

Pentland floating offshore wind farm

Volume 2: Offshore EIAR

Chapter 13: Commercial Fisheries



OFFSHORE EIAR (VOLUME 2): MAIN REPORT

CHAPTER 13: COMMERCIAL FISHERIES

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GLOSSARY OF PROJECT TERMS

Key Terms	Definition
Dounreay Tri Floating Wind Demonstration Project (the 'Dounreay Tri Project')	The 2017 consented project that was previously owned by Dounreay Tri Limited (in administration) and acquired by Highland Wind Limited (HWL) in 2020. The Dounreay Tri Project consent was for two demonstrator floating Wind Turbine Generators (WTGs) with a marine licence that overlaps with the Offshore Development, as defined. The offshore components of the Dounreay Tri Project consent are no longer being implemented.
Highland Wind Limited	The Developer of the Project (defined below) and the Applicant for the associated consents and licences.
Landfall	The point where the Offshore Export Cable(s) from the PFOWF Array Area, as defined, will be brought ashore.
Offshore Export Cable(s)	The cable(s) that transmits electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OECC)	The area within which the Offshore Export Cable(s) will be located.
Offshore Site	The area encompassing the PFOWF Array Area and OECC, as defined.
Onshore Site	The area encompassing the PFOWF Onshore Transmission Infrastructure, as defined.
Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s) (the 'Offshore Development')	All offshore components of the Project (WTGs, inter-array and Offshore Export Cable(s), floating substructures, and all other associated offshore infrastructure) required during operation of the Project, for which HWL are seeking consent. The Offshore Development is the focus of this Environmental Impact Assessment Report.
PFOWF Array	All WTGs, inter-array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the PFOWF Array Area, as defined, excluding the Offshore Export Cable(s).
PFOWF Array Area	The area where the WTGs will be located within the Offshore Site, as defined.
PFOWF Onshore Transmission Infrastructure (the 'Onshore Development')	All onshore components of the Project, including horizontal directional drilling, onshore cables (i.e. those above mean low water springs), transition joint bay, cable joint bays, substation, construction compound, and access (and all other associated infrastructure) across all project phases from development to decommissioning, for which HWL are seeking consent from The Highland Council.
PFOWF Project (the 'Project')	The combined Offshore Development and Onshore Development, as defined.

ACRONYMS AND ABBREVIATIONS

AIS	Automatic Information System
CEMP	Construction Environmental Management Plan
COLREGS	International Regulations for the Prevention of Collision at Sea
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Report
EMF	Electromagnetic Fields
EU	European Union
FIR	Fisheries Industry Representative
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FMMS	Fisheries Management and Mitigation Strategy
HDD	Horizontal Directional Drilling
HWL	Highland Wind Limited
ICES	International Council for the Exploration of the Sea
km	kilometre
IMO	International Maritime Organisation
m	metre
MMO	Marine Management Organisation
MS	Marine Scotland
MS-LOT	Marine Scotland - Licensing Operations Team
MSS	Marine Scotland Science
NAFC	North Atlantic Fisheries College
NECRIFG	North and East Coast Regional Inshore Fishery Group
nm	Nautical Mile
NtM	Notice to Mariners
OECC	Offshore Export Cable Corridor
OFA	Orkney Fishing Association
OFLO	Offshore Fisheries Liaison Officer
Offshore EIAR	Offshore Environmental Impact Assessment Report
PFOWF	Pentland Floating Offshore Wind Farm
PO	Plan Option
S.36	Section 36
SFF	Scottish Fishermen's Federation
SHE	Scottish Hydro Electric
SNMP	Scottish National Marine Plan

SOLAS	International Regulations for the Safety of Life at Sea
SWFPA	Scottish White Fish Producers Association
TAC	Total Allowable Catch
UK	United Kingdom
VMS	Vessel Monitoring System
WTG	Wind Turbine Generator

13 COMMERCIAL FISHERIES

13.1 Introduction

The potential effects of the Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s), hereafter referred to as the 'Offshore Development', during construction, operation and maintenance, and decommissioning on Commercial Fisheries are assessed in this chapter. This chapter also includes a review of the potential cumulative impacts with other relevant projects. Impacts relating to the distribution and abundance of commercially important species, including habitat impacts and impacts on ecology, are addressed in Chapter 10: Fish and Shellfish Ecology. Other impacts associated with Commercial Fisheries, including those relating to navigation, are discussed in Chapter 14: Shipping and Navigation.

This assessment has been undertaken by Xodus Group Limited. Further details on the competency of the Project Team, including lead authors for each chapter, are provided in Volume 3: Appendix 1.1: Details of the Project Team of this Offshore Environmental Impact Assessment Report (Offshore EIAR).

13.2 Legislation, Policy, and Guidance

The following relevant legislation and guidance relating to Commercial Fisheries were consulted in preparing this chapter:

13.2.1 Legislation

- > Fisheries Act 2020: The United Kingdom (UK) left the European Union (EU) in January 2021. As a result, EU regulations and policies which apply to EU Member States are no longer applicable in UK waters (within 370 kilometres [km] [200 nautical miles (nm)] of the coast); however, a number of EU regulations and policies have been retained (termed 'retained EU law'). The reformed Common Fisheries Policy (EC, 2014) is no longer applicable to UK waters, including Scottish waters (out to 370 km [200 nm] from the Scottish mainland). The UK is now a sovereign independent coastal state with the right to manage the resources in its waters, which was established through the Fisheries Act 2020 as amended. As an independent coastal state, the UK Government is responsible for managing the UK's territorial waters (out to 22 km [12 nm]) and the Exclusive Economic Zone (out to 370 km [200 nm] or the median line with other states). Following its departure from the EU, the UK can now regulate the access of non-UK fishing vessels to UK waters. Non-UK vessels now require licences to fish in UK waters, as per Section 16 of the Fisheries Act 2020 and the Trade and Cooperation Agreement, which came into force on 1 January 2021. During a transition period up to 2026, licenced EU vessels have access to fish specific Total Allowable Catch (TAC) and non-quota stocks in UK waters between the 220-km and 370-km (12-nm and 200-nm) limit and in areas where vessels have historic fishing rights between the 11-km and 22-km (6-nm and 12-nm) limit. Gradual changes to quota shares and TACs will also occur between 2021 and 2026, including a gradual reduction of EU quota shares within UK waters and the transfer of 25% of EU's fishing rights in UK waters to UK fleets (European Commission, 2020; European Council, 2021). Following the transition period, annual consultations will take place to determine access for EU vessels in UK waters and quota shares.

13.2.2 Policy

- > Scotland's National Marine Plan (MS, 2015) sets out policies and objectives requiring marine planners and decision-makers to consider the potential impacts of development on fisheries interests and is useful to identify some of the key concerns and issues that should be addressed in any impact assessment. Policies under Section 6 Sea Fisheries and General Policies GEN 1, GEN 4, and GEN 17 are considered relevant to Commercial Fisheries.

13.2.3 Guidance

- > Best practice guidance for fishing industry financial and economic impact assessments (UKFEN, 2012): The guidance provides information on the impacts to the fishing industry as a result of areas that are closed or restricted to normal fishing operations;

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- > Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010) provides useful measures to reduce the impacts for offshore floating wind and included fisheries representatives in the process;
 - > Fishing and Submarine Cables - Working Together (ICPC, 2009) provides information that promotes high standards of reliability and safety in the submarine cable environment;
 - > Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (FLOWW, 2014): This guidance was developed to inform developers within the offshore renewable energy sector and the commercial fisheries community on the need for effective communication at all stages in the development and operation of offshore renewable energy installation;
 - > FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendation for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015): This guidance complements the above FLOWW document and is to be used to inform discussions in conjunction with this document; and
 - > Scottish Government and Xodus Group Limited (2022): Good Practice Guidance for Assessing Fisheries Displacement by Other Licensed Marine Activities: Literature Review. This document provides good practice guidance for assessing fisheries displacement by other licensed marine activities.

13.3 Scoping and Consultation

Scoping and consultation have been ongoing throughout the Environmental Impact Assessment (EIA) process and have played an important role in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Offshore Development given the requirements of the regulators and their advisors.

Relevant comments from the EIA Scoping Opinion, Scoping Opinion Addendum, and other consultations specific to Commercial Fisheries provided by Marine Scotland - Licensing Operations Team (MS-LOT), Marine Scotland Science (MSS), Scottish Fishermen's Federation (SFF), and North and East Coast Regional Inshore Fishery Group (NECRIFG) are summarised in Table 13.1 below, which provides a high-level response on how these comments have been addressed within the Offshore EIAR.

Table 13.1 Summary of consultation responses specific to Commercial Fisheries

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
Scoping Opinion		
MS-LOT (on behalf of Scottish Ministers) / MSS	<p>MS-LOT: With regards to the available information proposed by the Developer to be used to inform the Commercial Fisheries baseline assessment, the Scottish Ministers highlight the MSS advice and advise that the most up to date fisheries statistics must be used. The Scottish Ministers recommend that all the data and guidance detailed in the MSS advice, including the MSS good practice guidance for assessing fisheries displacement once published, are fully considered in the EIAR.</p> <p>MSS: MSS highlight that finalised Scottish Government fisheries statistics for 2019 were published in October 2020 and therefore MSS recommend using the most up-to-date statistics. Please note that the format of the statistics has changed and from 2019 onwards, these will be published in .csv format and made available through the Marine Scotland Data page:</p> <p>https://data.marine.gov.scot/group/fisheries.</p> <p>The 2019 finalised statistics (which include finalised statistics for 2015 - 2019) are available on the following web page (doi: 10.7489/12338-1):</p> <p>https://data.marine.gov.scot/dataset/2019-scottish-sea-fisheries-statistics-fishing-effort-and-quantityand-value-landings-ices</p> <p>Historical statistics are also still available on the following web page:</p> <p>https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/RectangleData</p>	<p>The most up-to-date fisheries statistics available through the Marine Management Organisation (MMO) have been used (see Sections 13.4.2 and 13.4.3.1). This dataset covers the Study Area (as defined in Section 13.4.1) and can be queried by a greater number of fishing gear categories than fisheries statistics available through the Scottish Government. To account for the potential impact of the COVID-19 pandemic on fishing patterns in 2020, the annual variation in landings values between 2016 and 2020 is assessed in Section 13.4.3.4.</p> <p>The MSS good practice guidance for assessing fisheries displacement has been used to inform the impact assessment (see Section 13.6).</p>
MS-LOT (on behalf of Scottish Ministers)	<p>The Developer summarises all potential impacts on Commercial Fisheries during different phases of the Offshore Proposed Development within Table 9-1 of the Scoping Report. All impacts identified by the Developer are proposed to be scoped in for assessment within the EIAR. The Scottish Ministers agree all potential impacts must be scoped in however, advise that the representations from the SFF and NECRIFG together with the MSS advice must also be fully considered and addressed by the Developer.</p>	<p>Consultation responses from the SFF, NECRIFG, and MSS have been considered in drafting this chapter.</p>

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
MS-LOT (on behalf of Scottish Ministers) / MSS	<p>MS-LOT: <i>The Scottish Ministers highlight the MSS representation that as final design of the floating substructure, mooring system, anchor type and wind farm configuration have not been confirmed this has not allowed a full assessment of the potential impacts on Commercial Fisheries.</i></p> <p>MSS: <i>MSS understand that the final design of the floating substructure, mooring system, anchor type and wind farm configuration have not been confirmed yet. These final details will help MSS to make a better assessment of the potential impacts on Commercial Fisheries.</i></p>	The final design has not been confirmed; however, the impact assessment considers the worst case scenario for each impact, based on the Design Envelope for the Offshore Development. This allows for a full assessment and for representations by stakeholders to be made. The final WTG layout and design will be developed based on technical and commercial requirements and through consultation with relevant stakeholders, and presented within the Development Specification and Layout Plan which is subject to approval during the discharge of Section 36 (S.36) Consent and Marine Licence conditions (see Chapter 5: Project Description).
MS-LOT (on behalf of Scottish Ministers), SFF, and NECRIFG	<p>MS-LOT: <i>With regards to impacts on crab, lobster and scallop fisheries, the Scottish Ministers highlight the comments from NECRIFG that there are active shellfish areas within the Offshore Proposed Development and the SFF representation that indicates there is a high chance of scallop and creel fishing, especially crab fishing on the proposed Export Cable Corridor route. The Scottish Ministers advise that impacts on these fisheries must be scoped in and considered within the EIAR. The Scottish Ministers further highlight the SFF representation which suggests that there may also be a latent squid fishery and a haddock fishery within the wider area. The Scottish Ministers advise that impacts on squid and haddock fisheries must also be scoped in and considered in the EIAR.</i></p> <p>NECRIFG: <i>The inshore area is of most concern to the NECRIFG membership and by definition it will be the cable route which is of most interest. It is my understanding that there are active shellfish areas within the new development area and this includes, crab, lobster and scallop fishing. Inevitable impacts on these fisheries should be scoped in going forward and working with industry is key to ensure that the best information is available.</i></p> <p>SFF: <i>In terms of the wider area, we have had representations from members on a Haddock fishery, described as the Middens, which provides a winter fishery. There may also be a latent Squid fishery, and a high chance of Scallop fishing and Creel fishing on the export cable route, especially as Crab fishing has grown exponentially since the</i></p>	<p>Shellfish fisheries as well as haddock and squid fisheries have been considered within the baseline description set out in Section 13.4.3 and the Impact Assessment set out in Section 13.6.</p> <p>The Dounreay closed area, established under the Food Protection (Emergency Prohibitions) (Dounreay Nuclear Establishment) Order 1997, within which all fishing is prohibited, covers the nearshore section of the Offshore Export Cable Corridor (OECC); however, it is understood that vessels operating static fishing gear work within and around the PFOWF Array Area to the edge of the Dounreay closed area. HWL has appointed a Fisheries Liaison Officer (FLO) and a Fisheries Industry Representative who are actively liaising with these stakeholders. All mobile fishing gear operators which work in the area will be provided with updates throughout the development process. The potential impacts of loss of access to fishing grounds during construction, operation and maintenance, and decommissioning are considered within this Offshore</p>

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>original application. All of which need to be include in the scoping, to ensure the value of them is recognised going forward.</i>	EIAR, along with the other potential impacts assessed in Section 13.6.
MS-LOT (on behalf of Scottish Ministers and MSS)	<p>MS-LOT: <i>The Scottish Ministers advise that a fisheries displacement assessment must be carried out to estimate displacement levels. This assessment must include, but not be limited to, consideration of minimum operating space requirements for the range of fishing activities (deploying and hauling gear), vessel maneuverability and over trawlability. In addition, the assessment must include permanent loss and displacement in relation to the potential for damage or loss of fishing gear due to entanglement and snagging on floating and subsea structures and must consider the impact of displaced fishing on surrounding areas and other marine users. The MSS advice supporting this view must be fully implemented by the Developer.</i></p> <p>MSS: <i>It is likely that the development of a floating offshore wind farm and its associated cabling and mooring infrastructure may result in a permanent loss of access to fishing grounds and displacement of fishing activity for certain types of fisheries, in particular mobile fishing. This is due to health and safety concerns, and the potential for damage or loss of fishing gear due to entanglement and snagging on floating and subsea structures. This permanent loss and displacement should be considered in a fisheries displacement assessment to estimate displacement levels. This assessment should include (but not be limited to):</i></p> <ul style="list-style-type: none"> <i>> consideration of minimum operating space requirements for the range of fishing activities (deploying and hauling gear);</i> <i>> vessel maneuverability and,</i> <i>> over-trawl-ability of cables.</i> 	A fisheries displacement assessment is provided in Section 13.6, which considers the advice provided by MS-LOT and MSS.
MS-LOT (on behalf of Scottish Ministers) / MSS	<p>MS-LOT: <i>With regards to mitigation, the Scottish Ministers direct the Developer to the MSS representation and recommend that consideration of the types of fishing that takes place in the area, their minimum operating space requirements and vessel maneuverability are factored into the wind farm layout, configuration and turbine spacing, where possible, from an early design process stage. The Scottish Ministers strongly recommend continued engagement and consultation with fisheries</i></p>	The WTG layout and design have not been finalised. The impact assessment considers the worst case scenario for each impact, based on the Design Envelope for the Offshore Development. The final WTG layout will be developed based on technical and commercial requirements, and through consultation

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<p><i>stakeholders throughout all stages of the application process. The Scottish Ministers highlight the MSS advice that the Developer must consult fisheries stakeholders on the feasibility of the proposed rock protection measures to avoid the risk of fishing gear snagging on cable protection measures. This view is also supported by the SFF. The Scottish Ministers further highlight the NECRIFG representation regarding engagement with fisheries stakeholders on the cable route and over trawl surveys.</i></p> <p>MSS: <i>In terms of mitigation, MSS recommends consideration of the types of fishing that take place in the area, their minimum operating space requirements (deploying and hauling gear) and vessel maneuverability, and factor this into wind farm layout, configuration and turbine spacing where possible from an early design process stage.</i></p> <p><i>MSS recommend consulting with fisheries stakeholders on the feasibility of the proposed cable protection measures, either concrete mattresses or rock placement, to avoid the risks of fishing gear snagging on cable protection measures.</i></p>	<p>with relevant stakeholders and presented within the Development Specification and Layout Plan that will be subject to approval as part of the discharge of S.36 Consent and Marine Licence conditions.</p> <p>Fisheries stakeholder consultation has been maintained throughout the EIA process and will continue in the post-consent phase.</p> <p>Regarding overtrawl surveys, this would mainly be of relevance to demersal trawl and dredge vessels. The Vessel Monitoring System (VMS) values from 2016 to 2019 show low to moderate overall activity by this fleet within the PFOWF Array Area and less activity within the OECC. However, if required, HWL will develop an overtrawl survey methodology, which will be included in the Fisheries Management and Mitigation Strategy (FMMS), and will be subject to approval as part of the discharge of S.36 Consent and Marine Licence conditions.</p>
MS-LOT (on behalf of Scottish Ministers), SFF, and NECRIFG	<p>MS-LOT: <i>In relation to decommissioning, the Developer has stated in the Scoping Report that cables and scour protection may be left in situ. The Scottish Ministers advise that the MSS, SFF and NECRIFG representations on decommissioning are fully considered and highlight that full removal is the default position for the decommissioning of offshore renewable energy infrastructure in line with the relevant government guidance and that exceptions from full removal will be considered in line with the standards set by the International Maritime Organisation ("IMO") in 1989, only on presentation of compelling evidence that removal would create unacceptable risks to personnel or to the marine environment, be technically unfeasible or involve extreme costs. The IMO exception for 'extreme cost' is not normally expected to be accepted where it is the sole reason being cited for partial decommissioning.</i></p> <p>MSS: <i>With regards to decommissioning, the developer states that cables and scour protection may be left in situ. MSS advise that all infrastructure that might pose a hazard to fishing should be removed.</i></p>	<p>A Decommissioning Programme will be developed pre-construction as described in Chapter 5: Project Description.</p> <p>The decommissioning approach is set out in Section 5.11. The starting position for offshore components is complete removal to shore for re-use, recycling, and disposal unless there is compelling evidence to leave the buried sections <i>in situ</i>. Scour protection may be left <i>in situ</i> as it may not be practical to recover. Anchor piles may also be cut to a depth of 1 meter below the seabed and left <i>in situ</i>. Relevant stakeholders and regulators will be consulted to establish the approach. The seabed will be restored, as far as reasonably practicable, to the</p>

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<p>NECRIFG: <i>As far as the future decommissioning of the development it has been made very clear to me that the only option should be reinstatement of the site safeguarding the area for future use.</i></p> <p>SFF: <i>Chapter 5.5 on decommissioning, should, as in previous developments at sea, have a default position of reverting to the initial state. There should be a clear plan, including financial aspects, to show removal.</i></p>	condition it was prior to the construction of the Offshore Development.
MSS	<p><i>MSS is commissioning a project to develop good practice guidance for assessing fisheries displacement by other licensed marine activities. This contract has commenced and will end in July 2021. MSS recommend referring to this guidance if it is published in time to supplement this EIAR.</i></p> <p><i>The "Good practice guidance for assessing fisheries displacement by other licensed marine activities" has not been published yet. However, it is now in a final draft state with the aim for publication in autumn 2021.</i></p>	The MSS good practice guidance for assessing fisheries displacement has been used to inform the impact assessment (see Section 13.6).
MSS	<i>The assessment should also consider the impact of displaced fishing on surrounding areas and other marine users.</i>	A fisheries displacement assessment is provided in Section 13.6 which considers this advice.
NECRIFG	<p><i>We would have hoped to have much more clarity on the issue of the connecting cable. As mentioned above it is essential that those fishers mentioned above are involved at an early stage to try to position the cable route with the least impact but still fulfils the need of the developer. This should involve discussion on the issue of over trawl surveys which we would like to see acknowledged and specifics of what work will be undertaken included in the next stages. It is noted that Chapter 7 makes mention of the requirement for 2 cables and therefore the impacts are doubled depending in how this is taken forward.</i></p> <p><i>This should involve discussion on the issue of over trawl surveys which we would like to see acknowledged and specifics of what work will be undertaken included in the next stages.</i></p>	<p>The impacts of the Offshore Export Cable(s) have been fully assessed within this chapter and the worst case scenario has been assumed</p> <p>The final offshore export cable route has not yet been determined; however, relevant consultees will be consulted on the Cable Plan that will detail a more refined location / route that will be informed by a Cable Burial Risk Assessment. The Cable Plan will be subject to approval as part of the discharge of S.36 Consent and Marine Licence conditions.</p> <p>Regarding overtrawl surveys, this would mainly be of relevance to demersal trawl and dredge vessels. The VMS values from 2016 to 2019 show low to moderate overall activity by this fleet within the PFOWF Array Area and less still within the OECC. The Offshore</p>

