicted to remain **within acceptable limits** and would therefore be **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.262. As described for the construction phase, the sensitivity in respect of increased steaming times to fishing grounds is considered **low** for the scallop, squid, Nephrops, lobster and crab and whitefish fishery.

11.263. Whilst the impact would last for the operation phase, provided that weather conditions allow, fishing vessels are expected to be able to transit through Project Alpha and Project Bravo (see Chapter 12 [Shipping and Navigation]). With this in mind, the magnitude of the impact is considered to be **low**.

11.264. Taking the above into account, the impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.265. No additional mitigation is either required or proposed in relation to the impact of increased steaming times on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.266. The impact of increased steaming times is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

Crab and Lobster Fishery

11.267. A vessel Management Plan will be produced and will include provisions for appropriate liaison enabling awareness of maintenance vessels crews of the locations of static gears and fishermen's awareness of maintenance vessel transit routes. Furthermore, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. This would be applied in respect of both Project Alpha and Project Bravo. With this in mind the magnitude of the impact is considered to be **low**.

11.268. Taking the **medium** sensitivity of the receptor (previously described for the construction phase) and low impact magnitude, the impact of interference with fishing practices on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, squid, Nephrops and whitefish fisheries

11.269. As described for the construction phase, in the case of fisheries operating towed gears, namely the scallop, squid, Nephrops and whitefish fishery, taking account of their mobility, their sensitivity to interference is considered to be **low**.

11.270. Transiting operation and maintenance vessels will fully comply, as required under the International Regulations for Preventing Collisions at Sea (COLREGS). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course, or pose any risk to fishing gears being towed. In addition, as previously mentioned, a Vessel Monitoring Plan will be produced, the Marine Coordination Centre will monitor and coordinate vessel traffic on site and local FIRs will support dialogue with local fishermen. With the above in mind the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.271. The impact of interference with fishing practices on the scallop. Squid, Nephrops and whitefish fishery is therefore predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.272. No additional mitigation is either required or proposed in relation to interference with fishing activities on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.273. The impact of interference with fishing activity is predicted to be **Minor** for all the fisheries and therefore **Not Significant** in EIA terms.

IMPACT ASSESSMENT – DECOMMISSIONING

11.274. Detail on decommissioning at this point in time is necessarily limited. It is however likely that during this phase activities which may be required, will cause some disruption to normal fishing practices.

11.275. As outlined in Chapter 5 (Project Description), decommissioning is anticipated to include the following:

- Removal of WTGs: expected to be the reverse of the installation procedure;
- Removal of substructures and foundations: various approaches considered depending on whether GBS, suction pile, pin pile or monopile foundations are used; and
- Removal of offshore cabling: cables may be left in situ or wholly or partially removed.

11.276. The types of impact upon commercial fishing would be expected to be comparable to those identified for the construction phase, namely:

- Potential impacts on commercially exploited fish and shellfish populations**;**
- Temporary loss, or restricted access to traditional fishing grounds;
- Displacement of fishing activity into other areas;
- Safety issues for fishing vessels;
- Increased steaming times to fishing grounds; and
- Interference to fishing activities.

11.277. Given the nature of the likely decommissioning activities, it is assumed that the magnitude of the impacts associated with this phase would be commensurate with, and likely less, than that identified for the construction phase. Similarly, the sensitivity of the receptors would remain the same as identified for the construction phase.

11.278. Therefore, the outcomes of the assessments provided for the construction phase of each individual project and Project Alpha and Project Bravo combined are considered to also apply to the decommissioning phase. Further information will be provided in the Decommissioning Programme that Seagreen will be required to complete post consent. It is also likely that a separate EIA will be completed prior to decommissioning, to assess the impacts of the detailed decommissioning plans and activities that will be known at that time.

IMPACT ASSESSMENT: CUMULATIVE

11.279. The EIA Regulations require the assessment of cumulative impacts. This requires consideration and assessment of existing projects, projects under construction and consented or proposed projects identified in relevant development plans and programmes that have the potential to impact cumulatively with the optimised Seagreen Project.

11.280. Cumulative impacts can occur when the impacts from one project on an identified receptor combine (through either spatial or temporal overlap) with similar impacts from other projects on the same receptor. The purpose of considering cumulative impacts is to understand if the impacts from the optimised Seagreen Project parameters (Project Alpha and Project Bravo), when considered together (combined), or cumulatively with other plans and projects are different, or more significant than from the individual projects in isolation. This enables additional mitigation to be identified, as appropriate.

