Chapter 12: Commercial Fisheries

Array EIA Report

2024

Version	Comments	Authored by	Reviewed by	Approved by
FINAL	Final	RPS	RPS	RPS

Approval for Issue		
For and on behalf of Ossian OWFL	Rich Morris	28 June 2024

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12. COMMERCIAL FISHERIES

12.1. INTRODUCTION

1. This chapter of the Array Environmental Impact Assessment (EIA) Report presents the assessment of the likely significant effects (LSE[1]) (as per the EIA Regulations) on commercial fisheries as a result of the Ossian Array which is the subject of this application (hereafter referred to as "the Array"). Specifically, this chapter considers the potential impacts on commercial fisheries during the construction, operation and maintenance, and decommissioning phases.

2. The following technical chapters also inform the assessment presented in this chapter:

   - volume 2, chapter 9: Fish and Shellfish Ecology where effects on the ecology of fish and shellfish, including species of commercial interest, are assessed;
   - volume 2, chapter 13: Shipping and Navigation where effects on the navigational safety aspects of fishing activity are assessed; and
   - volume 2, chapter 18: Socio-Economics where effects on other businesses are assessed.

3. This chapter summarises information contained within volume 3, appendix 12.1.

4. This chapter assesses the LSE[1] of the Array on commercial fisheries activity, which is understood as fishing activity legally undertaken where the catch is sold for taxable profit.

12.2. PURPOSE OF THE CHAPTER

5. The Array EIA Report provides the Scottish Ministers, statutory and non-statutory stakeholders with adequate information to determine the LSE[1] of the Array on the receiving environment.

6. The purpose of this commercial fisheries Array EIA Report chapter is to:

   - present the existing environmental baseline established from desk studies, site-specific surveys and consultation with stakeholders;
   - identify any assumptions and limitations encountered in compiling the environmental information;
   - present the environmental impacts on commercial fisheries arising from the Array and reach a conclusion on the LSE[1] on commercial fisheries, based on the information gathered and the analysis and assessments undertaken; and
   - highlight any necessary monitoring and/or mitigation measures which are recommended to prevent, reduce or offset the likely significant adverse environmental effects of the Array on commercial fisheries.

12.3. STUDY AREA

7. The Array is located within the north-west portion of the International Council for the Exploration of the Seas (ICES) Division 4b (Central North Sea) statistical area; within the United Kingdom (UK) Exclusive Economic Zone (EEZ) waters (which is the area that extends from the UK territorial waters 12 nm boundary out to 200 nm). For the purpose of recording fisheries landings, ICES Division 4b is divided into statistical rectangles which are consistent across all ICES member countries operating in the North Sea (ICES, 1977).

8. The Array is located primarily within ICES rectangle 42E9, with small overlaps into ICES rectangles 42F0 and 41E9. These three ICES rectangles form the commercial fisheries local study area for the purposes of the EIA (Figure 12.1). In order to understand fishing activity in waters adjacent to the Array, a commercial fisheries regional study area has been defined to include the commercial fisheries local study area together with surrounding ICES rectangles 41E8, 41F0, 42E8, 43E8, 43E9 and 43F0 (Figure 12.1). Analysis of data at the scale of the commercial fisheries regional study area takes into consideration that most commercial fish and shellfish receptor populations are distributed at a wider spatial scale, ensuring that potential implications of displacement of fishing activity can be adequately understood.

9. To summarise, there are two scales of commercial fisheries study areas (Zones of Influence (ZoIs)) as follows:

   - commercial fisheries local study area: encompassing the Array and ICES Rectangles 42E9, 42F0 and 41E9; and
   - commercial fisheries regional fisheries study area: encompassing the Array and ICES Rectangles 41E8-F0, 42E8-F0, and 43E8-F0.

12.4. POLICY AND LEGISLATIVE CONTEXT

10. Volume 1, chapter 2 of the Array EIA Report presents the policy and legislation of relevance to renewable energy infrastructure. Policy specifically in relation to commercial fisheries, is contained in the Sectoral Marine Plan for Offshore Wind Energy (SMP) (Scottish Government, 2020), Scotland's National Marine Plan (NMP) (Scottish Government, 2015) and the UK Marine Policy Statement (MPS) (HM Government, 2011). Table 12.1 presents a summary of the policy provisions relevant to commercial fisheries. Table 12.2 sets out guidance relevant to commercial fisheries impact assessment.

Table 12.1: Summary of Key Policy Provisions Relevant to Commercial Fisheries

Summary of Relevant Policy	How and Where Considered in the Array EIA Report
NMP (Scottish Government, 2015)	
Contains sector-specific policies relevant to offshore wind and commercial fisheries. Policies under Chapter 4 General Policies are of relevance to commercial fisheries, specifically GEN 4 which encourages proposals to enable coexistence and developments that do not result in areas being unsuitable for future use by others. Policies under Chapter 6 Sea Fisheries ('FISHERIES 1 – 5') are considered relevant to commercial fisheries. Policies seek to safeguard existing fishing opportunities and activities wherever possible and advise that mechanisms for managing conflicts between the fishing sector and other users of the marine environment should be in place. (FISHERIES 1) Preparation of a Fisheries Management and Mitigation Strategy (FMMS) is recommended where existing fishing opportunities and activity cannot be safeguarded. (FISHERIES 3). Chapter 6 Sea Fisheries provides principles for interactions with other users (paragraph 6.22), including short-term displacement of fishing during installation, potential damage to fishing equipment and following best practice guidance (paragraph 6.26). In addition, Chapter 11 Offshore Wind and Marine Renewable Energy provides principles for interactions with other users (paragraphs 11.26-11.29), including physical competition for space due to the impact of the physical presence of structures and encourages an inclusive approach to minimise and avoid impacts; and participation in working groups to develop co-existence and mitigation.	Reflecting the key concerns and issues that should be addressed in an impact assessment and any FMMS (outline FMMS provided in volume 4, appendix 23), the EIA Report: • sets out key guidance that is adhered to (Table 12.2); • assesses the LSE[1] of the Array on commercial fisheries in section 12.11; and • sets out measures to mitigate significant constraints that the Array may place on commercial fishing activity in section 12.10 and 12.11.

Summary of Relevant Policy	How and Where Considered in the Array EIA Report
Policies under Chapter 14 Submarine Cables (CABLES 2) are considered relevant to commercial fisheries. Policies seek to minimise impacts on the environment and other users, reduce conflict with other users, ensure suitable protection where burial is not feasible and use of post-lay surveys, monitoring and remedial action where required. In addition, Chapter 14 Submarine Cables provides principles for interactions with other users (paragraphs 14.8-14.11), including burial and protection to reduce conflict with other users and prevent damage to cables, engagement with stakeholders and provision of information under the KIS-ORCA (Kingfisher Information Service – Offshore Renewable & Cable Awareness) project.	
SMP for Offshore Wind Energy (Scottish Government, 2020)	
Identifies plan option areas for offshore wind farm development and identifies key consenting issues associated with development. Potential impacts on commercial fishing are identified as a key risk factor to development in East Region plan option areas. (4.5)	Reflecting the key risk factors identified in the East Region Plan Option areas, this chapter presents an assessment of the LSE[1] on commercial fisheries in section 12.10.
UK MPS (HM Government, 2011)	
Explicitly expresses support for the fishing sector, and with regard to displacement, advocates *"Wherever possible, decision makers should seek to encourage opportunities for co-existence between fishing and other activities"* (3.8.10). Specifically, paragraphs 3.8.1, 3.8.2, and 2.3.1.5 stipulate that the process of marine planning should "*should identify areas of constraint and locations where a range of activities may be accommodated*" and supports the reduction of real and potential conflict as well as maximising compatibility between marine activities and encouraging co-existence of multiple uses.	Reflecting the desire for co-existence of activities in the marine environment, this chapter presents an assessment of the LSE[1] on commercial fisheries in section 12.11 and identifies measures to encourage co-existence in section 12.10.

Table 12.2: Summary of Key Guidance Provisions Relevant to Commercial Fisheries

Summary of Relevant Policy	How and Where Considered in the Array EIA Report
Good Practice Guidance for assessing fisheries displacement by other licensed marine activities (Scottish Government, 2022)	In addition to the general approach and guidance outlined in volume 1, chapter 6, the assessment of potential impacts on commercial fisheries receptors also complies with the listed guidance documents where they are specific to this topic.
Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network and Seafish, 2012)	
Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014 and noted to be currently in the process of being updated)	
FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015)	
Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a)	
Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b)	
Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Contract report: ME5403 (Centre for Environment Fisheries and Aquaculture Science (Cefas), 2012)	
Guidelines for liaison with the fishing industry on the United Kingdom Continental Shelf UKCS – Issue 8 (Offshore Energies UK, 2023);	
Fishing and Submarine Cables - Working Together (International Cable Protection Committee, 2009)	
European Subsea Cables Association (ESCA) Guideline 01 and Appendices (ESCA, 2018);	
Guidance on preparing a Fisheries Management and Mitigation Strategy (Draft) (Marine Scotland, 2020)	

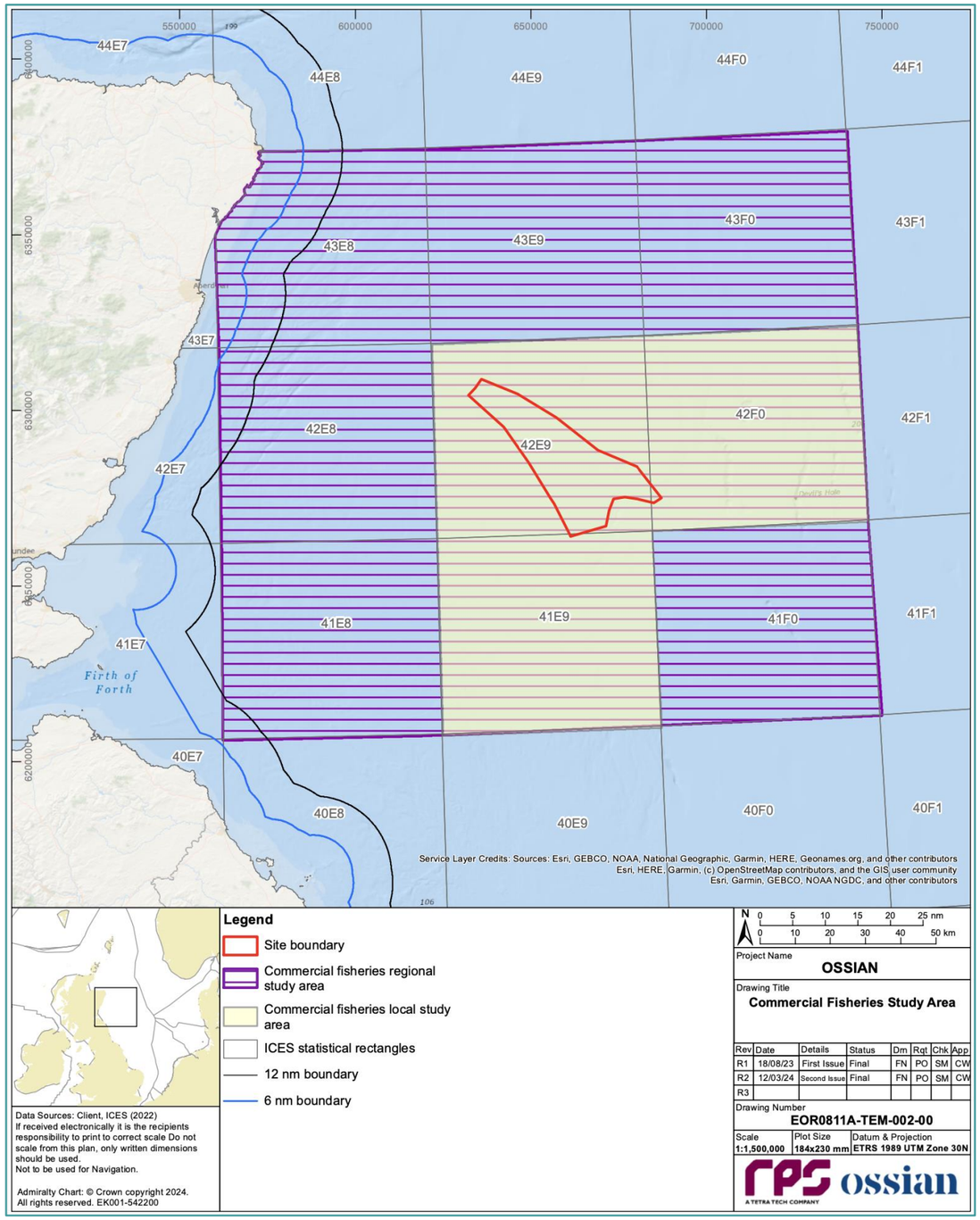

Figure 12.1: Commercial Fisheries Study Areas

12.5. CONSULTATION

11. Table 12.3 presents a summary of the key issues raised during consultation activities undertaken to date specific to commercial fisheries for the Array and in the Array EIA Scoping Opinion (Marine Directorate – Licensing Operations Team (MD-LOT), 2023) along with how these have these have been considered in the development of this commercial fisheries Array EIA Report chapter. Further detail is presented within volume 1, chapter 5.

Table 12.3: Summary of Issues Raised During Consultation and Scoping Opinion Representations Relevant to Commercial Fisheries

Date	Consultee and Type of Consultation	Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
Relevant Consultation to Date			
June 2022	E1 East [Ossian] commercial fisheries meeting Meeting with Scottish Fishermen's Federation (SFF) and Scottish White Fish Producers Association (SWFPA)	Applicant provided introduction to Ossian and the Array. The SWFPA and SFF raised concern related to historic 'small haddock' fishery in the area.	Baseline commercial fisheries activity, including demersal otter trawl activity from 2011 to 2022, is presented in section 12.7 and volume 3, appendix 12.1.
November 2022	Ossian Array EIA Pre-Scoping Workshop meeting with MD-LOT, Marine Directorate – Science, Evidence, Data and Digital (MD-SEDD) (formerly Marine Scotland Science (MSS)), NatureScot, SFF and SWFPA	Applicant provided introduction to Ossian and the Array and presented the approach to Scoping including baseline data to be considered and initial consideration of scope of the EIA. MD-LOT and MD-SEDD encouraged the use of surveillance data as part of the baseline. The geographic scope of the cumulative effects assessment was discussed and it was noted that scallop dredge vessels operate around the entirety of the UK.	Baseline commercial fisheries activity is presented in section 12.7 and volume 3, appendix 12.1, including surveillance data by gear type and vessel nationality. The geographic scope of the cumulative effects assessment is presented in section 12.12, confirming UK-wide consideration of cumulative effects to the scallop dredge fleet.
September 2023	Meeting with Scottish Pelagic Fishermen's Association (SPFA)	Applicant provided introduction to Ossian and the Array. Discussion of pelagic trawl fishing activity in and around the Array. SPFA confirmed that the Array is not considered to be key pelagic trawl grounds, although noted a short herring season in the summer that operates within the commercial fisheries local study area, but not specifically within the Array.	Baseline commercial fisheries activity, including pelagic trawl activity, is presented in section 12.7 and volume 3, appendix 12.1. Potential impacts to pelagic fisheries including the seasonal herring fishery are assessed in the impact assessment in section 12.11.
January 2024	Meeting with SFF and SWFPA	Applicant provided update on the Array and baseline assessment, including landings statistics with an extended timeline of 2011 to 2022. SWFPA queried if Vessel Monitoring System (VMS) data is available for the years before 2016.	Ossian Offshore Wind Farm Limited (Ossian OWFL) (hereafter referred to as "the Applicant") confirms that Figure 12.6 presents long term landing trends for key species including haddock, and that volume 3, appendix 12.1 includes VMS data from 2011 to 2020.
Scoping Opinion			
June 2023	MD-LOT	*The Scottish Ministers are content with the proposed study area.*	Noted, the commercial fisheries local and regional study areas are confirmed in section 12.3 and the commercial fisheries local study area is unchanged from that presented within the Array EIA Scoping Report (Ossian OWFL, 2023). The Applicant highlights that a commercial fisheries regional study area has been defined to ensure any displacement concerns can be adequately assessed.
		The Scottish Ministers are also broadly content with the data sources used to characterise the baseline as listed by the Developer in Section 7.1.3 and Appendix 10 of the Scoping Report.	Noted, data sources are confirmed in section 12.6.1.
		The Scottish Ministers however highlight the representation from the SFF who request that fishing industry records are reviewed alongside the baseline data already presented.	The Applicant confirms that fishing industry records for demersal otter trawl, demersal seine and pelagic trawl activity have been reviewed to sense-check the data. This was provided by the SPFA during the September 2023 meeting and the SFF in April 2024.
		In addition Scottish Ministers, in line with MSS advice, advise the Developer to include Marine Directorate and Marine Management Organisation surveillance sightings data to further improve the baseline fisheries data obtained from the study area.	The Applicant confirms that surveillance data has been obtained and presented in volume 3, appendix 12.1.
		The Scottish Ministers agree with the impacts scoped into the EIA Report, however, highlight the SFF representation and advice, for the avoidance of doubt that the worst case scenario is assessed in relation to long term loss or restricted access to fishing grounds.	Noted, the scope of the assessment and maximum design scenario for all impacts scoped into assessment are confirmed in section 12.8.
		As regards monitoring and mitigation, the Scottish Ministers highlight the representation from the SFF as regards monitoring of the following impacts: temporary loss or restricted access to fishing grounds, long term loss or restricted access to fishing grounds, displacement of fishing activity in other areas and interference with shipping activity. The Scottish Ministers advise that the representation from the SFF must be fully considered by the Developer in the EIA Report.	Commitments to mitigation are presented in sections 12.10 and 12.11 Whilst The EIA has not predicted a significant effect on an active fishery during construction or operation, the Applicant understands the importance of increasing the knowledge of how commercial fisheries will interact with operational floating offshore wind farms. We will therefore monitor fishing activity through utiliusing sing existing commercial fisheries datasets, including landings data, VMS, AIS and surveillance sightings to understand how fisheries use the area for the first 5 years of operation. This information will be detailed in the FMMS.

Date	Consultee and Type of Consultation	Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		The Scottish Ministers advise that in identifying appropriate mitigation measures, the Developer must consider the different types of fishing that take place within the Proposed Development and engage with the wider fishing industry to seek broad agreement on measures proposed.	Commitments to mitigation are presented in sections 12.10 and 12.11 . Commitments include the preparation of a FMMS (outline FMMS provided in volume 4, appendix 23) that will be engaged upon with the fishing industry. The FMMS includes the principles for liaison, management and mitigation for the wider fishing industry, as well as setting out the process for mitigating any significant impacts identified for specific commercial fishing fleets.
		The Scottish Ministers advise that when detailing the mitigation measures the Developer must clearly state commitments and explain any caveats to these commitments, such as EIA significance, so that stakeholders can easily understand the actual commitment(s) made.	Commitments to mitigation are presented in sections 12.10 and 12.11.
		The Scottish Ministers welcome the engagement with fisheries representatives that has been undertaken so far and recommend that early engagement with fisheries representatives is continued as outlined in the SFF and Fife Council representations.	The Applicant acknowledges the importance of early and continued engagement with commercial fisheries representatives and confirm engagement will continue throughout the consenting process and beyond.
June 2023	MD-SEDD Scoping Representation (April 2023)	*MSS advise that the commercial fisheries assessment for the EIA would benefit from the addition of MMO/Marine Scotland surveillance sightings data. This would help to further improve the baseline fisheries data for the study area.*	The Applicant confirms that surveillance sightings data were requested, obtained and are presented in volume 3, appendix 12.1.
June 2023	SFF Scoping Representation (April 2023).	*The SFF is very concerned that this development is in such a rush to build and produce power that the Project Design Envelope (PDE) commonly known as Rochdale Envelope is going to be stretched to the limit. Turbines are not defined, mooring systems are not defined, cabling is not defined, customers are not defined, with this lack of clarity a terrestrial planning authority would be hard pushed to accept such an application.*	The Applicant confirms that the maximum design scenario (MDS) has been assessed in relation to all potential impacts on commercial fisheries, as confirmed in section 12.8 and considered in the impact assessment in section 12.11.
		Because of lack of technical specification for any of the mooring systems, it is impossible to comment on the consequences of design. For example, using 9 moorings for each turbine, worst case scenario could require up to 2 km for moorings which could technically leave no room for fishing between the turbines and create massive snagging hazard for the fishing vessels. The SFF will not consider that the developers have provided enough information to grant the license.	The Applicant confirms that the MDS has been assessed in relation to all potential impacts on commercial fisheries, including long term loss or restricted access to fishing grounds. While catenary mooring systems remain a design option, this MDS equates to complete loss of active fishing access within the Array, as confirmed in section 12.8 and considered in the impact assessment in section 12.11.
		Regarding baseline data, the SFF advises to compare datasets with the fishing industry records to sense-check the data.	The Applicant confirms that fishing industry records for demersal otter trawl, demersal seine and pelagic trawl activity have been reviewed to sense-check the data. In addition, based on industry feedback, a long term data series for both landing statistics and VMS data have been analysed and presented in section 12.7 and volume 3, appendix 12.1.
		The SFF would expect to see the baseline for commercial fishery to monitor the impact for the life-time of the project.	The Applicant agrees that long term monitoring of commercial fisheries should be undertaken throughout the lifetime of the project. It is proposed that this monitoring will be defined within the FMMS and utilise existing commercial fisheries datasets, including landings data, VMS and surveillance sightings.
		Given the worst case scenario is no fishing within the project area so this should be scoped in.	The Applicant confirms that the MDS has been assessed in relation to long term loss or restricted access to fishing grounds. The Applicant remains open to exploring opportunities for coexistence, however, while catenary mooring systems remain a design option, this MDS assumes that active fishing would not resume within the Array for all gear types recorded in the study area, as confirmed in section 12.8 and considered in the impact assessment in section 12.11.
June 2023	Fife Council Scoping Representation (March 2023).	*Fife Council would reiterate their comments on all wind farm projects in the North Sea that representatives of the East Coast Fishing industry should be given the opportunity to comment on the proposals at each stage of development.*	The Applicant confirms that consultation is ongoing with a number of associations that represent the fishing industry operating along the east coast, including SFF, SWFPA and SPFA.

12.6. METHODOLOGY TO INFORM BASELINE

12. Commercial fisheries information and data has been reviewed and analysed to inform this commercial fisheries baseline. In addition, consultation with commercial fisheries industry representatives has been carried out to aid the collection of baseline information.

12.6.1. DESKTOP STUDY

13. Information on commercial fisheries within the commercial fisheries study area was collected through a detailed desktop review of existing studies and datasets which are summarised in Table 12.4.

14. Data has been sourced from ICES, the European Union (EU) Data Collection Framework (DCF), the Marine Directorate National Marine Plan interactive (NMPi), the UK Marine Management Organisation (MMO) and the European Maritime Safety Agency (EMSA).

15. Where data sources allow, a five to ten-year trend analysis has been undertaken, using the most recent annual datasets available at the time of writing. The temporal extent of this time period is dependent on each data source analysed, e.g. 2012 to 2016; 2016 to 2020; or 2011 to 2022.

16. Relevant literature from a number of sources has also been reviewed in the preparation of this report. A full list of references is provided at the end of this report and are cited within the text where appropriate.

17. The commercial fisheries technical report (volume 3, appendix 12.1) includes full details of the analysis undertaken to develop the commercial fisheries baseline.

Table 12.4: Summary of Key Desktop Reports

Title	Source	Extent	Year	Author
Landings statistics data for UK-registered vessels, with data query attributes for: landing year; landing month; vessel length category; ICES rectangle; vessel/gear type; port of landing; species; live weight (tonnes); and value (£).	MMO	2011 to 2022	2022a; 2023a	MMO
Landings statistics for EU registered vessels with data query attributes for: landing year; landing quarter; ICES rectangle; vessel length; gear type; species; and, landed weight (tonnes).	EU DCF database	2012 to 2016	EU DCF, 2022	EU DCF database
VMS data for UK registered vessels ≥15 m length. Note that UK vessels ≥12 m in length have VMS on board, however, to date, the MMO provide amalgamated VMS datasets for ≥15 m vessels only. VMS data sourced from MMO displays the first sales value (£) of catches.	MMO	2011 to 2020	MMO, 2022b	MMO
VMS data for EU registered vessels ≥12 m length. VMS data sourced from ICES displays the surface Swept Area Ratio (SAR) of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. Surface SAR provides a proxy for fishing intensity.	ICES	2016 to 2020	ICES, 2022	ICES
Fishing vessel route density, based on vessel Automatic Identification System (AIS) positional data. AIS is required to be fitted on fishing vessels ≥15 m length.	EMSA	2019 to 2022	EMSA, 2023	EMSA
Surveillance data indicating vessel nationality and gear type for actively fishing vessels.	MMO	2017 to 2022	MMO, 2023b	MMO

12.6.2. SITE-SPECIFIC SURVEYS

18. No site-specific surveys have been undertaken to inform the EIA for commercial fisheries. Baseline data sources have been validated via engagement with fisheries stakeholders (see Table 12.3) and by the results of site-specific marine traffic surveys that are described in volume 2, chapter 13.

19. The shipping and navigation EIA chapter (volume 2, chapter 13) analysed 12-months of AIS data for the 2022 period. AIS is only mandatory for fishing vessels of 15 m length and over, and therefore there is potential for fishing vessel activity to be underrepresented within the dataset.

20. Fishing vessels made up 4% of all vessels recorded on AIS during the 2022 data period. Fishing activity was determined by vessel speed, destination, track behaviour, and navigational status information transmitted via AIS. The shipping and navigation study area covers the Array plus a 10 nm buffer applied around the site boundary. A vessel traffic survey was undertaken over a period of 28 days (14 days in the summer and 14 days in the winter) to characterise the shipping and navigation baseline. Overall, fishing was relatively low in the shipping and navigation study area across the data period with the majority of vessels in transit to/from fishing grounds notably transiting north-west to south-east (see Figure 3.15 of volume 3, appendix 13.1). Only a small proportion of fishing vessels were considered to be involved in likely active fishing activity. These vessels were noted to the south-east extent and the north of the study area, and only engaged in likely activity during the months of May, June, and September.

21. Based on the AIS data assessment, the presence of fishing vessels can be regarded as seasonal with a greater average of unique vessels per day being recorded across the spring and summer months when compared with winter. On average, one fishing vessel was seen within the shipping and navigation study

area every two to three days across the data period. May was the busiest month for fishing vessels with an average of one vessel recorded per day within the study area. February was the quietest month with only three unique vessels being recorded across the whole month, averaging at one vessel every nine days (see volume 2, chapter 13 for further details).