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
		Export Cable(s) will also be of a relatively short length (12.5 km for each cable). However, if required, HWL will develop an overtrawl survey methodology, which will be included in the FMMS, and will be subject to approval as part of the discharge of S.36 Consent and Marine Licence conditions.
	<i>We are concerned that the document does not mention specifically the parts of the Scottish National Marine Plan [SNMP] which refer to fishing, we see this as fundamental to the document and would like to see due reference to this document going forward.</i>	The SNMP is referred to in Section 13.2, where relevant for the EIA, along with other relevant guidance such as the FLOWW guidance (2014; 2015).
SFF	<i>While acknowledging that the previously consented Dounreay Tri is the basis for the new application, when defining them it would be helpful to have direct comparisons to the previous application. SFF also acknowledge that the 2017 Consented area was of no impact on Commercial Fisheries.</i>	This Offshore EIAR includes details on all relevant project areas as part of the detailed project description set out in Chapter 5: Project Description. This application is a standalone application; therefore, a comparison of the Dounreay Tri Project's consent is not appropriate within the EIA. Nonetheless, an outline of the Dounreay Tri Project's consent is provided in Chapter 1: Introduction.
	<i>The introduction (chapter 1) indicates that the farm could be 5 times the size of the 2017 consent, without being overly clear on what that means. Nevertheless, the new parameters are quite likely to interfere with fishing activity, described above.</i>	Since the Scoping Report was submitted, the Offshore Site has been refined following consultation responses and following the Pre-application Consultation (PAC) event held in May 2022. The PFOWF Array Area was refined to increase the setback from the Dounreay coast and decrease its overall size in comparison to the original Dounreay Tri Marine Licence area as detailed in Chapter 3: Site Selection and Alternatives and the PAC Report accompanying this application. Design parameters relevant to commercial fisheries are presented in Section 13.5.4.
	<i>Moving on to 2.3, the paper falls foul of the common mistake, in describing the sections of the Scottish National Marine Plan which suit it, whilst ignoring to quote the Fisheries policies, which generally are very protective of fisheries place in Scottish waters.</i>	This Offshore EIAR takes account of and details relevant policies from the SNMP (see Section 13.2).

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>In the discussion on the potential plan, it is clear that micro-siting is a needful tool, which if thought about at an early stage, with fishing input might help towards co-existence. Clarity will be needed as to what the minimal spacing of 800m refers to; between Platforms or Anchors.</i>	Details regarding spacing, etc. are set out in Chapter 5: Project Description. HWL is keen to continue engaging with the fisheries industry throughout the consenting process to ensure coexistence of the Offshore Development and fisheries within the area.
	<i>SFF will not be satisfied with a simple claim of 80% burial without evidence to back it up. SFF would recommend a discussion with area fishers on suitable areas for mattresses or rock dumping, this discussion could also apply to any need for scour protection to avoid creating new problems.</i>	Any protection requirements will be discussed with local fishermen in advance of the final Cable Plan.
	<i>The description, in 5.2.7.4, of installing the inter-array cables would need to be clarified as it reads like, de facto closure to mobile fisheries. 5.2.7.5 really should be quite clear about the post-lay actions, such as the discussion with fisheries on the as laid route, burial status and any need for over-trawl trials. Scour protection and future work needing reburial should also include that discussion.</i>	HWL will ensure an open dialogue with fishers on post-lay actions and all laid infrastructure locations will be provided. Regarding overtrawl surveys, this would mainly be of relevance to demersal trawl and dredge vessels. The VMS values from 2016 to 2019 show low to moderate overall activity by this fleet within the PFOWF Array Area and less still within the OECC. However, if required, HWL will develop an overtrawl survey methodology, which will be included in the FMMS, and will be subject to approval as part of the discharge of S.36 Consent and Marine Licence conditions.
SFF	<i>SFF would expect any environmental designations including fisheries management be considered in the Cumulative impacts.</i>	A cumulative impact assessment is provided in Section 13.7 and considers fisheries management for environmental designation.
	<i>Table 7.1 proposes that leaving the export cable in the seabed could be beneficial, which the SFF takes issue with on safety grounds, and would insist on reinstatement.</i>	All relevant options will be considered as part of the Decommissioning Plan, details of which are provided in Chapter 5: Project Description. This will include consideration of the environmental, technical, and health and safety aspects associated with each option.

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>Chapter 8.3, points 7 & 8, would be strengthened by the addition of a baseline for commercially significant fish in order to assist in full and proper monitoring.</i>	A full baseline describing commercially significant fish in the area is included in Chapter 10: Fish and Shellfish Ecology and Section 13.4.3.
	<i>Table 8.4 scopes out Electromagnetic Fields (EMF), the SFF would contend that there is insufficient evidence to do so, therefore scope in. It gives Aggregations on Turbines as minor impact, which seems to be contradictory to other lines, so should be scoped in. Then we have the scoping in of Ghost Fishing, which will be interesting to see the justification and the outputs.</i>	<p>The potential impacts due to EMF during the operation and maintenance phase are scoped in for assessment (see Chapter 10: Fish and Shellfish Ecology).</p> <p>The potential effect of fish aggregation effects around the floating structure and associated infrastructure during the operation and maintenance phase are scoped in for assessment (see Chapter 10: Fish and Shellfish Ecology).</p> <p>In addition, the potential for ghost fishing (i.e. derelict fishing gear continuing to 'fish') is associated with the entanglement of fishing gear with the floating subsea structures and is assessed in Section 13.6.2.3.</p>
	<i>The SFF remains to be convinced about the safety of the practice of cutting cables, taking away any bare ones, but leaving buried ones. Similarly with rock dump & scour protection, the development should be clear as to how that is cleaned up after 25 years.</i>	<p>A Decommissioning Programme will be developed and further details are provided in Chapter 5: Project Description; Section 5.11.</p> <p>The decommissioning approach is set out in Section 5.11. This starts from the philosophy of complete removal of offshore infrastructure to shore for re-use, recycling and disposal during decommissioning, unless there is compelling evidence to leave the buried sections in situ. The only exception to this would be scour protection, which may not be practical to recover. Anchor piles may also be cut to a depth of 1 m below the seabed and left in situ. Relevant stakeholders and regulators will be consulted to establish the approach. Overall, the approach is for the seabed to be restored, as far as reasonably practicable to the condition it was prior to the construction of the Offshore Development.</p>

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>Table 13.1 seems to underplay the “wave regime” it will also impact on construction and decommissioning. As there is little real evidence available EMF/Heat should be scoped in. And, finally, fish aggregation should be scoped in so that it can be assessed against the claims made for its benefits.</i>	Environmental conditions within the PFOWF Array Area are considered and are reflected within the two-year construction phase, which avoids more difficult winter weather conditions. The engineering and design of the Offshore Development account for normal and extreme sea states (typically 50- and 100-year storm conditions). Potential impacts due to EMF during the operation and maintenance phase are scoped in for assessment (see Chapter 10: Fish and Shellfish Ecology). The potential effect of fish aggregation effects around the floating structure and associated infrastructure during the operation and maintenance phase are scoped in for assessment (see Chapter 10: Fish and Shellfish Ecology).
	<i>Moving on to chapter 9, reliance on Automatic Information System (AIS) may not be the whole picture. The 2017 consent area avoided fishing grounds, the expansion may not. Table 9.1 is not clear on Habitat recovery post decommissioning. Table 9.7 seems very positive about Tourism, Socio-economics etc., the SFF would like to see that assessed in future to verify the assumptions the development is making.</i>	Several data sources have been used to characterise the Commercial Fisheries baseline, including but not limited to AIS, as described in Section 13.4.2. Habitat recovery refers to the habitat recovering to a similar state to that which was present prior to the installation of structures. A detailed Socio-Economic Assessment is presented in Chapter 19: Socio-economics, Recreation, and Tourism.
Scoping Addendum Opinion Responses		
MS-LOT (on behalf of Scottish Ministers)	<i>The Developer notes that it has not reconsidered commercial fisheries as there would be no pathway to impact from the project changes compared with the 2021 Pentland Scoping Opinion. While the Scottish Ministers agree that these increases are not new impacts and the approach to assessing them will not alter, there will be an increase in the project spatial footprint with the added complexity of more subsea infrastructure.</i>	The assessment has considered the project design changes proposed within the Scoping Opinion Addendum. The assessment considers the worst case scenario for each impact, based on the Design Envelope for the Offshore Development. This allows for

Consultee	Comment/ Issue Raised	Offshore Development Approach and Section ID
	<i>This will increase the area unavailable to some types of commercial fishing practices, mainly mobile gear, due to safety concerns and the risk of snagging gear as highlighted by the MSS advice and representation from the SFF. In line with the MSS advice, the Scottish Ministers advise that this should be considered within the fisheries displacement assessment.</i>	a full assessment and for representations by stakeholders to be made. The assessment of displacement, presented in Section 13.6, considers the potential for fishing (e.g. by mobile fishing gear) to resume within the PFOWF Array Area.
SFF	<i>If there are piles going in, the grounds lost to fishing must be scoped in, if any.</i>	The potential effect of loss of fishing grounds is assessed in Section 13.6.
Cumulative Projects List		
The Highland Council	<p><i>Having reviewed the submitted document, I would suggest the following projects are also included in the cumulative assessment:</i></p> <p>> <i>Space Hub Sutherland (in all chapters of the EIAR not just the SLVIA section).</i></p>	<p>As described in Chapter 18: Other Users of the Marine Environment, the launch vehicles for the Space Hub Sutherland project (approximately 38 km southwest of the Offshore Site) will be between 7 degrees east of due north and 8 degrees west of due north. An overflight launch exclusion zone will be activated prior to and during launches that will be active for approximately six hours per launch, and there are expected to be approximately 12 launches per year. Whilst the launch exclusion zone is in operation, restrictions will be placed on marine users, such as commercial fisheries.</p> <p>Given the distance between the Offshore Site and the Space Hub Sutherland project, as well as the very short duration of the launch exclusion zones, the potential for a cumulative impact with the Offshore Development on commercial fisheries is limited.</p>

13.3.1 Additional Consultation

Consultation between Highland Wind Limited (HWL) and fisheries stakeholders has been carried out to inform the Commercial Fisheries impact assessment, in addition to the formal consultation associated with the EIA Scoping process.

Consultation with fisheries stakeholders has included the following:

- > Consultation meeting (via videoconference) with the Orkney Fishing Association (OFA), Scottish White Fish Producers Association (SWFPA), and SFF on 25th October 2021 to introduce the Project, discuss key concerns, and understand fishing patterns in the vicinity of the Offshore Site (see Sections 13.4 and 13.6);
- > Direct consultation with local fishermen by a Fisheries Industry Representative (FIR) and via an in-person Commercial Fisheries workshop held on 24th November 2021 to introduce the Project, present the current understanding of the baseline environment, and identify local concerns and fishing patterns. Three local fishers (creelers) attended the workshop. The fishers present were requested to annotate admiralty charts with their fishing grounds to understand the distribution of fishing in the area. Through the annotated admiralty charts, it was identified that three creelers are active in the Offshore Site and one is active to the west of the Offshore Site. It is understood that four additional creelers fish in the area, of which one mainly fishes there in poorer weather conditions and two are unlikely to fish within the Offshore Site itself, but these individuals were unable to attend the workshop. Key concerns raised by those that attended the workshop related to the potential for fishing to be unable to resume within or in the vicinity of the PFOWF Array Area once operational, as it was noted that creels can drift in currents in the Pentland Firth, potentially becoming entangled in the mooring lines and dynamic cables. Concerns were also raised on the potential impacts of the Offshore Development on fish and shellfish, which are assessed in Chapter 10: Fish and Shellfish Ecology. The information gained from this workshop has been incorporated throughout this chapter; and
- > Consultation with NECRIFG, OFA, SFF, and SWFPA via email, as required, to gather data on fishing activity in the vicinity of the Offshore Site. Through this consultation, it was highlighted that a seine netter and a demersal trawler fish in the northwest of the Offshore Site (see Sections 13.4 and 13.6).

13.4 Baseline Characterisation

This section outlines the current baseline for Commercial Fisheries within the Study Area, as defined in Section 13.4.1. This has been informed through a desk-based study and augmented through consultation. The section identifies the key fishing methods and commercial species relevant to the Study Area and, where possible, provides a quantitative assessment of fishing effort and value within and in the vicinity of the Offshore Site.

13.4.1 Study Area

The focus of the impact assessment is the potential impacts on Commercial Fisheries using the Offshore Site and adjacent waters.

The following areas are referred to in this impact assessment:

- > Offshore Site: The area encompassing the PFOWF Array Area and Offshore Export Cable Corridor (OECC), as defined;
- > PFOWF Array Area: The area where the Wind Turbine Generators (WTGs) will be located within the Offshore Site, as defined;
- > OECC: The area within which the Offshore Export Cable(s) will be located; and

Commercial Fisheries Study Area (the 'Study Area'): The Study Area is identified as International Council for the Exploration of the Sea (ICES) rectangles 46E5, 46E6, 47E5, and 47E6 (see

- > Figure 13.1). ICES rectangles provide a standardised spatial scale by which commercial fishing activity is monitored. The Offshore Site is not located within ICES rectangles 46E5, 47E5, and 47E6; however, it is

acknowledged that certain impacts may extend into the ICES rectangles surrounding ICES rectangle 46E6 (e.g. secondary displacement) and these ICES rectangles also provide additional context on the regional fishing activity in the area. Reference may also be made to waters outside of these four ICES rectangles to provide additional contextual information.

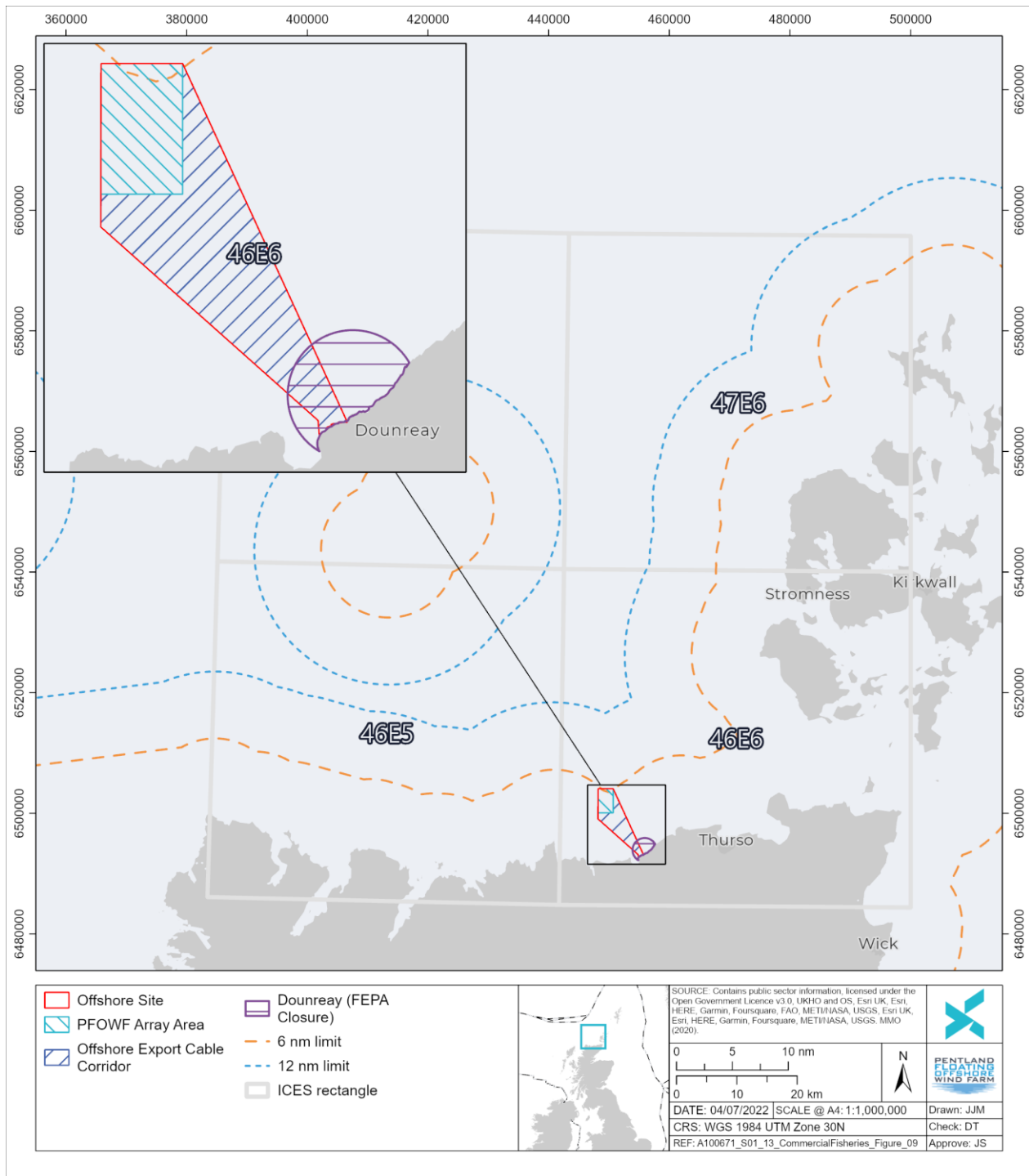


Figure 13.1 Study Area

13.4.2 Sources of Information

A review was undertaken of the literature and data relevant to this assessment of Commercial Fisheries and was used to give an overview of the existing environment. The primary data sources used in the preparation of this chapter are listed below in Table 13.2. The most up-to-date sources, available at the time of writing, have been used where possible. In addition to these datasets, this chapter has also been informed through consultation with fisheries stakeholders (see Section 13.3).

Table 13.2 Summary of key sources of information pertaining to Commercial Fisheries

Title	Source	Year	Author
Fisheries statistics per ICES Rectangle (average 2016 to 2020)	https://www.gov.uk/government/statistics/uk-sea-fisheries-annual-statistics-report-2020	2020	MMO
Surveillance sightings (2015 to 2019)	Sourced through Freedom of Information Request to the MMO.	2019	MMO
Vessel Monitoring System (VMS) values by fishing method (average 2016 to 2019)	https://environment.data.gov.uk/	2019	MMO
Spatial data on Commercial Fisheries on National Marine Plan Interactive, including restricted and prohibited fishing areas.	https://marinescotland.atkinsgeospatial.com/nmpi/	2020	National Marine Plan interactive
VMS Amalgamated Fishing Intensity Layers (2009 to 2013)	http://marine.gov.scot/node/12882	2015	Marine Scotland (MS)
Average intensity (hours) of fishing with bottom trawls (2010 to 2020)	http://marine.gov.scot/node/12832	2020	ICES / MS
Average intensity (hours) of fishing with dredges (2010 to 2020)	http://marine.gov.scot/node/12832	2020	ICES / MS
Average intensity (hours) of fishing for <i>Nephrops</i> and crustaceans with bottom trawls (2010 to 2020)	http://marine.gov.scot/node/12832	2020	ICES / MS
AIS data of fishing vessel tracks	https://environment.data.gov.uk/	2017	MMO
MS Salmon and Sea Trout Fishery Statistics and other associated reports	https://data.marine.gov.scot/dataset/salmon-and-sea-trout-fishery-statistics-1952-2020-season-reported-catch-and-effort-method	2020	MS
EU Data Collection Framework Database (available via the Science, Technical and Economic Committee for Fisheries)	https://stecf.jrc.ec.europa.eu/dd/fdi	2020	EU Data Collection Framework database

13.4.3 Baseline Description

Surveillance sightings data and fisheries statistics have been analysed to understand the key fishing methods and commercial fish and shellfish species relevant to the Study Area. This has been augmented by information gained through consultation and through an analysis of Vessel Monitoring System (VMS) and Automatic Information System (AIS) data to understand the distribution of fishing activity.