11.281. Cumulative impacts are considered for all stages of the optimised Seagreen Project throughout construction, operation and decommissioning. It should be noted that the Offshore Transmission Asset is already licensed and is unchanged, therefore this is considered alongside the other identified projects and plans.

11.282. In line with the assessment carried out for Project Alpha, Project Bravo and Project Alpha and Project Bravo combined, the following potential impacts are taken forward to the cumulative assessment:

- Potential impacts on commercially exploited fish and shellfish populations;
- Displacement of fishing activity into other areas;
- Temporary/permanent loss, or restricted access to traditional fishing grounds;
- Increased steaming times to fishing grounds; and
- Interference with fishing activities.

11.283. In the case of potential impacts associated with safety issues for fishing vessels, it is assumed that the same obligations will apply to all developments to ensure that safety issues are within acceptable limits. Potential cumulative impacts associated with safety issues (including seabed obstacles) are therefore not discussed further in the cumulative assessment.

11.284. Identification of relevant projects and developments included for assessment of cumulative impacts has been informed by scoping and wider consultation, as set out within Chapter 7 (Scope of EIA Report).

11.285. The projects that have been considered in the assessment are outlined in Table 11.16 and are illustrated in Figure 11.25. This includes information on the fisheries for which each project has been given consideration as well as a short description on each project and its status.

Table 11.16 Projects considered for cumulative assessment

Project	Description	Status	Fisheries Considered
Seagreen Offshore Transmission Asset Project	Installation of up to five Offshore Substation Platforms (OSPs) with inter connector cables within the Seagreen Project site and up to six export cable trenches	Consent application submitted October 2012. Consented by Scottish Ministers in October 2014.	All
Inch Cape	Installation of up to 110 WTGs with export capacity of approximately 784 MW	Consent application submitted July 2013. Approved by Scottish Government September 2014. Subject to Judicial Review raised by RSPB challenging the consent, which the Court of Session found in favour of in July 2016. This decision was subject to an appeal by the Scottish Government and was overturned in May 2017, which reinstated the consents.	All
Neart na Gaoithe	Installation of up to 64 WTGs with export capacity of approximately 450 MW.	Consent application submitted April 2012. Approved by Scottish Government September 2014. Subject to Judicial Review raised by RSPB challenging the consent, which the Court of Session found in favour of in July 2016. This decision was subject to an appeal by the Scottish Government and was overturned in May 2017, which reinstated the consents.	All
Kincardine Offshore Wind Farm	Installation of up to eight floating WTGs with overall generating capacity of up to 50 MW.	Consent application submitted March 2016. Approved by Scottish Government March 2017. Consent variation submitted in November 2017 to update design.	All
Forthwind Offshore Wind Farm	Installation of two WTGs with overall generating capacity of up to 18 MW.	Consent application submitted July 2015. Approved by Scottish Government December 2016	All
Forthwind Offshore Wind Demonstration Array	Installation of up to nine WTGs with overall generating capacity of up to 65 MW.	Scoping submitted November 2016, application for consent expected 2018.	All
ORE Catapult Levenmouth	Installation of one WTG with overall generating capacity of 7 MW.	Consent application submitted July 2012. Approved by Scottish Government May 2013. Currently operational.	All

Project	Description	Status	Fisheries Considered
Hywind Scotland Pilot Park	Installation of up to five floating WTGs with overall generating capacity of up to 30 MW.	Consent application submitted March 2015. Approved by Scottish Government October 2015. Construction completed in 2017.	All
European Offshore Wind Deployment Centre	Include, but not be limited to, 11 three bladed WTGs with a maximum power generation of up to 100 MW.	Consent application submitted March 2013. Approved by Scottish Government August 2014. Currently under construction. Completion expected September 2018.	All
NorthConnect	Interconnector with 1,400 MW capacity	Scoping submitted 2016. Construction planned 2021 to 2022.	All
Moray Offshore East development (encompassing Telford, Stevenson and MacColl Offshore Wind Farms)	Installation of 100 WTGs with overall generating capacity of up to 950 MW.	Consent application submitted August 2012. Approved by Scottish Government March 2014. CfD award 2017. Construction start expected 2019.	Nomadic scallop dredgers Squid fishery
Moray West	Installation of up to 90 WTGs with overall generating capacity of up to 750 MW.	Scoping submitted May 2016, application for consent expected 2018.	Nomadic scallop dredgers Squid fishery
Beatrice Demonstrator Project	Two WTGs with max capacity 10 MW.	No longer operational. Due to be decommissioned.	Nomadic scallop dredgers Squid fishery
Beatrice	Installation of up to 140 WTGs with overall generating capacity of up to 750 MW. Final wind farm design comprises 84 WTGs	Consent application submitted July 2012. Approved by Scottish Government March 2014. Currently under construction. Completion expected 2019.	Nomadic scallop dredgers Squid fishery
Caithness to Moray Interconnector	Interconnector	Caithness to Moray Currently under construction. Completion expected December 2018.	Nomadic scallop dredgers Squid fishery
Blyth Offshore Wind Farm	Two WTGs with max. capacity 3.8 MW.	Operational since 2000.	Nomadic scallop dredgers Squid fishery
Blyth Offshore Demonstrator Project -Array 2	Five WTGs with max. capacity 40 MW	Consent application submitted March 2012. Approved by Scottish Government October 2013. Currently Operational	Nomadic scallop dredgers Squid fishery
Rampion Offshore Wind Farm	116 WTG	Completion and full operation expected in 2018.	Nomadic scallop dredgers