12.7. BASELINE ENVIRONMENT

12.7.1. OVERVIEW OF LANDINGS FROM THE COMMERCIAL FISHERIES LOCAL STUDY AREA

22. Commercial fisheries statistics for the annual landed weight and first sales value of UK vessels operating within the specified commercial fisheries local study area (41E9, 42E9 and 42F0) are shown in Figure 12.2 and Figure 12.3 respectively. These data indicate a spike in landings of herring *Clupea harengus* during 2018 (equating to 2,000 tonnes and first sales value of £1.2 million in 2018). Herring is a pelagic species that is caught in shoals by vessels deploying pelagic trawls that target the shoaling fish as they migrate. This pattern leads to sporadic spikes in landings as noted in Figure 12.2 and Figure 12.3.

23. Following that, the landings are primarily dominated by *Nephrops norvegicus* (also known as Norway lobster, Dublin Bay prawn, langoustine and Nephrops; hereon referred to as *Nephrops*), haddock *Melanogrammus aeglefinus* and mixed demersal finfish species caught by demersal otter trawling vessels. The majority of landings by UK fishing vessels are made by vessels registered in Scotland (86% by value) and England (14% by value).

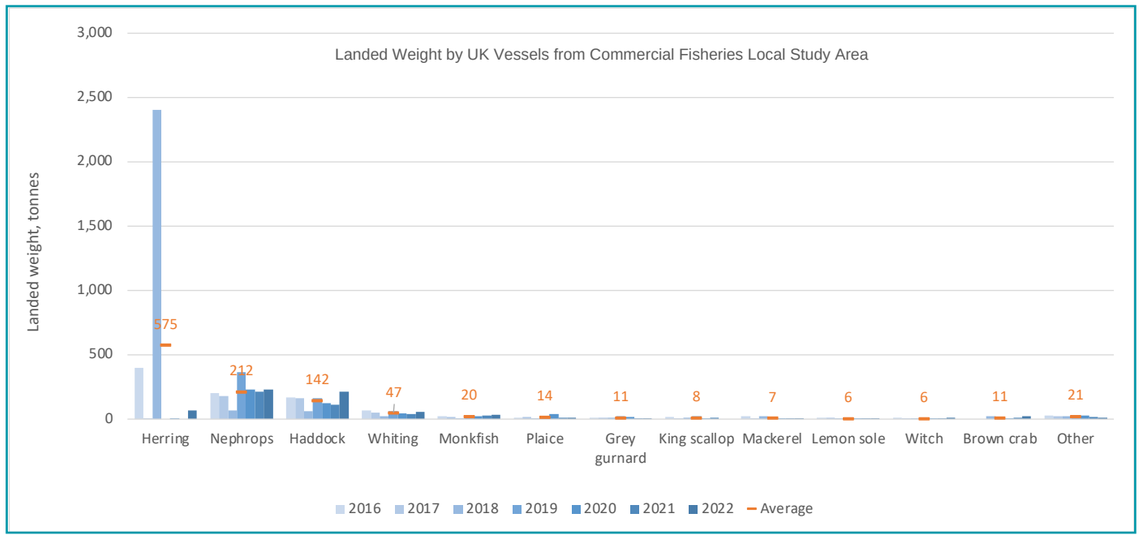

Figure 12.2: Key Species by Annual Landed Weight (tonnes) (2016 to 2022) from the Commercial Fisheries Local Study Area (MMO, 2022a; MMO, 2023a)

24. An annual average value of almost £1.72 million was landed by all UK vessels for the years 2016 to 2022 from the commercial fisheries local study area. *Nephrops* represent the highest value species landed from the commercial fisheries local study area (average £1 million per annum, Figure 12.3), although landings are highly variable across the time series, peaking in 2019 with significant drops in 2020 and 2021 (COVID- 19 pandemic), and growth in 2022. It is noted that during the COVID-19 pandemic (2020 to 2021) there was a drop in the market demand for *Nephrops* due to a reduction in restaurant trade and export of this high value shellfish. This is reflected in the landings and accounted for by considering a five and thirteen-year timeseries of data. Haddock, monkfish *Lophius piscatorius*, whiting *Merlangius merlangus* and halibut *Hippoglossus hippoglossus* have all followed a similar trend in landings pattern as *Nephrops*, which is expected given that they are caught as retained bycatch within the *Nephrops* targeted fishery. These species have a combined annual average value of £288,000 from 2016 to 2022.

25. Relatively small quantities of other species are landed from the commercial fisheries local study area, including lobster *Homarus gammarus* (£33,000 average annual value), king scallop *Pectan maximum* (£18,000 average annual value) and brown crab *Cancer pagurus* (£25,000 average annual value).

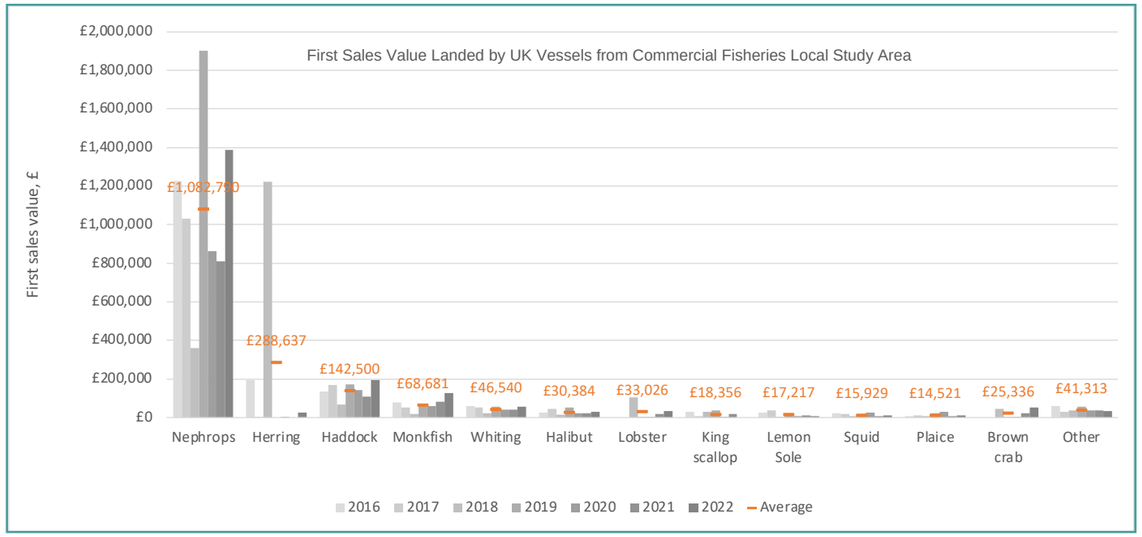

Figure 12.3: Key Species by Annual Landed Value (GBP) (2016 to 2022) from the Commercial Fisheries Local Study Area (MMO, 2022a; MMO, 2023a)

26. The commercial fisheries local study area encompasses three ICES rectangles, however, the majority of the Array is located within ICES rectangle 42E9. Landings statistics data by ICES rectangle is presented in Figure 12.4 and Figure 12.5 for weight and value respectively for the time period 2016 to 2022. The highest weight and value are landed from ICES rectangle 42F0, which overlaps with a very small portion of the Array, i.e. 1.02% of the Array is located in 42F0.

27. The average annual value landed by UK vessels from ICES rectangle 42E9 is £136,000, compared to landings of £1.5 million from 42F0. This highlights that 42E9 is not heavily fished or targeted by UK vessels, with relatively low value of catches; this pattern has remained consistent across the time period analysed (2016 to 2022).

28. VMS data provides detail on the number of vessels operating within each subdivision of the ICES rectangle at the scale to which data is reported (i.e. 200th of an ICES rectangle). Any individual vessel can operate throughout the ICES rectangle and therefore summing across the ICES rectangle will double count multiple vessels. To give an indication of the number of vessels active in ICES rectangle 42E9, the maximum number of vessels found in any subdivision across the period 2016 to 2020 was four demersal otter trawlers

and two dredge vessels. Thereby, a minimum of six vessels contributed to the value of £136,000 from ICES rectangle 42E9.

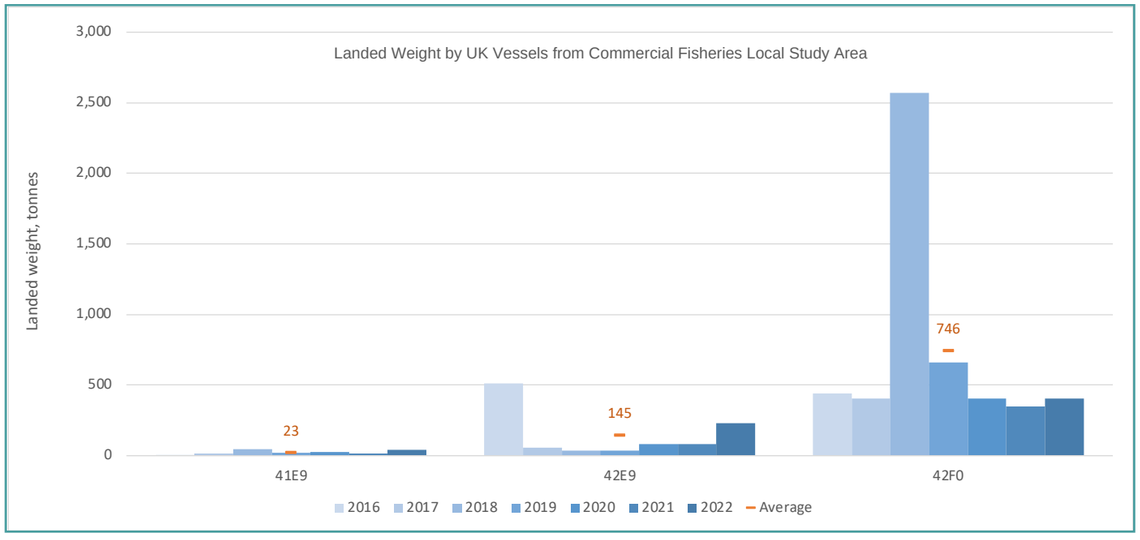

Figure 12.4: Annual Landed Weight (tonnes) (2016 to 2022) by ICES Rectangle from the Commercial Fisheries Local Study Area (41E9, 42E9 and 42F0) (MMO, 2022a; MMO, 2023a)

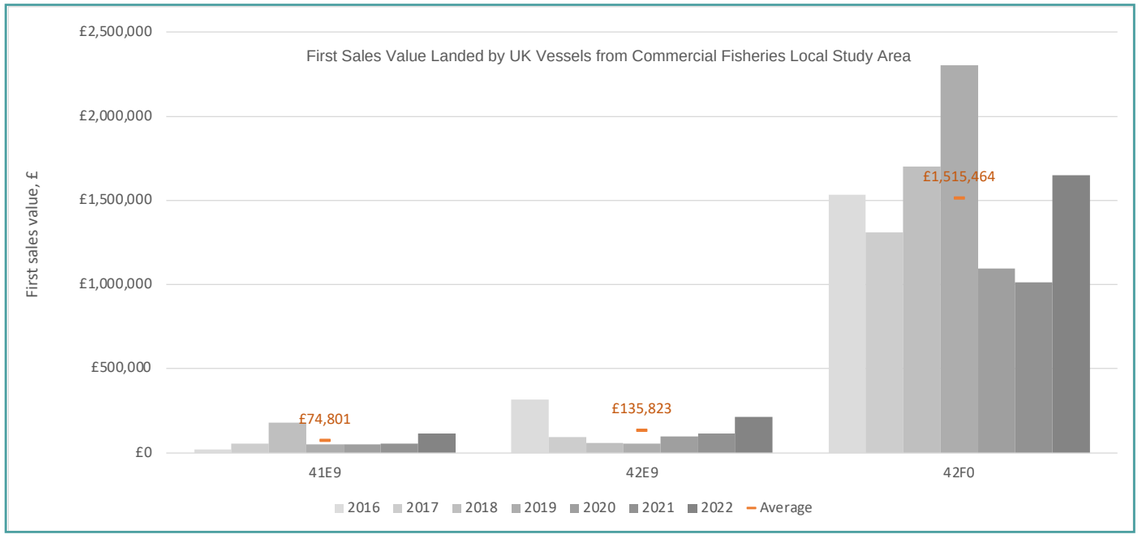

Figure 12.5: Annual Landed Value (GBP) (2016 to 2022) by ICES Rectangle from the Commercial Fisheries Local Study Area (41E9, 42E9 and 42F0) (MMO, 2022a; MMO, 2023a)

Long term landings data

29. Stakeholder consultation suggested that the commercial fisheries local study area has been more important in the years prior to 2016, specifically for small size classes of haddock (see Table 12.3). To explore this further, a longer term trend in landings has been analysed across the commercial fisheries local study area for the period 2011 to 2022 for the three top species: haddock, *Nephrops* and herring (Figure 12.6).

30. Haddock show significantly higher landings from 2011 to 2013, particularly from ICES rectangle 42E9 (which the majority of the Array overlaps with). The average value of haddock landed from 42E9 from 2011 to 2013 was £975,000, compared to £69,000 landed per annum from 2019 to 2022.

31. Landings of haddock from the commercial fisheries local study area fell dramatically in 2016, where levels have remained up to 2022. This trend is not seen at a stock level, where total landings of haddock from the North Sea, West of Scotland and Skaggerak (ICES Divisions 4, 6a and 3a respectively) haddock stock have remained relatively consistent since 2008. Therefore, the evidence suggests that the decline in landings from the commercial fisheries local study area in 2016 is not linked to biological stock factors such as low recruitment for example. Consultation with the fishing industry highlighted that the commercial fisheries local study area had historically been important for small size classes. After Brexit the market and processing resources (including staff) available for this size of haddock became unavailable resulting in the observed drop in haddock landings.

32. Landings of *Nephrops* from the commercial fisheries local study area are almost entirely from ICES rectangle 42F0 (partially overlapping the Array, but mainly to the east of the Array). *Nephrops* landings from this area have peaked and troughed, with a notable spike in landings in 2019; overall landings have been highest from 2019 to 2022 for the long term time series.

33. Herring landings are sporadic in nature, as previously discussed (see paragraph 22). A high peak is noted to occur in 2018 from ICES rectangle 42F0. Smaller landings from 42E9 are noted in 2014 and 2016, but any trends are typically more reliable to consider at a wider geographic scale due to the high mobility of this species.

34. The total landed weight and first sales value in ICES rectangle 42E9 and in all ICES rectangles within the UK EEZ are presented in Table 12.5. The landings and first sales value within 42E9 have steadily decreased between 2011 and 2021. As illustrated, the landings and first sales value from 42E9 are generally low in comparison to the wider UK.

Table 12.5: Summary of Key Fisheries Statistics for ICES Rectangle 42E9 and all ICES Rectangles in the UK EEZ between 2011 and 2021 (Source: MMO, 2017, 2022a)

Year	Sum of Landed Weight (tonnes)		Sum of First Sales Value (£)	
	42E9	Whole UK EEZ	42E9	Whole UK EEZ
2011	1,063	559,307	1,405,705	832,041,863
2012	1,237	591,727	1,023,182	787,909,538
2013	901	590,278	949,180	741,273,208
2014	521	719,403	411,542	864,103,318
2015	168	671,357	257,387	775,136,432
2016	510	701,091	316,003	936,160,594
2017	54	726,709	94,205	987,640,333
2018	32	699,988	58,423	1,002,769,899
2019	32	621,886	52,552	986,839,884
2020	80	623,246	99,097	830,878,160
2021	81	651,828	116,735	921,304,637
2022	229	625,737	213,747	1,067,524,790

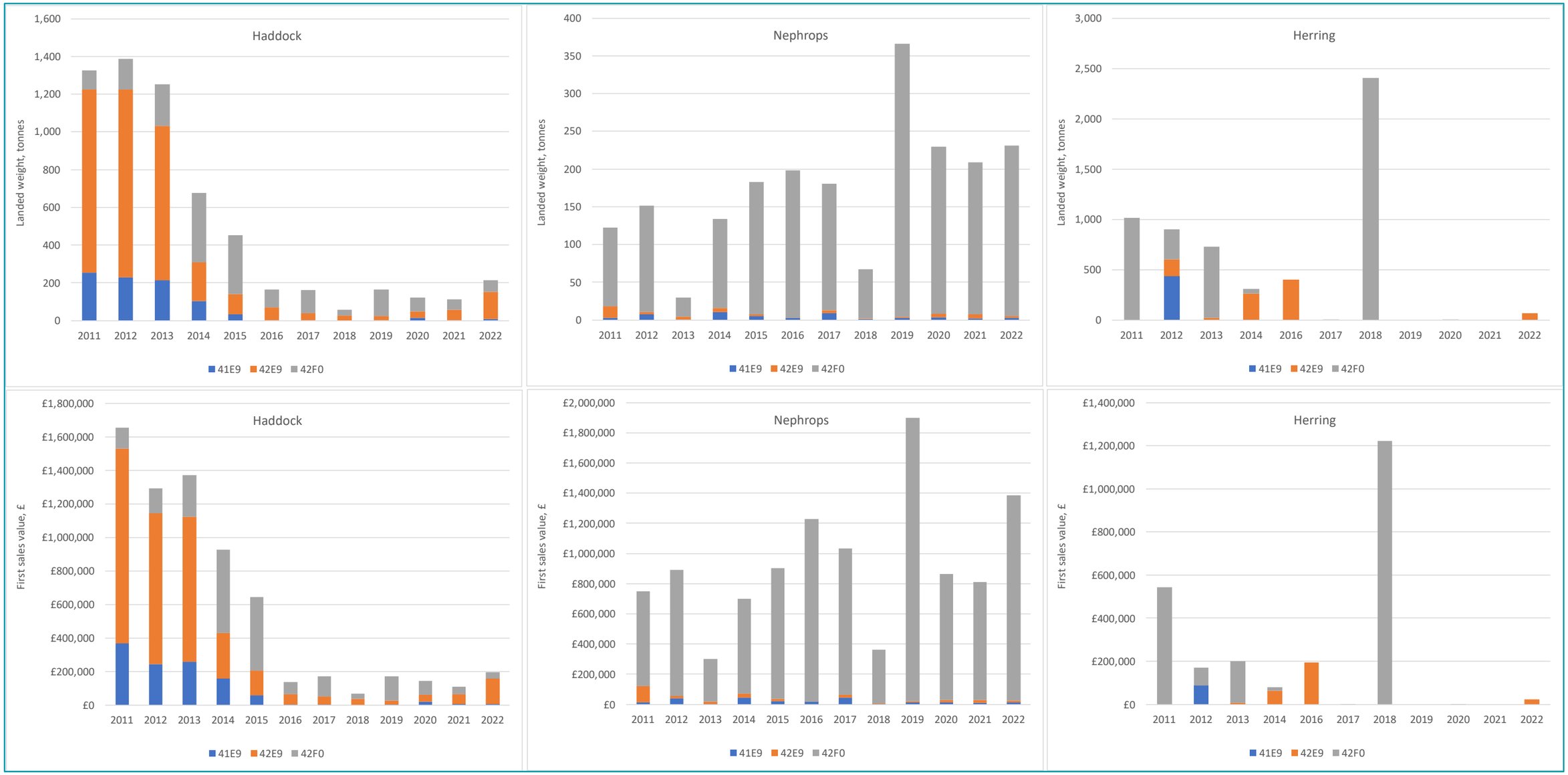

Figure 12.6: Long Term Landing Trends for Haddock, *Nephrops* and Herring from the Commercial Fisheries Local Study Area (MMO, 2022a; MMO, 2023a)

Haddock fishery

35. The long term data trends presented in Figure 12.6, together with the VMS data for 2011 to 2015 presented in the commercial fisheries technical report (volume 3, appendix 12.1) provide evidence that a haddock fishery was targeted by demersal otter trawl and demersal seine vessels pre 2016 . Furthermore, evidence provided by the fishing industry for vessel tracking/plotter data indicates activity by demersal otter trawl vessels in the north, central and southern portions of the Array (in a north to south direction). Activity by demersal seine vessels is evidenced in the central portions of the Array, understood to be harder ground routinely targeted by this gear type.

36. Industry consultation indicates that after Brexit, the fish processors found it challenging to secure labour to process small fish by hand, which led to the decline in demand for smaller size class of fish which are more labour intensive to hand-fillet.

37. Looking in more detail at the time-line of events, the free movement between the UK and the European Union ended on 31 December 2020 and moved to a point-based system based on skills and talent (UK Government, 2020). Therefore, labour shortages could feasibly impact the processing sectors from mid-2020/2021 onwards. However, the drop in haddock landings is noted from 2016 onwards (including the period prior to the referendum vote in the UK). While the reasoning for decline may have been influenced by Brexit, as well as COVID-19 restrictions from 2020 onwards, it does not explain the marked drop from 2016 onwards.

38. Fisheries legislation that may have influenced the fishery from 2016 onwards includes the Landing Obligation (MMO, 2015), which for the demersal otter trawl fishery in the North Sea was implemented in stages from 2016 to 2017. The landing obligation means that no commercial fishing vessel can return any quota species of any size to the sea once caught. This includes fish that are both over and under minimum conservation reference size (MCRS), with fish less than MCRS permittable to sell, but not for human consumption. In terms of implementation, in the North Sea in 2016, vessels using gear of mesh size 100 mm and more were required to land all haddock and in 2017 this was extended to gear of mesh size 80-99 mm (Marine Directorate, 2023). The landing obligation may have influenced fishers to avoid areas targeted for ‘small’ fish that are above the MCRS, but may bring a higher proportion of catch below MCRS.

39. Nevertheless, industry consultation in relation to the Array (see Table 12.3) has consistently raised the potential for this ‘small’ haddock fishery to resume in the region and overlapping the Array in the short to medium term.

40. This has been informed by recent investment in the Peterhead area for new processing capabilities, specifically an automated fish processing line using machinery to process smaller fish (rather than labour for filleting by hand). This will process smaller size classes of fish to produce fresh and frozen fillets and portion blocks for value-added ranges in UK and overseas markets. This venture was announced recently (April 2024), with production being fully operational later in 2024 and aims to provide capacity for processing of small size haddock landed within current fisheries quotas (Findlay, 2024). Processing capacity for small haddock may increase the value and profitability of landings with greater proportions of small size classes. This may lead to increase effort by demersal seine and otter trawl commercial fishing fleets in areas known for small size class haddock (and other white fish) in the future.

41. Overall, there is potential for this haddock fishery to return to the local study area, but it is not possible to predict when or the potential scale of any future fishery due to the range of factors influencing the decline in 2016, including the implementation of legislation (specifically the Landing Obligation in 2016 and 2017), and Brexit (specifically the referendum in 2016 and end of free movement between UK and EU in 2020).

12.7.2. OVERVIEW OF LANDINGS FROM THE COMMERCIAL FISHERIES REGIONAL STUDY AREA

42. An overview of the UK and EU landings from the commercial fisheries regional study area is presented in the commercial fisheries technical report (volume 3, appendix 12.1).

43. Within the commercial fisheries regional study area, the highest quantity of catch is taken from 43E9 (north of the Array). For non-UK activity, vessels registered in Denmark, Netherlands, France, Germany and Sweden are recorded to fish within the commercial fisheries regional study area. The key target species for these fleets is herring.

12.7.3. KEY COMMERCIAL FISHERIES FLEET MÉTIERS

44. The key fleet métiers operating across the commercial fisheries local and regional study areas include (in no particular order):

- UK demersal otter trawlers targeting *Nephrops*, haddock and mixed demersal species;
- UK demersal seine targeting haddock and mixed demersal species;
- UK, Norwegian, Danish, Dutch and German pelagic trawlers targeting herring;
- UK scallop dredgers targeting king scallop; and
- UK potting vessels targeting brown crab and lobster.

45. Volume 3, appendix 12.1 noted potential for a fishery by Danish industrial trawlers targeting sandeel. However, as of 2024, sandeel fishing within the UK EEZ has been prohibited for all UK and non-UK vessels and therefore this receptor is no longer considered appropriate to assess.

12.7.4. DESIGNATED SITES

46. A screening of designated sites in the vicinity of the Array has been carried out and has identified that there were no designated sites relevant to commercial fisheries. The potential for cumulative impacts to arise for commercial fisheries in relation to potential management measures implemented within designated sites is considered in section 12.12.

12.7.5. FUTURE BASELINE SCENARIO

47. The EIA Regulations require that “*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of environmental information and scientific knowledge*” is included within the Array EIA Report.

48. If the Array does is not developed, the ‘without development’ future baseline conditions are described within this section.

49. Commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors, including the following:

- market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, including the 2020 to 2021 COVID-19 pandemic;
- market prices: commercial fishing fleets respond to market prices by focusing effort on higher value target species when prices are high and markets in demand;
- stock abundance: fluctuation in the biomass of individual species stocks in response to status of the stock, recruitment, natural disturbances (e.g. due to storms, sea temperature etc.), changes in fishing pressure etc.;
- fisheries management: including new management for specific species where overexploitation has been identified, or changes in Total Allowable Catches (TACs) leading to the relocation of effort, and/or an overall increase/decrease of effort and catches from specific areas. Specifically, the recent prohibition on sandeel fisheries within the UK EEZ portion of the North Sea is noted;
- environmental management: including the potential restriction of certain fisheries within protected areas;
- improved efficiency and gear technology: with fishing fleets constantly evolving to reduce operational costs, e.g. by moving from beam trawl to demersal seine. Specifically, the recent prohibition of bottom trawling in thirteen MPAs implemented by the MMO is noted; and

- sustainability: with seafood buyers more frequently requesting certification of the sustainably of fish and shellfish products, such as the Marine Stewardship Council certification, industry is adapting to improve fisheries management and wider environmental impacts.

50. The variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and forms the principal reason for considering up to five years of key baseline data. Given the time periods assessed, the future baseline scenario would typically be reflected within the current baseline assessment undertaken. However, in this case, existing baseline data do not capture any potential changes in commercial fisheries activity resulting from the withdrawal of the UK from the EU.

51. Following withdrawal, the UK and the EU have agreed to a Trade and Cooperation Agreement (TCA), applicable on a provisional basis from 01 January 2021. The TCA sets out fisheries rights and confirms that from 01 January 2021 and during a transition period until 30 June 2026, UK and EU vessels will continue to access respective EEZs, (12 nm to 200 nm) to fish. In this period, EU vessels will also be able to fish in specified parts of UK waters between 6 nm to 12 nm.

52. Over the five-year transition period, 25% of the EU's fisheries quota in UK waters will be transferred to the UK; with 15% transferred in year one, most of this quota has already been transferred and distributed across the four nations of the UK. After the five-year transition there will be annual discussions on fisheries opportunities. Across the commercial fisheries regional study area, where UK fisheries primarily target non-quota shellfish species, it is expected that fleets are unlikely to be impacted by quota transfers. It is possible that UK vessels will seek to exploit additional quota-species opportunities, but fishing vessel owners would need to obtain the relevant quota allocation for that specific target species.