The key data gaps and limitations associated with the data sources described in the sections below are provided in Section 13.4.6.

13.4.3.1 Overview

13.4.3.1.1 Surveillance sightings

Surveillance sightings data by fishing method and nationality provide a general overview of the fishing activity across the Study Area. It should be noted, however, that due to the limitations relating to potentially uneven survey effort, these data cannot be used to provide a quantitative assessment of fishing effort and can only be interpreted to provide an indication of the general distribution of fishing activity by method and nationality.

Surveillance sightings data between 2015 and 2019 are displayed on Figure 13.2. Across the Study Area, the majority of sightings are of UK vessels, with a limited number of sightings for Danish, Dutch, French, German, and Irish vessels.

Within ICES rectangles 46E5 and 46E6, sightings are concentrated towards the northern coastline of Caithness, within the 22-km (12-nm) limit. The majority of sightings are of UK demersal stern trawlers and scallop dredgers, as well as UK potters / whelkers, which are predominantly recorded towards the east of ICES rectangle 46E6. No sightings of potters / whelkers are located within the Offshore Site. However, information gained through consultation confirmed that creelers are present. Other fishing vessels sighted in this area include other trawler vessels (trawler [all], stern trawler [pelagic / demersal]), gill netters and bottom (i.e. demersal) seiners. Sightings in the east of ICES rectangle 47E6 within the 22-km (12-nm) limit along the west of the Orkney Islands are dominated by UK potters / whelkers and demersal stern trawlers. As described in Section 13.4.3.1.2, pelagic trawling is not recorded within the landings statistics for the Study Area. Therefore, it is assumed that the majority of stern trawlers (pelagic / demersal) are demersal. Furthermore, as whelks do not form a large proportion of the landings statistics in the Study Area, the majority of these sightings are expected to be potters, targeting lobster and crab (i.e. creelers).

Further offshore, towards the north of ICES rectangles 46E5 and 46E6 and in the offshore waters of ICES rectangles 47E5 and 47E6, UK demersal stern trawlers and potter / whelkers account for the majority of sightings. Sightings of potters / whelkers are fairly evenly spread across these two ICES rectangles and sightings of demersal stern trawler are concentrated towards the northwest of ICES rectangle 47E6. Other trawler vessels are also recorded within these ICES rectangles, as well as demersal seiners, which are concentrated along the west of ICES rectangle 47E6.

13.4.3.1.2 Fisheries statistics

Fisheries statistics can be used to understand the primary fishing methods and key commercial species relevant to the Study Area. Landings values by ICES rectangle from 2016 to 2020 have been used to calculate the annual average by vessel length, fishing method, and species; these data are presented in Figure 13.3. The majority of landings across the Study Area are associated with vessels over 10 metres (m). A greater proportion of the landings values in the coastal ICES rectangles 46E6, 46E5, and 47E6 are attributed to vessels that are 10 m and under, which is consistent with smaller vessels generally having smaller operational ranges.

The landings data also generally corroborates the sightings data, indicating that demersal otter trawlers, pots and traps, and scallop dredgers account for the vast majority of fishing activity in the Study Area. Within ICES rectangle 46E6, within which the Offshore Site resides, pots and traps and demersal otter trawls contribute to a substantial proportion of the landings values, with the majority of the remaining landings values being associated with demersal seines, 'other passive gears', and scallop dredges. ICES rectangle 46E5 has comparably lower landings values than 46E6, although landings values within this ICES rectangle are mostly attributed to demersal otter trawls, pots and traps, and dredges. Notably, ICES rectangle 46E5 contains the lowest annual average landings values in the Study Area but contains the highest average annual landings values for scallop dredging.

Within ICES rectangles 47E5 and 47E6, a substantial proportion of the landings values are attributed to demersal otter trawls. Landings values for pots and traps and scallop dredges are proportionally lower than ICES rectangles 46E5 and 46E6.

In terms of species, crabs account for the highest proportion of landings values in ICES rectangles 46E5 and 46E6, consistent with the high landings values for pots and traps in these ICES rectangles. Lobster targeted by pots and traps contribute to a lower proportion of landings values in these ICES rectangles compared to

crab. In ICES rectangle 46E6, haddock and cod, targeted by demersal otter trawls and to a lesser extent demersal seines, and scallops targeted by scallop dredges, also contribute to a high proportion of landings values. Cod landings values in ICES rectangle 46E5 are comparably lower, with herring, haddock, scallops, and squid contributing to the majority of landings values. The pelagic species, such as herring and mackerel, are mainly landed by demersal otter trawls and pelagic trawling in the Study Area but were not recorded in the fisheries statistics between 2016 and 2020. Notably, squid contributes to a greater proportion of landings in ICES rectangle 46E5 when compared to the other ICES rectangles in the Study Area, forming 64% of the average landings values for this species across the Study Area. It is also understood through consultation that a latent squid fishery is present in the area.

Consistent with the lower contribution of pots and traps to the landings values in ICES rectangles 47E5 and 47E6, crab contribute to a lower proportion of landings values in these ICES rectangles. Mackerel contributes a high proportion of landings values in ICES rectangle 47E5, along with haddock and crab. In ICES rectangle 47E6, mackerel landings values are lower, and the majority of landings values are attributed to monk / anglerfish, cod, and crabs.

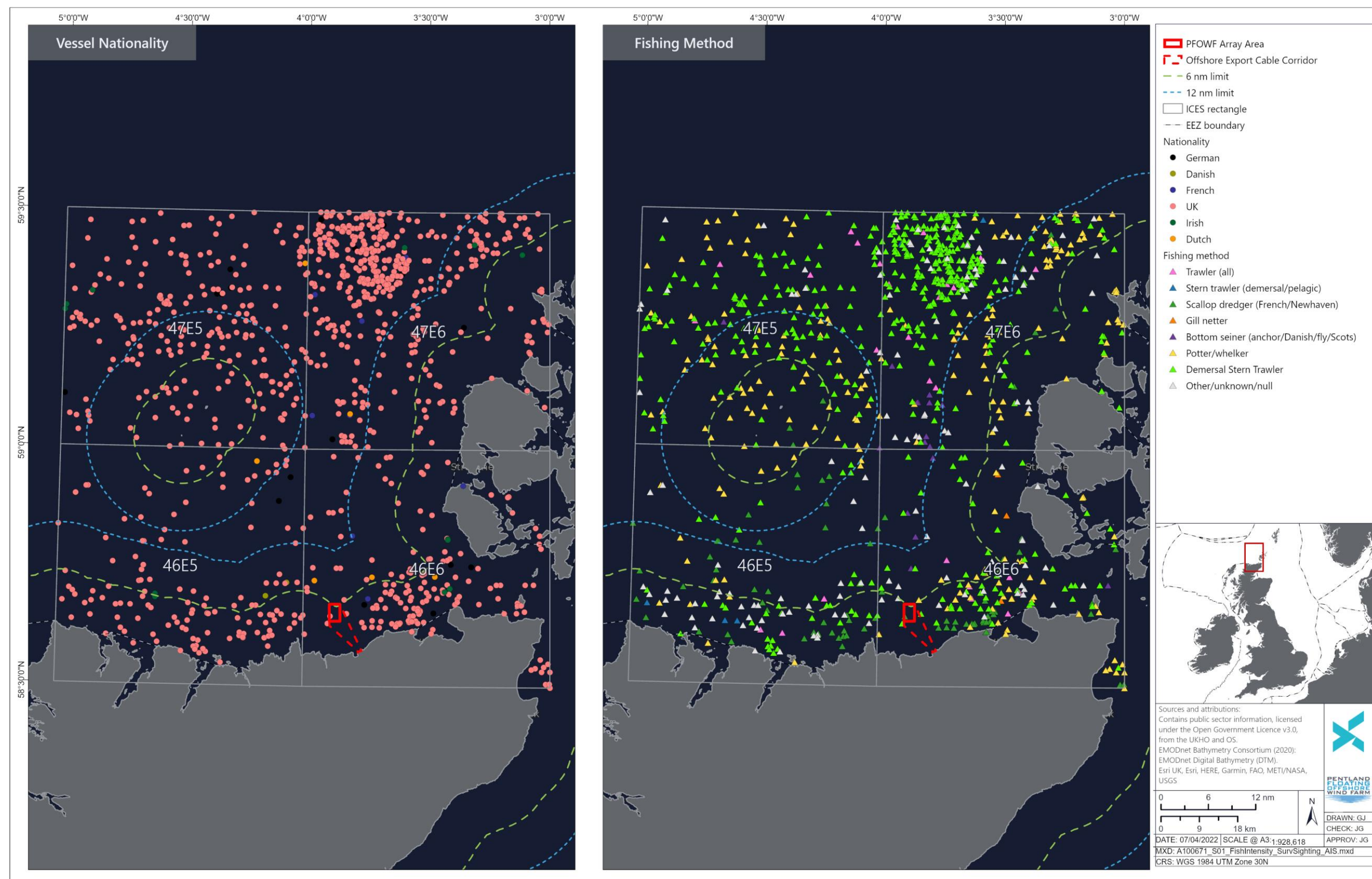


Figure 13.2 Surveillance sightings by vessel nationality and fishing method (MMO, 2020a)

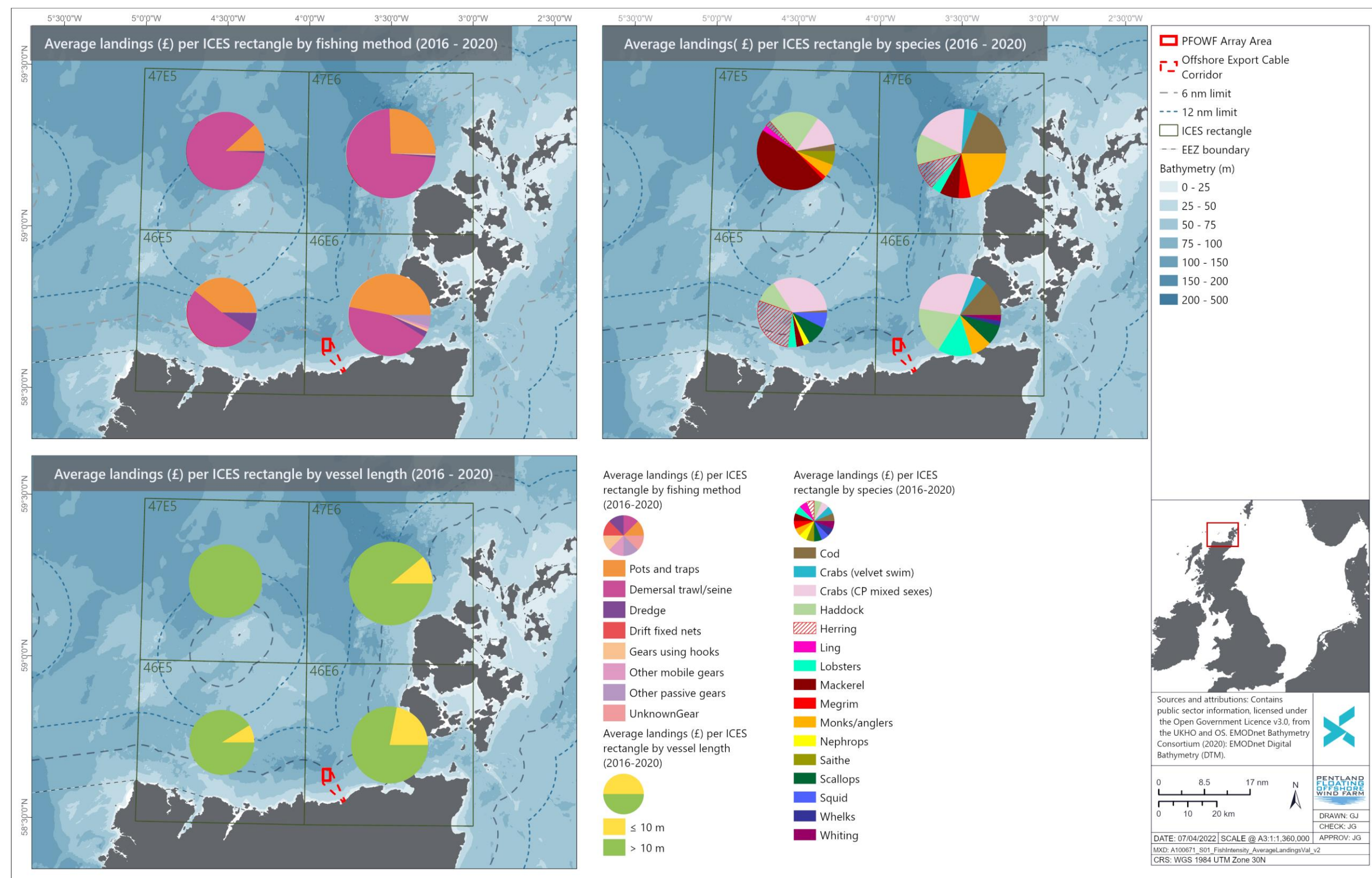


Figure 13.3 Average landings values (£) (2016 to 2020) by fishing method, species, and vessel length (MMO, 2021a) (Note: 'CP mixed sexes' denotes mixed sexes of *Cancer pagurus* [brown crab])

13.4.3.2 VMS data

VMS data for demersal trawls and seines (e.g. demersal otter trawls and demersal seines), dredge, passive gear (e.g. pots and traps), and pelagic fishing methods (e.g. midwater trawls) are presented in Figure 13.4 to Figure 13.7. Although fishing vessels over 12 m must be fitted with VMS units, the Marine Management Organisation (MMO) VMS dataset only shows effort and value for vessels over 15 m in length. Therefore, reference to the Marine Scotland (MS) VMS intensity layers, covering vessels over 12 m in length using bottom trawls and dredges, has also been included.

VMS data indicate that demersal trawling for species such as haddock and cod is highest in the north-west of the Offshore Site, which forms the southern end of an area of moderate demersal trawling activity throughout the western half of ICES rectangle 46E6 (Figure 13.4). The OECC in the south of ICES rectangle 46E6 experiences lower demersal trawling value and effort, and this is expected to be partly due to the Dounreay (Food and Environment Protection Act Closure) closed area. Within the wider Study Area, VMS values and effort from ICES rectangle 47E6 to the north of ICES rectangle 46E6 are higher, and the area of demersal trawling in ICES rectangles 47E5 and 47E6 is larger than that of 46E6. VMS data presented within a north Atlantic Fisheries College (NAFC) Marine Centre report which maps fisheries and habitats within the NECRIFG area indicate that both otter trawling and seine netting activity occurs along the west of ICES rectangle 46E6 (Shelmerdine and Mouat, 2021). Consultation also identified that Scottish seine netting vessels and trawlers are operational in the Offshore Site, predominantly in the northwest of the site.

The VMS data presented in Figure 13.4 are consistent with the surveillance sightings and fisheries statistics for ICES rectangle 46E6 and with older VMS data from 2009 to 2013 (available through MS on the National Marine Plan interactive) (Kafas *et al.*, 2013). This older VMS data indicate that demersal trawling is predominantly for whitefish and squid, with low effort levels associated with demersal trawling for *Nephrops* or other crustaceans. Demersal trawling for squid, according to VMS data from 2009 to 2013, occurs outwith the Offshore Site, in the south of ICES rectangle 46E5 and in the west of ICES rectangle 47E6. Although these data are now potentially outdated, this is consistent with the higher landings values for squid in ICES rectangle 46E5 between 2016 and 2020 (see Section 13.4.3.1.2). The latest VMS intensity layers available through MS, covering fishing by vessels over 12 m in length using bottom otter trawls from 2010 to 2020, also corroborate these other sources, indicating higher effort levels (approximately one to two days per year) in the west of ICES rectangle 46E6. Generally lower effort levels are recorded in ICES rectangle 46E6 compared that those in the north of the Offshore Site in ICES rectangle 47E6 (MS, 2021).

VMS data shown in Figure 13.5 indicate that ICES rectangle 46E6 supports relatively low levels of dredging activity for scallops, with low to moderate levels of scallop dredging activity taking place to the east and west of the Study Area nearshore. The surrounding ICES rectangles to the north of ICES rectangle 46E6, ICES rectangles 47E6 and 47E5, support patchy small areas of low dredging activity. Dredging activity is higher and more widespread in the west in ICES rectangle 46E5 and higher still in the Moray Firth to the southeast of the Study Area. VMS datasets for scallop dredging available through MS, which cover 2009 to 2013 and 2010 to 2020, are generally consistent with Figure 13.5 (Kafas *et al.*, 2013).

As shown in Figure 13.6, passive fishing activity (e.g. pots and traps / creels) by vessels over 15 m in length occurs across the Study Area. Within ICES rectangle 46E6, effort and value are highest to the east and west of the Offshore Site, with comparably lower value and effort within the Offshore Site itself. Effort and value in the remainder of the Study Area are concentrated in the south of ICES rectangle 46E5, with comparably lower value and effort in ICES rectangles 47E5 and 47E6. Notably, the majority (89%) of 10 m and under vessels represented in the landings values are attributed to pots and traps and will not be represented by the MMO VMS data, which only covers vessels over 15 m in length. During consultation, local fishers were requested to provide details on their fishing grounds and it was identified that three smaller creeling vessels are operational across the Offshore Site, targeting crab and lobster. These grounds are nearshore, out to 22 km (12 nm). It is also understood that a further four creelers fish the area, one of which fishes the area mainly in poorer weather conditions and two are unlikely to fish within the Offshore Site itself. Fishing grounds for these vessels were not mapped as these individuals were absent from the fisheries workshop conducted in November 2021.

Low levels of pelagic trawling activity are recorded in waters relevant to the Offshore Site, and those of surrounding ICES rectangles in the Study Area. Average VMS values of pelagic trawling increase to the north and west of ICES rectangle 46E6 in the west of ICES rectangle 46E5 (Figure 13.7). VMS data between 2009

and 2013 indicate that pelagic fishing activity for herring is relatively high within the Study Area. However, it should be noted that these data are several years old now, and this may represent historic fishing patterns which are no longer applicable for the Offshore Site.