Cumulative Impacts during Construction

11.286. The assessment provided within this section takes account of the potential increased spatial extent of each impact, when considering the optimised Seagreen Project in conjunction with other projects (where the construction of various projects occurs concurrently). It also takes account of the potential for increased temporal impacts in instances where construction at various projects may occur sequentially.

Potential impacts on commercially exploited fish and shellfish populations

Potential Impacts

All Fisheries

11.287. There may be potential for underwater noise from pile driving during construction of the optimised Seagreen Project in conjunction with other projects to result in cumulative impacts on fish and shellfish populations. This could in turn affect the productivity of the fisheries that target them. Key species to commercial fisheries in the regional study area include scallops, squid, Nephrops, crabs, lobster and haddock.

11.288. The cumulative impact of pile driving activity on fish and shellfish species, including those of commercial importance, has been assessed in Chapter 9 (Natural Fish and Shellfish Resource). This predicted impacts no exceeding minor significance. Consequently, the resulting impact on commercial fisheries is also predicted to not exceed **Minor** significance and is therefore **Not Significant** in EIA terms.

Additional Mitigation

11.289. No additional mitigation is either required or proposed in relation to impacts on commercially exploited fish and shellfish populations as no adverse significant impacts are predicted.

Residual Impact

11.290. The cumulative impact on commercially exploited fish and shellfish populations, and any subsequent impact on the fisheries that target them, is predicted to not exceed **Minor** and therefore is **Not Significant** in EIA terms.

Temporary loss of, or restricted access to, traditional fishing grounds

Potential Impacts

Scallop Fishery

11.291. As previously described for assessment of Project Alpha and Project Bravo individually and Project Alpha and Project Bravo combined, the sensitivity of the scallop fishery to loss of fishing grounds is considered to be **medium** for local smaller vessels, and **low** for nomadic vessels.

11.292. The construction of the optimised Seagreen Project cumulatively with other projects could result in exclusion from additional fishing grounds, to both local and nomadic vessels where construction occurs concurrently at various projects. Alternatively, it may result in an increased temporal effect where construction at different projects occurs sequentially.

11.293. Local smaller scallop dredgers would be primarily affected by construction activities at other projects within the regional study area. It should be noted, however, that with the exception of Inch Cape, these projects support relatively low levels of scallop dredging activity (Figure 11.26 and Figure 11.27). In addition, a number of these projects are already

operational or expected to be operational before construction at Project Alpha and Project Bravo starts (2022), including ORE Catapult Levenmouth, Hywind Scotland Pilot Park and the European Offshore Wind Deployment Centre (Table 11.16).

11.294. With this in mind, the magnitude of the impact in respect of local scallop dredgers is considered to be as previously described for Project Alpha and Project Bravo combined, namely **medium**.

11.295. In the case of nomadic vessels, the potential cumulative loss of grounds during construction would be a result of construction activities at a wider range of projects, including those in the regional study area, in the Moray Firth and some projects in English waters (particularly those off the north east coast and south coast of England) (Figure 11.28 and Figure 11.29). As described for local scallop dredgers, it should be noted that some of these projects are already operational or expected to be operational before construction at Project Alpha and Project Bravo starts (Rampion, Blyth Offshore Wind farm, Blyth Array 2, Beatrice Offshore Wind Farm, Caithness to Moray Interconnector). Whilst the increase in the extent of grounds potentially affected (where construction occurs concurrently) and/or in the duration of the impact (where construction occurs sequentially) when considering all the other projects is recognised, this would represent a relatively small area in the context of the grounds available to nomadic vessels. With this in mind the magnitude of the impact on nomadic vessels is assessed to be **low**.