53. Market changes have the potential to impact fishing activity in the commercial fisheries local and regional study areas; including the potential re-establishment of the historic 'small' haddock fishery. In terms of future baseline scenarios, with or without the Array, it is therefore possible, that the UK fleet will more heavily target 'small' haddock given the potential return of processing and market for this product.

12.7.6. DATA LIMITATIONS AND ASSUMPTIONS

54. Limitations of landings data include the spatial size of ICES rectangles, which can under- or over-estimate actual activity across the Array, and care is therefore required when interpreting the data. A further limitation of landings data is the potential under-reporting of landings associated with potting vessels. This may occur as a result of estimating catches (as opposed to accurate weighing) and not reporting catches that fall below the acceptable limit, as defined within the UK Registration of Buyers and Sellers (RBS) (i.e. when purchases of first sale fish direct from a fishing vessel are wholly for private consumption, and less than 30 kg is bought per day). While it is recognised that there is no statutory requirement for owners of vessels 10 m and under to declare their catches, registered buyers are legally required to provide sales notes of all commercially sold fish and shellfish, due to the 2005 Registration of Buyers and Sellers of First-Sale Fish Scheme (RBS legislation) (MMO, 2021). The RBS legislation is applicable to licenced fishing vessels of all lengths and requires name and Port Letters and Numbers (PLN) of the vessel which landed the fish, to be recorded in relation to each purchase. For the <10 m sector, landing statistics are recorded on sales notes provided by the registered buyers (MMO, 2021). Information that may not be formally recorded on the sales note, such as gear and fishing area, is added by coastal staff based on local knowledge of the vessels they administer; for example, from observations of the vessel during inspections at ports, or from air and sea surveillance activities, as well as discussions with the owner and/or operator of the vessel (MMO, 2021).

55. Lack of recent landings statistics for EU (non-UK) fleets is also recognised as a data limitation; based on the most recent European Commission data call, more recent (i.e. from 2017 onwards) landings data is no longer available by ICES rectangle. Data at a scale of ICES division (i.e. the whole of the North Sea) is less useful to understand fishing activity specific to the area overlapping the Array.

56. Limitations of VMS data are primarily focused on the coverage being limited to vessels ≥15 m for MMO data. It is important to be aware that where mapped VMS data may appear to show inshore areas as having lower (or no) fishing activity compared with offshore areas, this is not necessarily the case, because VMS data does not include vessels typically operating in inshore areas (i.e. which typically comprises vessels <15 m in length). Specifically, VMS data does not represent activity of vessels under 15 m in length. To assist in mitigating the risk of under-representing smaller inshore vessels, site-specific marine traffic survey data, comprising information on vessel movements gathered by AIS and radar, has been analysed alongside VMS data (detailed in volume 3, appendix 12.1).

57. Fishing vessel route density data from the EMSA is based on AIS data, representing activity for vessels with AIS (≥15 m in length). A limitation of AIS data is that is does not distinguish between steaming and actively fishing; nevertheless, it provides corroboration for key fishing grounds and insight into transit routes to alternative fishing grounds.

58. In addition, there is potential for the small haddock fishery detailed in paragraphs 40 and 41 to return to the local study area, however, it is not possible to predict when or the potential scale of any future fishery. This potential future baseline has been taken into consideration within impact assessments in sections 12.11 and 12.12, where applicable, however, it should be noted given the uncertainty around the small haddock future baseline, the assessments which consider the small haddock fishery are presented with a high level of precaution.

59. Data limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources and consultation with the fishing industry. Data forms only part of the evidence base and all data sources have been contextualised by consultation and professional judgement; therefore the limitations identified are not considered to affect the certainty, or reliability, of the impact assessments in sections 12.11 and 12.12.

12.8. KEY PARAMETERS FOR ASSESSMENT

12.8.1. MAXIMUM DESIGN SCENARIO

60. The maximum design scenarios identified in Table 12.6 are those expected to have the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in volume 1, chapter 3 of the Array EIA Report. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Description (volume 1, chapter 3) (e.g. different infrastructure layout), to that assessed here, be taken forward in the final design scheme.

Table 12.6: Maximum Design Scenario Considered for Each Potential Impact as Part of the Assessment of LSE[1] on Commercial Fisheries

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
Temporary loss or restricted access to fishing grounds	✓	×	✓	**Construction Phase:** • construction phase: 8 years from 2031 to 2038 inclusive; and • total Lease Area: 858 km^2. <u>Safety zones:</u> • 500 m safety zones around structures with active ongoing construction activities; • 50 m safety zones around partially complete structures or complete structures prior to commissioning of the full Array; and • Use of 'rolling'/temporary 500 m advisory safe passing distances around installation/maintenance vessels actively engaged in works. <u>Site preparation activities:</u> • area of boulder clearance along inter-array cables: 7,334,400 m^2; • area of boulder clearance along interconnector cables: 1,416,000 m^2; and • sand wave clearance area (within Array): 5,867,520 m^2 (excavated to a locality within the Array). <u>Wind turbines generators and Offshore Substation Platforms (OSPs), scour protection, and mooring and anchoring system:</u> As described for the potential impact of "long term loss or restricted access to fishing grounds". <u>Inter-array cables:</u> • total inter-array cables length: 1,261 km; • minimum target burial depth: 0.4 m; subject to Cable Burial Risk Assessment (CBRA); • total area of seabed disturbance: 24.45 km^2; • up to 20% of the length of the cables may require cable protection including: rock/concrete/cast iron/polyurethane/polyethylene. Total inter-array cable protection footprint for the Array: 4,889,600 m^2; and • with up to 12 inter-array cable crossings including: rock/rock bags/concrete mats cast iron/polyurethane/polyethylene. Total area of inter-array cable crossings: 12,000 m^2. <u>Interconnector cables:</u> • up to 12 interconnector cables; • total interconnector cables length: 236 km; • minimum target burial depth: 0.4 m; subject to CBRA; • total area of seabed disturbance: 4.72 km^2; • up to 20% of the length of the cables may require cable protection including: rock/concrete/cast iron/polyurethane/polyethylene. Total interconnector cable protection footprint for the Array: 944,000 m^2; and • with up to 12 interconnector cable crossings including: rock/rock bags/concrete mats/cast iron/polyurethane/polyethylene. Total area of interconnector cable crossings: 12,000 m^2.	The maximum design scenario represents the maximum duration and extent of fishing exclusion throughout the construction and decommissioning phase and, hence, the greatest potential to restrict access to fishing grounds. Given that construction of the site will happen sequentially from 2031 to 2038, it is assumed that construction activities could occur anywhere within the Array at any given time. It is therefore assumed that fishing is not prohibited from resumption, but is unlikely to resume within the Array throughout the construction and decommissioning phases.

[1] C = Construction, O = Operation and maintenance, D = Decommissioning

Potential Impact	Phase[1] C	O	D	Maximum Design Scenario	Justification
				Decommissioning Phase: At the end of the Array's operational lifetime, it is expected that all structures above the seabed (with the exception of driven piles and drag embedment anchors (DEA) (depending upon anchor system used), scour protection and cable protection) will be fully removed where feasible. Driven piles and/or DEAs installed as part of the wind turbine anchoring system, static portions of inter-array cables, interconnector cables, scour protection and cable protection are either expected to remain in where they are embedded within the seabed. Legislation, guidance and good practice will be kept under review throughout the lifetime of the Array and will be followed at the time of decommissioning. Environmental conditions and sensitivities will also be considered since removal of structures may result in greater environmental impacts in comparison to leaving *in situ*.	
Long term loss or restricted access to fishing grounds	×	✓	×	**Operation and Maintenance Phase:** • operational lifetime: 35 years <u>Wind turbines:</u> • maximum number of wind turbines: 265; • number of floating foundations: 265; • foundation surface dimension: 130 m x 110 m; • depth of structure "draft" in the water column: 25 m; and • minimum wind turbine spacing: 1,000 m. <u>Wind turbines mooring system:</u> • catenary mooring line type with up to 6 mooring lines and anchors (per foundation); • mooring line radius: up to 700 m; • mooring line cross-sectional area (πr^2): 1,539,380 m^2; • total mooring line area for 265 foundations: 407,935,806 m^2; and • proportion of mooring radius compared to total lease area: 47.54%. <u>OSPs:</u> • maximum number of OSPs: 15 (within the Array), including: – 3 larger OSPs of length x width: 121 m x 89 m; with piled jacket foundation, up to 12 legs per foundation and total seabed footprint and scour protection of 44,693 m^2; and – 12 smaller OSPs of length x width: 41 m x 37 m; with piled jacket foundation, up to 6 legs per foundation and total seabed footprint and scour protection of 50,121 m^2. <u>Scour protection (of moorings and anchors):</u> • scour protection material: mattress or rock; • scour protection footprint per foundation: 2,385 m^2; • total scour protection for the Array: 632,196 m^2.	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential to restrict access to fishing grounds. Given the mooring line radius of 700 m and minimum wind turbine spacing of 1,000 m, it is assumed that fishing is not prohibited from resumption, but is unlikely to resume within the Array throughout the operation and maintenance phase.

Potential Impact	Phase[1] C	O	D	Maximum Design Scenario	Justification
				Inter-array cables: • cable protection: up to 20% of 1,261 km, with total protection footprint: 4,889,600 m^2; • Scour protection footprint (per box): 884 m^2 • crossings: up to 12 with total area of crossings: 12,000 m^2. Interconnector cables: • cable protection: up to 20% of 236 km, with total protection footprint: 944,000 m^2; and • crossings: up to 12 with total area of crossings: 12,000 m^2. Maintenance activities: • Routine inspections (rolling campaign for wind turbines; every 6 months for first two years and annually thereafter for floating foundations and inter-array cables; annually for first 3 years then every 24 months thereafter for interconnector cables); • Geophysical surveys (every 24 months for foundations, annually for first 3 years then every 24 months thereafter for inter-array and interconnector cables); • Repairs or replacements of navigational equipment (estimated at once every 2 years); and • Cable repair (1 every 5 years) for interconnector cables and 5% of the inter-array cables annually. Cable reburial/protection (5% of cable annually) for inter-array and interconnector cables..	
Displacement of fishing activity into other areas	✓	✓	✓	**Construction and Decommissioning Phases:** As described for the potential impacts of “temporary loss or restricted access to fishing grounds”. **Operation and Maintenance Phase:** As described for the potential impacts of “long term loss or restricted access to fishing grounds”.	As per justifications for “long term” and “temporary loss or restricted access to fishing grounds”.
Interference with fishing activity	✓	✓	✓	**Construction Phase:** • maximum number of return trips for vessels over the construction phase: including site preparation 7,902; and • maximum number of vessels on site at one time over the construction phase: 97. **Operation and Maintenance Phase:** • maximum number of return trips for operation and maintenance phase: 508; and • maximum number of vessels on site at one time for operation and maintenance phase: 31. **Decommissioning Phase:** This is expected to be the same or similar as described for the construction phase.	The maximum number of wind turbines and associated infrastructure will lead to the highest level of construction activities and therefore highest level of construction vessel round trips. The maximum number of vessels transits and the maximum duration of the construction would result in the greatest potential for interference.
Increased snagging risk, which could result in loss or damage to fishing gear	✓	✓	✓	**Construction and Decommissioning Phases:** As described for the potential impacts of “temporary loss or restricted access to fishing grounds”. **Operation and Maintenance Phase:** As described for the potential impacts of “long term loss or restricted access to fishing grounds”.	As per justifications for “long term” and “temporary loss or restricted access to fishing grounds”.

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
Increased steaming/vessel transit times	✓	✓	✓	**Construction and Decommissioning Phases:** As described for the potential impacts of “temporary loss or restricted access to fishing grounds”. **Operation and Maintenance Phase:** As described for the potential impacts of “long term loss or restricted access to fishing grounds”.	As per justifications for “long term” and “temporary loss or restricted access to fishing grounds”.
Impacts to commercially exploited species populations	✓	✓	✓	As provided in Table 9.14 in volume 2, chapter 9:.	As provided in Table 9.14 in volume 2, chapter 9.

12.8.2. IMPACTS SCOPED OUT OF THE ASSESSMENT

61. The commercial fisheries pre-Scoping workshop was used to facilitate stakeholder engagement on topics to be scoped out of the assessment.

62. On the basis of the baseline environment and the Project Description outlined in volume 1, chapter 3 of the Array EIA Report, and following feedback from the pre-Scoping workshop and Ossian Array EIA Scoping Opinion (MD-LOT, 2023), it is proposed that no impacts are to be scoped out of the assessment for commercial fisheries.

12.9. METHODOLOGY FOR ASSESSMENT OF EFFECTS

12.9.1. OVERVIEW

63. The commercial fisheries assessment of effects has followed the methodology set out in volume 1, chapter 6 of the Array EIA Report. Specific to the commercial fisheries EIA, the following guidance documents have also been considered:

- Good Practice Guidance for Assessing Fisheries Displacement (Xodus, 2022);
- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network (UKFEN) and Seafish, 2012);
- FLOWW Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015);
- Damage to Gear Compensation Claim Forms (Marine Scotland, 2021);
- Guidance on completing Damage to Gear Compensation Claim Forms (Marine Scotland, 2021);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);
- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b);
- Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms (RenewableUK, 2013);
- Fishing and Submarine Cables - Working Together (International Cable Protection Committee, 2009); and
- Guidance on preparing a “FMMS” (draft) (Marine Scotland, 2020).

Assessment of displacement

64. The assessment of displacement has been undertaken with due regard to Xodus guidelines (Xodus, 2022) in defining the magnitude of impact to each receptor group and sensitivity of each commercial fishing fleet. The displacement considers both primary and secondary displacement, defined as follows (Xodus, 2022):

- Primary displacement refers to the first instance of displacement where fishing effort is relocated to another area as a result of a change in the spatial environment. In the context of this guidance, this corresponds to displacement that is a direct result of other licensed marine activities and associated infrastructure.
- Secondary displacement is an indirect effect of the other licensed marine activity and associated infrastructure. This occurs when the fishing effort that is relocated through primary displacement also displaces fishing effort.

65. The guidance provides details on baseline data sources, highlighting that "no single source of data can be used to comprehensively describe commercial fishing activity, due to the inherent limitations of each data source”. Data sources are detailed in Table 12.4 and Table 12.5, together with associated limitations and uncertainties.

66. The guidance specifically recommends the following steps (Xodus, 2022):

- Clear understanding of the commercial fishing 'receptors' for which impacts will be assessed, the fishing methods which are operated in the study area, including the areas where fishing activity may be relocated;
- Identification of the likely maximum distance of displacement by the receptors, and the potential spatial extent of displacement effects for the fishing vessels which are already operational in the area which vessels are displaced to;
- Identification of potential impacts on displaced commercial fisheries from the area that vessels are initially displaced from;
- Identification of potential impacts on any fishing vessel operators / owners which are already active in the area in which vessels are displaced to and the potential for competition for space;
- Establishing the sensitivity of each commercial fisheries receptor to displacement, with reference to the specifications;
- If possible, a quantitative assessment of magnitude (e.g. taking account of spatial extent, duration, fishing effort, number of vessels); and
- Consideration of primary and secondary displacement where applicable.

12.9.2. CRITERIA FOR ASSESSMENT OF EFFECTS

67. When determining the significance of effects, a two stage process is used which involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in volume 1, chapter 6 of the Array EIA Report.

68. The criteria for defining magnitude in this chapter are outlined in Table 12.7 and are based upon the technical expert’s experience and judgement. Each assessment considered the spatial extent, duration, frequency and reversibility of impact when determining magnitude which are outlined within the magnitude section of each impact assessment (e.g. a duration of hours or days would be considered for most receptors to be of short term duration, which is likely to result in a low magnitude of impact).

Table 12.7: Definition of Terms Relating to the Magnitude of an Impact

Magnitude of Impact	Definition
High	Impact is of long term duration (e.g. greater than 12 years duration) and/or is of extended physical extent; and/or: Impact is expected to result in one or more of the following: • Substantial loss of target fish or shellfish biological resource (e.g. loss of substantial proportion of resource within project area); and • Substantial loss of ability to carry on fishing activities (e.g. substantial proportion of effort within project area). (Adverse)
	Impact is expected to result in one or more of the following: • Large scale or major improvement of resource quality, measurable against biomass reference points; and • Extensive restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)

Magnitude of Impact	Definition
Medium	Impact is of medium term duration (e.g. less than 12 years) and/or is of moderate physical extent; and/or: Impact is expected to result in one or more of the following: • Partial loss of target fish or shellfish biological resource (e.g. moderate loss of resource within project area); and • Partial loss of ability to carry on fishing activities (e.g. moderate reduction of fishing effort within project area). (Adverse)
	Impact is expected to result in one or more of the following: • Moderate improvement of resource quality; and • Moderate restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)
Low	Impact is of short-term duration (e.g. less than 2 years) and/or is of limited physical extent; and/or: Impact is expected to result in one or more of the following: • Minor loss of target fish or shellfish biological resource (e.g. minor loss of resource within project area); and • Minor loss of ability to carry on fishing activities (e.g. minor reduction of fishing effort within project area). (Adverse)
	Impact is expected to result in one or more of the following: • Minor benefit to or minor improvement of resource quality; and • Minor restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)
Negligible	Impact is of very short-term duration (e.g. less than 1 year) and/or physical extent of impact is negligible; and/or: Impact is expected to result in one or more of the following: • Slight loss of target fish or shellfish biological resource (e.g. slight loss of resource within project area); and • Slight loss of ability to carry on fishing activities (e.g. slight loss of fishing effort within project area). (Adverse)
	Impact is expected to result in one or more of the following: • Very minor benefit to or very minor improvement of resource quality; and • Very minor restoration or enhancement of habitats supporting commercial fisheries resources. (Beneficial)

69. The criteria for defining sensitivity in this chapter are outlined in Table 12.8 and is based upon the technical expert's experience and judgement.

Table 12.8: Definition of Terms Relating to the Sensitivity of the Receptor

Value (Sensitivity of the Receptor)	Description
Very High	Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. And/or: No alternative fishing grounds are available.
High	Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. And/or: Low levels of alternative fishing grounds are available and/or fishing fleet has low operational range.
Medium	Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability. And/or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.
Low	Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. And/or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.
Negligible	Receptor is not vulnerable to impacts that may arise from the project and/or has very high recoverability. And/or: Very high levels of alternative fishing grounds are available and/or fishing fleet has extensive operational range; fishing fleet is very adaptive and resilient to change.

70. The magnitude of the impact and the sensitivity of the receptor are combined when determining the significance of the effect upon commercial fisheries. The particular method employed for this assessment is presented in Table 12.9.

71. Where a range is suggested for the significance of effect, for example, minor to moderate, it is possible that this may span the significance threshold. The technical specialist's professional judgement has been applied to determine which outcome defines the most likely effect, which took in to account the sensitivity of the receptor and the magnitude of impact. Where professional judgement was applied to quantify final significance from a range, the assessment has set out the factors that result in the final assessment of significance. These factors may include the likelihood that an effect will occur, data certainty and relevant information about the wider environmental context.

72. For the purposes of this assessment:

- a level of residual effect of moderate or more will be considered a 'significant' effect in terms of the EIA Regulations; and
- a level of residual effect of minor or less will be considered 'not significant' in terms of the EIA Regulations.

73. Effects of moderate significance or above are therefore considered important in the decision-making process, whilst effects of minor significance or less warrant little, if any, weight in the decision-making process.

Table 12.9: Matrix Used for the Assessment of the Significance of the Effect

Sensitivity of Receptor	Magnitude of Impact: Negligible	Low	Medium	High
Negligible	Negligible	Negligible to Minor	Negligible to Minor	Minor
Low	Negligible to Minor	Negligible to Minor	Minor	Minor to Moderate
Medium	Negligible to Minor	Minor	Moderate	Moderate to Major
High	Minor	Minor to Moderate	Moderate to Major	Major
Very High	Minor	Moderate to Major	Major	Major

12.10. MEASURES ADOPTED AS PART OF THE ARRAY

74. As part of the Array design process, a number of designed in measures have been proposed to reduce the potential for impacts on commercial fisheries (see Table 12.10). They are considered inherently part of the design of the Array and, as there is a commitment to implementing these measures, these have been considered in the assessment presented in section 12.11 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These designed in measures are considered standard industry practice for this type of development.

Table 12.10: Designed In Measures Adopted as Part of the Array

Designed In Measures Adopted as Part of the Array	Justification
Fisheries liaison	Appointment of a Fisheries Liaison Officer (FLO) and use of Offshore FLOs (OFLO) as required to enable ongoing liaison with fishing fleets to be maintained. Adherence to appropriate guidance with regards to fisheries liaison and mitigation procedures in the event of interactions between the proposed development and fishing activities, (i.e. FLOWW guidance).
Promulgation of information through timely and efficient posting of Notice to Mariners (NtM), Kingfisher Bulletins and navigational warnings, as appropriate. Information will include but not be limited to vessel routes, timings and locations, safety zones and advisory safe passing distances as required.	Maximises awareness of the Array allowing vessels to passage plan in advance.
Development of, and adherence to a Cable Burial Risk Assessment (CBRA).	The CBRA will determine the risks arising from cable burial, such as scour, erosion, and dropped objects, and any measures to address them, in order to limit disturbance to the seabed as far as reasonably practicable. The location of the areas of cable protection (if cable protection is required) will be communicated to the fishing industry.
Apply for and implement safety zones during major construction and operation and maintenance activities.	Application for safety zones up to 500 m around structures where vessels are undertaking construction work during construction and periods of major operation and maintenance and 50 m around partially completed or completed but not yet fully commissioned surface piercing structures during construction. Advisory temporary safe passing distances to be promulgated to mariners, including fishers, around installation/maintenance vessels actively engaged in works.
Development of, and adherence to an Environmental Management Plan (EMP) (outline in volume 4, appendix 21).	To reduce the risk of accidental release of contaminants from vessels as far as reasonably practicable, thus providing protection for marine life across all phases of the Array. This will include mitigation/monitoring measures and commitments made within the Array EIA Report to reduce the impacts on fish species, including but not limited to chemical usage, Invasive and Non-Native Species (INNS), pollution prevention and waste management.
Development of, and adherence to, an Operation and Maintenance Programme (OMP).	This will include a schedule of operation and maintenance activities and a procedure for setting out the refined parameters of any cable repair activities.
Development of, and adherence to, a FMMS (outline in volume 4, appendix 23).	The FMMS will set out the means of ongoing fisheries liaison through the lifetime of the Array and detail any mitigation measures of relevance to commercial fisheries to be put in place. This will set out commitments to environmental monitoring in the pre, during and post-construction phases. A procedure for claims due to loss of, or damage to fishing gear, will be included in the FMMS.
Member of and engagement in a Regional Commercial Fisheries Working Group.	Provides a forum for information sharing and discussion of key issues with commercial fisheries stakeholders and other developers in the region.
Development of, and adherence to a Navigational Safety and Vessel Management Plan (NSVMP) (outline in volume 4, appendix 24).	The NSVMP will confirm the types and numbers of vessels that will be engaged in activities associated with the Array, and consider vessel coordination including indicative transit route planning (Marine Coordination). All contractors undertaking works to be contractually obliged to ensure compliance with standard offshore policies, including those that prohibit the discarding of objects or materials overboard and that require the rapid recovery of accidentally dropped objects where feasible. Development and issue of a Code of Conduct to all project vessel operators to advise on how to avoid impacts on marine megafauna and interference with fishing activities. Compliance of all project vessels with maritime regulations as adopted by the relevant flag state including the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1974a) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974b).
Development of, and adherence to a Lighting and Marking Plan (LMP) (outline in volume 4, appendix 26).	The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting. Navigational aids and marine charting so that other marine users are made aware of the location of the Array. Consideration of UK Marine Guidance Note (MGN) 654 with respect to wind turbine design and construction, so that recognised safe standards are met with regards to navigational safety and emergency response (search and rescue, salvage and towing, counter pollution). Adherence with the provisions of the COLREGs for all contracted vessels, including the display of appropriate lights and shapes such as when vessels are restricted in their ability to manoeuvre.

Designed In Measures Adopted as Part of the Array	Justification
Development of, and adherence to a Decommissioning Programme (DP[2]).	The aim of this plan is to adhere to the existing UK and international legislation and guidance (at the time of writing) during the decommissioning phase. This will reduce the amount of long term disturbance to the environment as far as reasonably practicable.
Appropriate marking of structures on UK Hydrographic Office (UKHO) Admiralty Charts and other electronic charts as appropriate.	Ensure the appropriate marking of structures on UKHO Admiralty Charts to maximise the awareness of the Array allowing vessels to plan their passage in advance.

12.11. ASSESSMENT OF SIGNIFICANCE

75. Table 12.6 summarises the potential effects arising from the construction, operation and maintenance and decommissioning phases of the Array, as well as the maximum design scenario against which each impact has been assessed. An assessment of the likely significance of the effects of the Array on the commercial fisheries receptors caused by each identified impact is given below.

TEMPORARY LOSS OR RESTRICTED ACCESS TO FISHING GROUNDS

76. This impact relates to the temporary loss and/or temporary restricted access to fishing grounds due to construction and decommissioning activities related to the installation of the floating wind turbines and their associated mooring and anchoring systems and OSP jacket foundations, and the installation of inter-array and interconnector cables. This impact is considered temporary because it is only applicable throughout the duration of the construction and decommissioning phases. The long term loss of access is considered for the operation and maintenance phase in the following impact: Long term loss or restricted access to fishing grounds.

Construction phase

Magnitude of impact

77. During construction of the Array, associated infrastructure and cabling, commercial fisheries will be prevented from fishing where construction activities are taking place, plus 500 m safety zones around structures where active construction works are ongoing, 50 m safety zones will otherwise be in place up until full commissioning of the Array, and up to 500 m advisory safe passing distance for mobile installation vessels. The total construction duration for the Array will be eight years, with a number/range of construction activities being undertaken simultaneously across the Array.

78. This impact will lead to a localised loss of access to fishing grounds and access to the fish and shellfish resources within these grounds for a range of fishing opportunities during the construction phase, which will directly affect fleets over a medium term duration (i.e. less than 12 years, as per definition in Table 12.7). The impact is predicted to be intermittent with localised exclusion surrounding construction activities.

79. In terms of the area impacted by construction activities, in total a maximum of 43.58 km^2 of seabed will be temporarily disturbed during seabed preparation activities and installation of inter-array and interconnector cables (which equates to 5% of the total Array); and a mooring line cross-sectional area of 1.54 km^2 per wind turbine (which for 265 foundations equates to 408 km^2 and 47.54 % of the total Array). In addition, there will be 500 m safety zones around structures under construction (equating to 0.79 km^2 per structure) and 500 m advisory safe passing distances for mobile installation vessels (equating to 0.79 km^2 per vessel).