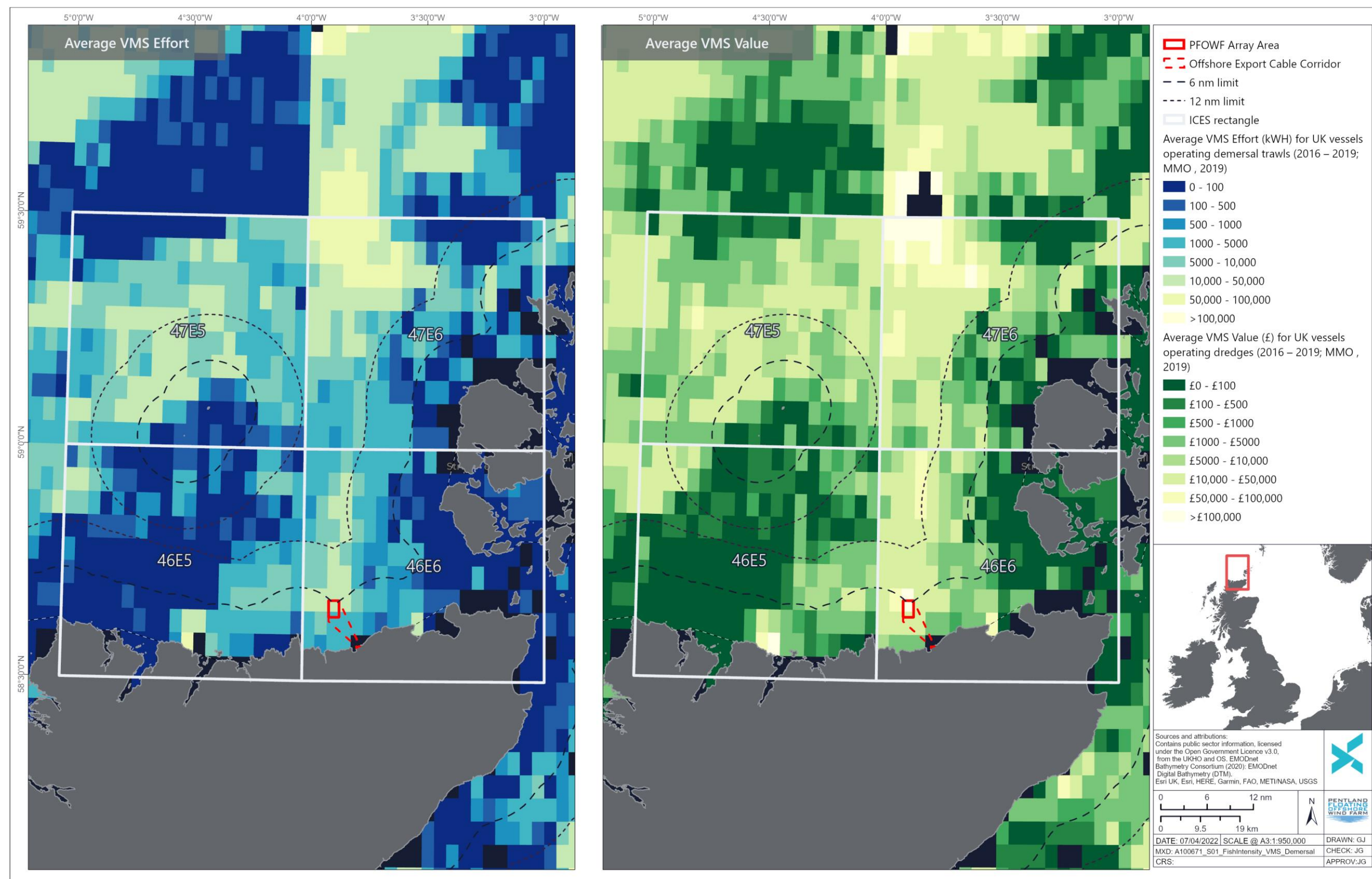


Figure 13.4 Average VMS value for demersal trawling vessels (2016 to 2019) (MMO, 2021b)

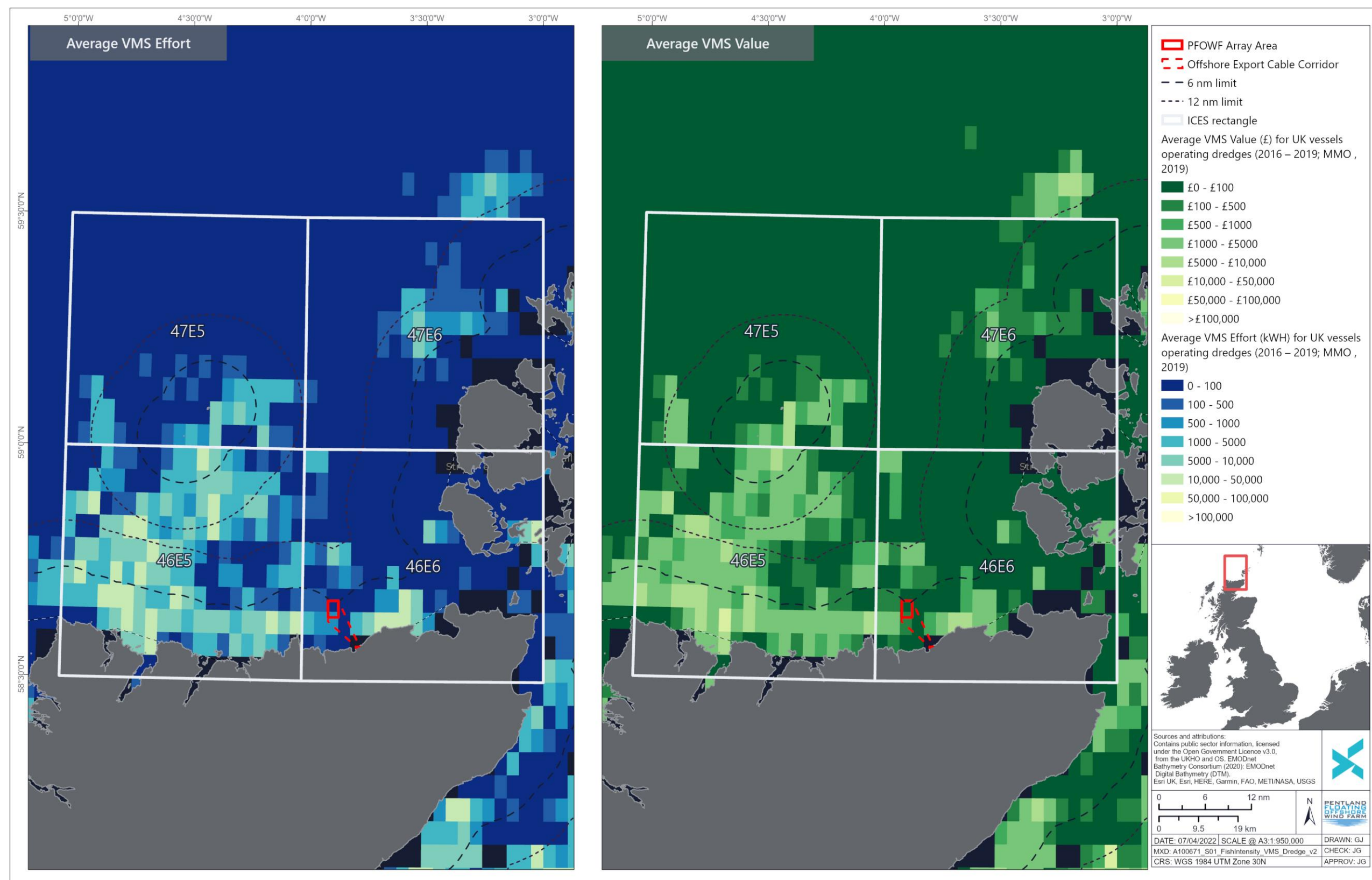


Figure 13.5 Average VMS values for dredging vessels (2016 to 2019) (MMO, 2021b)

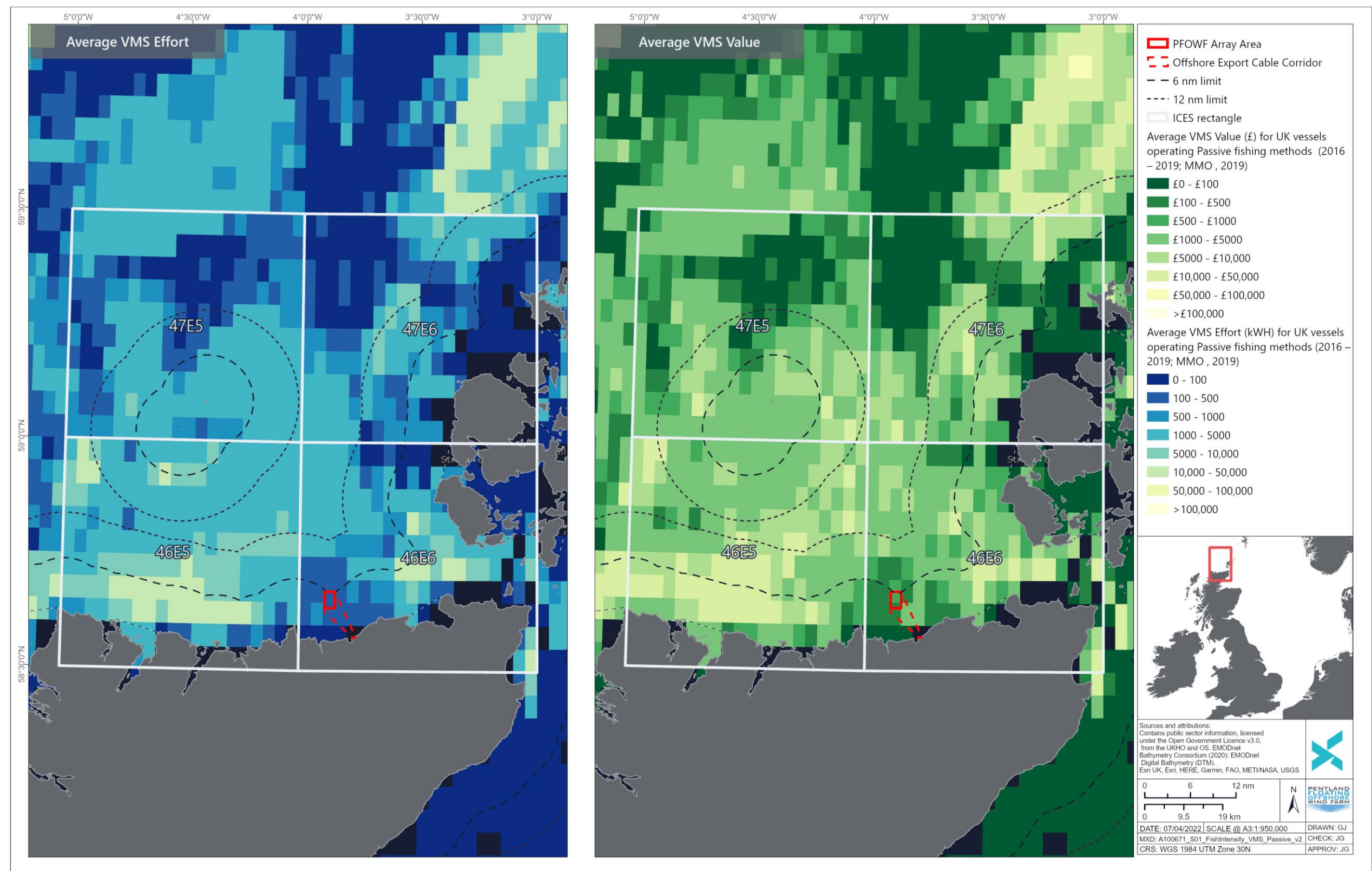


Figure 13.6 Average VMS values for passive fishing methods (2016 to 2019) (MMO, 2021b)

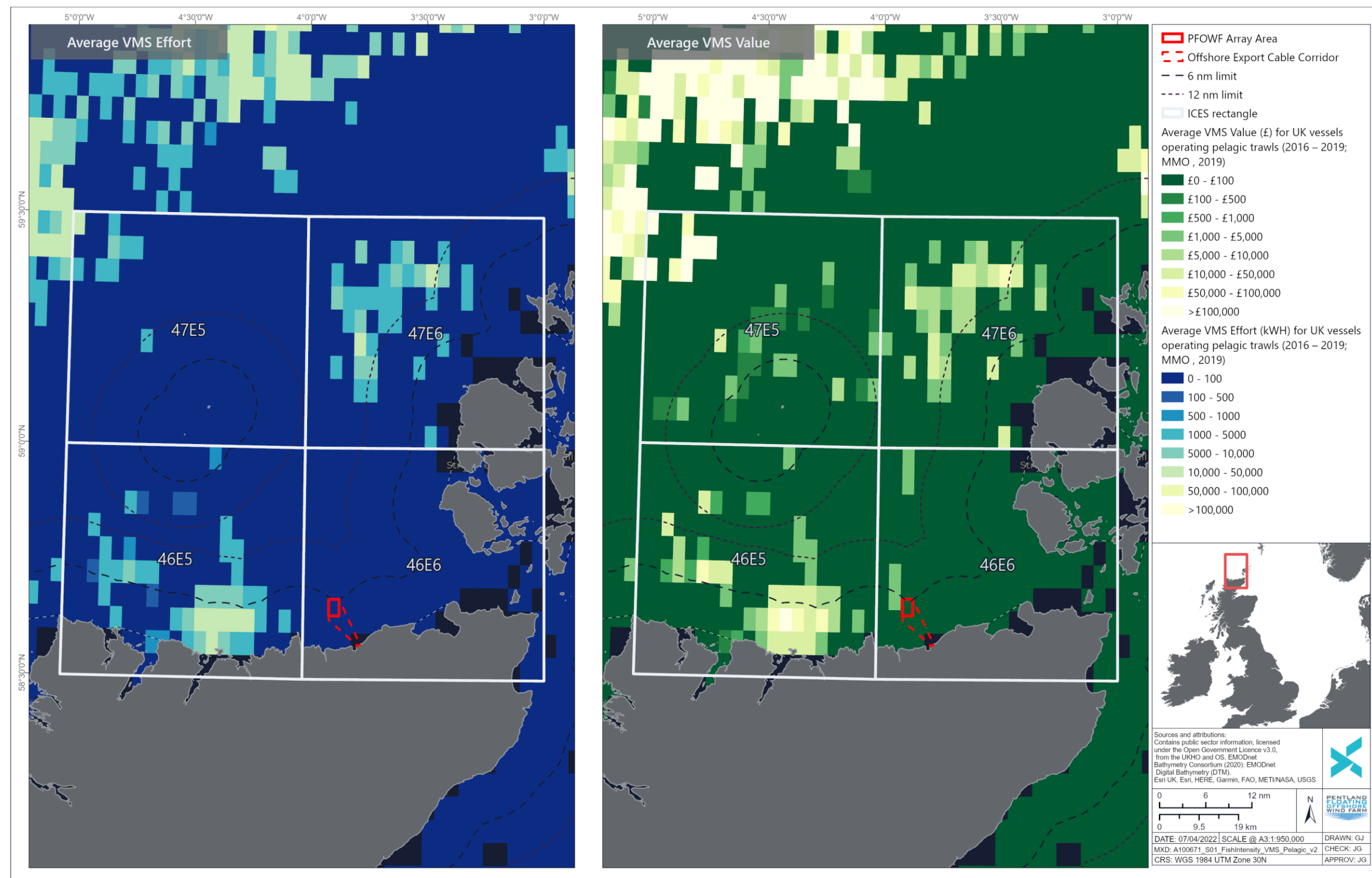


Figure 13.7 Average VMS values for pelagic fishing methods (2016 to 2019) (MMO, 2021b)

13.4.3.1 AIS Data

AIS-derived fishing vessel tracks for vessels over 15 m in length are displayed in Figure 13.8. There are clear fishing vessel routes to the north of the Offshore Site across the Pentland Firth and across the west of the Orkney Islands. Additionally, some tracks show characteristics of active fishing, going back and forth over a small area. These occur in the south of ICES rectangles 45E5 and 46E6 as well as in waters farther offshore to the north. Potting activity is evident as straight lines in a north / south orientation along the north coast of Caithness. Vessel tracks characteristic of seine netting are also present in the northwest of ICES rectangle 47E6.

As discussed in Chapter 14: Shipping and Navigation, fishing vessels accounted for 27% of the unique vessels recorded through AIS, radar, and visual observation per day within the Shipping and Navigation Study Area over a period of 28 days (14 summer days and 14 winter days).

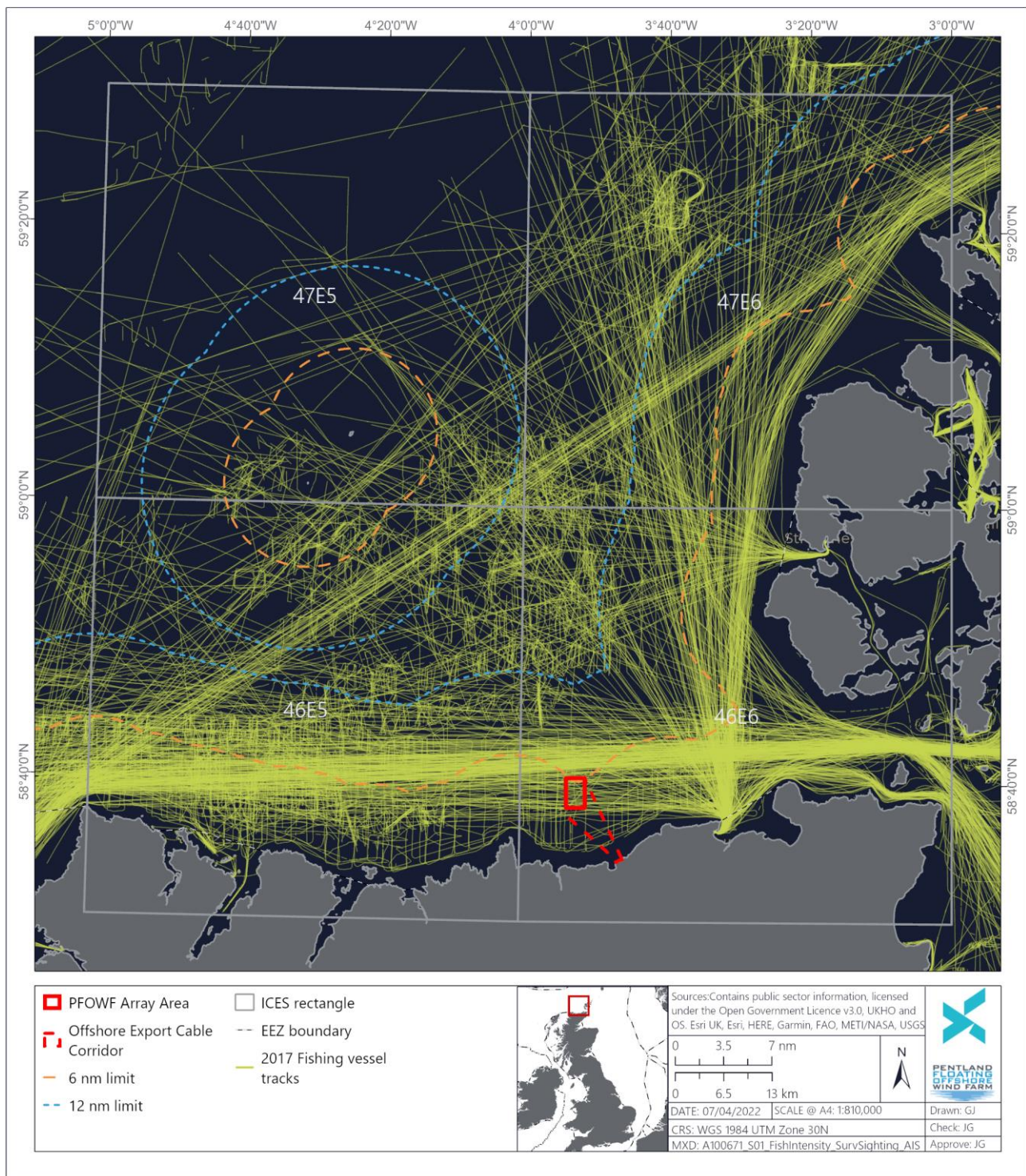


Figure 13.8 AIS-derived fishing vessel tracks in 2017 (MMO, 2019)

13.4.3.2 Non-UK fishing activity

The surveillance sightings data indicate that there are low levels of fishing activity by non-UK vessels in the Study Area.

Data on non-UK fishing effort by EU Member States are available through the EU Data Collection Framework database via the Science, Technical and Economic Committee for Fisheries. The most recent dataset includes effort data by non-UK vessels from 2014 to 2020. This dataset amalgamates fishing effort by EU vessels and can be queried by gear type and ICES rectangle, but not by country. The most recent dataset with fishing effort by EU vessels, which can be queried by country only, contains data up to 2016.

The annual average fishing effort (days fished) by EU vessels between 2014 and 2020 for the ICES rectangles within the Study Area is presented in Figure 13.9. EU vessels primarily utilise pelagic trawls within the Study Area, predominantly in the offshore ICES rectangles 47E5 and 47E6. Within ICES rectangle 46E6, within which the Offshore Site is located, the average annual fishing effort by EU vessels is very low, at less than one day of effort per year.

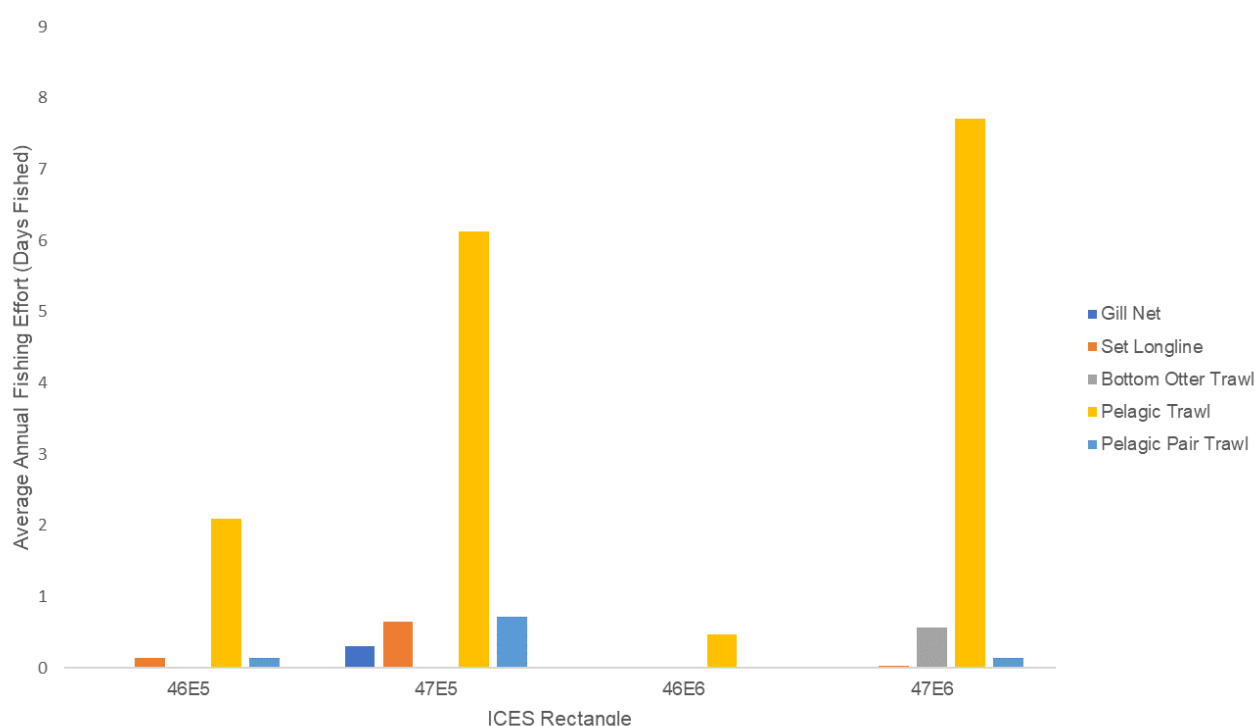


Figure 13.9 EU Annual fishing effort (days fished) (2014 to 2020) (Gibin *et al.*, 2021)

Analysis of the effort data between 2012 and 2016 indicates that the majority of EU fishing effort within the Study Area is conducted by Dutch, French, and German registered vessels (Zanzi *et al.*, 2017).