11.296. Taking the above into account, the cumulative impact of temporary loss of, or restricted access to, traditional fishing grounds on local smaller scallop dredging vessels is predicted to be **Moderate** and therefore **Significant** in EIA terms. In the case of nomadic vessels, the impact is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Squid Fishery

11.297. The potential cumulative impact of loss of grounds during construction on the squid fishery would be a result of construction activities in the regional study area. In addition, vessels with operational ranges that extend beyond the study area may be affected by the construction of other projects in the Moray Firth and projects off the north east coast of England (Figure 11.30 and Figure 11.31). As described for nomadic dredgers, it should be noted that some of these projects are already operational or expected to be operational before construction at Project Alpha and Project Bravo starts (Blyth Offshore Wind farm, Blyth Array 2, Beatrice Offshore Wind Farm, Caithness to Moray Interconnector). Furthermore, it should be noted that there is limited demersal trawling activity within the arrays of the majority of offshore wind farm sites included for assessment, with activity for the most part concentrating inshore, in areas relevant to the export cables of these projects. In this context the shorter installation periods for export cables and any associated loss of grounds/restricted access compared to that resulting from offshore construction activities within wind farm arrays should be recognised.

11.298. Acknowledging the extent of grounds potentially affected (where construction occurs concurrently) and/or the increase in the duration of the impact (where construction occurs sequentially) when considering all other projects, the magnitude of the impact on the squid fishery is considered to be **medium**.

11.299. Taking this and the low sensitivity of this fishery (described above for assessment of Project Alpha and Project Bravo), the cumulative impact of temporary loss or restricted access to traditional fishing grounds is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Lobster and Crab Fishery

11.300. As described for assessment of the optimised Seagreen Project, the majority of creeling activity in the regional study area occurs inshore of Project Alpha and Project Bravo, in rectangles 42E7 and 41E7. In addition, further offshore, a limited number of vessels that have high steaming speeds are currently also active.

11.301. The potential for cumulative loss of grounds/restricted access to grounds for the lobster and crab fishery would for the most part be a result of construction activities at Inch Cape and Neart na Gaoithe, as well as the Seagreen Offshore Transmission Asset Project, with the contribution of Project Alpha and Project Bravo to any cumulative impact being very small (Figure 11.32).

11.302. Considering construction activity at these projects, there may therefore be instances when certain vessels will be temporarily excluded from parts of their fishing grounds. Recognising the extent of grounds affected (where construction occurs concurrently) and/or the increase in the duration of the impact (where construction occurs sequentially), the magnitude of the impact is considered to be **medium.**

11.303. Taking this and the **medium** sensitivity of the fishery to loss of fishing grounds (previously identified for assessment of Project Alpha and Project Bravo), the impact of temporary loss of, or restricted access to traditional fishing grounds on the lobster and crab fishery is predicted to be **Moderate** and therefore **Significant** in EIA terms.

Additional Mitigation

11.304. No additional mitigation is either required or proposed, in relation to temporary loss or restricted access to fishing grounds for nomadic scallop dredgers and for the squid fishery, as no adverse significant impacts are predicted.

11.305. In the case of local smaller scallop dredgers and the lobster and crab fishery a **Moderate** impact and therefore **Significant** impact in EIA terms has been predicted.

11.306. In order to mitigate the potential loss of fishing grounds to local scallop dredgers during the construction phase, as described for assessment of Project Alpha and Project Bravo combined, Seagreen will make provisions to agree appropriate mitigation measures for these vessels in line with FLOWW Guidelines. These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders. Further mitigation to that described for Alpha and Bravo combined is not considered to be required to reduce the potential cumulative impact. This takes account of the comparatively lower levels of scallop dredging activity at the majority of the other projects included for assessment (Figure 11.27 and Figure 11.28).

11.307. In the case of the lobster and crab fishery, where vessels need to relocate their gear as a result of construction activity in other projects, it is anticipated that in line with the approach taken by Seagreen for Project Alpha and Project Bravo, other projects will also follow the policy as specified in FLOWW Guidelines (2015) of appropriate evidence based mitigation.