80. Of paramount importance to the commercial fisheries assessment is the assumptions around potential access to fishing grounds within the Array throughout the different project phases. During the construction and decommissioning phases a buoyed area will be implemented and given that construction/decommissioning activities can occur anywhere within the Array at any given time it is assumed that while fishing is not prohibited, it is unlikely to resume.

81. The impact is of relevance to international fishing fleets and is described below on a fishery-by-fishery basis.

Demersal otter trawl and demersal seine

82. Within the commercial fisheries local study area, a *Nephrops* fishery is targeted by UK demersal otter trawlers, that catch *Nephrops*, together with mixed demersal species including haddock, monkfish, whiting and halibut. Demersal otter trawl and demersal seine gear is also deployed to target mixed whitefish species, including haddock. These *Nephrops* and mixed demersal otter trawl fisheries are understood to occur outside and to the east of the Array, specifically within ICES rectangle 42F0. This is evidenced by landing statistics (Figure 12.2, Figure 12.3 and Figure 12.4) VMS data (see Figures 4.29 and 4.30 of volume 3, appendix 12.1) and consultation with SWFPA and SFF (Table 12.3).

83. The information provided during consultation with the commercial fishing industry indicated that haddock were targeted by demersal otter trawl/demersal seine historically within ICES rectangle 42E9 including within the Array. This is corroborated by landing statistics which indicate landings of haddock specifically in the years 2011 to 2013, which raised the overall value of the catches from 42E9 during these years (Table 12.5). VMS data has been interrogated for the years 2011 to 2020, and corroborates this trend of higher quantities of landings during the period 2011 to 2013 (see Figures 4.27 and 4.28 of volume 3, appendix 12.1). The VMS data indicates that landings were taken from the area north of the Array, as well as within parts of the Array. Mapping provided by the SFF corroborates the presence of this fishery, with evidence of demersal otter trawling and demersal seine within parts of the Array. Specifically, demersal trawling is evidenced in the north, central and southern portions of the Array; and demersal seine is evidence in the central portions of the Array, over what is considered harder ground typically targeted by this gear type. Industry consultation indicates that the area within ICES rectangle 42E9 had been specifically targeted for a smaller size class of haddock is that is above the Minimum Conservation Reference Size (MCRS) (and therefore landings are legally permitted for human consumption), but sizes are typically smaller than the size class currently landed. In the period 2011 to 2013, the area overlapping the Array was specifically understood to support this small size class of haddock. The reason for the decline of this fishery may be related to a number of possible reasons, including the Landing Obligation (MMO, 2015) legislation implemented in 2016 and 2017 for haddock in the North Sea, together with changes in processing capabilities and availability of EU labour to process ‘small’ haddock post Brexit.

84. The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. Based on the current baseline assessment, the magnitude of impact is therefore considered to be low for the demersal otter trawl and demersal seine fleets.

Pelagic otter trawl

85. The landing statistics indicate that pelagic species (notably herring) are occasionally caught by UK, Norwegian, Danish, Dutch and German fishing fleets within the commercial fisheries local study area. Pelagic trawling vessels are typically large (typically > 25 m in length), targeting highly mobile species (herring and/or mackerel *Scomber scombrus*) that consistently move/shoal during spawning migrations. Any activity by pelagic vessels within the Array is highly likely to be a sporadic, transitory event. Highly mobile pelagic species, that move in shoals and are not associated with specific seabed habitats, are assumed to be available to catch across large areas, i.e. if a shoal of herring cannot be caught within the Array, this shoal is expected to move to an area where they can be caught. Therefore, while the access to the water column within the Array may be affected; the opportunity to catch pelagic fish is not wholly lost.

VMS data collated by the MMO indicate activity by pelagic vessels to the east of the Array (in ICES rectangle 42F0) and north of the Array (in ICES rectangle 43E9) (see Figures 4.23 and 4.24 of volume 3, appendix 12.1). Consultation has been undertaken with the SPFA, a key pelagic fishing stakeholder, which confirmed that the Array is not targeted by Scottish pelagic vessels. This activity was confirmed through VMS data provided by SFPA for the Scottish pelagic members based on data from 2013 to 2021 (see Figures 4.25 and 4.26 of volume 3, appendix 12.1) and corroborated by Geographic Positional System (GPS) plotter data of the pelagic vessels. In addition, surveillance data records indicate pelagic trawl activity by UK, Norwegian, German, Danish and Dutch registered vessels to the north of the Array (in ICES rectangle 43E9) (see Figures 4.46 and 4.46 of volume 3, appendix 12.1). To summarise, all available evidence, including VMS, plotter data, surveillance data, landings statistics and industry consultation indicate that very limited landings are taken by pelagic vessels from within the Array. The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude of impact is therefore considered to be low for the pelagic otter trawl fleets (including UK, Norwegian, German, Danish and Dutch registered vessels).

Dredge

86. The UK dredging fleet targets scallops inshore from the Array, in ICES rectangles 41E8, 42E8 and 43E8 within the commercial fisheries regional study area. The dredge fleet does not operate across the Array as evidenced by VMS (Figures 4.36 to 4.38 of volume 3, appendix 12.1), surveillance data (Figure 4.47) and landings statistics. Scallops are found on clean firm sand and fine gravel and in currents which provide good feeding conditions. The targeted scallop grounds that run parallel to east coast of Scotland are well established and do not extend into the Array. There is a low potential for future scallop grounds emerging across the Array, but exploratory fishing on transit to and from established scallop grounds is possible. The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude of impact is therefore considered to be low for the scallop dredge fleet.

Potting

87. The UK potting fleet targets lobster and crab across a wide area, from inshore grounds, extending out towards and beyond the 12 nm boundary, and within ICES rectangles 41E8, 42E8 and 43E8 within the regional study area. The potting fleet does not operate across the Array as evidenced by VMS data (Figures 4.39 and 4.40 of volume 3, appendix 12.1), inshore spatial mapping (Figure 4.41 of volume 3, appendix 12.1), surveillance data (Figure 4.47 of volume 3, appendix 12.1) and landings statistics. The limitations of VMS data, in that they are not representative of vessels under 15 m in length is noted and therefore the assessment draws upon the inshore mapping, surveillance data and landing statistics as more robust and representative data sources of potting activity. The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude of impact is therefore considered to be low for the potting fleet.

Sensitivity of the receptor

88. The mobile fleets targeting demersal, pelagic and dredge fisheries across the Array are typically >15 m in length and operate across large areas of the North Sea. Given adequate notification, it is expected that these vessels will be in a position to avoid construction areas. All mobile fleets are considered to have a large operational range. All pelagic gear fleets (typically >25 m in length) are considered to have an extensive operational range, be highly adaptive and resilient to change.

89. The mobile fleets targeting pelagic and dredge fisheries are considered to have moderate-high levels of alternative fishing grounds; are deemed to be of low vulnerability, high recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be low.

90. The mobile demersal otter trawl and demersal seine fisheries are considered to have moderate to high levels of alternative fishing grounds; are deemed of low to medium vulnerability, high recoverability and medium value. However, unlike the pelagic and dredge fisheries, there is evidence (through confidential commercial fishing vessel plotter data provided by the fishing industry) that the Array has been fished by demersal otter trawl and demersal seine gear. This recorded activity, coupled with the inability to deploy these gear types within the Array during the construction phase, has therefore led to the sensitivity of these receptors to be assessed as medium.

91. The UK potting fleet are typically <15 m in length and operate across more distinct areas of ground, typically 0 nm to 12 nm from shore, but also extending beyond 12 nm, in areas that are already heavily exploited and are therefore more sensitive to disruption. The UK potting fleet are deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the effect

92. **Demersal otter trawl and demersal seine fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

93. **Pelagic and dredge fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms. Within the negligible to minor range as defined in the significance matrix, this effect is considered to be minor due to the duration of the eight year construction phase and recognition that while fishing activity is very low, the ability for exploratory fishing within the Array is lost.

94. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

95. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

96. At the end of the Array's operational lifetime, it is expected that all infrastructure above the will be fully removed where feasible, with the exception of cable and scour protection (depending on final material deployed). Driven piles and/or DEAs installed as part of the wind turbine anchoring system which are embedded deep in the seabed are expected to remain in-situ. Static portions of inter-array cables and interconnector cables that are buried may be left in situ or method of decommissioning is yet to be determined. Legislation, guidance and good practice will be kept under review throughout the lifetime of the Array and will be followed at the time of decommissioning. Environmental conditions and sensitivities will also be considered since removal of structures may result in greater environmental impacts in comparison to leaving *in situ*.

97. The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment. It is assumed that the decommissioning phase will have a similar duration as the constriction phase, i.e. across eight years in a single campaign.

98. The magnitude of impact is the same or similar to that assessed during construction as described in paragraphs 77 to 87.

99. The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low for all commercial fishing fleets.

Sensitivity of the receptor

100. The sensitivity of the commercial fishing receptors is the same or similar to that assessed during the construction phase as described in paragraphs 88 to 91 and summarised as low for pelagic and dredge fisheries, and medium for demersal otter trawl, demersal seine and potting.

Significance of the effect

101. **Demersal otter trawl and demersal seine fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

102. **Pelagic and dredge fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms. Within the negligible to minor range as defined in the significance matrix, this effect is considered to be minor due to the duration of the decommissioning phase and recognition that while fishing activity is very low, the ability for exploratory fishing within the Array is lost.

103. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

104. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

LONG TERM LOSS OR RESTRICTED ACCESS TO FISHING GROUNDS

105. Long term loss or restricted access to fishing grounds may arise due to the physical presence of the wind turbines and floating foundations, including mooring and anchoring systems, OSPs and inter-array and interconnector cabling, as well as operation and maintenance activities within the Array. This impact is relevant to the operation and maintenance phase of the Array and may cause direct impacts to receptors.

Operation and maintenance phase

Magnitude of impact

106. This impact will lead to a localised loss of access to fishing grounds and to the fish and shellfish resources within these grounds for a range of fishing opportunities during the period of operation and maintenance, which will directly affect fleets over a long term duration (i.e. the 35 years operation and maintenance phase of the Array, which is greater than 12 years, as per definition in Table 12.7). The impact is predicted to be continuous, throughout the operation and maintenance phase.

107. In terms of the area impacted by the physical presence of the Array, a mooring line radius of 700 m and cross-sectional area of 1.54 km^2 per wind turbine is assessed (which for 265 foundations equates to 408 km^2 and 47.54 % of the total Array), together with a minimum wind turbine spacing of 1,000 m. Overall, during the operation and maintenance phase, it is assumed that fishing is not prohibited from resumption, but is unlikely to resume within the Array throughout the operation and maintenance phase. This assumption is based on the perception of risk to fishers operating within a floating offshore wind farm and has been informed by industry consultation (Table 12.3).

108. During the operation and maintenance phase, fishing will not be prohibited from within the Array. Given the mooring line radius of 700 m and minimum wind turbine spacing of 1,000 m, it is assumed that due to fisher's perception of risk it is unlikely that they would choose to resume active fishing within the Array throughout the operation and maintenance phase.

109. It is acknowledged that static fishing gear trials have been undertaken at Hywind floating offshore wind farm (Wright *et al*., 2023). Crab creels, *Nephrops* creels, fish traps and jigging gear were all successfully operated within trial areas within and between the five floating wind turbines at Hywind. The gear deployed was for a trial scale, (i.e., not at commercial scale), with the objective to ascertain which static fishing methods were feasible. The crab and *Nephrops* creels were each set in a fleet of 20 creels; eight fish traps and three hooks on the jigging line which drifted with the vessel in the tide. For all gear types there were no safety issues, gear snagging or fishing gear lost during the trial. Overall, the study "*demonstrated that under the right sea and weather conditions, it is possible to fish safely within the Hywind floating offshore wind farm with the static fishing gear tested*" (Wright *et al*., 2023).

110. The defined fishing trial areas within the Hywind study were based on 200 m distance from turbines, infrastructure and dynamic cabling. It is not currently possible to define whether fishing areas can be established within the Array based on the maximum design scenario. It is therefore assumed that commercial scale fishing will not resume within the Array during the operation and maintenance phase.

111. The impact is of relevance to international fishing fleets and is described below on a fishery-by-fishery basis.

Demersal otter trawl targeting *Nephrops*:

112. The evidence to inform the assessment is the same or similar to that described for the construction phase. The *Nephrops* demersal otter trawl fishery is not expected to be impacted by the Array, as grounds are identified to be located outside the Array. *Nephrops* fishing grounds are highly specific to benthic muddy habitats where *Nephrops* burrow; given that habitat shift changes (i.e. from sandy gravel to mud) are not expected as a result of the Array, it is considered highly unlikely that a *Nephrops* fishery would establish within the Array at any point in the future. The impact is predicted to be of local spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low for the demersal otter trawl fleets targeting *Nephrops*.

Demersal otter trawl and demersal seine targeting haddock and mixed demersal

113. The evidence to inform the assessment is the same or similar to that described for the construction phase in paragraphs 77 to 87. The *Nephrops* demersal otter trawl fishery is not expected to be impacted by the Array, as grounds are identified to be located outside the Array. Concern has been raised by the Scottish fishing industry in relation to the potential return of a 'small' haddock fishery within and around the Array. Historic evidence corroborates the existence of such a fishery, specifically during 2011 to 2013, as demonstrated through VMS data (Figures 4.27 and 2.28 of volume 3, appendix 12.1) and landing statistics (Figure 4.8 of volume 3, appendix 12.1). The time-period of the decline of the haddock landings in ICES rectangle 42E9 coincides with the implementation of the landing obligation for North Sea haddock in 2016 and 2017. Overall, while it is feasible that the 'small' haddock fishery could resume at some point in the

future and within the 35 years of operation and maintenance phase, there is no evidence within the current baseline assessment that landings of haddock are increasing and existing legislation (i.e., the landing obligation) may make this area less attractive to target for 'small' haddock. The impact is predicted to be of local spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low for the demersal otter trawl and seine fleets targeting haddock and mixed demersal.

All other fleets (i.e. pelagic trawl, dredge and potting fisheries)

114. The evidence to inform the assessment is the same or similar to that described for the construction phase in paragraphs 85 to 87 and summarised as low for all other fisheries. While the duration of impact is long term (35 years), compared to the medium term duration for construction phase (eight years), the magnitude remains consistent across both time periods due to the low level of fishing activity within the Array by these fishing fleets.

Sensitivity of the receptor

115. The mobile fleets targeting demersal, pelagic and dredge fisheries across the Array are typically >15 m in length and operate across large areas of the North Sea. Given adequate notification, it is expected that these vessels will be in a position to avoid construction areas. All mobile fleets are considered to have a large operational range. All pelagic gear fleets (typically >25 m in length) are considered to have an extensive operational range, be highly adaptive and resilient to change. However, the mobile fleets are considered to be more vulnerable to this impact (as per sensitivity defined in Table 12.8) due to the length of the operation and maintenance phase and the assumption that fishing would not resume within the Array by any mobile fleet due to the presence of mooring systems within the water column. Overall the mobile fleets would not be able to recover to the level of fishing opportunities pre-construction of the Array.

116. The mobile fleets targeting demersal, pelagic and dredge fisheries are considered to have moderate-high levels of alternative fishing grounds; are deemed to be of medium-high vulnerability, low recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be medium.

117. The UK potting fleet are typically <15 m in length and operate across more distinct areas of ground, typically 0 nm to 12 nm from shore, but also extending beyond 12 nm, in areas that are already heavily exploited and are therefore more sensitive to disruption. The UK potting fleet are deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of the effect

118. **Demersal trawl and seine fishery targeting haddock**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

119. **Demersal trawl fishery targeting *Nephrops*, dredge and pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

120. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

121. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

DISPLACEMENT OF FISHING ACTIVITY INTO OTHER AREAS

122. Loss of access to fishing grounds during the construction, operation and maintenance, and decommissioning phases of the Array may lead to increases in fishing effort in other areas that may already be exploited, thereby leading to gear conflict and increased fishing pressure on adjacent grounds.

Construction phase

Magnitude of impact

123. Conflict over diminished grounds may occur if displaced vessels explore grounds traditionally fished by other gear types; and/or displaced vessels relocate to actively fish grounds already targeted by the same gear. For example, this could include displaced demersal otter trawlers exploring areas fished by potters and thereby causing gear conflict or gear entanglement between potting lines and trawl gear and/or displaced demersal otter trawlers focusing effort in areas already fished by demersal otter trawlers and therefore increasing competition in that area.

124. The impact is predicted to be of regional spatial extent, medium term duration, intermittent and with medium reversibility. It is predicted that the impact will affect the receptor directly. The impact is of relevance to international fishing fleets as described below.

Dredge

125. While the previous example describes displacement scenarios for dredge fleet, displacement from the Array is not expected to affect the dredge fishery operating between 6 nm to 12 nm and beyond 12 nm to the west of the Array, based on the distance from the Array to these grounds, together with the established dredge fishery in this area (noting that the Array is 80 km from shore). This assessment is based on the very low levels of current fishing within the Array, which is therefore predicted to cause minimal displacement.

Demersal trawl and seine

126. VMS data indicate that there are areas north and east of the Array that are targeted by demersal gear types. Displacement from the Array is not expected to affect the demersal trawl and seine fisheries operating in the commercial fisheries regional study area. This assessment is based on the very low levels of current fishing within the Array, which is therefore predicted to cause minimal displacement.

Pelagic

127. Pelagic otter trawlers from all nationalities may occasionally operate within the Array, however, these vessels operate throughout the entirety of the North Sea, west of Scotland and Celtic Sea across a range of established fishing grounds. Displacement is not expected to affect pelagic fleets due to the fishing not being directly associated with seabed types and the target species being highly mobile.

Potting

128. This gear type is typically more at risk to displacement effects than mobile gears. This is due to the potential for mobile gear to damage potting gear that is left on the seabed. Displacement from the Array is not expected to affect the potting fisheries operating in the commercial fisheries regional study area. This assessment is based on the very low levels of current fishing within the Array, which is therefore predicted to cause minimal displacement.

129. The impact is predicted to be of regional spatial extent, medium term duration, intermittent and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be low for demersal, dredge and potting fisheries and negligible for pelagic fisheries.

Sensitivity of the receptor

130. All mobile commercial fisheries fleets (including demersal trawl, demersal seine, pelagic trawl and dredge fisheries) operating within and around the Array are considered to have high availability of alternative fishing grounds (including current focus of effort), and an operational range that is not limited to the Array or commercial fisheries local study area. All mobile fleets are deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of all mobile fleets is therefore, considered to be low.

131. The UK potting fleet operates across large areas inshore from the Array. This form of static fishing gear is considered to have a high vulnerability to gear conflict interactions since it is left unattended on the seabed. There is potential for any displacement from mobile vessels to lead to exploration of other fishing grounds outside the Array, which includes areas currently targeted by potters. While grounds targeted by potters may not be suitable for other mobile gears due to substrate, the potential for gear conflict is well recognised and becomes a more prevalent concern with increasing marine spatial squeeze (Plymouth Marine Laboratory, 2024). The UK potting fleet are, therefore, deemed to be of high vulnerability, with medium recoverability and medium value. The sensitivity of the UK potting fleet is therefore, considered to be medium.

Significance of the effect

132. **Demersal otter trawl, demersal seine and dredge fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

133. **Pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be **negligible**, which is not significant in EIA terms.

134. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

135. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

136. Exclusion from fishing grounds during the operation and maintenance phase of the Array may lead to increases in fishing effort in other areas that may already be exploited thereby leading to gear conflict.

137. The magnitude of impact of displacement during the operation and maintenance phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 123 to 129). While the duration of impact is long term (35 years), compared to the medium term duration for construction phase (eight years), the magnitude remains consistent across both time periods. There is potential for fleets to adapt to the presence of the Array and for displacement effects to lessen with time; however given the potential for ongoing impacts and the assumption that fishing would not resume within the Array, the magnitude is considered to align with that assessed for construction. The impact is predicted to be of regional spatial extent, long term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore, considered to be low for demersal otter trawl, demersal seine, dredge and potting; and negligible for vessels deploying pelagic gear.

Sensitivity of the receptor

138. The sensitivity of the commercial fisheries receptors is the same as that presented for the construction phase in paragraphs 130 to 131, summarised as low for mobile pelagic and demersal fisheries and medium for potting fisheries.

Significance of the effect

139. **Demersal otter trawl, demersal seine and dredge fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

140. **Pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **negligible** adverse significance, which is not significant in EIA terms.

141. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

142. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

143. Exclusion from fishing grounds during the decommissioning phase of the Array may lead to increases in fishing effort in other areas that may already be exploited thereby leading to gear conflict.

144. The magnitude of impact of displacement during the decommissioning phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 123 to 129). The

impact is predicted to be of regional spatial extent, medium term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the explanations above, the magnitude is therefore, considered to be low for demersal otter trawl, demersal seine, dredge and potting; and negligible for vessels deploying pelagic gear.

Sensitivity of the receptor

145. The sensitivity of the commercial fisheries receptors is the same as that presented for the construction phase in paragraphs 130 to 131, summarised as low for mobile pelagic and demersal fisheries and medium for potting fisheries.

Significance of the effect

146. **Demersal otter trawl, demersal seine and dredge fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

147. **Pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be **negligible**, which is not significant in EIA terms.

148. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

149. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

INTERFERENCE WITH FISHING ACTIVITY

150. This section assesses the LSE[1] arising from Array related vessel traffic and changes to shipping patterns as a result of any potential navigational channels leading to interference with fishing activity (i.e. reduced access) during construction, operation and maintenance and decommissioning.

Construction phase

Magnitude of impact

151. Vessel movements (i.e. construction vessels transiting to and from areas undergoing construction works) related to the construction of the Array and all associated infrastructure will add to the existing level of shipping activity in the area (see volume 2, chapter 13 for a full assessment of additional vessel movements).

152. Up to 7,902 return trips by construction vessels (and site preparation vessels) may be made throughout the construction phase and will include vessels which are Restricted in their Ability to Manoeuvre (RAM). Project vessels will be managed by marine coordination, including the use of traffic management procedures such as the designation of entry and exit points to and from the buoyed construction area. Project vessels will also carry AIS and be compliant with relevant Flag State regulations, including the COLREGs, and comply with the procedures set out in the NSVMP (which will be a condition of consent).

153. Safety zones will be applied for including up to 500 m around structures where vessels are undertaking construction work and 50 m around partially completed or completed surface piercing structures prior to commissioning of the wind farm. Such safety zones will protect project vessels involved in construction which may be RAM. If on-site as deemed necessary via risk assessment, guard vessels will also assist with monitoring safety zones and alerting third-party traffic to their presence.

154. Details of construction activities, including the presence of safety zones and any use of advisory safe passing distances, as defined by risk assessment, will be suitably promulgated to maximise awareness of ongoing construction activities.

155. Additionally, the use of International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 (IALA, 2021) compliant lighting and marking including lights, marks, sounds, signals and other aids to navigation as required by the Northern Lighthouse Board (NLB) and the Maritime and Coastguard Agency (MCA) will further maximise awareness, both in day and night conditions including in restricted visibility. This includes the buoyed construction area which will be agreed with the NLB and within which project vessels undertaking construction activities will most likely be located during construction activities.

156. It is noted that continuous liaison with the fishing industry will be undertaken including location and duration of construction activities; further details are provided in the outline FMMS (volume 4, appendix 23).

157. The magnitude for fleets deploying pelagic gear is considered negligible, based on the operational range of such large vessels that typically fish for distinct time periods (e.g. a number of days/weeks) throughout the year. All other fishing fleets are considered to be able to avoid vessel movements related to construction of the Array based on prior provision of construction details (timings and locations) allowing fishing vessels to plan their activities; use of traffic management procedures including entry and exit points for Project related vessels; use of buoyed construction area and adherence to the NSVMP.

158. The impact is predicted to be of regional spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

159. Potting gear can be vulnerable to increased construction vessel movements within supply routes to and from entry and exit points due to risk of entanglement of construction vessel propellers with marker buoys of fishing gear. It is noted that established shipping routes do currently cross the Array, and that the construction vessels are likely to follow these routes where possible. The UK potting fishery is deemed to be of medium vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be medium.

160. All other fishery fleets are expected to be in a position to avoid the Array construction areas. Demersal trawl fisheries (including otter trawl and demersal seine) and dredge fishery are deemed to be of low vulnerability, high recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be low.

161. The pelagic fisheries are deemed to be of very low vulnerability, very high recoverability and medium-high value. The sensitivity of these receptors is therefore, considered to be low.

Significance of the effect

162. **Demersal otter trawl, demersal seine, dredge and pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

163. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

164. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

165. Up to 508 return trips from vessels may be made throughout the operation and maintenance phase and will include vessels which are RAM. As per the construction phase, project vessels will be managed by marine coordination, carry AIS and be compliant with relevant Flag State regulations. Also, safety zones will be applied for including up to 500 m around structures where vessels are undertaking major maintenance work.

166. The magnitude of impact of interference of fishing activity due to the presence and transiting of maintenance vessels during the operation and maintenance phase is decreased compared to in the construction phase (see paragraphs 151 to 158) given that fewer project vessels will generally be on-site at any time, noting the much longer duration of the operation and maintenance phase. The impact is predicted to be of regional spatial extent, long term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the low level of project related vessel activity across a long time period, the magnitude is therefore, considered to be negligible for all fisheries.

Sensitivity of the receptor

167. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 159 to 161, summarised as low for mobile pelagic and demersal fisheries and medium for potting fisheries.

Significance of the effect

168. **Demersal otter trawl, demersal seine, dredge and pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be low. The effect will, therefore, be **negligible**, which is not significant in EIA terms.

169. **Potting fishery**: overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be **negligible**, which is not significant in EIA terms.

Secondary mitigation and residual effect

170. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

171. The magnitude of impact of interference of fishing activity due to the presence and transiting of vessels during the decommissioning phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 151 to 158). The impact is predicted to be of regional spatial extent, medium term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

172. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 159 to 161, summarised as low for mobile pelagic and demersal fisheries and medium for potting fisheries.

Significance of the effect

173. **Demersal otter trawl, demersal seine, dredge and pelagic trawl fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

174. **Potting fishery**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

175. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

INCREASED SNAGGING RISK, WHICH COULD RESULT IN LOSS OR DAMAGE TO FISHING GEAR

Construction phase

Magnitude of impact

176. During construction, the Array and associated infrastructure, including wind turbines, floating foundations, mooring system, OSPs and foundations, inter-array cables and interconnector cable (and associated scour protection) represent potential snagging points for fishing gear both on the seabed and in the water column and could lead to damage to, or loss of, fishing gear. The safety aspects including potential loss of life as a result of snagging risk are assessed within volume 2, chapter 13.