The Offshore Site mostly lies within the 22-km (12-nm) limit, within which fishing access for non-UK vessels is more restricted than between the 22-km and 370-km (12-nm and 2000-nm) limit. Within the 11-km to 22-km (6-nm to 12-nm) limit, fishing access is limited to non-UK vessels with historic fishing rights for that area.

13.4.3.3 Salmon netting

Scottish salmon fisheries include fixed engine, net and coble (i.e. netting), and rod and line fisheries (MS, 2015). Across Scotland, the majority of salmon and sea trout catch is from rod and line (MS, 2021a). It is understood, however, that several coastal netting sites are present along the Caithness coastline and that salmon netting is historically important for this area, although these are no longer active (Youngson, 2017; Scottish Government, 2020).

Each salmon fishery is required to provide the number and total weight of salmon, grilse, and sea trout caught and retained each month of the fishing season. MS collates salmon and sea trout catch statistics by district or region on an annual basis. Latest catch statistics for the North region indicate that there were no catches from nets in the districts along the north coast of Caithness between 2016 and 2020 (MS, 2021b). Rod and line catches within the 'Thurso, Forss and Halladale', and 'Strathy and Naver' reporting areas, adjacent to the OECC, were recorded between 2016 and 2020 (MS, 2021b); however, these are mostly understood to be recreational, which is not discussed within this chapter. It is also worth noting that that recreational fishing is not permitted within the nearshore section of the OECC due to the extant fisheries exclusion zone (Dounreay FEPA Closure) within 2 km of Dounreay Power Station. Impacts on recreation, including recreational fishing, are considered in Chapter 19: Socio-economics, Recreation and Tourism.

Records show that salmon catches across Scotland have declined significantly in recent years (Scottish Government, 2020). The Conservation of Salmon (Scotland) Regulations 2016 have prohibited the retention of salmon caught in coastal waters and in specified inland waters (depending on their conservation status) since 2016.

13.4.3.4 Annual and seasonal variation

It is understood from consultation with the SFF in November 2021 that fishing effort in the Study Area has declined in recent years and now fishing is mainly seasonal.

Figure 13.10 displays the combined annual landings values for the ICES rectangles within the Study Area between 2016 and 2020. Landings values in 2020 are the lowest in this time period, which may be partly due to the COVID-19 pandemic, although it is notable that landings values in 2019 were also relatively low compared with previous years. The data also indicate that the annual landings values for mackerel and herring varied by year. Landings values for mackerel were particularly high in 2018, with lower landings values in 2019 and 2020, whereas landings values for herring show a general decline from 2016 to 2020, ranging from £3,197,774 in 2016 to £112 in 2020. Other species' landings values were relatively consistent between 2016 and 2020.

Figure 13.11 displays the seasonal variation in the landings values in the Study Area between 2016 and 2020. This indicates that mackerel landings show a pattern of higher value in January, and further analysis of the data indicates that this is attributed to higher landings in January 2016, 2017, and 2018, predominantly in ICES rectangle 47E5. The data also indicate that landings values for crabs and lobster peak in the winter months between September and January and landings values for herring are highest between July and November. On the contrary, scallop landings values are highest in the summer between May and September and squid landings values exhibit a pattern of higher landings values between June and September.

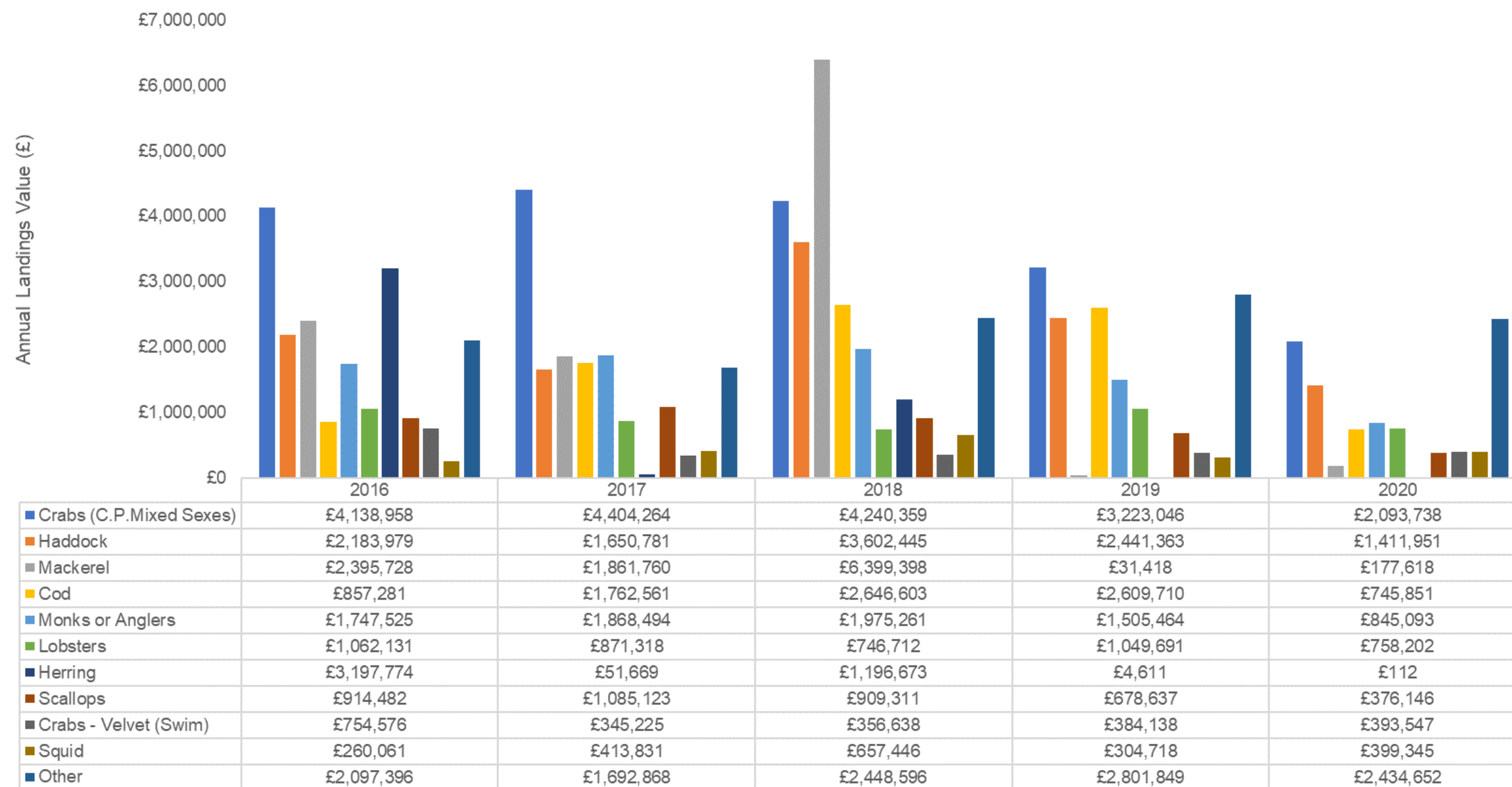


Figure 13.10 Annual landings values (2016 to 2020) for ICES rectangles 46E5, 46E6, 47E5, and 47E6 (MMO, 2021a)

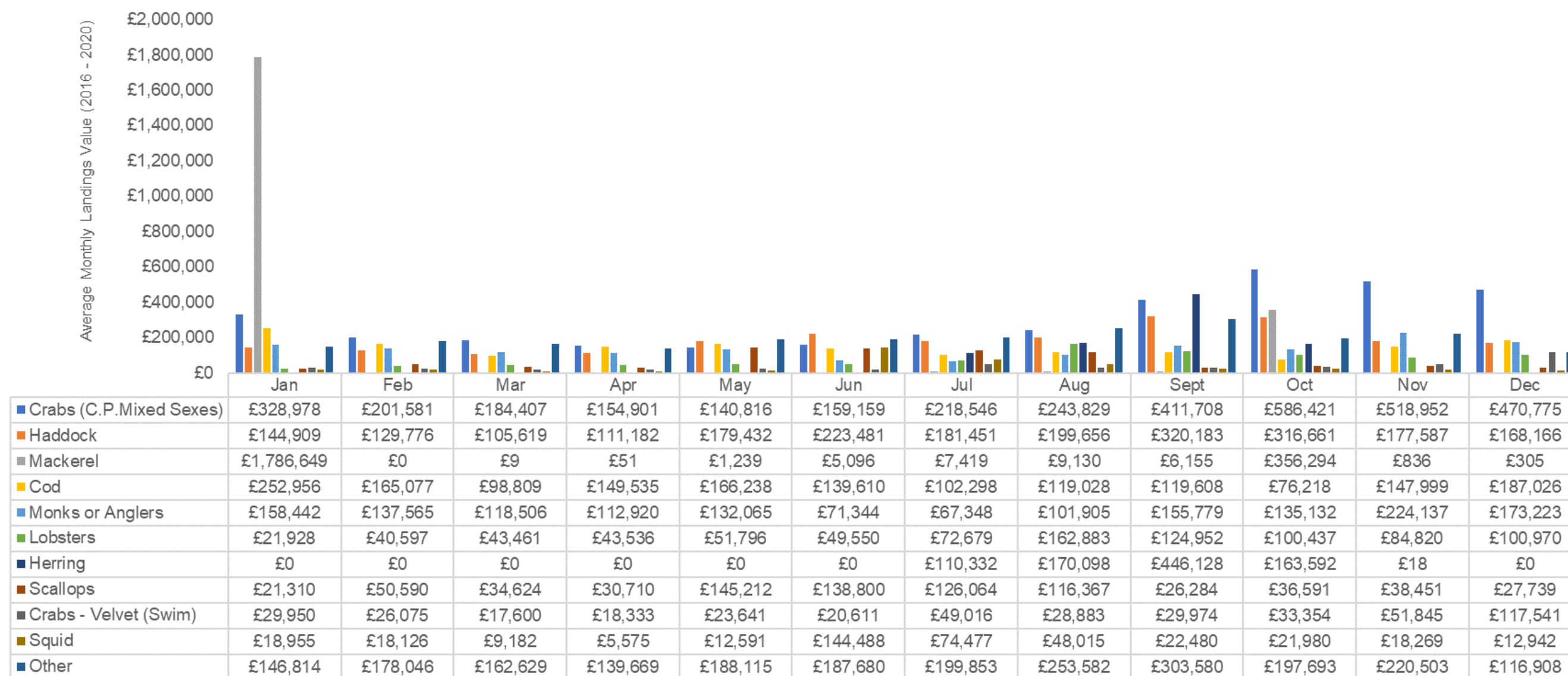


Figure 13.11 Average monthly landings values (2016 to 2020) for ICES rectangles 46E5, 46E6, 47E5, and 47E6 (MMO, 2021a)

13.4.4 Future Baseline

As described in Sections 13.2 and 13.4.3.2, it is anticipated that as a result of the UK's withdrawal from the EU, gradual changes to quota shares and TACs are expected to result in a decrease in the EU quota share in UK waters. The Offshore Development is located within the 22-km (12-nm) limit where fishing activity is already restricted; therefore, this change is not expected to result in any major alteration to the fishing activity at the Offshore Site (see Section 13.4.3).

The future baseline may also gradually change due to changes in:

- > Stock abundance (e.g. resulting from range shifts of commercial species driven by climate change, as discussed in Chapter 20: Climate and Carbon Assessment);
- > Fisheries management measures and licencing;
- > Gear technology / efficiency; and
- > Market prices (which could drive changes in target species).

Overall, the current baseline described in Section 13.4.3, which spans five years in most cases, is considered to be generally consistent with the future baseline, whilst recognising the multitude of factors that can alter commercial fishing activity.

13.4.5 Summary of Baseline Environment

Publicly available literature has been reviewed to understand the key fishing fleets that may potentially be impacted by the Offshore Development, and this has been augmented through consultation. The principal commercial fishing receptors considered relevant to the Study Area include (in no particular order):

- > UK pots and traps, including vessels under and over 15 m in length, operating across the Offshore Site. It is also understood through consultation that four to five six creelers are potentially active in the Offshore Site, with another vessel that fishes in the Offshore Site only in poor weather conditions;
- > UK scallop dredgers, operating mostly to the south of the Offshore Site, relevant to the OECC;
- > UK demersal trawlers, including vessels targeting whitefish, such as haddock and cod, as well vessels targeting squid. Most are expected to be over 10 m in length and operational across the Offshore Site, although predominantly in the northwest. Lower demersal trawling effort is expected across the OECC;
- > UK seine netters operating in the west of ICES rectangle 46E6 and north-west of the Offshore Site; and
- > EU fishing activity, mainly by Dutch, French, and German vessels, is concentrated within the ICES rectangles further offshore than the Offshore Site. Low levels of non-UK fishing effort are expected within the Offshore Site.

Salmon netting is of historical importance for the northern Caithness coastline, with several netting sites being present in the region. However, recent data indicate that salmon have not been caught and retained at these sites since salmon fishing in coastal waters was prohibited in Scottish waters since 2016. This is reviewed annually, but the current status is to continue the prohibition of coastal caught salmon.

Potential receptors and impacts scoped into the assessment and impacts scoped out are provided in Section 13.6 along with justification.

13.4.6 Data Gaps and Uncertainties

The key limitations and uncertainties of the data sources reviewed to inform the Commercial Fisheries baseline are presented in Table 13.3.

Table 13.3 Limitations / uncertainties of the data sources used to inform the Commercial Fisheries baseline

Data Source	Limitations / Uncertainties
Surveillance sightings data	<p>Subject to survey effort (air and vessel patrols) and only provides a 'snapshot' of the vessels present at the time of the patrol.</p> <p>Fishing method and nationality are assigned by sight, and are not confirmed, due to the similarities of fishing vessels when gear is in operation (especially mobile gear); it should be assumed that these data are indicative only.</p> <p>Due to these limitations, these data cannot be used to provide a quantitative assessment of fishing effort and only provide a general indication of the distribution of activity.</p>
Landings Statistics	<p>Landings statistics are available at an ICES rectangle scale. Data may misrepresent fishing activity, depending on the size of the development / project, given the large spatial scale of the landings data. Data from 2020 may also be impacted by the COVID-19 pandemic.</p> <p>Landings statistics include 10 m and under vessels; however, the monitoring systems differ from those for over 10 m vessels and may not be representative of all activity.</p>
VMS Data	<p>Under 15 m vessels are not represented in the MMO VMS dataset and ICES rectangles with less than five transmissions are also not included. VMS data for bottom otter trawls and dredges for vessels over 12 m in length are available through MS and have been reviewed and compared with the MMO VMS dataset.</p> <p>These data do not differentiate between vessels that are fishing or stationary / steaming (although it is filtered to include vessels travelling between 1 knot and 6 knots to limit the effect this has on the data).</p>
AIS data	<p>Under 15 m vessels may not be represented in the dataset.</p> <p>AIS data does not typically provide information on fishing method, and some errors in fishing vessel categorisation may be present.</p>

All data sources have been carefully reviewed with a consideration of the key limitations and uncertainties of each source. In addition, data sources have been considered in the context of other sources to further corroborate each source, and this has been supplemented by consultation.

The key data gap for the Commercial Fisheries baseline is the paucity of data for vessels under 15 m in length. Under 15 m vessels are not represented by MMO VMS and AIS data and so any interpretation of the distribution of fishing activity for these smaller vessels through publicly available data alone can only be made at an ICES rectangle scale. To account for this uncertainty, details on the distribution of fishing activity by smaller vessels was a key objective of the consultation with local fishers, as described in Section 13.3.

13.5 Impact Assessment Methodology

13.5.1 Impacts Requiring Assessment

This assessment covers all impacts identified through the scoping process, as well as any further potential impacts that have been highlighted as the EIA has progressed. It should be noted that impacts are not necessarily relevant to all stages of the Offshore Development.

Table 13.4 below indicates the potential direct and indirect impacts assessed with regard to Commercial Fisheries and indicates the Offshore Development stages to which they relate. Cumulative impacts are discussed in Section 13.7.

Table 13.4 Potential impacts requiring assessment

Potential Impact	Description
Construction	
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction	The implementation of safety zones around construction activities may result in a temporary loss or restricted access to fishing grounds within and in the vicinity of the Study Area.
Displacement of fishing activity into other areas	Fishing activity may be temporarily displaced due to the temporary loss or restricted access to fishing grounds associated with safety zones around construction activities or vessels. This may temporarily increase fishing pressure in other existing fishing grounds and increase the potential for gear conflict and competition.
Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear or ghost fishing ⁱ .	<p>Navigational safety risks (e.g. collision / allision) may arise as a result of increased vessel traffic associated with construction works. Potential navigational risks are considered in Chapter 14: Shipping and Navigation and are considered further in the Navigational Risk Assessment (NRA) (Offshore EIAR [Volume 3]: Appendix 14.1: Navigational Risk Assessment).</p> <p>In addition to navigational safety risks, in the specific case of vessels engaged in fishing, there may be additional risks such as the potential for entanglement or snagging with Offshore Development infrastructure and the presence of objects / obstacles on the seabed (e.g. partially installed infrastructure, including anchors that are planned to be installed in Stage 1 in advance of the WTGs in Stage 2). Areas of cable awaiting burial or protection may also pose a snagging risk.</p>
Operation and Maintenance	
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zones	<p>The presence of infrastructure within the Study Area may result in a loss of or restricted access to fishing grounds during the operation and maintenance phase.</p> <p>Additionally, the implementation of safety zones around major maintenance activities may also result in temporary localised loss or restricted access to grounds. Operational safety zones are under consideration by HWL in terms of their status (advisory or statutory) and extent. If statutory operational safety zones are planned, further consultation will be held with stakeholders before making an application, which will be supported by risk-based justification. For the worst case scenario, it is assumed that safety zones will be implemented. Further details on safety zones are included in Chapter 5: Project Description.</p>
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zones	<p>Fishing activity may be displaced into other areas as a result of loss of grounds or restricted access to fishing grounds during the operation and maintenance phase.</p> <p>Any displacement of existing fishing activity from the area may result in increased pressure on other existing grounds, affecting those fishing locally and in other areas, as well as potential gear conflict and increased competition. This has the potential to affect existing local fishing management practices and relationships between existing sea users.</p>

ⁱ Note that this impact was not included in the Scoping Report; however, as the anchors are planned to be installed ahead of the WTGs, this presents a potential snagging risk and therefore requires assessment.

Potential Impact	Description
Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage, loss of fishing gear or ghost fishing	<p>Navigational safety risks (e.g. collision / allision) may arise as a result of increased vessel traffic associated with maintenance works and the presence of Offshore Development infrastructure. Potential navigational risks are considered in Chapter 14: Shipping and Navigation and are considered further in the NRA (Offshore EIAR [Volume 3]: Appendix 14.1: Navigational Risk Assessment).</p> <p>In addition to navigational safety risks, in the specific case of vessels engaged in fishing, there may be additional risks such as the potential for entanglement or snagging with Offshore Development infrastructure and the presence of objects / obstacles on the seabed (e.g. in areas where the inter-array cables are suspended [the dynamic part of the inter-array cable] or if there are areas where the Offshore Export Cable(s) cannot be buried to the optimal burial depth and cable protection is required or the cable becomes exposed over time, there is an increased risk of snagging).</p>
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	The Offshore Development may result in changes to local navigation and transit routes for fishing vessels, potentially increasing steaming times.
Decommissioning	
Loss of access to fishing grounds due to the presence of vessels and safety zones during decommissioning	The implementation of safety zones around decommissioning activities may result in a temporary loss of or restricted access to fishing grounds within and in the vicinity of the Study Area.
Displacement of fishing activity into other areas	Fishing activity may be temporarily displaced due to the temporary loss or restricted access to fishing grounds associated with safety zones around decommissioning activities or vessels. This may temporarily increase fishing pressure in other existing fishing grounds and increase the potential for gear conflict and competition.