Residual Impact

11.308. With the implementation of the mitigation outlined above in respect of local scallop dredgers and assuming that, where relevant, other projects adhere to FLOWW Guidelines, to minimise loss of fishing grounds on the lobster and crab fishery, the cumulative impact of loss, or restricted access to traditional fishing grounds on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.309. As described for the assessment of Project Alpha and Project Bravo, the level of potential displacement would be a function of the level of temporary loss or restricted access to fishing grounds that each fishery is subject to. Therefore, it is considered that the sensitivity, magnitude and impact significance identified for assessment of temporary loss or restricted access to fishing grounds also applies in respect of displacement. The outcomes of the assessment are summarised in Table 11.17.

Table 11.17 Summary of assessment of Displacement of Fishing Activity during Construction

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Medium	Moderate (significant)
Nomadic Scallop Dredgers	Low	Low	Minor (not significant)
Squid fishery	Low	Medium	Minor (not significant)
Lobster and crab fishery	Medium	Medium	Moderate (significant)

Additional Mitigation

11.310. No additional mitigation is either required or proposed, in relation to the impact of displacement of fishing activity into other areas on nomadic scallop dredgers and the squid fishery, as no adverse significant impacts are predicted.

11.311. In the case of local smaller scallop dredgers and the lobster and crab fishery, as the level of displacement would be a function of the loss or restricted access to fishing grounds, the same considerations on additional mitigation discussed above in respect of temporary loss or restricted access to fishing grounds would also apply here.

Residual Impact

11.312. Considering the additional mitigation outlined above, the cumulative impact of displacement of fishing activity into other areas on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.313. As described for assessment of Project Alpha and Project Bravo, the sensitivity of the scallop, creel, Nephrops, squid and whitefish fishery to increased steaming times is **low**.

11.314. Considering all the other projects included in the cumulative assessment there would be potential for an increase in the duration of the potential impact (where construction occurs sequentially) and/or in the number of safety zones potentially in place at a given time (where construction occurs concurrently), compared to those associated with the optimised Seagreen Project in isolation. Whilst this is recognised, considering the small, temporary and discrete nature of safety zones, the magnitude of the impact is expected to remain **low** for all the fisheries included for assessment.

11.315. In light of the above, the significance of the cumulative impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.316. No additional mitigation is either required or proposed, in relation to the impact of increased steaming times on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.317. The cumulative impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

11.318. The construction of other projects would result in an increase in the number of construction vessel transits, compared to that required for the optimised Seagreen Project in isolation. This could in turn result in increasing potential for interference with fishing activities.

Lobster and Crab Fishery

11.319. As described for the assessment of Project Alpha and Project Bravo, a Vessel Management Plan will be produced and will include provisions for appropriate liaison, enabling awareness of construction vessels crews of the locations of static gears and fishermen's awareness of construction vessel transit routes. In line with standard practice, it is expected that this, or similar measures, will be applied to the installation of other projects included in the cumulative assessment. With this in mind the magnitude of the impact is considered to remain **low**.

11.320. The sensitivity of the lobster and crab fishery to interference is considered to be **medium** (as previously described for Project Alpha and Project Bravo). Taking this and the low magnitude of the impact, the cumulative impact of interference with fishing practices on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, squid, Nephrops and whitefish fisheries

11.321. In the case of fisheries operating towed gear, namely the scallop, squid, Nephrops and whitefish fishery, as described in the assessment of each individual project, their sensitivity to interference is considered to be **low**.

11.322. Transiting construction vessels involved in activities at all the projects included in the cumulative assessment would be expected to fully comply with the International Regulations for Preventing Collisions at Sea (COLREGS). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course, or pose any risk to fishing gears being towed. With the above in mind the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.323. Taking the low sensitivity of the receptor and low magnitude of the impact, the cumulative impact of interference with fishing practices on the scallop, squid, Nephrops and whitefish fisheries is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.324. No additional mitigation is either required or proposed in relation to interference with fishing activities on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.325. The cumulative impact of interference with fishing activity on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Cumulative Impacts during Operation

Complete loss of, or restricted access to, traditional fishing grounds

Potential Impacts

Scallop Fishery

11.326. As previously described, local scallop dredgers would be able to regain access to both Project Alpha and Project Bravo once operational. In the absence of legislation prohibiting fishing within operational wind farms, and provided that cables are buried to sufficient depths, these vessels would also be expected to regain some level of fishing access to the other projects in the regional study area. Considering this, and the fact that the these projects, with the exception of Inch Cape, support relatively low levels of scallop dredging activity, the magnitude of the impact is considered to be **low** (Figure 11.26 and Figure 11.27).