177. Statutory safety zones will be applied for including up to 500 m around structures where vessels are undertaking construction work and 50 m around partially completed or completed surface piercing structures prior to commissioning of the wind farm. Such safety zones will protect project vessels involved in construction which may be RAM. If on-site as deemed necessary via risk assessment, guard vessels will also assist with monitoring safety zones and alerting third-party traffic to their presence.

178. Snagging poses a risk to fishing equipment and in extreme cases may potentially lead to capsize of vessel and crew fatalities, as well as damage to subsea infrastructure. Three phases of interaction are possible:

initial impact of gear and subsea infrastructure; pullover of gear across subsea infrastructure; and snagging or hooking of gear on the subsea infrastructure. The snagging or hooking of fishing gear with infrastructure/cables on the seabed is the most hazardous to the vessel and crew due to the possibility of capsizing.

179. In the instance that snagging does occur, the Applicant will adhere to guidance produced by FLOWW (2014), in particular section 10: Fouling or loss of gear/equipment and section 11: Dealing with claims for loss or damage of gear.

180. If mobile gear strikes or becomes fastened to a cable, the Applicant recommends the following approach (SSE Renewables, 2024), based on Seafish and KIS-ORCA guidance (KIS-ORCA, 2024).

- If the fastened gear is not easily retrieved, fishers should not apply excessive winch, line or net hauler loads; or engine powers in attempts to retrieve fastened gear.
- Fishers should advise the coastguard and company Fisheries Liaison Officer (CFLO) immediately, giving an accurate position of the vessel and/or lost gear.
- If the coastguard confirms that the vessel is in the immediate vicinity of a cable, serious consideration will be given to the slipping of the gear and buoying and recording of its position.
- If the gear is slipped, after buoying off the gear, the position should be confirmed with the coastguard and CFLO.
- The skipper should contact the local Fishery Office and register the incident in the normal manner
- On no account should skippers grapple in an attempt to recover fishing gear lost or cut away in the vicinity of offshore cables.

181. It is considered likely that fishermen will operate appropriately (i.e. adhering to Safety Zones and exclusion zones, and avoiding under construction infrastructure and cable protection at the defined locations) given adequate notification of the locations of any snagging hazards; and are highly likely to avoid the under construction infrastructure within the Array. In addition, it is assumed that fishers will follow MCA guidance MGN661 (MCA, 2021), which advises that fishing vessels should avoid fishing activity near either side of submarine cables in order to minimize the risk of damage as much as possible.

182. In relation to mooring system failure and loss of station, the MCA require under their Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and HSE, 2017) that developers arrange Third Party Verification (TPV) of the mooring systems by an independent and competent person/body. The Regulatory Expectations state that TPV is a “continuous activity”, and that if any modifications to a system occur or if new information becomes available with regard to its reliability, additional TPV would be required. This TPV will facilitate management of any risk of failure of the mooring lines. On this basis, a loss of station is considered highly unlikely.

183. The impact is predicted to be of local spatial extent, medium term duration, continuous (over construction phase) and with low reversibility. It is predicted that the impact will affect the receptor directly. Based on the designed in measures that will be implemented as part of the Array (including safety zones and commitment to adhere to guidance produced by FLOWW (2014), in particular section 10: Fouling or loss of gear/equipment and section 11: Dealing with claims for loss or damage of gear) and the commitment to follow standard protocols should snagging occur, the magnitude is considered to be low for all fleets.

Sensitivity of the receptor

184. Mobile demersal gear, including demersal otter trawl, demersal seine and dredge fishing gear is actively towed and directly penetrates the seabed with near continuous contact. The gear on the seabed is connected to the fishing vessels via both the fishing gear itself and the ropes connecting it to the mechanical trawling systems on board the vessels. Mobile demersal gear is therefore sensitive to both seabed infrastructure (including scour protection) and infrastructure in the water column and at sea-level. MGN 661 is noted as advising that fishing activity is avoided either side of submarine cables.

185. Pelagic otter trawl gear does not typically make contact with the seabed, with nets pulled through the mid-water column to catch shoaling pelagic fish species. Pelagic trawl gear is therefore sensitive to infrastructure in the water column and at sea-level.

186. Potting gear is placed on the seabed and is not actively towed (through the water column or along the seabed), it therefore has a lower risk of entanglement. Never-the-less, tidal movements have the potential to move strings of pots that can become entangled around anchor mooring systems and other seabed infrastructure.

187. The sensitivity for all fleets is assessed to be medium.

Significance of the effect

188. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

189. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

190. During operation and maintenance designed in measures will be implemented to reduce the risk of snagging of fishing gear on project infrastructure. The NSVMP will outline the navigational safety measures to be implemented during normal operations and periods of major maintenance, and will include details of marine coordination, summaries of the LMP. In addition, the Applicant will ensure that the final as-built infrastructure is marked appropriately on UKHO admiralty charts and other electronic charts so fishers are aware of the presence of any subsurface infrastructure. A full LMP will be prepared and lighting and marking will be maintained as agreed prior to construction throughout the operational phase of the Array.

191. For any major maintenance works safety zones will be applied for including up to 500 m around structures where vessels are RAM. Such safety zones will protect project vessels and third-party vessels involved in major maintenance. If on-site (determined via risk assessment of major maintenance activities), guard vessels will assist with monitoring safety zones and alerting third-party traffic to their presence. Similarly to the construction phase, details of major maintenance activities including the presence of safety zones and any advisory safe passing distances, as defined by risk assessment, will be suitably promulgated (e.g. via NtMs, Kingfisher bulletin) to maximise awareness of ongoing major maintenance activities. .

192. The FMMS will include a procedure for claims in the event of loss of, or damage to fishing gear.

193. The magnitude of impact of snagging gear due to the presence the Array and associated infrastructure during the operation and maintenance phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 176 to 183). The impact is predicted to be of regional spatial extent, long term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above and the designed in measures in place, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

194. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 184 to 187, summarised as medium for all fisheries.

Significance of the effect

195. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

196. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

197. The magnitude of impact of snagging gear due to the presence the Array and associated infrastructure during the decommissioning phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 176 to 183). The impact is predicted to be of regional spatial extent, medium term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the explanations above, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

198. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 184 to 187, summarised as medium for all fisheries.

Significance of the effect

199. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

200. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

INCREASED STEAMING/VESSEL TRANSIT TIMES

201. A detailed Navigational Risk Assessment (NRA) (volume 3, appendix 13.1) has been undertaken and is discussed in volume 2, chapter 13, which includes full consideration of commercial fishing vessels while transiting (e.g. from a collision and allision perspective). This assessment focuses on the LSE[1] arising from longer steaming distances to alternative fishing grounds during the construction, operation and maintenance and decommissioning phases.

Construction phase

Magnitude of impact

202. Details of the Array's construction activities will be promulgated in advance of, and during construction via the usual means (e.g. NtMs, Kingfisher bulletin) so that mariners are made aware of the ongoing works. Localised construction works will necessitate minor deviations for fishing vessels. Localised impacts are anticipated but will be limited to the immediate area of construction activity and associated construction vessels. The shipping and navigation assessment found transiting fishing vessels moving north-east to south-west (see volume 3, appendix 13.1) through analysis of 12-months of AIS data in 2022, however this is considered at low frequency, with no clear transit routes to any notable fishing grounds evidenced within EMSA AIS data from 2019 to 2022 (Figures 4.44 and 4.45 of volume 3, appendix 12.1). It is therefore not expected that additional steaming would be required to access fishing grounds normally targeted beyond the Array.

203. The impact is predicted to be of regional spatial extent, medium term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

204. The demersal otter trawl, demersal seine, dredge and pelagic otter trawl fisheries targeting the local and regional study areas are understood to operate across wider areas of the North Sea and in the case of larger vessels, beyond this range. Given adequate notification it is expected that these vessels will be in a position to avoid construction areas and the Array with limited impact upon steaming times.

205. The UK potting fleet active in the local and regional study areas operate across a range of grounds to haul and re-set different fleets of traps/pots/nets on a daily basis. Their normal operating range is expected to be inshore from the Array. Given adequate notification it is expected that these vessels will be in a position to avoid construction areas with limited impact upon steaming times.

206. In relation to ground within the Array, all commercial fisheries fleets are considered to have high availability of alternative fishing grounds and an operational range that is not limited to the Array. The sensitivity of the receptor is therefore, considered to be low for all fisheries.

Significance of the effect

207. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

208. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

209. The magnitude of impact of increased steaming times due to the presence of the Array and associated infrastructure during the operation and maintenance phase is expected to be the same or similar to that

during construction for all commercial fishing fleets (see paragraphs 202 to 203). While the operational phase in longer duration (35 years) compared to construction (eight years), it is expected that fishing vessels will adjust to the presence of the Array over time. The impact is predicted to be of regional spatial extent, long term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

210. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 204 to 206, summarised as low for all fisheries.

Significance of the effect

211. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

212. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

213. The magnitude of impact of increased steaming times due to the presence of the Array and associated infrastructure during the decommissioning phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 202 to 203). The impact is predicted to be of regional spatial extent, medium term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the explanations above, the magnitude is therefore, considered to be low for all fisheries.

Sensitivity of the receptor

214. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 204 to 206, summarised as low for all fisheries.

Significance of the effect

215. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

216. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

IMPACTS TO COMMERCIAL EXPLOITED SPECIES POPULATIONS

217. Noise and seabed disturbances during the construction, operation and maintenance and decommissioning phases may decrease or displace commercially important fish and shellfish populations from the area. This section assesses the subsequent effect for the owners of fishing vessels, where commercially important stocks may be disturbed or displaced to a point where normal fishing practices would be affected.

Construction phase

Magnitude of impact

218. Detailed assessments of the following potential construction impacts have been undertaken in volume 2, chapter 9:

- temporary habitat loss and disturbance;
- long term habitat loss and disturbance; and
- underwater noise impacting fish and shellfish receptors.

219. With respect to the magnitude of this impact on commercial fisheries, the overall significance of the effect on fish and shellfish species is considered (i.e. both the magnitude and sensitivity of fish and shellfish species are considered to assess the magnitude on commercial fishing fleets). This is because the overall effect on the fish and/or shellfish species relates directly to the availability and amount of exploitable resource. For instance, where an effect of negligible significance is assessed for a species, a negligible magnitude is assessed for commercial fishing; where an effect of minor adverse significance is assessed for a species, a low magnitude is assessed for commercial fishing, and so on.

220. Details of the fish and shellfish ecology assessment, together with the supporting evidence and justification are summarised in volume 2, chapter 9. Temporary and long term habitat loss and disturbance during construction phase is not expected to affect fish and shellfish resources; and underwater noise (assessed for piling installation) is expected to be highly localised with high recoverability. The fish and shellfish ecology assessment found all construction impacts to be of negligible to minor adverse significance for all fish and shellfish receptors.

221. The magnitude of impact is predicted to be of regional spatial extent, of relevance to international fishing fleets, and of medium term duration. It is predicted that the impact will affect the receptor directly through loss of resources. The magnitude is therefore considered to be low for all species and all potential impacts.

Sensitivity of the receptor

222. Exposure to the impact is likely and commercial fleets targeting key species may be affected, including *Nephrops*, haddock, monkfish and herring.

223. Due to the range of alternative areas targeted and the distribution of key commercial species throughout the northern, central and southern North Sea, all fleets are deemed to be of low vulnerability, high recoverability and medium-low value. The sensitivity of the receptor for all fisheries is therefore, considered to be low.

Significance of the effect

224. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

225. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

226. Detailed assessments of the following potential operation and maintenance impacts have been undertaken in volume 2, chapter 9:

- temporary habitat loss and disturbance;
- long term habitat loss and disturbance;
- colonisation of hard structures;
- increased SSCs and associated deposition; and
- effects to fish and shellfish receptors due to electromagnetic fields (EMF) from subsea electrical cabling.

227. Details of the fish and shellfish ecology assessment, together with the supporting evidence and justification are summarised in volume 2, chapter 9. The fish and shellfish ecology assessment found all operation and maintenance impacts to be of negligible to minor adverse significance for all fish and shellfish receptors. The potential effect on resources is not expected to be beyond what could be discernible from baseline conditions for fish and shellfish resources.

228. The magnitude of impact is predicted to be of regional spatial extent, of relevance to international fishing fleets, of long term duration and to affect the receptor directly. The magnitude is therefore considered to be low for all species and all potential impacts.

Sensitivity of the receptor

229. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 222 to 223, summarised as low for all fisheries.

Significance of the effect

230. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

231. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

232. Detailed assessments of the following potential decommissioning impacts have been undertaken in volume 2, chapter 9:

- temporary habitat loss and disturbance; and
- long term habitat loss and disturbance.

233. The magnitude of impact during the decommissioning phase is expected to be the same or similar to that during construction for all commercial fishing fleets (see paragraphs 218 to 221). The magnitude of impact is predicted to be of regional spatial extent, of relevance to international fishing fleets, of long term duration and to affect the receptor directly. The magnitude is therefore considered to be low for all species and all potential impacts.

Sensitivity of the receptor

234. The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 222 to 223, summarised as low for all fisheries.

Significance of the effect

235. **All fisheries**: overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

236. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

12.12. CUMULATIVE EFFECTS ASSESSMENT

12.12.1. METHODOLOGY

237. The CEA assesses the LSE[1] associated with the Array together with other relevant plans, projects and activities. Cumulative effects are defined as the combined effect of the Array in combination with the effects from a number of different projects, on the same receptor or resource. Further details on CEA methodology are provided in volume 1, chapter 6.

238. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see volume 3, appendix 6.4 of the Array EIA Report). Volume 3, appendix 6.4 further provides information regarding how information pertaining to other plans and projects is gained and applied to the assessment. Each project or plan has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, impact-receptor pathways and the spatial/temporal scales involved.

239. In undertaking the CEA for the Array, it should be noted that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the Array. Therefore, a tiered approach has be adopted which provides a framework for placing relative weight upon the potential for each project/plan to be included in the CEA to ultimately be realised, based upon the project/plan's current stage of maturity and certainty in the projects' parameters. The tiered approach which will be utilised within the Array CEA employs the following tiers:

- tier 1 assessment – Array with Proposed offshore export cable corridor(s) and Proposed onshore transmission infrastructure, and all plans/projects which became operational since baseline characterisation, which are part of the baseline but have an ongoing impact, those under construction, and those with consent and submitted but not yet determined;
- tier 2 assessment – All plans/projects assessed under Tier 1, plus those projects with a Scoping Report; and

- tier 3 assessment – All plans/projects assessed under Tier 2, which are reasonably foreseeable, plus those projects likely to come forward where an Agreement for Lease (AfL) has been granted.

240. The commercial fisheries cumulative study area has been defined as the North Sea, which is considered to be representative of the fishing grounds exploited by the fleets active across the regional study area, for all fleets except scallop dredging. For scallop dredging the cumulative study area is defined at a UK level; this is because the UK fleet of scallop dredgers are nomadic in nature and target grounds across the North Sea, West of Scotland, Irish Sea and English Channel. This was discussed at the pre-Scoping Workshop with commercial fisheries stakeholders (see Table 12.3). The commercial fisheries cumulative study area is presented in Figure 12.7.

241. The specific projects scoped into the CEA for commercial fisheries, are outlined in Table 12.11 and presented in Figure 12.8.

242. The range of potential cumulative impacts that are identified and included in Table 12.12, is a subset of those considered for the Array alone CEA assessment. This is because some of the potential impacts identified and assessed for the Array alone, are localised and temporary in nature. It is considered therefore, that these potential impacts have limited or no potential to interact with similar changes associated with other plans or projects. These have therefore not been taken forward for detailed assessment.

243. Similarly, some of the potential impacts considered within the Array alone assessment are specific to a particular phase of development (e.g. construction, operation and maintenance or decommissioning). Where the potential for cumulative effects with other plans or projects only have potential to occur where there is spatial or temporal overlap with the Array during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no plans or projects have been identified that have the potential for cumulative effects during this period.

244. It is considered that other renewable projects in the North Sea have the potential to reduce access to fishing grounds, especially where floating foundations are proposed for offshore wind farm developments. This could lead to the potential cumulative effect of temporary (during construction and decommissioning) and long term (during operation and maintenance) loss or restricted access to fishing grounds. This incremental loss of fishing grounds is often termed ‘spatial squeeze’ and is a growing concern within the fishing industry. The loss of access to fishing grounds may lead to displacement at a cumulative level, where vessels are exploratory fishing and focusing effort in areas outside of cumulative developments. This could lead to the cumulative effect of incremental displacement across the North Sea. This displacement effect and where a displaced fisher chooses to direct the displaced effort can be difficult to assign to a specific project, given that fishing operators are responding to multiple developments.

245. In addition, incremental disruption to fish and shellfish species could lead to cumulative displacement of the commercial resource. For example, at the ecosystem level offshore wind farms and other developments in the marine environment could act as aggregation devices, attracting a different assemblage of species (which could in itself provide new commercial opportunity), or there could be barrier effects). The fish and shellfish ecology assessment has considered potential cumulative effects to specific species and species groups, as presented within volume 2, chapter 9, with potential knock-on effects considered within this chapter for commercially exploited resources.

246. The remaining impacts to commercial fisheries, including interference with fishing activity due to project-related vessel movements, snagging risk and increased transit times are considered to be highly localised to specific projects. Given the scale of the Array alone effects, any cumulative, additive effects across these impacts within the commercial fisheries cumulative study area would be negligible across projects.

247. To summarise, the following impacts are considered at a cumulative level:

- temporary loss or restricted access to fishing grounds;
- long term loss or restricted access to fishing grounds;
- displacement of fishing activity into other areas; and
- impacts to commercial exploited species populations.

248. The approach to CEA screening of projects for commercial fisheries has taken a wide and inclusive approach, including many developments that are in operational phase. This is because these developments are recognised to continue to pose a potential impact on commercial fisheries through incremental loss of fishing grounds.

Table 12.11: List of Other Projects and Plans Considered within the CEA for Commercial Fisheries

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Tier 1						
Proposed offshore export cable corridor(s)	Planned	0.00	The Proposed offshore export cable corridor(s) for the Array.	2030 to 2037	2038 to 2072	All phases of Project overlaps with all phases of Array
Offshore Wind Projects and Associated Cables						
Aberdeen Offshore Wind Farm	Active/In Operation	79.32	Aberdeen Offshore Wind Farm consists of up to 11 turbines at a capacity of 96.8 MW.	N/A	Currently operational, decommissioning 2046 to 2047	Project operation and maintenance phase overlaps with Array construction phase. Project decommissioning phase overlaps with Array operation and maintenance phase.
Beatrice Offshore Wind Farm – 18016	Active/In Operation	191.63	Beatrice Offshore Wind Farm consists of 84 turbines at a capacity of 588 MW.	N/A	Currently operational, decommissioning 2045 to 2046	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Berwick Bank Offshore Wind Farm	Planning	56.84	Berwick Bank Offshore Wind Farm is proposed for up to 307 turbines with a capacity of up to 4.1 GW	2025 to 2032	2033 onwards	Project construction and operation and maintenance phases overlaps with Array construction and operation and maintenance phases.
Blyth Demo Phase 1	Active/In Operation	162.77	Blyth Demonstration 1 consists of up to 15 turbines at a capacity of 41.5 MW.	N/A	Currently operational, decommissioning 2045 to 2046	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Blyth Demo Phase 2&3	Under Construction	154.48	Blyth Demonstration 2 is consented for up to 5 floating turbines at a capacity of 58.4 MW.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank A (Creyke Beck A)	Under Construction	218.64	Dogger Bank A Offshore Wind Farm is consented for up to 95 turbines with no maximum generating capacity.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank B (Creyke Beck B)	Under Construction	191.20	Dogger Bank B Offshore Wind Farm is consented for up to 95 turbines with no maximum generating capacity.	2024 to 2025	2026 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank C	Under Construction	227.37	Dogger Bank C is consented for up to 87 turbines with no maximum generating capacity.	2024 to 2027	2028 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Dudgeon	Active/In Operation	370.22	Dudgeon Offshore Wind Farm consists of up to 67 turbines at a capacity of 402 MW.	N/A	Currently operational, decommissioning 2043 to 2044	Project operation and maintenance phase overlaps with Array construction phase and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Dudgeon Extension Project	Consented	363.35	Dudgeon Extension Project is proposed for up to 30 turbines at a capacity of 402 MW.	2024 to 2027	2028 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
East Anglia One	Active/In Operation	499.30	East Anglia One Offshore Wind Farm consists of up to 102 turbines at a capacity of up to 714 MW.	N/A	Currently operational, decommissioning 2044 to 2045	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
East Anglia One North	Under Construction	483.57	East Anglia One North Offshore Wind Farm is consented for up to 67 turbines at a capacity of 800 MW.	2024 to 2026	2027 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
East Anglia Three	Under Construction	460.81	East Anglia Three Offshore Wind Farm is consented for up to 172 turbines with no maximum generating capacity.	2024 to 2026	2027 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
East Anglia Two	Under Construction	491.85	East Anglia Two Offshore Wind Farm is consented for up to 75 turbines at a capacity of 900 MW.	2024 to 2026	2027 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Five Estuaries	Planning	526.18	Five Estuaries Offshore Wind Farm is proposed for up to 79 turbines at a capacity of 353 MW.	2028 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Forthwind Demonstration Project	Active/In Operation	154.64	Forthwind Offshore Wind Demonstration Project is consented for up to 7 turbines with no maximum generating capacity.	N/A	Currently operational, decommissioning 2049 to 2050	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Galloper	Active/In Operation	523.13	Galloper Offshore Wind Farm consists of up to 56 turbines at a capacity of 353 MW.	N/A	Currently operational, decommissioning 2047 to 2048	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Greater Gabbard	Active/In Operation	524.40	Greater Gabbard Offshore Wind Farm consists of up to 140 turbines at a capacity of 504 MW.	N/A	Currently operational, decommissioning 2038 to 2039	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Green Volt Offshore Wind Farm	Planning	100.84	Green Volt Offshore Wind Farm is proposed for up to 35 turbines at a capacity of 560 MW.	2024 to 2029	2030 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Gunfleet Sands 3 Demo	Active/In Operation	542.19	Gunfleet Sands 3 Demonstration Project consists of 2 turbines at a capacity of 12 MW.	N/A	Currently operational, decommissioning 2039 to 2040	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Gunfleet Sands I	Active/In Operation	538.57	Gunfleet Sands I Offshore Wind Farm consists of up to 30 turbines at a capcity of 108 MW.	N/A	Currently operational, decommissioning 2036 to 2037	Project operation and maintenance and decommissioning phases overlap with Array construction phase.
Gunfleet Sands II	Active/In Operation	539.68	Gunfleet Sands II Offshore Wind Farm consists of up to 18 turbines at a capacity of 65 MW.	N/A	Currently operational, decommissioning 2036 to 2037	Project operation and maintenance and decommissioning phases overlap with Array construction phase.
Hornsea One	Active/In Operation	308.42	Hornsea One Offshore Wind Farm consists of up to 174 turbines at a capacity of 1,200 MW.	N/A	Currently operational, decommissioning 2045 to 2046	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Hornsea Project Two	Active/In Operation	298.44	Hornsea Two Offshore Wind Farm consists of up to 165 turbines at a capacity of 1,300 MW.	N/A	Currently operational, decommissioning 2048 to 2049	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Hornsea Project Four (HOW04)	Consented	266.45	Hornsea Four Offshore Wind Farm is proposed for up to 180 turbines at a capacity of 2,600 MW.	2025 to 2028	2029 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Hornsea Project Three (HOW03)	Consented	319.38	Hornsea Three Offshore Wind Farm is consented for up to 231 turbines with no maximum generating capacity.	2025 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Humber Gateway	Active/In Operation	317.10	Humber Gateway Offshore Wind Farm consists of up to 73 turbines at a capacity of 219 MW.	N/A	Currently operational, decommissioning 2041 to 2042	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Hywind (Buchan Deep Demo)	Active/In Operation	72.08	Hywind Offshore Wind Farm consists of up to 5 turbines at a capacity of 30 MW.	N/A	Currently operational, decommissioning 2043 to 2044	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Inch Cape Offshore Wind Farm	Consented	86.92	Inch Cape Offshore Wind Farm is consented for up to 72 turbines with no maximum generating capacity.	2024 to 2026	2027 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Inner Dowsing	Active/In Operation	368.97	Inner Dowsing consists of up to 27 turbines at a capacity of 97.2 MW.	N/A	Currently operational, decommissioning 2034 to 2035	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase.
Kentish Flats	Active/In Operation	567.38	Kentish Flats consists of up to 30 turbines at a capacity of 90 MW.	N/A	Currently operational, decommissioning 2047 to 2048	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Kentish Flats Extension	Active/In Operation	567.38	Kentish Flats Extension consists of up to 15 turbines at a capacity of 49.5 MW.	N/A	Currently operational, decommissioning 2042 to 2043	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Kincardine Offshore Wind Farm	Active/In Operation	61.65	Kincardine Offshore Wind Farm consists of 6 turbines at a capacity of 50 MW.	N/A	Currently operational, decommissioning 2047 to 2048	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Lincs	Active/In Operation	365.80	Lincs Offshore Wind Farm consists of 75 turbines at a capacity of 270 MW.	N/A	Currently operational, decommissioning 2038 to 2039	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
London Array	Active/In Operation	547.55	London Array Offshore Wind Farm consists of up to 175 turbines at a capacity of 630 MW.	N/A	Currently operational, decommissioning 2038 to 2039	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Lynn	Active/In Operation	376.24	Lynn Offshore Wind Farms consist of 27 turbines at a capacity of 97 MW.	N/A	Currently operational, decommissioning 2034 to 2035	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Methil Demo	Active/In Operation	154.95	Methil Demo consists of up to 1 turbine at a capacity of 4 MW.	N/A	Currently operational, decommissioning 2030 to 2031	Project decommissioning phase overlap with Array construction phase
Mona Offshore Wind Farm	Planning	368.06	Mona Offshore Wind Farm is proposed for up to 107 turbines at a capacity of 945 MW.	2027 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Moray Offshore Wind Farm (East)	Active/In Operation	174.37	Moray East Offshore Wind Farm consists of up to 100 turbines at a capacity of 950 MW.	N/A	Currently operational, decommissioning 2047 to 2048	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Moray Offshore Wind Farm (West)	Under Construction	182.19	Moray West Offshore Wind Farm is consented for up to 60 turbines with no maximum generating capacity.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Neart Na Gaoithe Offshore Wind – 66600019	Under Construction	105.05	Neart na Gaoithe Offshore Wind Farm is consented for up to 54 wind turbines with no maximum generating capacity.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Norfolk Boreas Offshore Wind Farm	Consented	419.31	Norfolk Boreas Offshore Wind Farm is consented for up to 158 wind turbines with no maximum generating capacity.	2025 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Norfolk Vanguard Offshore Wind Farm	Consented	439.73	Norfolk Vanguard Offshore Wind Farm is consented for up to 200 turbines with no maximum generating capacity.	2025 to 2028	2029 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
North Hoyle	Active/In Operation	392.58	North Hoyle Offshore Wind Farm consists of up to 30 turbines at a capacity of 60 MW.	N/A	Currently operational, decommissioning 2029 to 2030	Project decommissioning phase overlap with Array construction phase
Ormonde	Active/In Operation	329.17	Ormonde Offshore Wind Farm consists of up to 30 turbines at a capacity of 150 MW.	N/A	Currently operational, decommissioning 2037 to 2038	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Pentland Floating Offshore Wind	Consented	266.14	Pentland floating Offshore Wind Farm is consented for up to 10 turbines with no maximum generating capacity.	2024 to 2026	2027 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Race Bank	Active/In Operation	359.41	Race Bank Offshore Wind Farm consists of up to 91 turbines at a capacity of 573 MW.	N/A	Currently operational, decommissioning 2044 to 2045	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Rampion	Active/In Operation	644.24	Rampion Offshore Wind Farm consists of up to 116 turbines at a capacity of 400 MW.	N/A	Currently operational, decommissioning 2044 to 2045	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Rampion 2 (Rampion Extension)	Planning	646.42	Rampion 2 (Extension) is proposed for up to 116 turbines at a capacity of 1,200 MW.	2026 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Rhyl Flats	Active/In Operation	403.34	Rhyl Flats Offshore Wind Farm consists of up to 25 turbines at a capacity of 90 MW.	N/A	Currently operational, decommissioning 2035 to 2036	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Scroby Sands	Active/In Operation	448.04	Scroby Sands Offshore Wind Farm consists of up to 30 turbines at a capacity of 60 MW.	N/A	Currently operational, decommissioning 2030 to 2031	Project decommissioning phase overlap with Array construction phase
Seagreen 1 Offshore Wind Farm	Active/In Operation	50.72	Seagreen 1 Offshore Wind Farm consists of up to 114 wind turbines at a capacity of 1,075 MW.	N/A	Currently operational, decommissioning 2049 to 2050	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Seagreen 1A Project	Consented	66.28	Seagreen 1A Offshore Wind Farm is consented for up to 36 turbines with no maximum generating capacity.	2024 to 2025	2026 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Sheringham Shoal	Active/In Operation	381.27	Sheringham Shoal Offshore Wind Farm consists of up to 88 turbines at a capacity of 317 MW.	N/A	Currently operational, decommissioning 2038 to 2039	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Sheringham Shoal Extension	Consented	373.77	Sheringham Shoal Extension is proposed for up to 27 turbines at a capacity of 317 MW.	2024 to 2027	2028 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Sofia	Under Construction	208.93	Sofia Offshore Wind farm consists of up to 100 turbines at a capacity of 1,400 MW.	2024 to 2025	2026 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Teesside	Active/In Operation	209.65	Teeside Offshore Wind Farm consists of up to 62 turbines at a capacity of 27 MW.	N/A	Currently operational, decommissioning 2039 to 2040	Project operation and maintenance phase overlaps with Array construction phase. Project decommissioning phase overlaps with Array operation and maintenance phase.
Thanet	Active/In Operation	575.30	Thanet Offshore Wind farm consists of up to 100 turbines at a capacity of 300 MW.	N/A	Currently operational, decommissioning 2051 to 2052	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Triton Knoll	Active/In Operation	337.50	Triton Knoll Offshore Wind Farm consists of up to 90 turbines at a capacity of 860 MW.	N/A	Currently operational, decommissioning 2048 to 2049	Project operation and maintenance phase overlaps with Array construction phase
Walney 1	Active/In Operation	335.47	Walney 1 Offshore Wind Farm consists of up to 51 turbines at a capacity of 183.6 MW	N/A	Currently operational, decommissioning 2037 to 2038	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase
Walney 2	Active/In Operation	334.69	Walney 2 Offshore Wind Farm consists of up to 51 turbines at a capacity of 183.6 MW	N/A	Currently operational, decommissioning 2038 to 2039	Project operation and maintenance phase and decommissioning phase overlap with Array construction phase. Project decommissioning phase overlaps with Array operation and maintenance phase.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Walney Extension	Active/In Operation	337.53	Walney Extension offshore wind farm consists of up to 87 turbines at a capacity 659 MW.	N/A	Currently operational, decommissioning 2044 to 2045	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Wave Hub	Active/In Operation	762.88	Wave Hub Floating Offshore Wind Projects consented for up to 2 turbines at a capacity of 40 MW.	N/A	Currently operational, decommissioning 2044 to 2045	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
West of Duddon Sands	Under Construction	336.40	West of Duddon Sands Offshore Wind farm consists of up to 108 turbines at a capacity of up to 389 MW.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
West of Orkney Wind Farm	Planning	288.44	West of Orkney Wind Farm is proposed for up to 125 turbines at a capacity of 2,250 MW.	2028 to 2031	2032 onwards	Project construction and operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Westermost Rough	Active/In Operation	297.22	Westermost Rough Offshore Wind Farm consists of up to 35 turbines at a capacity of 210 MW.	N/A	Currently operational, decommissioning 2041 to 2042	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases. Project decommissioning phase overlaps with Array operation and maintenance phase.
Borkum Riffgrund 3 (Germany)	Under Construction	501.18	Borkum Riffgrund 3 is consented for up to 83 turbines with no maximum generating capacity.	2024	2025 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
OWF Princess Amalia (Netherlands)	Active/In Operation	517.93	OWF Princess Amalia consists of up to 60 turbines at a capacity of 120 MW.	N/A	Currently operational, decommissioning 2035 to 2036	Project operation and maintenance and decommissioning phases overlaps with Array construction phase
Oil and Gas Activities						
ARBROATH – 700001906	Active	117.79	Oil and gas project	N/A	Up to 2025, with decommissioning from 2026	Project decommissioning phase overlap with Array construction phase
AUK A – 700002059	Active	125.75	Oil and gas project	N/A	Up to 2032, with decommissioning from 2033	Project decommissioning phase overlap with Array construction phase
CLAYMORE Production Platform – 700002127	Active	174.69	Oil and gas project	N/A	Up to 2025, with decommissioning from 2026	Project decommissioning phase overlap with Array construction phase
CLYDE – 700002123	Active	138.64	Oil and gas project	N/A	Up to 2027, with decommissioning from 2028	Project decommissioning phase overlap with Array construction phase