The assessment of impacts on Commercial Fisheries was a desk-based exercise making use of publicly available data and information gained through consultation.

As salmon and sea trout fishing activity is primarily in-river, there will be no direct impacts. Indirect impacts to these fisheries are considered to be the most relevant. Therefore, the impact assessment on salmon, sea trout, and other migratory species is included in Chapter 10: Fish and Shellfish Ecology.

Impacts relating to safety issues for fishing vessels are also discussed in Chapter 14: Shipping and Navigation.

13.5.2 Impacts Scoped Out

No impacts were scoped out of the assessment during EIA scoping.

13.5.3 Assessment Methodology

The EIA process and methodology are described in detail in Chapter 6: EIA Methodology.

Project-specific criteria have been developed for the sensitivity of the receptor and the likelihood and magnitude of impact as detailed below.

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

13.5.3.1 Defining impact magnitude

Defining impact magnitude requires consideration of how the following factors will impact on the baseline conditions:

- > Spatial Extent: The area over which the impact will occur;
- > Duration: The period of time over which the impact will occur;
- > Frequency: The number of times the impact will occur over the Offshore Development's life-cycle;
- > Intensity - the severity of the impact;
- > Likelihood: The probability that the impact will occur and the probability that the receptor will be present; and
- > Reversibility: The ability for the receiving environment / exposed receptor to return to baseline conditions.

In addition, to provide context in terms of impact magnitude, where appropriate, the relative importance of each fishery affected by each potential impact has been taken into account.

Based on these parameters, and expert judgement, a summarised description on the assignment of magnitude criteria is provided in Table 13.5.

Table 13.5 Impact magnitude criteria for the Commercial Fisheries receptor

Magnitude of impact	Definition
Very high	The area affected by the impact sustains high levels of activity by the fishery and covers a moderate extent of its grounds; and/or The impact to fishing activity is permanent.
High	The area affected by the impact sustains high levels of activity by the fishery and covers a moderate extent of its grounds; and/or The impact is temporary but occurs over a long period (i.e. years).
Moderate	The area affected by the impact sustains medium / high levels of activity by the fleet and covers a small extent of its grounds; and/or The impact is temporary but occurs over a relatively long period (i.e. months).
Low	The area affected by the impact sustains medium / low levels of activity by the fleet and covers a small extent of its grounds; and/or The impact is temporary and occurs over a relatively short timescale (i.e. weeks).
Negligible	The fleet has very little or no history of fishing in the area affected; and/or The impact is short term (i.e. days).

13.5.3.2 Receptor sensitivity

As part of the assessment of significance of effects it is necessary to determine the receptor sensitivity. Receptor sensitivity is defined as 'the degree to which a receptor is affected by an impact'.

Overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance, and recoverability (all terms relevant to biological receptors rather than commercial fishing). Due to the range of possible potential values and vulnerabilities within commercial fishing fleets, definitions for these criteria have not been set and receptor sensitivity has been assigned using the criteria in Table 13.6.

Recognising the different sensitivities of vessels, the assessment of impacts has been undertaken separately for each principal fisheries identified as being relevant for the Offshore Development.

Table 13.6 Sensitivity of Commercial Fisheries receptor

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

13.5.3.3 Evaluation to determine significance of effect

Significance of effect is determined by correlating the magnitude of the impact and the sensitivity of receptor in conjunction with professional judgement whilst utilising professional judgement and industry best practice guidance, science, and accepted approaches.

To ensure a transparent and consistent approach throughout this Offshore EIAR, a matrix approach has been adopted to guide the assessment of significance of effects (see Table 13.7). Importantly, latitude for professional judgement in the application of this matrix is permitted where deemed appropriate.

Table 13.7 Significance of effects matrix

Significance of Effects Matrix					
Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Moderate	High
Negligible	Negligible	Negligible	Negligible	Negligible	Minor
Low	Negligible	Negligible	Minor	Minor	Moderate
Moderate	Negligible	Minor	Minor	Moderate	Major
High	Negligible	Minor	Moderate	Major	Major
Very High	Negligible	Minor	Major	Major	Major

Definitions of significance of effect are described in Table 13.8. For the purposes of this Offshore EIAR, any effect with a significance of moderate or greater is generally considered 'significant' in EIA terms and additional mitigations may be required. Effects identified as minor or negligible are generally considered to be 'not significant' in EIA terms.

Table 13.8 Assessment of consequence

Assessment consequence	Description (consideration of receptor sensitivity and value and impact magnitude)	Significance of Effect
Major Effects	Effects (beneficial or adverse) are likely to be highly noticeable and long-term, or permanently alter the character of the baseline and are likely to disrupt the function and/or status / value of the receptor. They may have broader systemic consequences. Such adverse effects are a priority for mitigation in order to avoid or reduce the anticipated significance of the effect.	Significant
Moderate Effects	Effects (beneficial or adverse) are likely to be noticeable and result in lasting changes to the character of the baseline and may cause hardship to, or degradation of, the receptor, although the overall function and value of the baseline / receptor are not disrupted. Such adverse effects are a priority for mitigation in order to avoid or reduce the anticipated significance of the effects.	Significant
Minor Effects	Effects (beneficial or adverse) are expected to comprise noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause long term degradation or hardship or impair the function and value of the receptor. Such adverse effects are not typically contentious and will not generally require additional mitigation but may be of interest to stakeholders.	Not Significant
Negligible	Effects are expected to be either indistinguishable from the baseline or within the natural level of variation. These effects do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not Significant

13.5.3.4 Assessment of Safety Issues

The criteria for the assessment of safety issues differ from other impacts. The assessment criteria outlined in Table 13.5 and Table 13.6 are not considered adequate for the assessment of potential health and safety risks to fishing vessels and their crews. In these instances, impacts are assessed in terms of potential risk (severity of consequence and frequency of occurrence). This is in line with Marine Guidance Note 654 the International Maritime Organisation Formal Safety Assessment process, as outlined in Chapter 14: Shipping and Navigation, and is presented in Table 13.9 and Table 13.10 below.

Table 13.9 Severity of consequences

Rank	Description	Definition			
		People	Property	Environment	Business
1	Negligible	No perceptible impact	No perceptible impact	No perceptible impact	No perceptible impact
2	Minor	Slight injury(ies)	Minor damage to property (i.e. superficial damage)	Tier 1 local assistance required	Minor reputation impact – limited to users
3	Moderate	Multiple minor or single serious injury	Damage not critical to operations	Tier 2 limited external assistance required	Local reputation impacts
4	Serious	Multiple serious injury or single fatality	Damage resulting in critical impact on operations	Tier 2 regional assistance required	National reputation impacts
5	Major	More than one fatality	Total loss of property	Tier 3 national assistance required	International reputation impacts

Table 13.10 Frequency of occurrence ranking definitions

Rank	Description	Definition
1	Negligible	<1 occurrence per 10,000 years
2	Extremely Unlikely	1 per 100 to 10,000 years
3	Remote	1 per 10 to 100 years
4	Reasonably Probable	1 per 1 to 10 years
5	Frequent	Yearly

The risk ranking matrix used to determine the significance of effects from the frequency of occurrence and the severity of consequences is presented in Table 13.11.

Table 13.11 Tolerability matrix and risk rankings

Consequences	Major	Tolerable with Mitigation (intermediate risk)	Tolerable with Mitigation (intermediate risk)	Unacceptable (high risk)	Unacceptable (high risk)	Unacceptable (high risk)
	Serious	Broadly Acceptable (low risk)	Tolerable with Mitigation (intermediate risk)	Tolerable with Mitigation (intermediate risk)	Unacceptable (high risk)	Unacceptable (high risk)
	Moderate	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Tolerable with Mitigation (intermediate risk)	Tolerable with Mitigation (intermediate risk)	Unacceptable (high risk)
	Minor	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Tolerable with Mitigation (intermediate risk)	Tolerable with Mitigation (intermediate risk)
	Negligible	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Broadly Acceptable (low risk)	Tolerable with Mitigation (intermediate risk)
		Negligible	Extremely Unlikely	Remote	Reasonably Probable	Frequent
Frequency						

In EIA terms, impacts which are assessed as being Tolerable with Mitigation or Broadly Acceptable are considered 'not significant', while Unacceptable impacts are considered 'significant'.

13.5.4 Design Envelope Parameters

As detailed in Chapter 5: Project Description, this assessment considers the Offshore Development parameters which are predicted to result in the greatest environmental impact, known as the 'realistic worst case scenario'. The realistic worst case scenario represents, for any given receptor and potential impact on that receptor, various options in the Design Envelope that would result in the greatest potential for change to the receptor in question.

Given that the realistic worst case scenario is based on the design option (or combination of options) that represents the greatest potential for change, confidence can be held that development of any alternative options within the design parameters will give rise to no effects greater or worse than those assessed in this impact assessment. Table 13.12 presents the realistic worst case scenario for potential impacts on Commercial Fisheries during the construction, operation and maintenance and decommissioning phases of the Offshore Development.

For commercial fisheries, the realistic worst case scenario has been derived by ensuring that the maximum parameters of components for the Offshore Development with the potential to interact with Commercial Fisheries receptors are assessed (e.g. the maximum area and duration for construction activities which would result in the greatest potential loss of access to fishing grounds).

For example, the worst case scenario for impacts relating to loss of access, displacement, and obstruction of transiting vessels, assumes that seven WTGs are built out across the maximum extent of the PFOWF Array Area, with the greatest mooring line radius (1,500 m), as this would result in the greatest area over which these impacts could occur. However, with regard to potential entanglement, a minimum spacing of 800 m has been assumed, as this is considered to represent the scenario with the greatest potential for safety issues to arise. With regard to snagging risk with subsea infrastructure, the minimum burial depth, maximum additional cable protection, and maximum anchor height have been assumed within the assessment, as these parameters would result in the greatest potential risk of fishing gear interacting with the infrastructure. Similarly, the maximum mooring spread of 1,500 m has been assumed. The assessment also assumes that the construction phase will last approximately two years with the commencement of the horizontal directional drilling (HDD) works at the landfall location possible in the year before Stage 1 of the construction phase (i.e. anticipated to be in 2024) and the installation of the offshore components proposed across two construction stages, comprising seven months per year during (Stage 1 and Stage 2), and a pause during the winter months between the two stages. It is assumed that anchors will be installed in Stage 1 ahead of the remaining infrastructure in Stage 2, as this could pose a snagging risk during the winter delay between the construction stages.

Table 13.12 Design parameters specific to Commercial Fisheries receptor impact assessment

Potential Impact	Design Envelope Scenario Assessed
Construction Phase	
Temporary loss of access to fishing grounds due to the presence of vessels and safety zones during construction	<ul style="list-style-type: none"> > A maximum of seven WTGs built-out to the maximum extent of the PFOWF Array Area; > A maximum of nine mooring lines and anchors per WTG with a mooring radius of 1,500 m, a maximum seabed footprint per anchor of 625 square metres (m²), and a maximum height above the seabed of 5 m; > A maximum seabed footprint of inter-array cables (including area required for seabed preparation and installation equipment) of 20 km x 10 m, of which 50% (10 km) may require additional remedial protection, with a maximum length of 500 m (per WTG) for inter-array cables in the water column; > A maximum number of two offshore export cables to the landfall location with a maximum seabed footprint (including area required for seabed preparation and installation equipment) of 12.5 km x 15 m per offshore export cable, of which 50% may require remedial protection (6.25 km per offshore export cable); > 500-m construction safety zones around each renewable energy installation, implemented on a rolling basis; advisory safety zones of 500 m around installation vessels; and 50-m statutory safety zones once each WTG is installed prior to commissioning; > Presence of unburied cable awaiting burial or protection and/or pre-installed mooring systems awaiting WTG hook-up; > Planned commencement of the HDD works at landfall in 2024 followed by the installation of the offshore components across two stages, each comprising seven months per year (Stage 1 and Stage 2), and pausing over the winter months between the two stages; > A maximum construction duration of seven months planned for Stage 1 and seven months planned for Stage 2, with the construction phase lasting approximately two years; and > Approximately 660 vessel trips with a maximum of 10 vessels at the Offshore Site at any one time.
Displacement of fishing activity into other areas	As per temporary loss of access to fishing grounds as this will result in the greatest potential for displacement.

Potential Impact	Design Envelope Scenario Assessed
Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	<ul style="list-style-type: none"> > A maximum of seven WTGs with a minimum spacing of 800 m; > A maximum of nine mooring lines and anchors per WTG with a mooring radius of 1,500 m, a maximum seabed footprint per anchor of 625 m², and a maximum height above the seabed of 5 m; > A maximum seabed footprint of inter-array cables (including area required for seabed preparation and installation equipment) of 20 km x 10 m, of which 50% (10 km) may require additional remedial protection, with a maximum length of 500 m (per WTG) for inter-array cables in the water column; > A maximum number of two offshore export cables to the landfall location with a maximum seabed footprint (including area required for seabed preparation and installation equipment) of 12.5 km x 15 m per offshore export cable, of which 50% may require remedial protection (6.25 km per offshore export cable); > 500-m construction safety zones around each renewable energy installation, implemented on a rolling basis; advisory safety zones of 500 m around installation vessels; and 50-m statutory safety zones once each WTG is installed prior to commissioning; > Planned commencement of the HDD works at the landfall location in 2024 followed by the installation of the offshore components across two stages, each comprising seven months per year (Stage 1 and Stage 2), and pausing over the winter months between the two stages; and > Presence of unburied cable awaiting burial or protection and/or pre-installed mooring systems awaiting WTG hook-up.
Operation and Maintenance Phase	
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zones	<ul style="list-style-type: none"> > A maximum number of seven WTGs built out across the maximum extent of the PFOWF Array Area; > A maximum of nine mooring lines and anchors per WTG with a mooring radius 1,500 m, a maximum seabed footprint per anchor of 625 m², and a maximum height above the seabed of 5 m; > Minimum spacing between WTGs of 800 m; however, the worst case scenario for loss of access assumes that the WTGs are spread out across the PFOWF Array Area with larger spacing between WTGs; > A maximum total combined length of 20 km for inter-array cables on the seabed, of which 50% (10 km) may require additional remedial protection; > A maximum length of 500 m (per WTG) for inter-array cables in the water column;

Potential Impact	Design Envelope Scenario Assessed
	<ul style="list-style-type: none"> > A maximum of two offshore export cables, each with a maximum length of 12.5 km, of which up to a maximum of 50% may require additional remedial protection (6.25 km per offshore export cable); > Statutory or advisory safety zones of 50 m around each renewable energy installationⁱⁱ and statutory or advisory safety zones of 500 m during times of major maintenance (note that any statutory safety zones will be subject to a separate application); and > Approximately 210 annual vessel trips required during operation and maintenance (up to 30 years) and a maximum of 10 vessels at the Offshore Site at any one time.
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zones	As per loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zones as this represents the greatest potential for displacement.
Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage, loss of fishing gear or ghost fishing	<ul style="list-style-type: none"> > A maximum number of seven WTGs with a minimum spacing of 800 m; > A maximum of nine mooring lines and anchors per WTG with a mooring radius of 1,500 m, a maximum seabed footprint per anchor of 625 m², and a maximum height above the seabed of 5 m; > A maximum total combined length of 20 km for inter-array cables on the seabed, of which 50% (10 km) may require additional remedial protection; > A maximum length of 500 m (per WTG) for inter-array cables in the water column; and > A maximum of two offshore export cables, each with a maximum length of 12.5 km, of which 50% (6.25 km per cable) is expected to require remedial protection; and > Minimum target depth for inter-array and offshore export cables of 0.6 m.

ⁱⁱ Please note that operational safety zones are under consideration for the Offshore Development in terms of their status (advisory or statutory) and extent. If statutory operational safety zones are planned, further consultation will be held with stakeholders before making an application, which will be supported by risk-based justification. For the worst case scenario, it is assumed that operational safety zones will be implemented. Further details on safety zones are included in Chapter 5: Project Description.

Potential Impact	Design Envelope Scenario Assessed
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	<ul style="list-style-type: none"> > A maximum number of seven WTGs with a maximum footprint of 15,625 m² across the PFOWF Array Area; > A maximum of nine mooring lines and anchors per WTG with a mooring radius of 1,500 m, a maximum seabed footprint per anchor of 625 m², and a maximum height above the seabed of 5 m; > Minimum spacing between WTGs of 800 m; however, the worst case scenario for loss of access assumes that the WTGs are spread out across the PFOWF Array Area with larger spacing between WTGs; > Statutory or advisory safety zones of 50 m around each renewable energy installationⁱⁱ and statutory or advisory safety zones of 500 m during times of major maintenance; and > Approximately 5,074 vessel trips required during operation and maintenance (up to 30 years) and a maximum of five vessels at the Offshore Site at any one time.
Decommissioning	
Temporary loss of access to fishing grounds due to the presence of vessels and safety zones during decommissioning	<p>In the absence of detailed information regarding decommissioning works, the implications for Commercial Fisheries are considered analogous to or likely less than those of the construction phase. Therefore, the worst case parameters defined for the construction phase also apply to decommissioning.</p> <p>The decommissioning approach is set out in Chapter 5: Project Description. The starting position for offshore components is complete removal to shore for re-use, recycling, and disposal during decommissioning unless there is compelling evidence to leave the buried sections <i>in situ</i>. An exception to this is scour protection, which may not be practical to recover. Anchor piles may also be cut to a depth of 1 m below the seabed and left <i>in situ</i>. Relevant stakeholders and regulators will be consulted to establish the approach. The seabed will be restored, as far as reasonably practicable, to the condition it was prior to the construction of the Offshore Development.</p>
Displacement of fishing activity into other areas	As per temporary loss of access to fishing grounds due to the presence of vessels and safety zones during decommissioning.

13.5.5 Embedded Mitigation and Management Plans

As part of the Offshore Development design process, a number of designed-in measures and management plans have been proposed to reduce the potential for impacts on Commercial Fisheries receptors (Table 13.13). As there is a commitment to implementing these measures which will likely be secured through Section 36 Consent and Marine Licence conditions, they are considered inherently part of the design of the Offshore Development and have therefore been considered in the assessment presented below (i.e. the determination of the magnitude of impact and therefore the significance of effects assumes implementation of these measures). These measures are considered standard industry practice for this type of development.

Table 13.13 Embedded mitigation measures specific to Commercial Fisheries for the Offshore Development

Embedded Mitigation Measures and Management Plans	Justification
Management Plans	
Construction Environmental Management Plan (CEMP)	The CEMP will set out procedures to ensure all activities with the potential to affect the environment are appropriately managed and will include: a description of works and construction processes, roles and responsibilities, description of vessel routes and safety procedures, pollution control and spillage response plans, incident reporting, chemical usage requirements, waste management plans, plant service procedures, communication and reporting structures, and timeline of work. It will detail the final design selected and take into account Marine Licence Conditions and commitments.
Offshore Construction Method Statement	A Construction Method Statement will be developed in accordance with the CEMP and detail how the Offshore Development activities and plans identified within the CEMP will be carried out whilst also highlighting any possible dangers / risks associated with specific Offshore Development activities.
Project Environmental Monitoring Plan	Through the EIA process, conclusions have been drawn on the potential environmental impact of developing the Offshore Development. Where required, a monitoring plan will be put in place to provide further evidence to support these conclusions and provide information for future offshore wind farm developments. Pre-, during and post-construction and operation surveys on aspects such as commercial fisheries will be considered as part of the monitoring plan.
Development Specification and Layout Plan	A Development Specification and Layout Plan will allow stakeholders to see the specifics of the Offshore Development layout (e.g. WTG layout and mooring arrangement positions). This will be agreed upon with Scottish Ministers and key consultees, including SFF.
Cable Plan	A Cable Plan will detail the location / route and cable laying techniques of the inter-array and offshore export cables. This will be supported by survey results from the geotechnical, geophysical, and benthic surveys. The Cable Plan will also detail the EMF of the cables deployed, target burial depths, and cable survey methods during the life-cycle of the cables.
Vessel Management Plan	A Vessel Management Plan will be prepared for the Offshore Development which will detail the number, type, and specification of vessels utilised during construction and operation and maintenance. This will also detail the ports and transit corridors proposed.
Navigational Safety Plan	A Navigational Safety Plan will be developed for the Offshore Development which will detail all navigational safety measures, construction safety zones, Notices to Mariners (NtMs) and radio navigation warnings, anchoring areas, lighting and marking requirements, and emergency response procedures during all phases of the Offshore Development.