11.327. With the above in mind and taking the medium sensitivity of local smaller scallop dredgers to loss of fishing grounds, the cumulative impact of complete loss or restricted access to traditional fishing grounds on these vessels is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

11.328. In the case of large nomadic vessels, taking a conservative worst case, it has been assumed that these vessels would elect not to fish within the arrays of any of the projects included for cumulative assessment. Recognising the increased fishing area potentially lost and its long term duration (25 years) the magnitude of the effect on these vessels is considered to be **medium** (Figure 11.28 and Figure 11.29).

11.329. Taking the low sensitivity and medium impact magnitude, the impact of complete loss or restricted access to traditional fishing grounds on nomadic vessels is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Squid Fishery

11.330. Vessels targeting squid would be able to regain access to the area of Project Alpha and Project Bravo during the operation phase. Similarly, they would be expected to regain some level of access to the array area of other offshore wind farms included in the assessment. In this context it is important to note that there is limited demersal trawling activity within the arrays of the majority of offshore wind farm sites included for assessment (Figure 11.30 and Figure 11.31). In addition, squid vessels would be expected to be able to resume fishing activity over the export cables of these projects during operation.

11.331. Whilst the long term nature of the potential impact is recognised, with the above in mind, the magnitude of the impact on the squid fishery is considered to be **low**.

11.332. As previously described, the sensitivity of the squid fishery is **low** in respect of loss of fishing grounds. Considering this and the low magnitude of the impact, the cumulative impact is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Crab and Lobster Fishery

11.333. Creelers would be able to regain access to the area of Project Alpha and Project Bravo during operation. Similarly, they would be expected to regain access to the array areas of the other offshore wind farms included in the assessment and to fish over export cables once operational. Whilst the long term nature of the potential impact is recognised, with vessels being able to regain access and considering the extent of grounds they have available, the magnitude of the impact is considered to be **low** (Figure 11.32).

11.334. As previously described, the sensitivity of the lobster and crab fishery to loss or restricted access to fishing grounds is **medium**. Taking this and the low impact magnitude the cumulative impact is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.335. No additional mitigation is either required or proposed, in relation to complete loss or restricted access to fishing grounds on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.336. The cumulative impact of complete loss or restricted access to traditional fishing grounds on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Displacement of fishing activity into other areas

Potential Impacts

11.337. As previously described, the level of potential displacement would be a function of the level of loss, or restricted access to fishing grounds that each fishery is subject to. Therefore, it is considered that the sensitivity, magnitude and impact significance identified for assessment of loss or restricted access to fishing grounds also applies in respect of displacement. The outcomes of the assessment are summarised in Table 11.18.

Table 11.18 Summary of assessment of Displacement of Fishing Activity during Operation

Receptor	Sensitivity	Magnitude	Impact Significance
Local Scallop Dredgers	Medium	Low	Minor (not significant)
Nomadic Scallop Dredgers	Low	Medium	Minor (not significant)
Squid fishery	Low	Low	Minor (not significant)
Lobster and crab fishery	Medium	Low	Minor (not significant)

Additional Mitigation

11.338. No additional mitigation is either required, or proposed in relation to the impact of displacement of fishing activity into other areas on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.339. The cumulative impact of displacement of fishing activity into other areas on the scallop, squid and lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Increased steaming times to fishing grounds

Potential Impacts

All fisheries

11.340. As described for the construction phase, the sensitivity in respect of increased steaming times to fishing grounds is considered **low** for the scallop, squid, Nephrops, lobster and crab fishery and whitefish fishery.

11.341. Whilst the impact would last for the operation phase, provided that weather conditions allow, fishing vessels are expected to be able to transit through Project Alpha and Project Bravo and through all the other projects included for assessment. With this in mind, the magnitude of the impact is considered to be **low**.

11.342. Taking the above into account, the cumulative impact of increased steaming times on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.343. No additional mitigation is either required or proposed in relation to the impact of increased steaming times on commercial fisheries receptors as no adverse significant impacts are predicted.

Residual Impact

11.344. The cumulative impact of increased steaming times is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Interference with fishing activities

Potential Impacts

11.345. The operation and maintenance phase of other projects would result in an increase in the number of vessel transits, compared to that required for the optimised Seagreen Project. This could in turn result in increasing potential for interference with fishing activities.