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
FULMAR A – 700002073	Active	129.95	Oil and gas project	N/A	Up to 2026, with decommissioning from 2027	Project decommissioning phase overlap with Array construction phase
FULMAR AD – 700002169	Active	129.98	Oil and gas project	N/A	Up to 2026, with decommissioning from 2027	Project decommissioning phase overlap with Array construction phase
GANNET A – 700002076	Active	86.45	Oil and gas project	N/A	Up to 2027, with decommissioning from 2028	Project decommissioning phase overlap with Array construction phase
JADE – 700002494	Active	138.36	Oil and gas project	N/A	Up to 2039, with decommissioning after 2040	Project decommissioning phase overlap with Array construction phase
MONTROSE A – 700001950	Active	123.76	Oil and gas project	N/A	Up to 2032, with decommissioning from 2033	Project decommissioning phase overlap with Array construction phase
MONTROSE Bridge Linked PLATFORM – 700003749	Active	123.85	Oil and gas project	N/A	Up to 2032, with decommissioning from 2033	Project decommissioning phase overlap with Array construction phase
NELSON A – 0	Decommissioning	132.68	Oil and gas project	N/A	Decommissioning from 2024	Project decommissioning phase overlap with Array construction phase
SCOTT JD – 700001883	Active	164.70	Oil and gas project	N/A	Up to 2028, with decommissioning from 2029	Project decommissioning phase overlap with Array construction phase
SCOTT JU – 700001884	Active	164.63	Oil and gas project	N/A	Up to 2028, with decommissioning from 2029	Project decommissioning phase overlap with Array construction phase
SHEARWATER A – 0	Active	126.73	Oil and gas project	N/A	Up to 2037, with decommissioning from 2038	Project decommissioning phase overlap with Array construction phase
SHEARWATER C – 0	Active	126.66	Oil and gas project	N/A	Up to 2037, with decommissioning from 2038	Project decommissioning phase overlap with Array construction phase
Tier 2						
Offshore Wind Projects and Associated Cables						

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Broadshore Hub Offshore Wind Farms	Scoping	148.14	The Broadshore Hub Offshore Wind Farms (comprising Broadshore Offshore Wind Farm, Sinclair Offshore Wind Farm and Scaraben Offshore Wind Farm) is proposed for up to 72 turbines at a capacity of 1,100 MW across the three projects.	2028 to 2029	2030 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Buchan Offshore Wind Farm	Scoping	151.62	Buchan Offshore Wind Farm is proposed for up to 60 turbines at a capacity of 960 MW.	2028 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Caledonia Offshore Wind Farm	Scoping	157.49	Caledonia Offshore Wind Farm is proposed for up to 150 turbines at a capacity of 2,000 MW.	2028 to 2029	2030 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Cenos Offshore Wind Farm	Scoping	91.70	Cenos Offshore Wind Farm is proposed for up to 1,400 MW	Unknown	Unknown	Unknown
Culzean Floating Offshore Wind Turbine Pilot Project	Scoping	129.69	Culzean Floating Offshore Wind Turbine Pilot Project is proposed for up to 3 MW	2025	2026 to 2035	Project operation and maintenance phase overlaps with Array construction phase.
Dogger Bank D Offshore Wind Farm	Scoping	233.00	Dogger Bank D Offshore Wind Farm is proposed for up to 2,000 MW capacity.	2027 to 2028	2029 onwards	Project construction and operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank South	Scoping	219.40	Dogger Bank South Offshore Wind Farm is proposed for up to 200 turbines at a capacity of 1,500 MW.	Unknown	Unknown	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank South East – RWE Renewables	Scoping	241.02	Dogger Bank South East is proposed for up to 150 turbines at a capacity of 750 MW.	Unknown	Unknown	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Dogger Bank South West – RWE Renewables	Scoping	219.40	Dogger Bank South West is proposed for up to 150 turbines at a capacity of 750 MW.	Unknown	Unknown	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Marram	Scoping	123.55	Marram Offshore Wind Farm is proposed for up to 150 turbines at a capacity of 3,000 MW.	2031 to 2038	2039 onwards	Project construction and operation and maintenance phases overlaps with Array construction and operation and maintenance phases.
Morgan Offshore Wind Farm	Scoping	352.50	Morgan Offshore Wind Farm is proposed for up to 107 turbines at a capacity of 1,500 MW.	2027 to 2030	2031 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Morven Offshore Wind Farm	Scoping	5.50	Morven Offshore Wind Farm is proposed for up to 191 turbines at a capacity of 2,300 MW	2031 to 2037	2038 onwards	Project construction and operation and maintenance phase overlaps with Array construction and operation and maintenance phases.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Muir Mhor Offshore Wind Farm	Scoping	51.38	Project construction expected to start construction in 2026 with commercial operation starting in 2030	2026 to 2029	2030 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
North Falls	Scoping	520.42	North Falls Offshore Wind Farm is proposed for up to 71 turbines at a capacity of 504 MW.	2028 to 2029	2030 onwards	Project operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
Outer Dowsing Offshore Wind (Generating Station)	Scoping	333.63	Outer Dowsing Offshore Wind (Generating Station) is proposed for a capacity of 1,500 MW.	Unknown	Unknown	The construction of Outer Dowsing Offshore Wind (Generating Station) might overlap with the construction and operation and maintenance phases of the Array.
Salamander Offshore Wind Farm	Scoping	79.49	Salamander Offshore Wind Farm is proposed for up to 100MW	Unknown	Unknown	The construction of Salamander Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Spiorad na Mara	Scoping	386.32	Spiorad na Mara is proposed for up to 840 MW capacity	Unknown	Unknown	The construction of Spiorad na Mara might overlap with the construction and operation and maintenance phases of the Array.
Stromar	Scoping	182.39	Stromar is proposed for up to 1,000MW capacity.	2025 to 2032	2033 onwards	Project construction and operation and maintenance phase overlaps with Array construction and operation and maintenance phases.
UK Marine Protected Areas (MPA) network						
MPAs	Designated		Network of Special Areas of Conservation (SAC), Special Protected Areas (SPA), Marine Conservation Zones (MCZ)	N/A	2024 onwards	Overlaps with all Array phases
Tier 3						
Offshore Wind Projects and Associated Cables						
Arven Offshore Wind Farm	Pre Planning	363.92	Arven Offshore Wind Farm is proposed for a capacity of 1800MW.	Unknown	Unknown	The construction of Arven Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Ayre Offshore Wind Farm	Pre Planning	219.96	Ayre Offshore Wind Farm is proposed for up to 60 turbines at a capacity of 1000MW.	Unknown	Unknown	The construction of Ayre Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Bellrock Offshore Wind Farm	Pre Planning	8.67	Bellrock Offshore Wind Farm is proposed for a capacity of 1200MW.	Unknown	Unknown	The construction of Bellrock Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Bowdun Offshore Wind Farm	Pre Planning	25.36	Bowdun Offshore Wind Farm is proposed for up to 60 turbines at a capacity of 1000MW.	Unknown	Unknown	The construction of Bowdun Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.

Project/Plan	Status [i.e. Application, Consented, Under Construction, Operational]	Distance from Array Area (km)	Description of Project/Plan	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Array [e.g. Project Construction Phase Overlaps with Array Construction Phase]
Campion Offshore Wind Farm	Pre Planning	44.15	Campion Offshore Wind Farm is proposed for up to 100 turbines at a capacity of 2000MW.	Unknown	Unknown	The construction of Campion Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Havbredey Offshore Wind Farm	Pre Planning	343.57	Havbredey Offshore Wind Farm is proposed for up to 108 turbines at a capacity of 1500MW.	Unknown	Unknown	The construction of Haybredey Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Flora Floating Wind Farm	Pre Planning	68.41	Flora Floating Wind Farm is proposed for up to 50MW	Unknown	Unknown	The construction of Flora Floating Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Malin Sea Offshore Wind	Pre Planning	391.41	Malin Sea Offshore Wind is proposed for up to 100MW	Unknown	Unknown	The construction of Malin Sea Offshore Wind might overlap with the construction and operation and maintenance phases of the Array.
Aspen Offshore Wind Farm	Pre Planning	85.61	Aspen Offshore Wind Farm is proposed for up to 1350MW	Unknown	Unknown	The construction of Aspen Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
INTOG Site 8: Harbour Energy	Pre Planning	154.62	INTOG Site 8: Harbour Energy is proposed for up to 1008MW	Unknown	Unknown	The construction of INTOG Site 8: Harbour Energy might overlap with the construction and operation and maintenance phases of the Array.
Beech Offshore Wind Farm	Pre Planning	160.41	Beech Offshore Wind Farm is proposed for up to 1008MW	Unknown	Unknown	The construction of Beech Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Cedar Offshore Wind Farm	Pre Planning	51.65	Cedar Offshore Wind Farm is proposed for up to 1008MW	Unknown	Unknown	The construction of Cedar Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
INTOG Site 13: Harbour Energy	Pre Planning	135.28	INTOG Site 13: Harbour Energy is proposed for up to 15MW	Unknown	Unknown	The construction of INTOG Site 13: Harbour Energy might overlap with the construction and operation and maintenance phases of the Array.
MachairWind Offshore Wind Farm	Pre Planning	356.19	MachairWind Offshore Wind Farm is proposed for up to 100 turbines at a capacity of 2000MW.	Unknown	Unknown	The construction of MachairWind Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Stoura Offshore Wind Farm	Pre Planning	393.33	Stoura Offshore Wind Farm is proposed for up to 500 MW capacity.	Unknown	Unknown	The construction of Stoura Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.
Tallisk Offshore Wind Farm	Pre Planning	387.32	Tallisk Offshore Wind Farm is proposed for up to 495 MW capacity.	Unknown	Unknown	The construction of Tallisk Offshore Wind Farm might overlap with the construction and operation and maintenance phases of the Array.

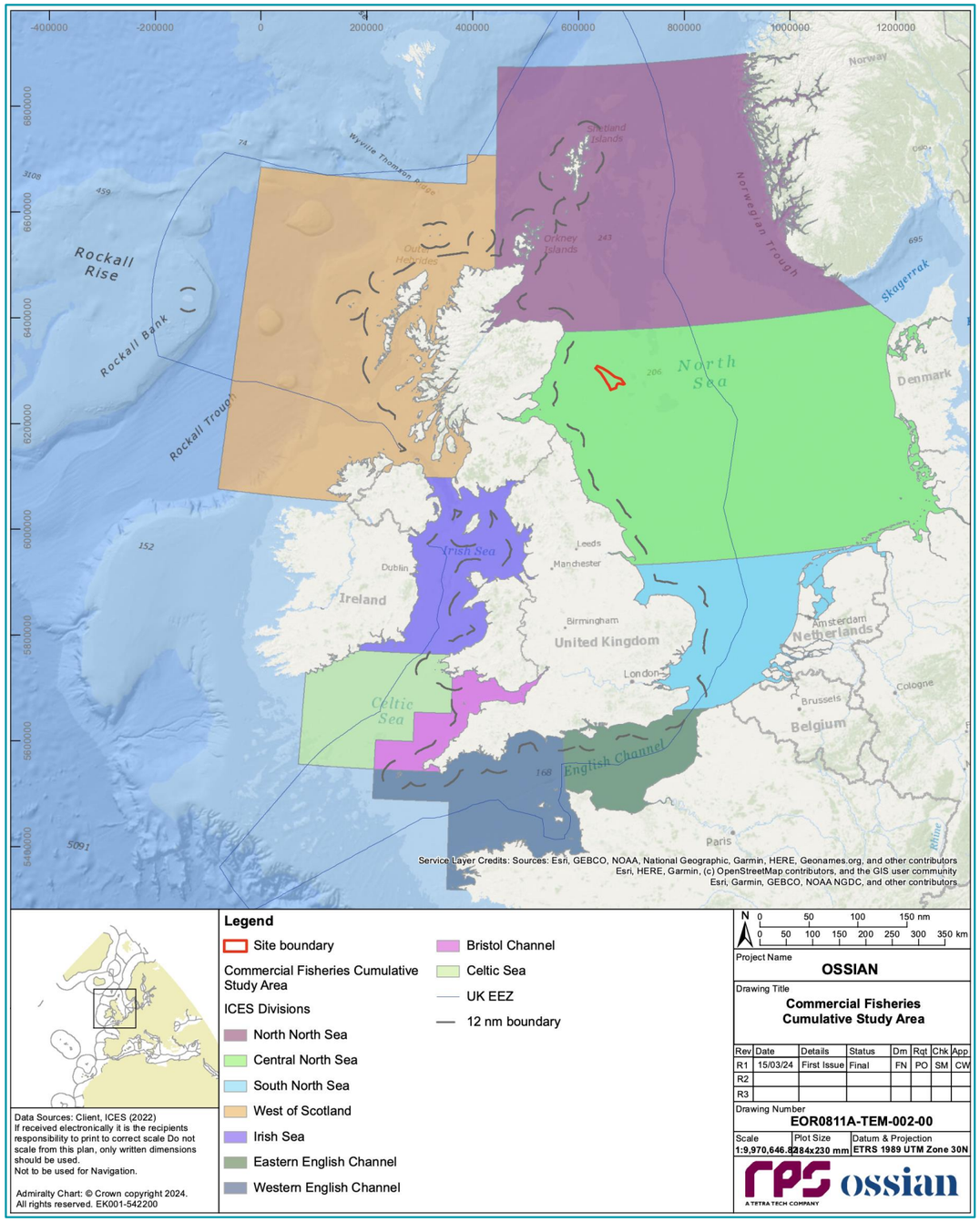

Figure 12.7: Commercial Fisheries Cumulative Study Area

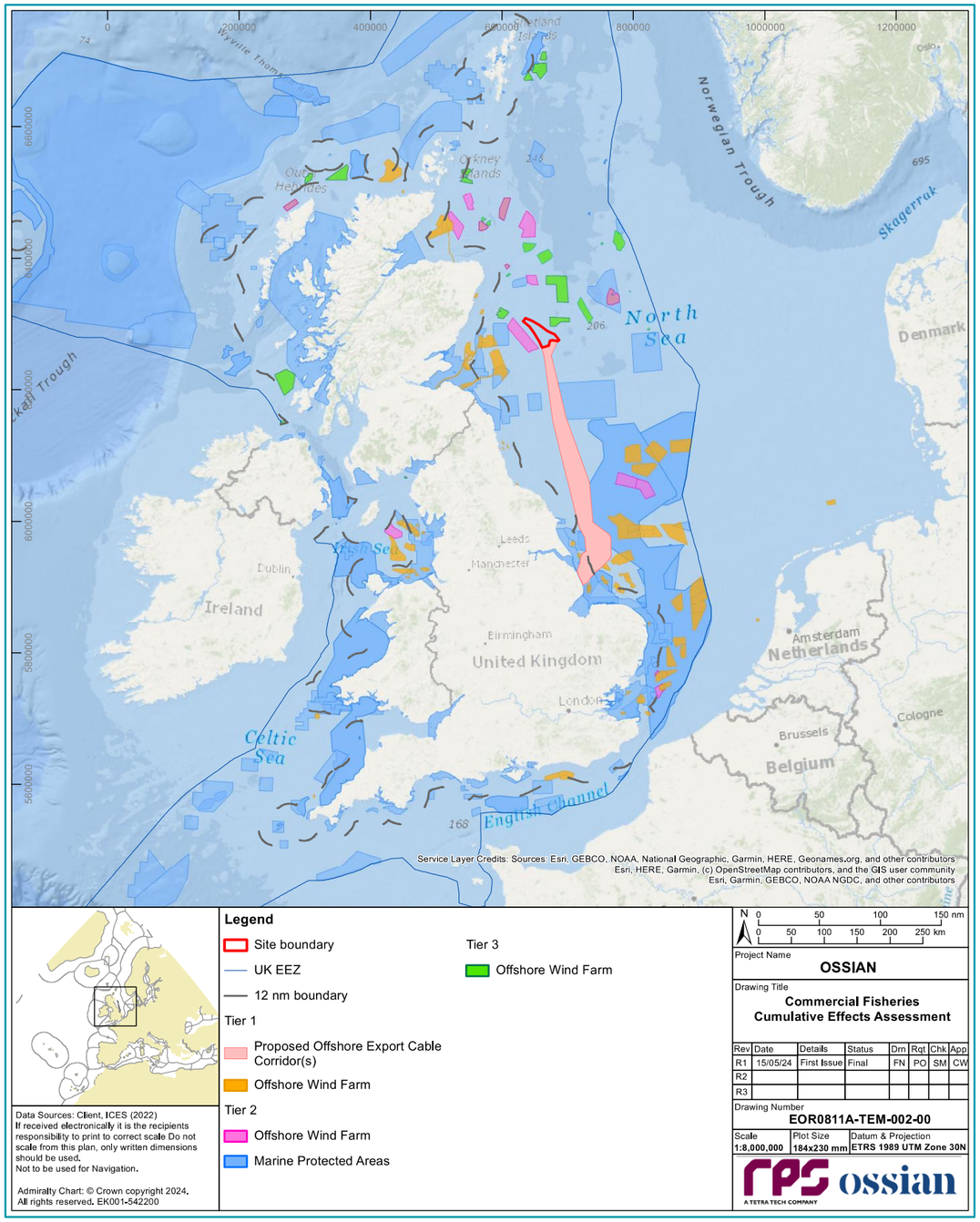

Figure 12.8: Other Projects/Plans Screened into the Cumulative Effects Assessment for Commercial Fisheries

12.12.2. MAXIMUM DESIGN SCENARIO

249. The maximum design scenarios identified in Table 12.12 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the details provided in volume 1, chapter 3 of the Array EIA Report as well as the information available on other projects and plans (see volume 3, appendix 6.4), to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Description (e.g. different wind turbine layout), to that assessed here, be taken forward in the final design scheme.

Table 12.12: Maximum Design Scenario Considered for Each Impact as part of the Assessment of Likely Significant Cumulative Effects on Commercial Fisheries

Potential Cumulative Effect	Phase[2] C	Phase[2] O	Phase[2] D	Tier	Maximum Design Scenario
Temporary loss or restricted access to fishing grounds	✓	×	✓	1	**Construction Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects. **Operation and Maintenance Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects. **Decommissioning Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects.
				2	**Construction Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects; and • full build out of all Tier 2 projects. **Operation and Maintenance Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects; and • full build out of all Tier 2 projects. **Decommissioning Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 1 projects; and • full build out of all Tier 2 projects.
				3	**Construction Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for Array alone case (Table 12.6); • full build out of all Tier 2 projects; and • full build out of all Tier 3 projects. **Operation and Maintenance Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); and • full build out of all Tier 2 projects; and • full build out of all Tier 3 projects. **Decommissioning Phase** • same parameters for the Array as considered for the MDS for the assessment of the equivalent impact for the Array alone case (Table 12.6); • full build out of all Tier 2 projects; and • full build out of all Tier 3 projects.
Long term loss or restricted access to fishing grounds	×	✓	×	1 2 3	As for Temporary loss or restricted access to fishing grounds impact.

[2] C = Construction, O = Operation and maintenance, D = Decommissioning

Potential Cumulative Effect	Phase[2]			Tier	Maximum Design Scenario
	C	O	D		
Displacement of fishing activity	✓	✓	✓	1 2 3	As for Temporary loss or restricted access to fishing grounds impact.
Impacts to commercial exploited species populations	✓	✓	✓	1 2 3	As for Temporary loss or restricted access to fishing grounds impact.

12.12.3. CUMULATIVE EFFECTS ASSESSMENT

250. An assessment of the likely significance of the cumulative effects of the Array upon commercial fisheries receptors arising from each identified impact is given below. The receptors are the commercial fishing fleets operating within and around the Array that may also be affected cumulatively by other plans and projects. The commercial fisheries receptors considered in this assessment include:

- demersal otter trawl targeting whitefish and mixed demersal fish species and/or *Nephrops;*
- demersal seine targeting whitefish and mixed demersal fish species;
- dredge targeting king scallop;
- pelagic trawl targeting herring; and
- potting targeting brown crab and lobster.