Embedded Mitigation Measures and Management Plans	Justification
Fisheries Mitigation and Management Strategy	The FMMS will detail monitoring and collecting data methods to assess the Offshore Development's effects on local fishermen and other sea users in accordance with the findings of the EIA. Where relevant, the FMMS will also detail the process for the agreement of cooperation payments with fishers directly affected by the construction works.
Decommissioning Programme	A Decommissioning Programme will be drafted pre-construction to address the principal decommissioning measures for the Offshore Development. This will be written in accordance with applicable guidance and detail the management, environmental management, and schedule for decommissioning.
Embedded Mitigation	
Fisheries Liaison Officer and Fisheries Industry Representative	An FLO and FIR will be appointed to establish effective communications surrounding the Offshore Development with local fishermen and other sea users. The FLO will distribute information on the safe operations of fishing activities at the Offshore Site and will be a contact for fishermen and other sea users during the life-cycle of the Offshore Development. The FIR will liaise with the wider fishing industry. The specific roles and responsibilities will be defined within the FMMS.
Charting Requirements	Prior to construction, the final WTG positions and height will be provided to the United Kingdom Hydrographic Office, Ministry of Defence, and Defence Geographic Centre for aviation and nautical charting purposes.
Target depth of lowering	Static cables will be trenched and buried to a minimum target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. The cable burial target depth will be informed by a CBRA and implemented through the CaP produced post-consent.
The International Regulations for the Prevention of Collision at Sea (COLREGs) and the International Regulations for the Safety of Life at Sea (SOLAS)	All vessels will comply with the relevant COLREGS and SOLAS provisions to ensure navigational safety and minimise the risk of equipment snagging. This will include the display of appropriate lights and shapes, such as when vessels are restricted in their ability to manoeuvre.
Procedures for dropped objects and claim processes for loss/damage to fishing gear/vessels.	The FMMS will include protocols and procedures for dropped objects to minimise the risk of equipment snagging on large, dropped objects associated with the Offshore Development.
NtMs, Kingfisher notifications, and other navigational warnings on the location, duration, and nature of works.	HWL will issue NtMs, Kingfisher notifications, and other navigational warnings, as required in a timely and efficient manner. This will ensure navigational safety and minimise the risk of equipment snagging through the appropriate propagation of notices to other sea users.
The use of guard vessels and Offshore Fisheries Liaison Officers, where required.	The appointment of guard vessels and Offshore Fisheries Liaison Officers during construction, major maintenance works and decommissioning works, where required, ensures effective communication with the fishing community during the Offshore Development activities and reduces the potential for interactions with fishing activities. Where possible, guard vessels will be sourced locally and, at a minimum, will be Scottish vessels.

13.6 Assessment of Environmental Effects

13.6.1 Effects during Construction

13.6.1.1 *Loss of access to fishing grounds due to the presence of vessels and safety zones during construction*

Within the PFOWF Array Area, temporary loss of access to fishing grounds will result from where construction activities are occurring and through the implementation of 500-m construction statutory safety zones around each of the (maximum) seven WTGs (an approximate area of 0.8 square kilometres). The safety zones will be implemented on a rolling basis throughout the Offshore Site and phased as construction is undertaken. Only one 500-m statutory safety zone will likely be implemented at any one time unless concurrent installation of the WTGs (and associated floating substructure) occurs. After each WTG is installed, but prior to commissioning, 50-m statutory safety zones may be implemented around installed structures until commissioning. In addition, advisory safety zones will be implemented around installation vessels. Therefore, the area occupied by safety zones may increase as construction progresses. The safety zones within the PFOWF Array Area are anticipated to be implemented across seven months in Stage 1 for the anchor installation and seven months in Stage 2 for the installation of the remaining infrastructure. During the winter period between the construction stages, if required, the site will be marked or guard vessels will be present; this may restrict access in the areas of the pre-installed anchors during that period.

Within the OECC, temporary loss of access to fishing grounds will occur where installation vessels are present, due to the 500-m advisory safety zones and in areas of unburied cable awaiting burial or additional remedial protection, as it is assumed that fishing will be excluded from these areas. The installation vessels will be present for approximately seven months, planned for either Stage 1 or Stage 2, depending on the sequencing of offshore export cable installation. However, the advisory safety zone will not be present in a single location for the duration of these seven months, as the installation vessels will progress along the OECC route.

A total of 660 vessel trips are assumed to occur over the construction phase, across the Offshore Site.

This temporary loss of access to fishing grounds impact will be mitigated through the measures outlined in Table 13.13, including communications from the Fisheries Liaison Officer (FLO) and promulgation of information through Notices to Mariners (NtMs) and Kingfisher notifications to ensure that fishers are aware of the construction works and provided with updated information.

13.6.1.1.1 Creelers (pots and traps)

It is understood that four to five creelers are active across the Offshore Site, with potentially more vessels with an operational range that could explore these fishing grounds. The fisheries statistics indicate that both over and under 10 m creelers are active in the Study Area, with vessels mostly targeting crabs and, to a lesser extent, lobster.

By nature of the fishing methods used by creelers, this fleet has low flexibility in terms of where they can deploy their fishing gear, and a large proportion of the fleet is situated within the local area. Most vessels operating static gear have smaller operating ranges compared with larger vessels operating mobile gear (operating mainly out to the 22-km [12-nm] limit); however, there are a small number of vivier crabbers (crab vessels with onboard water ponds) which work in and around the 22-km (12-nm) limit and beyond, depending on crew staffing requirements. Therefore, creelers are considered to be of **moderate sensitivity** to loss of access to fishing grounds.

Temporary loss or restricted access to fishing grounds may occur throughout the Offshore Site, as those operating static gear will be requested to relocate their gear from the area during the construction phase. Therefore, loss of access across the Offshore Site will occur for a total duration of 14 months (encompassing the two seven-month construction stages). During the period between the two construction stages, if required, the site will be marked or guard vessels will be present for the unprotected anchor installations if these protrude above the seabed. This may further restrict fishing within this area. The fishing grounds at the Offshore Site are considered to be of moderate value and represent a small extent of the available grounds within the Study Area.

Considering the temporary nature of the loss of access during construction, in addition to the embedded mitigation measures and management plans presented in Section 13.5.5, including the preparation and adherence to the FMMS which will incorporate an evidence-based additional mitigations for vessels requested to relocate gear in line with FLOWW guidance (2014; 2015), the magnitude is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.6.1.1.2 Demersal trawlers

Demersal trawlers targeting whitefish (e.g. haddock and cod) and squid are active in the Study Area.

13.6.1.1.2.1 Whitefish

The landings value data indicate that the majority of demersal trawling occurring in ICES rectangle 46E6, within which the Offshore Site is located, is associated with whitefish, mainly haddock, cod, and monkfish / anglerfish, with comparably lower landings values for squid in this ICES rectangle.

Demersal trawlers targeting whitefish are considered to have greater versatility in terms of target species when compared with creelers and scallop dredgers. There are also fewer constraints in terms of the seabed habitat requirements for this fishing method when compared to other fishing methods, such as demersal trawlers targeting *Nephrops*. It is acknowledged, however, that this may be dependent on the quotas allocated to the vessel. The majority of landings values in the Study Area are associated with demersal trawlers over 10 m in length; therefore, the operational range of these vessels is expected to be moderate to high. For these reasons, demersal trawlers targeting whitefish are considered to be of **low sensitivity** to loss of access to fishing grounds.

Based on VMS data, demersal trawling for whitefish within the Offshore Site is of moderate to high value and effort, and the Offshore Site is considered to represent a small extent of the available fishing grounds in the area. Lower levels of effort and value are expected along the OECC. Temporary loss or restricted access to fishing grounds within the PFOWF Array Area are anticipated to only apply to the safety zones around the WTGs that will be implemented on a rolling basis, safety zones around installation vessels, and areas of pre-installed infrastructure (e.g. pre-installed anchors planned to be installed in Stage 1 and mooring lines awaiting hook-up to WTGs). Within the OECC, temporary loss or restricted access to fishing grounds will result from safety zones around installation vessels and in areas of unburied cable awaiting burial or additional remedial protection. Considering the small area lost to fishers when compared with the availability of grounds for this fishing method, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers targeting whitefish is considered to be **minor** and **not significant**.

13.6.1.1.2.2 Squid

Lower landings values for squid occur within the Study Area, when compared to whitefish. Nevertheless, consultation identified that a latent squid fishery is present in the area. The landings values for squid in ICES rectangle 46E6, within which the Offshore Site is located, are proportionally lower than in ICES rectangles 46E5, indicating that more valuable grounds may be located to the west of the Offshore Site.

The majority of squid landings are associated with vessels over 10 m in length, thus, vessels are expected to be able to exploit fishing grounds beyond the Study Area. Demersal trawlers targeting squid are considered to have the ability to adapt their gear to target other species, such as whitefish. For these reasons, demersal trawlers targeting squid are considered to be of **low sensitivity** to loss of access to fishing grounds.

Considering the temporary nature of any loss of access to fishing grounds during the construction phase and the fact that the area of impact represents an area which sustains relatively low value for squid according to landings statistics, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers targeting squid is considered to be **minor** and **not significant**.

13.6.1.1.3 Seine netters

As a result of consultation, it is understood that one to two seine netting vessels are active in the Study Area, with grounds which overlap with the Offshore Site. Landings statistics for demersal seines indicate that the landings values within the Study Area are highest in ICES rectangle 46E6, within which the Offshore Site resides. VMS data for seine nets presented with the NAFC Marine Centre report on fisheries and habitats in the NECRIFG indicate that fishing effort is moderate to high along the western boundary of ICES rectangle 46E6, overlapping with the Offshore Site.

Seine netting vessels active in the Study Area are over 10 m in length and are expected to have a wide operational range. These vessels have versatility in their target species, but a requirement for soft / clean seabed, potentially reducing the availability of grounds for this fishing method. This method of fishing often targets seabed features which attract fish, such as seamounts, bedforms, or wrecks. This is a fishery that is locally important with a high-grossing vessel which has fished these local waters for generations. Therefore, seine netters are considered to be of **moderate sensitivity** to loss of access to fishing grounds.

Within the Study Area, seine netting occurs along the western boundary of ICES rectangle 46E6 and, to a lesser extent, in ICES rectangle 47E6. The Offshore Site represents a low to moderate proportion of the available fishing grounds for seine, and as described in Chapter 9: Benthic Ecology, the seabed within and surrounding the Offshore Site is classified as sand with occasional boulders present. Therefore, there are expected to be alternative areas to operate this fishing method in the vicinity of the Offshore Site. Considering this, along with the fact that any loss of access will be temporary and localised to safety zones and pre-installed infrastructure, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to seine netters is considered to be **minor** and **not significant**.

13.6.1.1.4 Scallop dredgers

Most vessels operating scallop dredges in the Study Area are over 10 m in length. Many scallop dredges are nomadic, meaning they operate across the North Sea, to opportunistically fish in a pattern which corresponds to the cyclical and fluctuating nature of scallop density in a location over time. Although fishing grounds for scallop dredges are widespread across the UK, these have become more limited in recent years, due to the implementation of fishing restrictions and the construction of wind farms across the UK. Considering this, scallop dredgers are considered to be of **low sensitivity** to loss of access to fishing grounds.

The Offshore Site sustains low to moderate levels of scallop dredge fishing, with higher levels of value and effort in the waters outside the Offshore Site, including in ICES rectangle 46E5. Loss of access will be temporary and confined to the construction safety zones and areas of pre-installed infrastructure, which represent a small proportion of the available fishing grounds in the area. Scallop dredging mainly occurs within the OECC; therefore, temporary loss or restricted access are mainly expected to result from safety zones around installation vessels within the OECC and in areas of unburied cable awaiting burial or additional remedial protection. Scallop dredging within the PFOWF Array Area is expected to be low, and so any pre-installed anchors are not expected to result in a considerable loss of grounds for this fishing method. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.6.1.1.5 Non-UK fishing fleets

EU vessels operating in the Study Area are considered to have large operational ranges. Analysis of the effort data shows that all vessels are over 18 m in length, with the majority over 40 m (Gibin *et al.*, 2021). Taking into account the large operational range of these vessels and the wide availability of grounds, non-UK fishing vessels are considered to be **negligible sensitivity** to loss of access to fishing grounds.

Fishing effort data for the Study Area indicate that non-UK fishing effort within the Offshore Site is likely to be very low, which is partly due to the restrictions on fishing activity by non-UK vessels within the 22-km (12-nm) limit. Considering the low effort levels sustained within the Offshore Site, alongside the temporary and localised nature of any loss of access to fishing grounds during construction, the impact is defined as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing fleets is considered to be **negligible** and **not significant**.

13.6.1.2 Displacement of fishing activity into other areas

As a result of the temporary loss of access to fishing grounds during construction, fishing activity may be temporarily displaced to alternative areas. Displacement of fishing activity can cause competition for space and gear conflict both within a fleet (e.g. static fishing gear being relocated to areas where existing static fishing gear is typically set) and between fleets (e.g. static fishing gear being relocated into areas of scallop dredging or demersal trawling). This will directly impact vessels being displaced from the Offshore Site (i.e. primary displacement impacts) and indirectly impact vessels in established fishing grounds that vessels from the Offshore Site are displaced to (i.e. secondary displacement impacts).

As noted for the assessment of loss of access to fishing grounds during construction, displacement within the PFOWF Array Area may occur from the statutory safety zones associated with the WTGs, advisory safety zones associated with installation vessels, and in areas of pre-installed infrastructure.

Within the OECC, displacement will result from the advisory safety zones associated with installation vessels and in areas of unburied cable awaiting burial or additional remedial protection.

The displacement of fishing activity is assessed with direct reference to the assessment of loss or restricted access to fishing grounds, as the latter leads to the former. However, predicting where fishing is likely to be displaced to is complex and depends on a number of different assumptions which make these predictions unreliable. It is expected that vessels will focus displaced effort in established fishing grounds for the same fishing method and target species. However, it is acknowledged that this will not always be the case as this will depend on the fishing patterns of individual skippers. For the assessment, it is assumed that fishing vessels with a greater operational range and a wider availability of alternative grounds will be less sensitive to displacement impacts.

13.6.1.2.1 Creelers (pots and traps)

As described in Section 13.6.1.1.1, creelers are considered to have relatively low availability of fishing grounds. This is due to creelers typically having smaller operating ranges and a low target species / gear versatility. As pots and traps are left unattended on the seabed, this fishing method is also vulnerable to gear conflict. Hence, creelers are considered to be of **moderate sensitivity** to displacement.

A high proportion of the landings values in ICES rectangle 46E6 are attributed to pots and traps. VMS data and information gained through consultation indicate that creeling does occur within the Offshore Site, meaning displacement of effort is likely to occur. As described in Section 13.6.1.1.1, vessels operating static gear will be requested to relocate their gear during construction within the PFOWF Array Area and the OECC.

Available data indicate that creeling activity of moderate to high value and effort also occurs in the areas surrounding the Offshore Site, and it is assumed that the majority of effort will be displaced to these surrounding fishing grounds. Considering the number of pots and traps that the relatively small area of the Offshore Site can support, combined with the temporary nature of the displacement impacts during construction, displacement impacts are expected to be minimal. However, it is acknowledged that some displacement impacts are likely to occur.

Secondary displacement impacts resulting from vessels operating mobile gear being displaced from the Offshore Site to fishing grounds traditionally fished by creelers may also occur. Demersal trawlers and scallop dredgers are active within the 22-km (12-nm) limit, where smaller creeling vessels are known to fish, meaning there is the potential for gear conflict to arise between creelers and displaced scallop dredgers and demersal trawlers. However, vessels operating mobile gears typically have large operational ranges and it would be expected that displaced vessels operating mobile gear would focus their effort to areas which are traditionally fished by these fleets and be able to avoid established areas fished by creelers. Vessels operating mobile gear also have a degree of manoeuvrability to avoid pots and traps unattended on the seabed. Considering this, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**

13.6.1.2.2 Demersal trawlers

13.6.1.2.2.1 *Whitefish*

As described in Section 13.6.1.2.1, demersal trawlers targeting whitefish are considered to have a wide availability of alternative grounds and a high versatility in terms of their target species (dependent on quota limits). Demersal trawlers targeting whitefish are considered to be of **low sensitivity** to displacement.

Displacement of demersal trawlers during construction will be limited to construction safety zones and areas of pre-installed infrastructure, over a total period of two years, of which construction will be occurring over approximately seven months per year. The Offshore Site is associated with moderate to high levels of effort / value which represents a small proportion of the fishing activity by demersal trawlers targeting whitefish. However, very limited activity is recorded within the OECC. Considering the small area that vessels will be displaced from at any given time and the wide operational range of demersal trawlers within the Study Area, there is considered to be a limited potential for increased competition and gear conflict as a result of displacement during construction.

Secondary displacement impacts on demersal trawlers targeting whitefish, may also occur from other fleets being displaced from the Offshore Site. Vessels operating other types of mobile gear (e.g. scallop dredgers and demersal seines) typically have wide operational ranges, reducing the potential for conflict and competition to occur. It is also anticipated that displaced creelers will largely avoid established fishing grounds for demersal trawling to reduce any chance of damage to static gear by these mobile methods, although it is acknowledged that smaller vessels may have more limited operational ranges for fishing effort to be displaced to. Considering this, the impact is defined as being of **moderate magnitude**.

Therefore, the overall effect to demersal trawlers targeting whitefish is considered to be **minor** and **not significant**.

13.6.1.2.2.2 *Squid*

Demersal trawlers targeting squid are considered to have large operational ranges and wide availability of alternative grounds and may adapt their gear to fish other target species. Therefore, demersal trawlers targeting squid are considered to be of **low sensitivity** to displacement.

The landings statistics for ICES rectangle 46E6 indicate that landings for squid are comparably low when compared to ICES rectangle 46E5. Therefore, it is expected that only low levels of effort will be displaced from the Offshore Site.

It is possible that displacement of fishing activity from other fleets could impact established grounds for demersal trawlers targeting squid (i.e. secondary displacement impacts). However, as described above for demersal trawlers targeting whitefish, demersal trawlers targeting squid can avoid pots and traps that are displaced from the Offshore Site and vessels operating other mobile gears are considered to generally have wide operational ranges, reducing the potential for gear conflict and competition to arise. Therefore, impacts resulting from secondary displacement of other fleets from the Offshore Site on demersal trawlers targeting squid are expected to be minimal. However, this does rely on these fishers working cooperatively with the static gear fishers which may not happen.

Overall, considering the temporary nature of any displacement during construction, the low levels of activity by demersal trawlers targeting squid within the Offshore Site, and the limited potential for increased competition and conflict with other offshore fleets as a result of displacement, the impact is defined as being of **moderate magnitude**.

Therefore, the overall effect to demersal trawlers targeting squid is considered to be **minor** and **not significant**.

13.6.1.2.3 Seine netters

As described in Section 13.6.1.1.3, seine netters are considered to have wide operational ranges but potentially limited availability of grounds due to the need for a soft / clean seabed to operate this type of gear. Therefore, seine netters are considered to be **moderate sensitivity** to displacement.

Seine netting activity in the Study Area predominantly occurs along the western boundary of ICES rectangle 46E6, overlapping with the Offshore Site. Due to the small area that vessels will be displaced from during the construction phase over a period of two years, during which construction will be occurring over approximately seven months per year, the potential for increased competition and conflict within and between fleets is considered to be low. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to seine netters is considered to be **minor** and **not significant**.

13.6.1.2.4 Scallop dredgers

Scallop dredgers are typically nomadic with wide operational ranges and a wide availability of alternative grounds. However, scallop grounds have become more limited in recent years due to the implementation of fishing restrictions and through the construction of wind farms across the UK. Hence, scallop dredgers are considered to be of **low sensitivity** to displacement.

Similar to demersal trawlers and seine netters, vessels will be displaced from a relatively small area during construction, when compared with the grounds available to scallop dredgers. Considering the Offshore Site sustains low to moderate levels of scallop dredge fishing, as well as the temporary and localised nature of displacement during construction, displacement impacts resulting from vessels displaced from the Offshore Site are considered to be minimal. Furthermore, as per demersal trawlers and seine netters, scallop dredgers are expected to be able to avoid areas used by creelers displaced from the Offshore Site and combined with the wide operational ranges of displaced vessels operating other types of mobile gear, secondary displacement impacts to scallop dredgers are expected to be limited. However, it is acknowledged that creelers have limited operational ranges and considering this, the impact is defined as being of **moderate magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.6.1.2.5 Non-UK fishing vessels

As described in Section 13.6.1.1.5, vessels associated with the non-UK fishing effort in the Study Area are mostly over 40 m in length and are considered to have wide operational ranges and availability of grounds. Furthermore, most non-UK vessels operate pelagic fishing gear within the Study Area, targeting highly mobile pelagic species which are not constrained by a particular seabed habitat. Therefore, non-UK fishing vessels are considered to be of **negligible sensitivity** to displacement.