Lobster and crab fishery

11.346. As described for the assessment of Project Alpha and Project Bravo combined, a Vessel Management Plan will be produced and will include provisions for appropriate liaison enabling awareness of operation and maintenance vessel crews of the locations of static gears and fishermen's awareness of construction vessel transit routes. In line with standard practice, it is expected that this, or similar measures would be applied to the other projects included in the cumulative assessment. With this in mind the magnitude of the impact is considered to remain **low**.

11.347. As previously described, the sensitivity of the lobster and crab fishery to interference is **medium**. Taking this and the low impact magnitude, the cumulative impact on the lobster and crab fishery is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Scallop, squid, Nephrops and whitefish fisheries

11.348. In the case of fisheries operating towed gears, namely the scallop, squid, Nephrops and whitefish fishery, as described in the assessment of each individual project, their sensitivity to interference is considered **low**.

11.349. Transiting operation and maintenance vessels involved in activities at all the projects included in the cumulative assessment would be expected to fully comply as required under the International Regulations for Preventing Collisions at Sea (COLREGS). Such compliance would negate the requirement for fishing vessels engaged in fishing to alter course, or pose any risk to fishing gears being towed. With the above in mind the magnitude of the impact in respect of fisheries operating towed gear is considered to be **low**.

11.350. Taking the low sensitivity of the receptor and low impact magnitude, the cumulative impact of interference with fishing practices on the scallop, squid, Nephrops and whitefish fisheries is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Additional Mitigation

11.351. No additional mitigation is either required or proposed, in relation to interference with fishing activities on commercial fisheries receptors, as no adverse significant impacts are predicted.

Residual Impact

11.352. The cumulative impact of interference with fishing activity on commercial fisheries receptors is predicted to be **Minor** and therefore **Not Significant** in EIA terms.

Cumulative Impacts during Decommissioning

11.353. Detail on decommissioning of the projects included in the cumulative assessment at this point in time is necessarily limited.

11.354. In the absence of the above information, and in line with the assessment carried out for Project Alpha and Project Bravo, given the nature of the activities likely required during decommissioning, it is assumed that the magnitude of the impacts associated with this phase would be commensurate with, and likely less, than that identified for the construction phase. Similarly, the sensitivity of the receptors would remain the same as identified for the construction phase.

11.355. Therefore, the outcomes of the cumulative assessment provided for the construction phase are considered to also apply to the decommissioning phase.

11.356. Further information will be provided in the Decommissioning Programme that Seagreen will be required to complete post consent. It is also likely that a separate EIA will be completed prior to decommissioning, to assess the impacts of the detailed decommissioning plans and activities that will be known at that time.

INTERRELATIONSHIPS

11.357. Interrelationships describe the potential interaction of multiple project impacts upon one receptor and have a spatial and/or temporal component. Impacts may occur throughout different phases of the project (construction, operation or decommissioning) and/or different project impacts may have spatial overlap and may interact to create a more significant impact on a receptor than when considered in isolation. Interrelated impacts may be short term, temporary or longer term over the lifetime of the Project.

11.358. No potentially significant interrelationships have been identified in relation to commercial fisheries. The only potential impacts on commercial fisheries, with potential to result in interactions are temporary/complete loss or restricted access to fishing grounds and displacement of fishing activity into other areas. The assessments carried out within this chapter take account of the fact that displacement of fishing activity into other areas would be a function of the level of temporary/complete loss or restricted access to fishing grounds that each fishery is subject to. Therefore, the potential interactions between these two impacts are integrated within the main assessment provided for the optimised Seagreen Project.

TRANSBOUNDARY IMPACTS

11.359. As identified in Appendix 11A (Commercial Fisheries Technical Report) there is negligible activity by non-UK fishing vessels in areas relevant to Project Alpha and Project Bravo. Transboundary impacts are therefore not to be expected in respect of commercial fisheries.

MITIGATION AND MONITORING

11.360. In order to mitigate loss of fishing grounds for local scallop dredging vessels during the construction phase of Project Alpha and Project Bravo, provisions will be made to agree appropriate mitigation measures in line with FLOWW Guidelines. These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders. The Fisheries Management and Mitigation strategy will also include a description of Seagreen's support for and participation in the CFWG.

11.361. With regards to the lobster and crab fishery, in instances in which vessels may need to relocate their gear as a result of construction activity in Project Alpha and Project Bravo, Seagreen will follow policy as specified in the FLOWW Guidelines (2015) of appropriate evidence based mitigation.