TEMPORARY LOSS OR RESTRICTED ACCESS TO FISHING GROUNDS

Tier 1

Construction phase

Magnitude of impact

251. There is potential for cumulative reduction in access to or exclusion from established fishing grounds as a result of construction activities associated with the Array and other projects that are under construction, and with planned decommissioning. There is also potential for cumulative reduction in access to or exclusion from established fishing grounds during the construction of the Array and other projects in construction or operation, although it is assumed that access would be possible for most gear types (with exception of pelagic trawl) within the Tier 1 wind farms and access to export cable routes for most mobile gears, potting and pelagic trawl (noting that while MGN 661 advises that mobile fishing vessels with penetrative gear avoid submarine cables, cables are typically buried or protected to allow trawling, with the exception of dredging). For the purposes of this assessment, this cumulative effect has been assessed within the North Sea (i.e. the commercial fisheries cumulative study area, Figure 12.7), which is considered to be a reasonable extent for the fishing grounds exploited by the commercial fisheries receptors active across the commercial fisheries regional study area, for all fleets except scallop dredging. For scallop dredging this effect is assessed at a UK level; this is because the UK fleet of scallop dredgers are nomadic in nature and target grounds across the North Sea, West of Scotland, Irish Sea and English Channel. Fisheries data has been reviewed against the Tier 1 projects.

252. Scallop dredging is noted to occur across a number of Tier 1 projects, specifically in the Irish Sea: Mona Offshore Wind Farm and in the North Sea: Beatrice, Moray East, Moray West, Seagreen 1 Offshore Wind Farm and Dogger Bank A Offshore Wind Farms. Scallop dredging is evident along the western edge of the Proposed offshore export cable corridor(s), outside 12 nm adjacent to the Lincolnshire coastline (Figure 12.9).

253. Demersal otter trawl and demersal seine activity occurs throughout the North Sea, with highly defined grounds for targeting *Nephrops* (related to muddy habitat) and less defined grounds when targeting whitefish/mixed demersal species, including haddock and cod. Defined grounds for *Nephrops* fishery are noted primarily across the cable routes of Tier 1 offshore wind farms, including in the Firth of Forth (Neart na Gaoithe, Berwick Bank, Inch Cape and Seagreen 1 Offshore Wind Farms) and Moray Firth (Moray East and Moray West Offshore Wind Farms). Lower levels of demersal otter trawl activity are noted across the Proposed offshore export cable corridor(s) (Figure 12.10).

254. Pelagic otter trawl activity occurs primarily north of the Array, in the central areas of the northern North Sea (Figure 12.11). There is very limited overlap with Tier 1 projects.

255. Potting VMS spatial data is not fully representative of the UK potting fleet because the data is only available for vessels 15 m and over, while the majority of the potting fleet is less than 15 m in length. Nevertheless, the potting VMS data does indicate areas of high activity for the 15 m and over fleet, specifically off the Holderness Coast and in North Norfolk (Figure 12.12). The impact of the Proposed offshore export cable corridor(s) will be temporary and localised in nature, with any significant effects on disruption to the static sector expected to be mitigated directly with affected fishers if required and where appropriate to do so. Furthermore, there is negligible potting activity within the Array and any potting in the vicinity of the regional study area is not likely to be undertaken by the potting fleets potentially affected by the Proposed offshore export cable corridor(s) off the Holderness Coast.

256. A number of operational offshore wind farms are included in the Tier 1 assessment, which throughout their construction provided a range of mitigation directly to commercial fishing businesses. Fishermen have adapted their activities in response to the presence of these offshore wind farms, including both operating within the arrays (for example, by adapting how and where gear is used or set); avoiding construction areas and returning to fishing grounds across export cables post construction and in certain instances overtrawl surveys to confirm resumption of fishing.

257. The offshore wind farms are located in areas where scallop dredgers, demersal otter trawls, pelagic trawls and potting activity were likely to have been operated, with varying degrees of effort. Overall, the commercial fishing fleets have adapted to the presence of the offshore wind farms and adjusted practices to allow fishing businesses to continue operation.

258. The potential for incremental loss of fishing grounds is recognised in the ABPmer (2022) spatial squeeze in fisheries report, which focused on assessment of mobile fishing gears in response to present and future scenarios for restricted access due to Marine Protected Areas (MPAs) (included in Tier 2 of this assessment) and offshore developments including offshore wind farms and cables. The study found that the spatial footprint of activities and policies that constrain trawling represents 23% of the UK EEZ area for the 'present' scenario (i.e. as of 2022). It is noted, however, that the scenarios for loss within the ABPmer (2022) report treat all areas equally, i.e. the report does not distinguish between areas that can actually be utilised (and are currently targeted) for fishing. The 'future 2030' scenario predicted 36% of the UK EEZ would be restricted to trawling and the 'future 2050' worst case scenario predicted 49% of the UK EEZ would be restricted, with an area greater than 30,000 km^2 occupied by the renewable offshore wind sector. The 'future 2050' worst case scenario assumes mobile fishing would be restricted within all wind farms, which is noted to not necessarily be the case.

259. The ABPmer (2022) report highlights that the fishing industry has adapted to the 'present' scenario, based on the majority of restrictions being linked to nature conservation restrictions in waters deeper than 800 m, together with offshore wind farms sited in areas not previously intensively trawled.

260. Overall, it is considered that the fishing industry continue to adapt to operational projects included in the Tier 1 assessment, including active fishing within operational wind farms.

261. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the adaptation of the commercial fishing sector to operational offshore wind farm developments, the magnitude is therefore, considered to be low for Tier 1 projects.

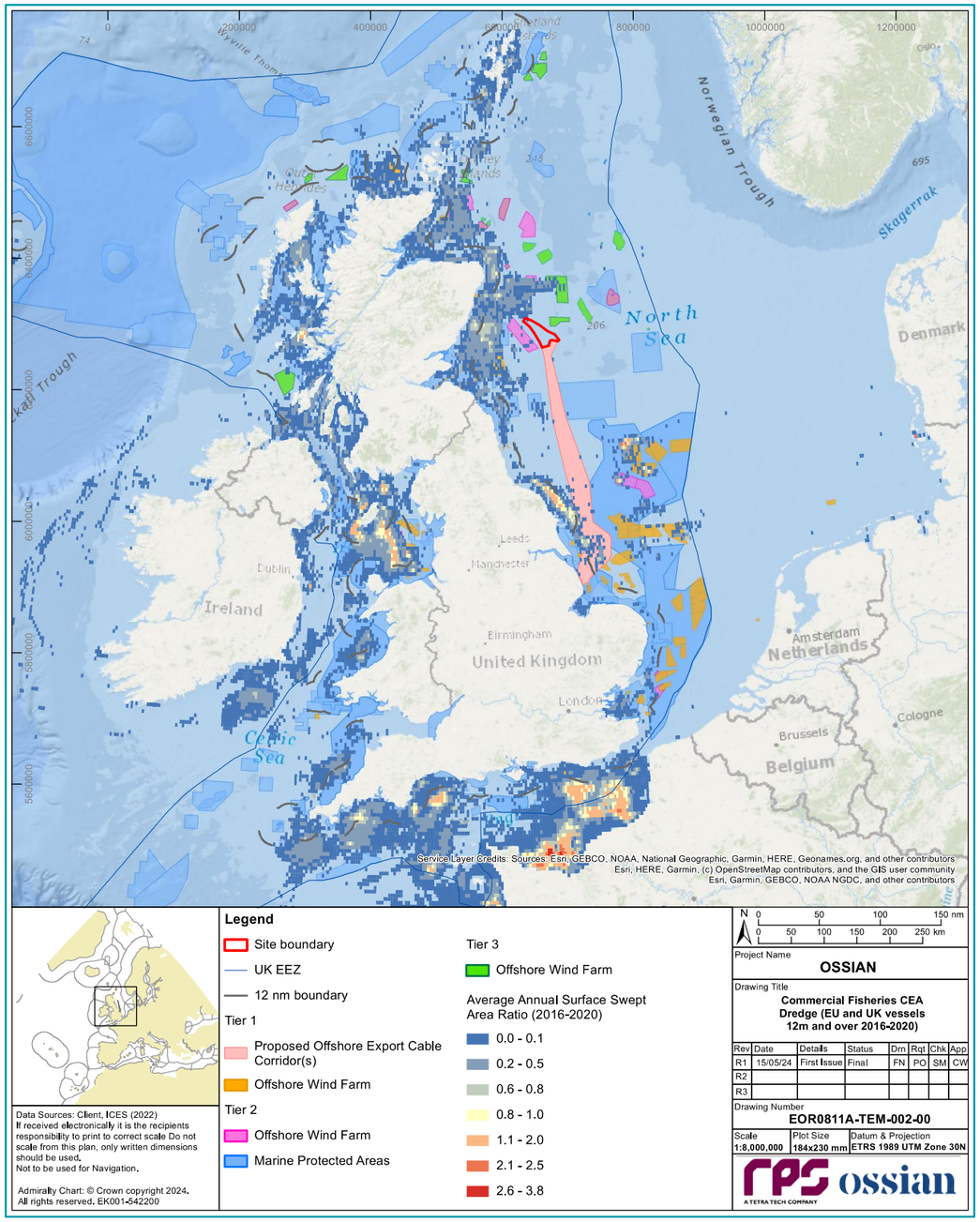

Figure 12.9: Commercial Fisheries Cumulative Projects and Dredge Swept Area Ratio for EU and UK vessels 12 m and over (ICES, 2022)

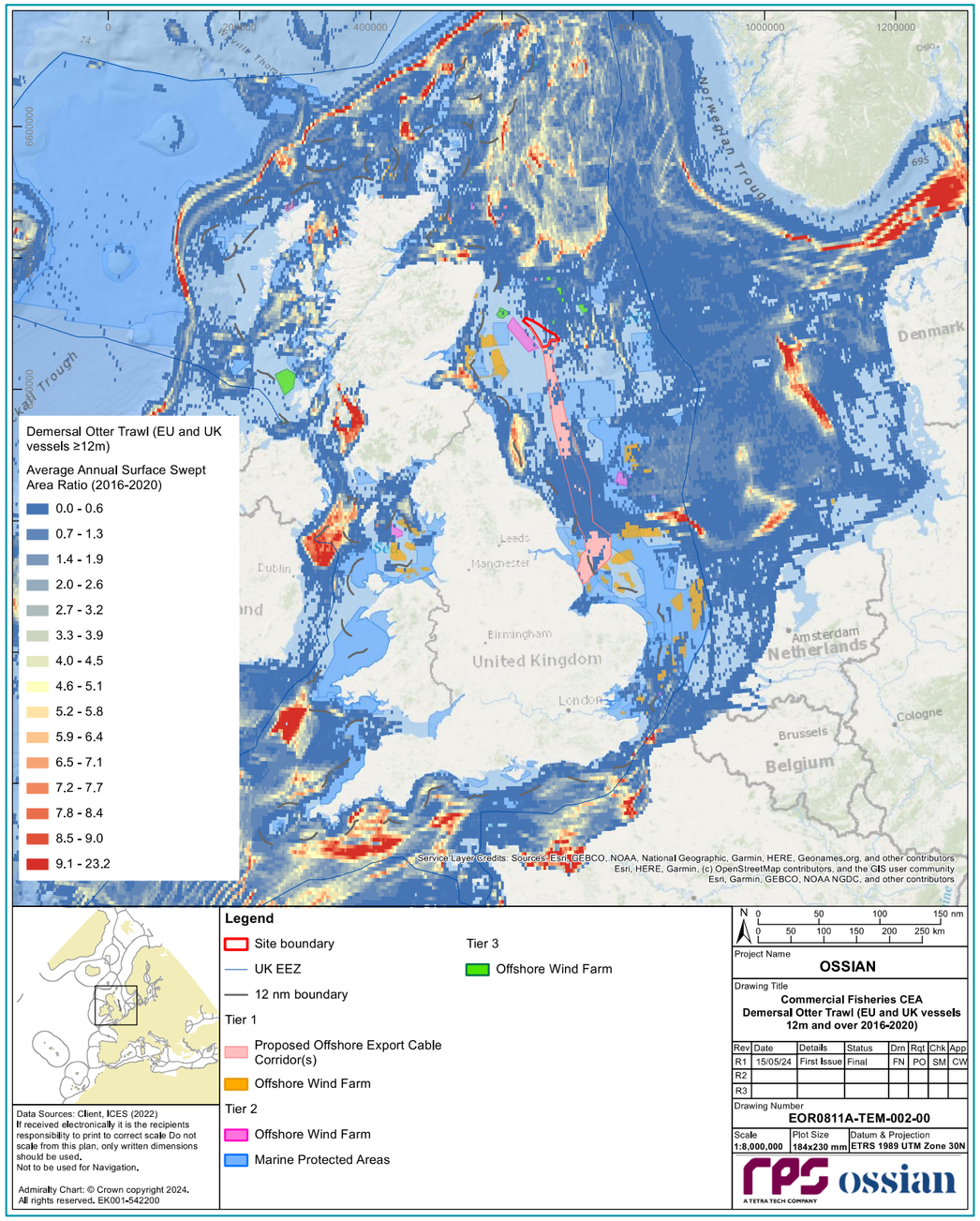

Figure 12.10: Commercial Fisheries Cumulative Projects and Demersal Otter Trawl Swept Area Ratio for EU and UK vessels 12 m and over (ICES, 2022)

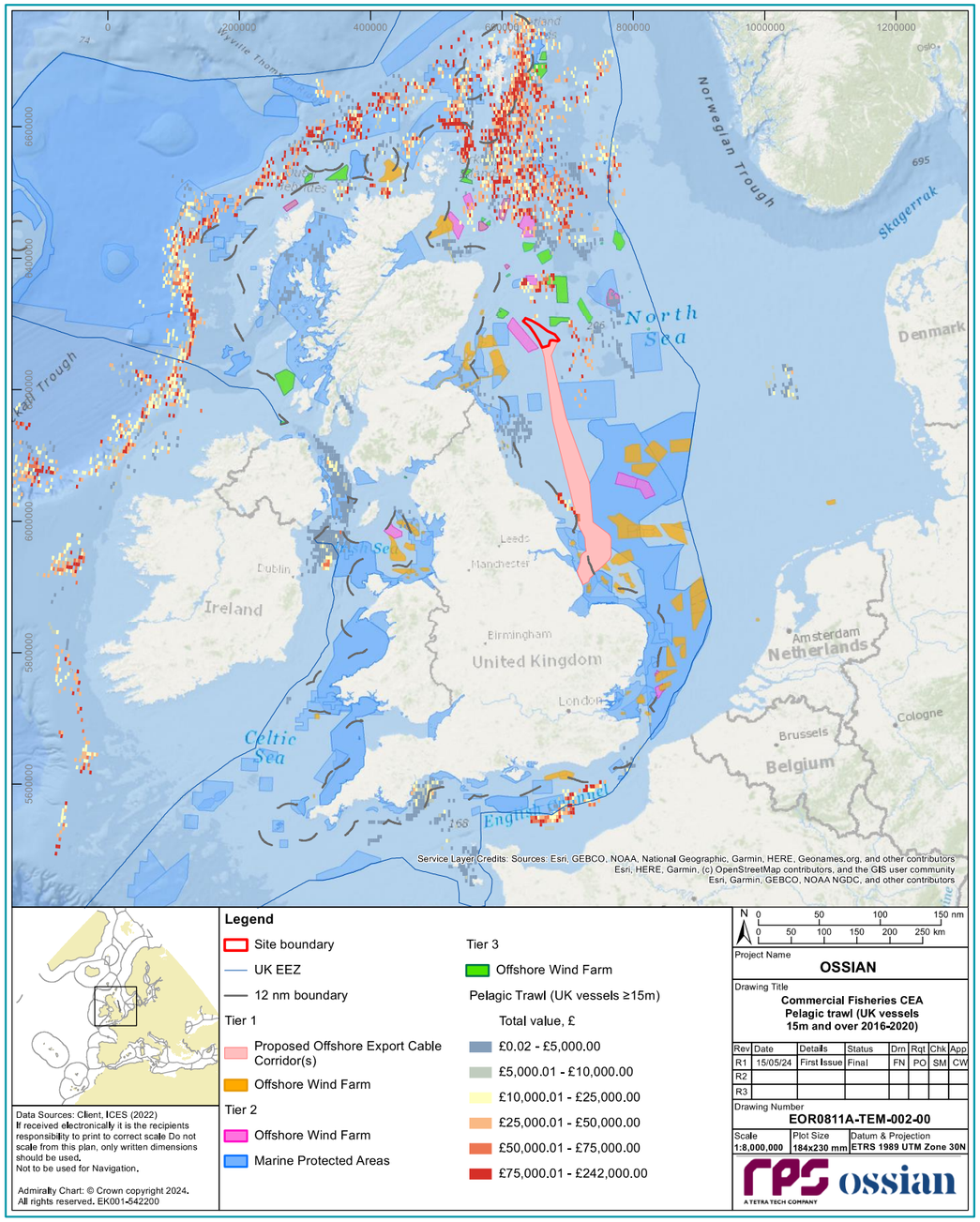

Figure 12.11: Commercial Fisheries Cumulative Projects and Pelagic Trawl VMS data indicating value of landings by UK vessels 15 m and over from 2016 to 2020 (MMO, 2022b)

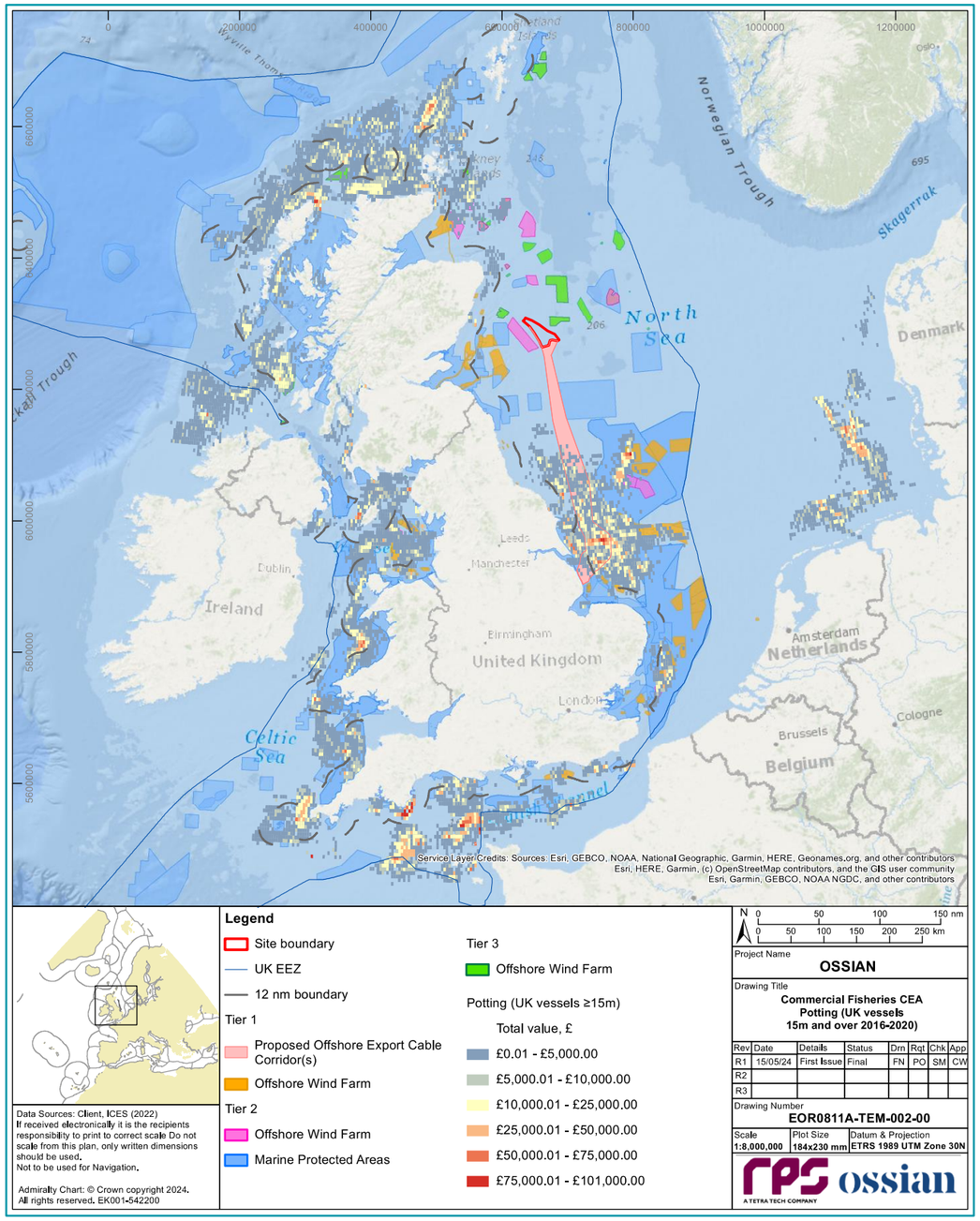

Figure 12.12: Commercial Fisheries Cumulative Projects and Potting VMS data indicating value of landings by UK vessels 15 m and over from 2016 to 2020 (MMO, 2022b)

Sensitivity of receptor

262. All commercial fishing fleets are sensitive to incremental loss of access to fishing grounds.

263. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

264. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

265. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

266. The magnitude of impact is the same or similar to that assessed for construction, summarised as low for Tier 1 projects.

Sensitivity of receptor

267. The sensitivity of receptors is the same or similar to that assessed for construction, summarised as medium for all commercial fishing fleets.

Significance of effect

268. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual *effect*

269. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Tier 2

Construction phase

Magnitude of impact

270. The Tier 2 cumulative assessment includes a number of offshore wind farms (including those using floating wind technology), together with the network of UK designated MPAs. Fisheries administrators across the UK are at various stages of implementing management measures within MPAs. The MMO recently (March 2024) implemented byelaws with prohibitions on bottom contact fishing gear within nine MPAs. From a Scottish context, the Marine Directorate has implemented a series of Marine Conservation Orders (MCOs) and fisheries orders in MPAs and SACs, affecting from 2022, and a series of possible MCOs and fisheries orders for other MPAs remains under consideration.

271. In terms of fishing activity, scallop dredge activity is notable within Muir Mhor and Caledonia Offshore Wind Farms, and also to the north and west of Morven and within Morgan Offshore Wind Farm (in the Irish Sea); and demersal otter trawl activity is notable within Caledonia, Marram and Muir Mhor Offshore Wind Farms.

272. The scale of potential restrictions to the commercial fishing fleets is recognised, including through the ABPmer (2022) spatial squeeze analysis. Overall, there is potential for incremental loss of grounds to occur from floating offshore wind farms and nature conservation management. However, the contribution of the Array to spatial squeeze is low particularly when considering the low levels of current fishing activity ongoing within the Array.

273. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the loss of access posed by floating offshore wind farms, together with the anticipated introduction of fisheries management within the MPA network, the magnitude is therefore, considered to be medium for Tier 2 projects for demersal otter trawl and demersal seine and low for all other fishing fleets. This assessment is based on the potential resumption of a fishery targeting a smaller size class of haddock which is not presently (i.e., from 2018 to 2022) being targeted, but has been in the past (evidenced by confidential fishing industry plotter data and landing statistics for 2011 to 2014). Whilst the area in which Ossian is located is not presently considered important for mobile demersal trawling fleets, as shown by Figure 12.6 and in the commercial fisheries technical report (volume 3, appendix 12.1), there is the possibility that there could be additional pressures on this fishery should all ScotWind floating projects in Tier 2 progress to construction. Based solely on the recent baseline (i.e., from 2018 to 2022), the assessment outcome is low in magnitude, however taking account of the long term data series, and the potential future baseline, the cumulative magnitude of impact has conservatively been assessed as medium for the mobile demersal otter trawl fleet.

274. Given the uncertainty around the small haddock future baseline, the assessment presented is highly uncertain and is presented as a precautionary assessment. The uncertainty relates to whether the fishery for small haddock returns in this area, whether fishing can resume within a floating offshore wind farm (the assessment assumes it cannot) and whether the floating offshore wind farms within Tier 2 are consented.

Sensitivity of receptor

275. All commercial fishing fleets are sensitive to incremental loss of access to fishing grounds.

276. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

277. Demersal otter trawl and demersal seine fishing fleets: overall, the magnitude of the cumulative effect is deemed to be medium (taking account of the long term data series and the potential future baseline) and the sensitivity of the receptor is conservatively considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

278. All other commercial fishing fleets: overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

279. A significant cumulative effect of loss of access to fishing grounds is predicted for demersal otter trawl and demersal seine fishing fleets. However, it is emphasised that the overall contribution of the Array to this cumulative impact is considered low.

280. Further mitigation is proposed at a regional scale to monitor fishing activity with the region to identify any changing effort. This monitoring will utilise publicly available datasets on landing statistics, VMS and AIS to monitor the fishing activity and patterns within the commercial fisheries regional study area. The intention of this monitoring is to identify any changes in the baseline assessment from 2023 onwards up to construction and operational phases to ensure that the impact assessment remains valid. Findings from the monitoring will be discussed with the CFWG and support any necessary updates to the FMMS so that mitigation remains valid throughout the operation and maintenance phase. Monitoring fisheries activity is not standard procedure and therefore not considered as a designed in measure. Monitoring in this instance is therefore defined as further mitigation, with the following linkages to the FMMS:

- The proposed approach to monitoring commercial fisheries activity would be detailed in the FMMS.
- The designed in measures within the FMMS includes liaison principles, means of information dissemination and use of company FLO and OFLO as appropriate.
- Appropriate information dissemination to fishers operating in the area would allow them to plan their activities appropriately.

281. In addition, the Applicant is committed to explore opportunities for coexistence within the Array, subject to final design and layout.

282. Overall, for the demersal trawl and seine fishery targeting haddock, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The residual effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

283. The magnitude of impact is the same or similar to that assessed for construction (paragraphs 270 to 274), summarised as medium for Tier 2 projects.

Sensitivity of receptor

284. The sensitivity of receptors is the same or similar to that assessed for construction (paragraphs 275 to 276), summarised as medium for all commercial fishing fleets.

Significance of effect

285. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

286. Further mitigation is as proposed for construction Tier 2 assessment (paragraphs 279 to 282).

287. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 3

Construction and decommissioning phases

Magnitude of impact

288. The additional floating offshore wind farms within Tier 3 raise the cumulative effect of loss or restricted access to fishing grounds, however this rise is considered to remain within the medium magnitude category (i.e., leading to moderate loss of access to fishing grounds) and does not enter the high magnitude category (i.e., leading to substantial loss of access to fishing grounds). The Tier 3 projects are not considered to raise the category of magnitude of impact beyond what is assessed for Tier 2 (paragraphs 270 to 274), summarised as medium for all commercial fishing fleets.

Sensitivity of receptor

289. The sensitivity of receptors is the same or similar to that assessed for Tier 2 (paragraphs 275 to 276), summarised as medium for all commercial fishing fleets.

Significance of effect

290. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

291. Further mitigation is proposed as described for temporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 279 to 282).

292. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

LONG TERM LOSS OR RESTRICTED ACCESS TO FISHING GROUNDS

Tier 1

Operation and maintenance phase

Magnitude of impact

293. The justification for the magnitude of impact is the same or similar to that assessed for Temporary loss or restricted access to fishing grounds during construction for Tier 1 projects (paragraphs 251 to 260). While the operation and maintenance phase is of longer duration (35 years) than the construction phase (eight years); the impact magnitude is not considered to rise above that assessed for the construction phase.

294. The cumulative impact is predicted to be of international spatial extent (based on geographic scope of the commercial fisheries cumulative study area which covers multiple EEZs and UK and non-UK fishing fleets), long term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the adaptation of the commercial fishing sector to operational wind farm developments, the magnitude is therefore, considered to be low for Tier 1 projects.

Sensitivity of receptor

295. The justification for the sensitivity is the same or similar to that assessed for Temporary loss or restricted access to fishing grounds during construction for Tier 1 projects (paragraph 262).

296. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

297. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

298. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Tier 2

Operation and maintenance phase

Magnitude of impact

299. The justification for the magnitude of impact is the same or similar to that assessed for Temporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 270 to 274).

300. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the loss of access posed by floating offshore wind farms, together with the anticipated introduction of fisheries management within the MPA network, the magnitude is therefore, considered to be medium for Tier 2 projects.

Sensitivity of receptor

301. The justification for the sensitivity is the same or similar to that assessed for Temporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 275 and 276).

302. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

303. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

304. Further mitigation is proposed as described for temporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 279 to 282).

305. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 3

Operation and maintenance phase

Magnitude of impact

306. The Tier 3 projects are not considered to raise the magnitude of impact beyond what is assessed for Tier 2 (paragraph 299), summarised as medium for all commercial fishing fleets.

Sensitivity of receptor

307. The sensitivity of receptors is the same or similar to that assessed for Tier 2 (paragraph 301), summarised as medium for all commercial fishing fleets.

Significance of effect

308. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

309. Further mitigation is proposed as described for ttemporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 279 to 282).

310. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

DISPLACEMENT OF FISHING ACTIVITY

Tier 1

Construction phase

Magnitude of impact

311. The effect of displacement during construction leading to gear conflict and increased fishing pressure is directly correlated to the previous impact of reduced access to fishing grounds (i.e. if there is no reduction in access, then there will be no displacement). There is a low magnitude of impact for reduced access to fishing grounds from Tier 1 projects and therefore an ongoing cumulative displacement effect is not expected to be recognisable beyond baseline conditions. Resumption of fishing within existing wind farms included in Tier 1 is assumed for scallop dredge, potting and demersal otter trawl and therefore displacement over time will have dissipated as commercial fishing fleets adapt and operate within fixed foundation wind farms. While pelagic trawl gear would not be feasible within Tier 1 wind farms, these are not located across grounds specifically targeted by pelagic trawl, and it is assumed that the opportunity to catch the fish outside wind farm area is not wholly lost.

312. Displacement is possible in response to the Proposed offshore export cable corridor(s) during its construction phase. However, it is expected that potting vessels active across the Proposed offshore export cable corridor(s) are unlikely to be the same potting vessels operating in the commercial fisheries regional study area for the Array, due to the distance of the identified potting grounds from the Array (approximately 100 nm south of the Array). Furthermore, it is assumed that appropriately mitigated loss of access impacts associated with the Proposed offshore export cable corridor(s) would limit the effect of displacement.

313. Overall, based on the above justifications, the magnitude of impact of displacement is assessed as low for all fleets.

Sensitivity of receptor

314. All commercial fishing fleets are sensitive to displacement into other areas.

315. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

316. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

317. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

318. The effect of displacement during operational phase leading to gear conflict and increased fishing pressure is directly correlated to the previous impact of reduced access to fishing grounds (i.e. if there is no reduction in access, then there will be no displacement). There is a low magnitude of impact for reduced access to fishing grounds from Tier 1 projects and therefore displacement is not expected. As such the magnitude of impact of displacement is assessed as low for all fleets.

Sensitivity of receptor

319. All commercial fishing fleets are sensitive to displacement into other areas.

320. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

321. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

322. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

323. The effect of displacement during decommissioning leading to gear conflict and increased fishing pressure is directly correlated to the previous impact of reduced access to fishing grounds (i.e. if there is no reduction in access, then there will be no displacement). There is a low magnitude of impact for reduced access to fishing grounds from Tier 1 projects and therefore displacement is not expected. As such the magnitude of impact of displacement is assessed as low for all fleets.

Sensitivity of receptor

324. All commercial fishing fleets are sensitive to displacement into other areas.

325. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

326. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

327. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Tier 2

Construction phase

Magnitude of impact

328. The effect of displacement during construction leading to gear conflict and increased fishing pressure is directly correlated to the previous impact of reduced access to fishing grounds (i.e. if there is no reduction in access, then there will be no displacement). There is a medium magnitude of impact for reduced access to fishing grounds from Tier 2 projects, specifically due to the assumption that fishing will not resume within floating offshore wind farms and therefore displacement is expected.

329. The Applicant is committed to explore opportunities for coexistence subject to final design and layout within the Array.

330. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the loss of access posed by floating offshore wind farms (Broadshore Hub, Buchan, Caledonia, Cenos, Marram, Muir Mhor, Stromar, and Salamander Offshore Wind Farms) and knock-on displacement effects, together with the anticipated introduction of fisheries management within the MPA network, the magnitude is therefore, considered to be medium for Tier 2 projects.

Sensitivity of receptor

331. All commercial fishing fleets are sensitive to displacement into other areas.

332. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

333. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **moderate** adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

334. Further mitigation is proposed as described for Temporary loss or restricted access to fishing grounds during construction for Tier 2 projects. It is considered appropriate to focus mitigation of displacement under the effect of loss of access to fishing grounds. No further mitigation specific to displacement is proposed.

335. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

336. The justification for the magnitude of impact is the same or similar to that assessed for construction for Tier 2 projects (paragraph 328 to 330)

337. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the loss of access posed by floating offshore wind farms, together with the anticipated introduction of fisheries management within the MPA network, the magnitude is therefore, considered to be medium for Tier 2 projects.

Sensitivity of receptor

338. All commercial fishing fleets are sensitive to displacement into other areas.

339. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

340. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of moderate adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

341. Further mitigation is proposed as described for Temporary loss or restricted access to fishing grounds during construction for Tier 2 projects. It is considered appropriate to focus mitigation of displacement under the effect of loss of access to fishing grounds. No further mitigation specific to displacement is proposed.

342. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

343. The justification for the magnitude of impact is the same or similar to that assessed for construction for Tier 2 projects (paragraph 328 to 330)

344. The cumulative impact is predicted to be of international spatial extent, medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. Given the loss of access posed by floating offshore wind farms, together with the anticipated introduction of fisheries management within the MPA network, the magnitude is therefore, considered to be medium for Tier 2 projects.

Sensitivity of receptor

345. All commercial fishing fleets are sensitive to displacement into other areas.

346. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

347. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of moderate adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

348. Further mitigation is proposed as described for Temporary loss or restricted access to fishing grounds during construction for Tier 2 projects. It is considered appropriate to focus mitigation of displacement under the effect of loss of access to fishing grounds. No further mitigation specific to displacement is proposed.

349. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 3

All phases

Magnitude of impact

350. The Tier 3 projects are not considered to raise the magnitude of impact beyond what is assessed for Tier 2 (paragraphs 328 to 330), summarised as medium for all commercial fishing fleets.

Sensitivity of receptor

351. The sensitivity of receptors is the same or similar to that assessed for Tier 2 (paragraphs 331 to 332), summarised as medium for all commercial fishing fleets.

Significance of effect

352. Overall, the magnitude of the cumulative effect is deemed to be medium and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of moderate adverse significance, which is significant in EIA terms.

Further mitigation and residual effect

353. Further mitigation is proposed as described for temporary loss or restricted access to fishing grounds during construction for Tier 2 projects (paragraphs 279 to 282). It is considered appropriate to focus mitigation of displacement under the effect of loss of access to fishing grounds. No further mitigation specific to displacement is proposed.

354. Overall, following mitigation, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

IMPACTS TO COMMERCIAL EXPLOITED SPECIES POPULATIONS

Tier 1

Construction phase

Magnitude of impact

355. The cumulative effects for fish and shellfish ecology have been assessed in volume 2, chapter 9 covering the following effects during the construction phase:

- temporary habitat loss and disturbance;
- long term habitat loss and disturbance; and
- underwater noise impacting fish and shellfish receptors.

356. Temporary and long term habitat loss and disturbance may occur due to the installation of infrastructure as assessed in volume 2, chapter 9 and predicted to be of minor adverse significance.

357. The underwater noise effects on fish and shellfish receptors are assessed in volume 2, chapter 9 and predicted to be of minor adverse significance.

358. Overall, cumulative effects on fish and shellfish ecology during construction are assessed to be of negligible to minor adverse significance. Therefore, the magnitude of impact to commercial fisheries resources is assessed as low for all commercial fishery fleets.

Sensitivity of receptor

359. All commercial fishing fleets are sensitive to displacement of their target resource.

360. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

361. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

362. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Operation and maintenance phase

Magnitude of impact

363. The cumulative effects for fish and shellfish ecology have been assessed in volume 2, chapter 9 covering the following effects during the operation and maintenance phase:

- temporary habitat loss and disturbance;
- long term habitat loss and disturbance;

- colonisation of hard structures; and
- effects to fish and shellfish receptors due to EMF from subsea electrical cabling.

364. Effects of temporary and long term habitat loss and disturbance is as described for the construction phase in paragraph 356 to 358.

365. It is assessed in volume 2, chapter 9 that colonisation of hard structures may lead to a shift in baseline seabed conditions from soft to hard substrate in the areas where the infrastructure is installed, resulting in potential benefits of increased biodiversity, greater shelter/protection opportunities, greater prey availabilities and potential reef effects. Potential for habitat loss for subtidal sands and gravels, which may be suitable burial substrate for species like brown crab and sandeel, is also recognised.

366. In relation to EMF, it is noted in volume 2, chapter 9 that EMF levels in the vicinity of subsea cables are influenced by a variety of design and installation factors, including distance between cables, cable sheathing, number of conductors, and internal cable configuration. Further, the intensity of EMF from subsea cables decreases at approximately the inverse square/power of the distance away from the cable and this attenuation is the same for buried, unburied, and dynamic cables (see volume 2, chapter 9). Therefore, the effect of EMF is likely to be highly localised to within metres to tens of metres from cables.

367. Overall cumulative effects on fish and shellfish ecology during operation and maintenance are assessed to be of negligible to minor adverse significance. Therefore, the magnitude of impact to commercial fisheries resources is assessed as low for all commercial fishery fleets.

Sensitivity of receptor

368. All commercial fishing fleets are sensitive to displacement of their target resource.

369. All commercial fishing fleets are deemed to be of high vulnerability, medium recoverability and medium-high value. The sensitivity of the receptor is therefore, considered to be medium.

Significance of effect

370. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

371. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Decommissioning phase

Magnitude of impact

372. No cumulative effects to fish and shellfish ecology were defined during the decommissioning phase.

Tier 2

All phases

Magnitude of impact

373. The Tier 2 projects are not considered to raise the magnitude of impact beyond what is assessed for Tier 1 (paragraphs 355 to 358, and paragraphs 363 to 367), summarised as low for all commercial fishing fleets.

Sensitivity of receptor

374. The sensitivity of receptors is the same or similar to that assessed for Tier 1 (paragraphs 359 to 360, and paragraphs 368 to 369), summarised as medium for all commercial fishing fleets.

Significance of effect

375. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

376. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

Tier 3

All phases

Magnitude of impact

377. The Tier 3 projects are not considered to raise the magnitude of impact beyond what is assessed for Tier 2 (paragraph 373), summarised as low for all commercial fishing fleets.

Sensitivity of receptor

378. The sensitivity of receptors is the same or similar to that assessed for Tier 2 (paragraph 374), summarised as medium for all commercial fishing fleets.

Significance of effect

379. Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be medium. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effect

380. No commercial fisheries mitigation is considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in section 12.10) is not significant in EIA terms.

12.13. PROPOSED MONITORING

381. This section outlines the proposed monitoring proposed for commercial fisheries. Proposed monitoring measures are outlined in Table 12.13 below.

Table 12.13: Proposed Monitoring and the Method of Implementation for commercial fisheries

Potential Environmental Effect	Monitoring Commitment	Means of Implementation
Disruption and changes to fishing activities	Commitment to monitoring of existing data sources , including landing statistics, VMS and AIS for commercial fishing vessels to understand any changes in fishing activities, in the commercial fisheries local and regional study areas across a period covering pre-construction, during-construction and during operation.	Fisheries Mitigation and Management Strategy (outline FMMS provided in volume 4, appendix 23). Detailed monitoring commitments will be proposed post consent and included in the FMMS.

12.14. TRANSBOUNDARY EFFECTS

382. Transboundary effects are defined as those effects upon the receiving environment of European Economic Area (EEA) states, whether occurring from the Array alone, or cumulatively with other projects in the wider area. A screening of transboundary impacts has been carried out, which identified that there was the potential for transboundary effects to occur in relation to commercial fisheries. The potential transboundary impacts screened into the assessment for commercial fisheries are:

- effects on commercial fishing fleets as a result of impacts from the Array on commercial fish stocks in the waters of EEA States; and
- effects on commercial fishing fleets from all EEA countries as a result of constraints on foreign commercial fishing activities operating in the Array, including demersal trawling, and other gears. These effects may include reduction in access to fishing grounds and potential displacement of fishing effort from the Array to alternative fishing grounds in EEA States, which will have direct implications to that fishing ground.

383. Effects on biological resources could occur over a range of tens of kilometres from the Array and could therefore interact with the following EEA states: Norway. Based on the minor to negligible significance of disruption to commercial species during all phases of the project, and informed by the fish and shellfish ecology assessment (volume 2, chapter 9), it is expected that the impact on all fish and shellfish stocks in the Norwegian EEZ will be negligible. Therefore, the potential transboundary impact of effects on commercial fish stocks in the waters of other EEA states on commercial fisheries is concluded to be not significant in EIA terms.

384. Effects on commercial fishing fleets could occur over a range of hundreds of kilometres from the Array (i.e. affecting fleets from other states that operate in the vicinity of the Array) and could therefore interact with the following EEA states: the Netherlands, Germany, Belgium, Denmark, Norway, France and Ireland. Effects on these foreign commercial fishing fleets from EEA states, in terms of reduction in access to fishing grounds and displacement into alternative grounds including other EEZs, have therefore been intrinsically considered throughout the commercial fisheries EIA process and are consistent to those presented in the assessment of the effects of the Array alone (section 12.11) and CEA (section 12.12.3).

12.15. INTER-RELATED EFFECTS (AND ECOSYSTEM ASSESSMENT)

385. A description of the likely inter-related effects arising from the Array on commercial fisheries is provided in volume 2, chapter 20 of the Array EIA Report.

386. For commercial fisheries, the following potential impacts have been considered within the inter-related assessment:

- temporary loss or restricted access to fishing grounds;
- long term loss or restricted access to fishing grounds;
- displacement of fishing activity into other areas;
- interference with fishing activity;
- increased snagging risk, which could result in loss or damage to fishing gear;
- increased steaming/vessel transit times; and
- impacts to commercially exploited species populations.

387. Table 12.14 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, operation and maintenance phase, and decommissioning of the Array and also the inter-related effects (receptor-led effects) that are predicted to arise for commercial fisheries receptors.

388. Effects on commercial fishing also have the potential to have a secondary effect on other receptors and these effects are fully considered in the topic-specific chapters and elsewhere in this chapter. These receptors and effects are:

- fish and shellfish ecology:
  - displacement of fishing activities into other areas could increase fishing pressure in these areas and affect fish and shellfish receptors; and
- benthic subtidal ecology:
  - displacement of fishing activities into other areas could increase fishing pressure in these areas and affect benthic subtidal ecology receptors; and
- socio-economics:
  - reduced value of fish caught by commercial fisheries with potential downstream impacts, for example on fish processors.

Table 12.14: Summary of Likely Significant Inter-Related Effects for Commercial Fisheries from Individual Effects Occurring Across the Construction, Operation and Maintenance and Decommissioning Phases of the Array (Array Lifetime Effects) and from Multiple Effects Interacting Across all Phases (Receptor-led Effects)

Description of Impact	Phase[3] C	O	D	Likely Significant Inter-Related Effects
Array Lifetime Effects				
Temporary loss or restricted access to fishing grounds	✓	×	✓	Loss or restricted access to fishing grounds is considered to be temporary during construction and decommissioning and long term during the operation and maintenance phase. As the Array is constructed, the loss of access will gradually increase up to the point of commissioning in the operation and maintenance phase when it is assumed the entirety of the Array will not be accessed for fishing. Therefore, across the lifetime of the Array the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result in inter-related effects of greater significance than the assessments presented for each individual phase. As a result, the inter-related effects are of minor adverse significance which is not significant in EIA terms.
Long term loss or restricted access to fishing grounds	×	✓	×	
Displacement of fishing activity into other areas	✓	✓	✓	Fishing may be disrupted and displaced into other areas due to the loss of access during all phases of the Array. Similarly, for loss of access, the level of displacement experienced is expected to increase incrementally up to the point of operation, when the entire Array will not be accessed for fishing. Therefore, across the lifetime of the Array, the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result in inter-related effects of greater significance than the assessments presented for each individual phase. As a result, the inter-related effects are of minor adverse significance which is not significant in EIA terms.
Interference with fishing activity	✓	✓	✓	With the successful implementation of measures adopted for the Array (i.e. issue of NtMs), preparation of a FMMS, close liaison with the local vessels), no significant effects are predicted for the construction, operation and maintenance, and decommissioning phases of the Array. The majority of vessel traffic (resulting in interference with fishing) is predicted to peak during construction and decommissioning with reduced potential for interference during the operation and maintenance phase. Therefore, across the lifetime of the Array, the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result in inter-related effects of greater significance than the assessments presented for each individual phase. As a result, the inter-related effects are of minor adverse significance which is not significant in EIA terms.
Increased snagging risk, which could result in loss or damage to fishing gear	✓	✓	✓	Impacts due to gear snagging may occur during the construction and operation and maintenance phases due to the presence of floating wind turbine foundations and associated moorings and anchoring. At the end of the Array's operational lifetime, it is expected that all structures above the seabed (with the exception of driven piles and DEAs (depending upon anchor system used), scour protection and cable protection) will be fully removed where feasible. Driven piles and/or DEAs installed as part of the wind turbine anchoring system, static portions of inter-array cables, interconnector cables, scour protection and cable protection may remain in situ where it can be demonstrated that it would cause a greater environmental impact than removal. Legislation, guidance and good practice will be kept under review throughout the lifetime of the Array and will be followed at the time of decommissioning. Environmental conditions and sensitivities will also be considered since removal of structures may result in greater environmental impacts in comparison to leaving in situ. Across the lifetime of the Array, the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result inter-related effects of greater significance than the assessments presented for each individual phase. As a result, the inter-related effects are of minor adverse significance which is not significant in EIA terms.
Increased steaming/vessel transit times	✓	✓	✓	Impacts on steaming and transit times are expected to be highest during construction and decommissioning when areas undergoing installation/decommissioning activities will be avoided. Vessels may also choose to avoid transiting through the Array during operation and maintenance phase. However, it is noted that regular fishing transiting routes are not established across the Array. Therefore, across the lifetime of the Array, the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result in inter-related effects of greater significance than the assessments presented for each individual phase. As a result, the inter-related effects are of minor adverse significance which is not significant in EIA terms.
Impacts to commercial exploited species populations	✓	✓	✓	Project lifetime inter-related effects are unlikely as the nature of potential impact is different during construction (underwater noise) and operation and maintenance phases (EMF, colonisation of hard structures and increased SSCs and suspended sediments). Temporary and long term habitat loss which occurs across all phases is expected to be proportionally small in relation to habitat availability in the commercial fisheries regional study area. Therefore, across the lifetime of the Array, the effects on commercial fisheries receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase. As a result, the in combined effects are of minor adverse significance which is not significant in EIA terms.
Receptor led effects				
An inter-related receptor led effect may occur from the combination of the reduction in access to fishing grounds and the subsequent displacement and increased pressure on adjacent grounds. While these two affects may act together, given the overall low levels of current fishing activity in the Array, it is considered that any inter-related effect will not be of any greater significance than those already assessed in isolation. This is consistent with the socio-economics assessment (volume 9, chapter 18). As a result, the receptor-led effects are of minor adverse significance which is not significant in EIA terms.				

[3] C = Construction, O = Operation and maintenance, D = Decommissioning

12.16. SUMMARY OF IMPACTS, MITIGATION, LIKELY SIGNIFICANT EFFECTS AND MONITORING

389. Information on commercial fisheries within the commercial fisheries local and regional study areas was collected through desktop review, data analysis and consultation. This information is summarised in Table 12.15 and Table 12.16.

390. Table 12.15 presents a summary of the potential impacts, designed in measures and the conclusion of LSE[1] in EIA terms in respect to commercial fisheries. The impacts assessed include:

- temporary loss or restricted access to fishing grounds;
- long term loss or restricted access to fishing grounds;
- displacement of fishing activity into other areas;
- interference with fishing activity;
- increased snagging risk, which could result in loss or damage to fishing gear;
- increased steaming/vessel transit times; and
- impacts to commercial exploited species populations.

391. Overall, it is concluded in section 12.11 that there will be the no LSE[1] arising from the Array during all phases.

392. To ensure the baseline assessment remains valid, monitoring commercial fisheries activity is proposed for 2024 onwards, as well as commitment to a FMMS including updates as necessary based on monitoring findings.

393. Table 12.16 presents a summary of the potential impacts, designed in measures and the conclusion of likely significant cumulative effects on commercial fisheries in EIA terms. The cumulative effects assessed include:

- temporary loss or restricted access to fishing grounds;
- long term loss or restricted access to fishing grounds;
- displacement of fishing activity into other areas; and
- impacts to commercial exploited species populations.

394. Overall, it is concluded that there will be the following likely significant cumulative effects from the Array alongside other projects/plans:

- temporary loss or restricted access to fishing grounds;
- long term loss or restricted access to fishing grounds; and
- displacement of fishing activity into other areas.

395. Additional mitigation in the form of participation and engagement in a regional commercial fisheries working group and regional monitoring of fisheries activity is proposed. Overall, this lowers the residual impact to be not significant in EIA terms.

396. No likely significant transboundary effects have been identified in regard to effects of the Array.

Table 12.15: Summary of Likely Significant Environmental Effects, Secondary Mitigation and Monitoring

Description of Impact	Phase	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Measures	Significance of Residual Effect	Proposed Monitoring
Temporary loss or restricted access to fishing grounds	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Low • Pelagic trawl: Low • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Low • Pelagic trawl: Low • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
Long term loss or restricted access to fishing grounds	Operation and maintenance	• Demersal otter trawl (targeting haddock and mixed demersal fishery): Low • Demersal seine (targeting haddock and mixed demersal fishery): Low • Demersal otter trawl (targeting *Nephrops* fishery): Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Medium • Pelagic trawl: Medium • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
Displacement of fishing activity into other areas	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Negligible • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	Minor adverse to negligible	None	Minor adverse to negligible	None
	Operation and maintenance	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Negligible • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	Minor adverse to negligible	None	Minor adverse to negligible	None
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Negligible • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	Minor adverse to negligible	None	Minor adverse to negligible	None
Interference with fishing activity	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
	Operation and maintenance	• Demersal otter trawl: Negligible • Demersal seine: Negligible • Dredge: Negligible • Pelagic trawl: Negligible • Potting: Negligible	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	All: Negligible	None	All: All Negligible	None

Description of Impact	Phase	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Measures	Significance of Residual Effect	Proposed Monitoring
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
Increased snagging risk, which could result in loss or damage to fishing gear	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Medium • Pelagic trawl: Medium • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
	Operation and maintenance	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Medium • Pelagic trawl: Medium • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Medium • Demersal seine: Medium • Dredge: Medium • Pelagic trawl: Medium • Potting: Medium	All: Minor adverse	None	All: Minor adverse	None
Increased steaming/vessel transit times	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None
	Operation and maintenance	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None
Impacts to commercial exploited species populations	Construction	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None
	Operation and maintenance	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None

Description of Impact	Phase	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Measures	Significance of Residual Effect	Proposed Monitoring
	Decommissioning	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	• Demersal otter trawl: Low • Demersal seine: Low • Dredge: Low • Pelagic trawl: Low • Potting: Low	All: Minor adverse	None	All: Minor adverse	None

Table 12.16: Summary of Likely Significant Cumulative Environment Effects, Mitigation and Monitoring

Description of Impact	Phase	Cumulative Effects Assessment Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Measures	Significance of Residual Effect	Proposed Monitoring
Temporary loss or restricted access to fishing grounds	Construction	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Temporary loss or restricted access to fishing grounds	Decommissioning	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Temporary loss or restricted access to fishing grounds	Construction	2	Demersal otter trawl and demersal seine: Medium All other fleets: Low	All fleets: Medium	Demersal otter trawl and demersal seine: Moderate adverse All other fleets: Minor adverse	Yes	Minor adverse	Yes
Temporary loss or restricted access to fishing grounds	Decommissioning	2	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Temporary loss or restricted access to fishing grounds	Construction	3	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Temporary loss or restricted access to fishing grounds	Decommissioning	3	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Long term loss or restricted access to fishing grounds	Operation and maintenance	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Long term loss or restricted access to fishing grounds	Operation and maintenance	2	Al fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Long term loss or restricted access to fishing grounds	Operation and maintenance	3	Al fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Construction	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Displacement of fishing activity into other areas	Operation and maintenance	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Displacement of fishing activity into other areas	Decommissioning	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Displacement of fishing activity into other areas	Construction	2	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Operation and maintenance	2	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Decommissioning	2	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Construction	3	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Operation and maintenance	3	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Displacement of fishing activity into other areas	Decommissioning	3	All fleets: Medium	All fleets: Medium	Moderate adverse	Yes	Minor adverse	Yes
Impacts to commercial exploited species populations	Construction	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Impacts to commercial exploited species populations	Operation and maintenance	1	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None

Description of Impact	Phase	Cumulative Effects Assessment Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Measures	Significance of Residual Effect	Proposed Monitoring
Impacts to commercial exploited species populations	Construction	2	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Impacts to commercial exploited species populations	Operation and maintenance	2	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Impacts to commercial exploited species populations	Construction	3	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None
Impacts to commercial exploited species populations	Operation and maintenance	3	All fleets: Low	All fleets: Medium	Minor adverse	None	Minor adverse	None

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