IMPACT ASSESSMENT SUMMARY – THE OPTIMISED SEAGREEN PROJECT

11.362. This chapter has assessed the potential impacts on commercial fisheries of the construction, operation and decommissioning phases of the optimised Seagreen Project, both in isolation and cumulatively. Where significant impacts have been identified, additional mitigation has been considered and incorporated into the assessment. Table 11.19 summarises the impact assessment undertaken and the conclusion of residual impact significance, following the application of additional mitigation.

11.363. It should be noted that the outcomes of some of the assessments provided in this chapter differ from those presented in the 2012 Offshore ES (Chapter 14 [Commercial Fisheries]). This is primarily a result of the environmental measures incorporated in the project relevant to commercial fisheries considered in the current assessment, the refinement of the assessment for the scallop fishery (assessments carried out where appropriate separately for local and nomadic vessels) and the undertaking of a more detailed cumulative assessment.

Table 11.19 Summary of Predicted Impacts for the optimised Seagreen Project

Potential Impact	Receptor	Phase (C, O or D)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Project Alpha					
Potential impacts on commercially exploited fish and shellfish species	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Temporary loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Minor (not significant)	N/A	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Minor (not significant)	N/A	Minor (not significant)
Safety issues for fishing vessels	All vessels	C	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	C	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	C	Minor (not significant)	N/A	Minor (not significant)
Complete loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)

Potential Impact	Receptor	Phase (C, O or D)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Safety issues for fishing vessels	All vessels	O	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	O	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	O	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	O	Minor (not significant)	N/A	Minor (not significant)
Impacts during decommissioning (D) are assumed to be as assessed for the operation (O) phase.					
Project Bravo					
As outlined above for Project Alpha					
Project Alpha and Project Bravo Combined					
Adverse impacts on commercially exploited fish and shellfish species	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Temporary loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	C	Moderate (significant)	Appropriate mitigation measures in line with FLOWW Guidelines These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders.	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Minor (not significant)	N/A	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	C	Moderate (significant)	As above for assessment of temporary loss or restricted access to traditional fishing grounds	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Minor (not significant)	N/A	Minor (not significant)

Potential Impact	Receptor	Phase (C, O or D)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Safety issues for fishing vessels	All vessels	C	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	C	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	C	Minor (not significant)	N/A	Minor (not significant)
Complete loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)
Safety issues for fishing vessels	All vessels	O	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	O	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	O	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	O	Minor (not significant)	N/A	Minor (not significant)
Impacts during decommissioning (D) are assumed to be as assessed for the operation (O) phase.					

Potential Impact	Receptor	Phase (C, O or D)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Cumulative Impact Assessment					
Potential impacts on commercially exploited fish and shellfish species	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Temporary loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	C	Moderate (significant)	Appropriate mitigation measures in line with FLOWW Guidelines. These measures will be included in the Fisheries Management and Mitigation Strategy following consultation with relevant stakeholders.	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Moderate (significant)	Assumes adherence to FLOWW guidance in respect of evidence based mitigation is implemented by other projects included in the cumulative assessment where relevant.	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	C	Moderate (significant)	As above for temporary loss or restricted access to traditional fishing grounds.	Minor (not significant)
	Nomadic scallop dredgers	C	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	C	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	C	Moderate (significant)	As above for temporary loss or restricted access to traditional fishing grounds.	Minor (not significant)
Safety issues for fishing vessels	All vessels	C	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)

Potential Impact	Receptor	Phase (C, O or D)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Increased steaming times to fishing grounds	All fisheries	C	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	C	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	C	Minor (not significant)	N/A	Minor (not significant)
Complete loss or restricted access to traditional fishing grounds	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)
Displacement of fishing activity into other areas	Local smaller scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Nomadic scallop dredgers	O	Minor (not significant)	N/A	Minor (not significant)
	Squid fishery	O	Minor (not significant)	N/A	Minor (not significant)
	Lobster and crab fishery	O	Minor (not significant)	N/A	Minor (not significant)
Safety issues for fishing vessels	All vessels	O	Within acceptable limits (not significant)	N/A	Within acceptable limits (not significant)
Increased steaming times to fishing grounds	All fisheries	O	Minor (not significant)	N/A	Minor (not significant)
Interference with fishing activity	Lobster and crab fishery (static gear)	O	Minor (not significant)	N/A	Minor (not significant)
	Scallop, Squid, Nephrops and whitefish fishery	O	Minor (not significant)	N/A	Minor (not significant)
Impacts during decommissioning (D) are assumed to be as assessed for the operation (O) phase.					
Key: C = Construction, O = Operational, D = Decommissioning					

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