Fishing effort by non-UK vessels is low within the Offshore Site, and hence, only low effort levels will be temporarily displaced during construction. Therefore, impacts relating to non-UK vessels being displaced from the Offshore Site are expected to be minimal. With regards to the displacement impacts to non-UK fleets in areas where UK vessels active in the Offshore Site are displaced to, considering that a large proportion of creel activity is expected to be displaced to areas within the 22-km (12-nm) limit, alongside the wide operational range of UK vessels operating mobile gear, these impacts are expected to be minimal. Taking the above into account, the impact is defined as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing fleets is considered to be **negligible** and **not significant**.

13.6.1.3 Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear, or ghost fishing

Structures on or near the seabed present a potential snagging risk to fishing gear which is towed along the seabed. During the construction phase within the PFOWF Array Area, this includes pre-installed infrastructure, such as the anchors installed in advance of the mooring lines, WTGs, any mooring lines installed ahead of hook-up to WTGs, any areas of cable awaiting burial or protection, and any dropped objects.

Within the OECC, the potential snagging points include areas of cable awaiting burial or protection or dropped objects.

Commercial fisheries stakeholders will be informed of the locations of any areas of pre-installed infrastructure or unburied cable via the communication channels listed within the embedded mitigation in Section 13.5.5, such as the circulation of information through NtMs. An FLO will be in place to coordinate communications

with the fishing industry. Furthermore, statutory safety zones will be installed around each WTG during construction, reducing any potential snagging risk associated with the installation itself.

Guard vessels and an Offshore Fisheries Liaison Officer (OFLO) will also be onsite, if required, during construction works to aid offshore communications and warnings of any hazards associated with the Offshore Development. In the period between the anchor installation, planned for Stage 1, and the installation of remaining infrastructure, planned for Stage 2, the site will be marked and, if required, a guard vessel may also be in place to reduce the snagging risk associated with anchors.

The frequency of this impact is considered to be **extremely unlikely**, taking into account all mitigation. Since this impact could lead to significant damage to one of the vessels involved and potential injury to crew members, the severity is ranked as **serious**.

Therefore, the overall risk is considered to be **tolerable**, and therefore within acceptable limits and **not significant** in EIA terms.

13.6.1.4 Summary of effects during construction

summary of the assessment of effects during construction is provided in Table 13.14.

Table 13.14 Summary of significance of effects from construction impacts

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effect
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range; > Moderate value of fishing grounds at the Offshore Site; and > Temporary impact which would occur throughout the Offshore Site for the duration of construction, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range; > Moderate to high value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range and have the ability to adapt gear to target other species; > Low value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Seine netters have a wide operational range but are constrained to areas of soft seabed; > Low to moderate value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Low	Low	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Moderate value of fishing grounds in the Offshore Site, mainly in the OECC; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Non-UK fishing vessels	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels in the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Negligible Effects	Not Significant		Not Significant
Displacement of fishing activity into other areas	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range and leave gear unattended on the seabed, making it vulnerable to gear conflict; > Moderate value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact with effort from the Offshore Site being displaced for the duration of construction; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of vessels operating mobile gear that could be displaced into grounds already established by creelers, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that the effect was not significant.	Not Significant

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effect
	Demersal trawlers - whitefish	Low	Moderate	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range and availability of grounds; > Moderate to high value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Moderate	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range and availability of grounds and can adapt their gear to target other species; > Low value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Seine netters have a wide operational range but are constrained to areas of soft seabed; > Low to moderate value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not significant		Not Significant
	Scallop dredgers	Low	Moderate	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Moderate value of fishing grounds in the Offshore Site, mainly in the OECC; > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not significant		Not Significant
	Non-UK fishing vessels	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels in the Offshore Site; > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Negligible Effects	Not Significant		Not Significant

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effect
Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	All Fleets	Extremely Unlikely	Serious	<ul style="list-style-type: none"> > Extremely unlikely as adequate liaison, site marking and, if required, the site will be marked or guard vessels will be present to reduce the potential for gear snagging subsea structures during the two seven-month construction stages and at areas of unburied cable awaiting burial or protection; and > Serious severity as this impact could lead to significant damage or potential injury. 	Tolerable with Mitigation (Not Significant)	Not Significant		Not Significant

13.6.2 Effects during Operation and Maintenance

13.6.2.1 Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone

The WTG layout has not been confirmed at this stage; however, the worst case scenario for loss of access during the operation and maintenance period assumes that the WTGs are spread out across the PFOWF Array Area. The minimum WTG spacing will be 800 m with a maximum radius for the mooring lines around the seven WTGs of 1,500 m. Each WTG may also have a 50-m statutory or advisory safety zone. Any statutory safety zones would be subject to a separate application. There is no legislative requirement for the prevention of fishing within operational wind farm sites. However, it is acknowledged that the decision to fish within the PFOWF Array Area will be at the discretion of each skipper, based on their perception of risk which will be influenced by vessel size, manoeuvrability and the operational spread of gear deployed by the vessel, as well as weather and tidal conditions. Considering the 1,500-m mooring line radius and the potential safety risks for vessels operating gear within the PFOWF Array Area, it is assumed that fishing within the PFOWF Array Area by vessels operating mobile gear is unlikely to occur in the operation and maintenance phase. It may be possible for some static fishing to resume within the PFOWF Array Area.

500-m safety zones around maintenance activities may also result in temporary loss of access during the operation and maintenance phase. Those associated with each WTG may be advisory or statutory (centred on the installation being worked on), whereas those performing maintenance works not associated with the WTGs will be advisory.

As a worst case, it is assumed that up to two offshore export cables will be installed in separate trenches within the OECC. The Offshore Export Cable(s) will be buried to a minimum target depth of 0.6 m where possible, and this will be informed by a cable burial risk assessment. It is expected that up to a maximum of 50% of the Offshore Export Cable(s) will be buried with the potential for 6.25 km of each cable to require additional protection. It is anticipated that up to 20 km of the inter-array cables will be installed on the seabed and that up to a maximum of 10 km will require additional protection.

It is assumed where the Offshore Export Cable(s) is buried to a minimum depth of 0.6 m, informed by the cable burial risk assessment, that fishing may be able to resume safely over the cable. The requirement for overtrawl surveys will be discussed with fisheries stakeholders in the post-consent phase, with details included within the Cable Plan, where relevant. If required, the approach and methodologies for the overtrawl surveys will be developed with MS-LOT, in consultation with fisheries stakeholders. HWL will share all post-installation survey data with the fishing industry.

13.6.2.1.1 Creelers (pots and traps)

Creelers are expected to be active both within the PFOWF Array Area and the OECC. As described for construction in Section 13.6.1.1.1, creelers are considered to be of **moderate sensitivity** to loss of access to fishing grounds.

The safety risks associated with fishing within operational wind farms are generally considered to be lower for creelers, as this gear is less vulnerable to snagging compared with towed gear. However, concerns were raised by local fishers during consultation that pots and traps set within the PFOWF Array Area could drift in the strong currents of the Pentland Firth and become entangled with the mooring lines and mid-water inter-array cables. Notably, the Hywind offshore wind farm, which comprises five floating WTGs with mooring lines of 900 m in length and a WTG spacing of 1 to 2 km, are planning on conducting trials in Summer 2022 to understand whether static gear can be operated within a floating offshore wind farm.

The Offshore Export Cable(s) will be buried to a target depth of at least 0.6 m and where this is not possible, which is expected to be along up to 50% of the static cables, additional remedial protection will be installed. It is assumed that fishing by creelers will be able to resume over the Offshore Export Cable(s) during the operation and maintenance phase. Therefore, with respect to the Offshore Export Cable(s), any loss of access will be temporary, resulting from 500-m safety zones around maintenance works. The fishing industry will be informed of any safety zones surrounding maintenance works required during the operation and maintenance phase through the measures outlined in Section 13.5.5.

The fishing grounds in the PFOWF Array Area are considered to be of moderate value and represent a small proportion of the available grounds in the area. The loss of access may be long-term (although some access may resume with restrictions) within the PFOWF Array Area, lasting the full design life of the Offshore Development (i.e. 30 years). Additional areas of temporary loss of access due to the relocation of gear during maintenance activities may also occur. Fishing will be able to resume within the OECC. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.6.2.1.2 Demersal trawlers

13.6.2.1.2.1 Whitefish

As described for construction in Section 13.6.1.1, demersal trawlers targeting whitefish are active in the Offshore Site (concentrated in the northwest of the site). The majority of demersal trawlers active in the Offshore Site are over 10 m in length and are considered to have a wide operational range and versatility in their target species. Therefore, demersal trawlers targeting whitefish are considered to be of **low sensitivity** to loss of access to fishing grounds.

Demersal trawl nets are held open by trawl doors (otter boards) and the net is towed several tens or hundreds of metres behind the vessel, with the width between the trawl doors also being up to tens or hundreds of metres. It is assumed based on the operational spread of demersal trawling gear, and the presence of mooring lines out to a maximum of 1,500 m from each WTG, that fishing by demersal trawlers will not resume in the PFOWF Array Area during the operation and maintenance phase. It is recognised that fishing within operational offshore wind farms has been demonstrated previously in offshore wind farms on the west coast of England (Gray *et al.*, 2016). However, these offshore wind farms were deploying fixed-bottom WTGs with no mooring lines or inter-array cables suspended in the water column.

The Offshore Export Cable(s) will be buried to a depth of at least 0.6 m and where this is not possible, which is expected to be up to 50% of the cables, additional remedial protection will be used. The final target cable burial depth will be informed by a cable burial risk assessment and will consider fishing activity in the area. The fishing industry would be communicated with as soon as a cable exposure is identified and this would be charted as appropriate, as described in Section 13.5.5. It is acknowledged that fishing by demersal trawlers may be impacted within areas with additional remedial protection. The as-built locations of the cable and any areas of protection will be issued to Kingfisher. The requirement for overtrawl surveys will also be discussed with fisheries stakeholders. If required, the approach and methodologies for the overtrawl surveys will be developed with MS-LOT, in consultation with fisheries stakeholders and presented within the FMMS.

The value of the Offshore Site for demersal trawlers targeting whitefish is considered to be moderate to high, representing a small extent of the available grounds in the area. Considering the relatively small area lost to demersal trawlers when compared to the available fishing grounds alongside the long-term nature of the impact, the impact is defined as being of **moderate magnitude**.

Therefore, the overall effect to demersal trawlers targeting whitefish is considered to be **minor** and **not significant**.

13.6.2.1.2.2 Squid

Squid landings values are highest in ICES rectangle 46E5 and lower in ICES rectangle 46E6 where the Offshore Site resides in. Demersal trawlers targeting squid are considered to have a wide operational range with gear / target species versatility. Therefore, demersal trawlers targeting squid are considered to be **low sensitivity** to loss of access to fishing grounds.

For the same reasons described for demersal trawlers targeting whitefish, it is considered unlikely that fishing by demersal trawlers targeting squid will resume in the PFOWF Array Area during the operation and maintenance phase. Demersal trawlers targeting squid may also be impacted by areas of remedial protection.

The impact will be long-term over 30 years. However, the value of the Offshore Site for demersal trawlers targeting squid is considered to be low, representing a small extent of the available grounds in the area, with areas of greater value in ICES rectangle 46E5. For these reasons, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers targeting squid is considered to be **minor** and **not significant**.

13.6.2.1.3 Seine netters

As discussed for construction in Section 13.6.1.1.3, it is understood that one to two seine netting vessels are active in the Offshore Site.

Seine netters are considered to have a **moderate sensitivity** to loss of access to fishing grounds, as these vessels have wide operational ranges but are constrained to areas of soft ground.

Seine netters require a large area to deploy and haul their gear. This fishing method involves shooting an encircling net with ropes up to 3 km long which is then hauled in via a winch (Seafish, 2022). A large area is required to when shooting and hauling this fishing gear. Therefore, it is considered unlikely that fishing could resume within the PFOWF Array Area. As described above for demersal trawlers, it is expected that fishing could continue over the Offshore Export Cable(s) and the requirement for overtrawl surveys will be discussed with fisheries stakeholders.

The Offshore Site represents a low to moderate proportion of the available fishing grounds for seine netting, which operates along the western boundary of ICES rectangle 46E6, and to a lesser extent in ICES rectangle 47E6. Although the impact would be long-term, the impact is defined as having a **low magnitude**, considering the small area associated with the PFOWF Array Area and the wider availability of the soft seabed fished by these vessels. The area of the PFOWF Array Area has been reduced and represents an even smaller proportion of fishing grounds in the region compared with what was presented at Scoping. HWL will work with relevant stakeholders to minimise the direct impact of the Offshore Development by considering key fishing grounds when determining the WTG layout, where possible.

Therefore, the overall effect to seine netters is considered to be **minor** and **not significant**.

13.6.2.1.4 Scallop dredgers

Scallop dredgers are mainly nomadic with wide operational ranges. However, scallop grounds have become more limited in recent years due to the implementation of fishing restrictions and the construction of wind farms across the UK. Scallop dredgers are considered to have a **low sensitivity** to loss of access to fishing grounds.

Scallop dredging vessels operate a rigid metal frame onto which is attached a chain mail bag and at the mouth a series of spring-loaded teeth which penetrate the seabed, dredging the scallops which are mostly sedentary and are seabed dependent. The dredges are attached to a spreading bar which is often attached to one of two beams, on either side of the fishing vessel. Each scallop dredge is approximately 0.75-m wide and the maximum number of dredges which can be operated is 16 between the 0-km to 11-km (0-nm to 6-nm) limit and 20 between the 11-km to 22-km (6-nm to 12-nm) limitⁱⁱⁱ. Large nomadic vessels also have a low manoeuvrability which may restrict fishing within the PFOWF Array Area when operational. Therefore, it is assumed that fishing within the PFOWF Array Area will not resume during the operation of the Offshore Development. The Offshore Site is considered to have a low value for scallop dredging, mainly in the OECC. Surrounding areas in the Study Area (e.g. ICES rectangle 46E5) are considered to be of a higher value than the Offshore Site.

The gear penetrates the seabed to dredge scallops and will often dredge the same area with repeat passes. Therefore, vessels may avoid dredging over areas of remedial protection. As mentioned previously, it is assumed that up to 50% of the inter-array and Offshore Export Cable(s) may require additional remedial protection, a total of 22 km of the cable infrastructure on the seabed.

The Offshore Site is considered to support low to moderate levels of scallop dredging with more valuable areas surrounding the Offshore Site. Although the impact will be long-term, any permanent loss from the PFOWF

ⁱⁱⁱ Under the Regulation of Scallop Fishing (Scotland) Order 2017.

Array Area or resulting from areas of additional remedial protection across the OECC will represent a small proportion of the available fishing grounds to this fleet. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.6.2.1.5 Non-UK fishing vessels

As described for construction in Section 13.6.1.2.5, EU vessels operating in the Study Area are mostly over 40 m and are considered to have wide operational ranges. Therefore, non-UK fishing vessels are considered to be of **negligible sensitivity** to loss of access to fishing grounds.

Considering the size of the non-UK vessels operational in the Study Area, the vessels are considered to have low manoeuvrability and are unlikely to fish within the PFOWF Array Area when operational.

As the fishing effort by non-UK vessels in ICES rectangle 46E6 within which the Offshore Site resides is very low and represents a very small proportion of the fishing grounds available for non-UK vessels, the impact is defined as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **negligible** and **not significant**.

13.6.2.2 Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zone

As described in Section 13.6.1.2, loss or restricted access to fishing grounds may result in the relocation of fishing effort to alternative grounds, potentially increasing competition and gear conflict. The impact assessment considers both primary and secondary displacement impacts.

13.6.2.2.1 Creelers (pots and traps)

Creelers are considered to have a **moderate sensitivity** to displacement, as these vessels are more limited in their availability of grounds with less flexibility in terms of target species / gear versatility. The gear is also left unattended on the seabed making it vulnerable to gear conflict.

As mentioned above in Section 13.6.2.1.1, it is assumed that fishing may be possible, but with restrictions, within the PFOWF Array Area, and therefore, displacement during the operation and maintenance phase is likely to occur. It is assumed that fishing can resume over the cable, so any displacement would be associated with the safety zones around maintenance activities. This temporary displacement would be highly localised and on a short-term basis only.

Vessels could be displaced from the PFOWF Array Area for the operational life of the Offshore Development (30 years). The PFOWF Array Area is considered to be of moderate value for creeling and it is assumed that the majority of vessels will be displaced to surrounding fishing grounds already established for creeling. As the PFOWF Array Area represents a small proportion of the available fishing grounds for this fleet, with other grounds available to this fleet in the surrounding area, the displacement impacts are expected to be minimal.

With regards to secondary displacement impacts, it is acknowledged that vessels operating mobile gear within the PFOWF Array Area are unlikely to resume fishing, and therefore, displacement of vessels operating mobile gear is likely to occur. As described for construction, considering the relatively wide operational range of vessels operating mobile gear, it is anticipated that vessels will be displaced across a relatively wide area and focussed to grounds already established for this fishing method.

Considering the relatively small area encompassed by the PFOWF Array Area, it is expected that displacement of effort can occur without any major increase in gear conflict and competition. Therefore, despite the impact being long-term, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.6.2.2.2 Demersal trawlers

13.6.2.2.2.1 *Whitefish*

As described for construction, demersal trawlers targeting whitefish are considered to have a **low sensitivity** to displacement as those present in the Study Area are mainly over 10 m and this fleet has a wide availability of alternative grounds and a high versatility in terms of target species.

Demersal trawlers are unlikely to resume fishing within the PFOWF Array Area when constructed, considering the operational spread of this gear and the potential safety risks posed by the mid-water mooring lines and inter-array cables (see Section 13.6.2.1). Therefore, displacement is likely to occur for the operational life of the Offshore Development (30 years). There are alternative grounds of moderate to high value surrounding the PFOWF Array Area (e.g. in ICES rectangle 47E6) which vessels could be displaced to. Considering the relatively small proportion of the available grounds that the Offshore Site represents, and the availability of fishing grounds surrounding the Offshore Site, the primary displacement impacts are expected to be minimal.

For the same reasons described for construction in Section 13.6.1.1.2.1, secondary displacement impacts are also expected to be minimal.

Despite this impact being long-term, considering the wide availability of alternative grounds for demersal trawlers targeting whitefish and the small proportion of these grounds that the Offshore Site represents, it is expected that alternative fishing grounds will be able to accommodate the relocation of effort. Therefore, the impact is defined as having a **low magnitude**.

Therefore, the overall effect to demersal trawlers targeting whitefish is **minor** and **not significant**.

13.6.2.2.2.2 *Squid*

As described for construction, demersal trawlers targeting squid have a **low sensitivity** to displacement impacts, as this fleet has a wide availability of alternative fishing grounds and a versatility in target species and gear.

As described in Section 13.6.2.1.2.2, it is unlikely that demersal trawlers targeting squid will resume fishing within the PFOWF Array Area once operational. Therefore, displacement is likely to occur for the 30-year operation and maintenance phase of the Offshore Development. Secondary displacement may also occur. However, considering the low landings value for squid in the PFOWF Array Area and the availability of alternative grounds in the surrounding area (e.g. ICES rectangle 46E5), displacement impacts are expected to be minimal. It is recognised that fishing vessels operating other fishing methods may be displaced to the higher value grounds for squid. However, considering the small area occupied by the PFOWF Array Area, displaced effort is expected to be low, and it is expected that alternative grounds can accommodate displaced effort without any major increases in gear conflict or increased competition. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers targeting squid is considered to be **minor** and **not significant**.

13.6.2.2.3 Seine netters

For the same reasons described in Section 13.6.1.1.3, seine netters are considered to have a **moderate sensitivity** to displacement.

It is highly unlikely that fishing by seine netters will resume within the PFOWF Array Area when constructed due to the operational spread of this gear, as described in Section 13.6.2.1.3. Therefore, displacement is likely to occur over the operational life of the Offshore Development. Secondary displacement may also occur as a result of vessels operating other fishing methods being displaced into grounds used by seine netters. Seine netters are mainly operational over the western edge of ICES rectangle 46E6 and 47E6. Other fishing methods are also operational in this area, such as pots and traps and demersal trawls and effort by these fleets could be displaced here. However, the PFOWF Array Area represents a relatively small extent of available fishing grounds in the area, and considering the moderate availability of grounds for seine netters, the impact is defined as being of **low magnitude**. Therefore, the overall effect to seine netters is considered to be **minor** and **not significant**.

13.6.2.2.4 Scallop dredgers

Scallop dredgers are mainly nomadic with wide availability of grounds. As described for construction, scallop dredgers are considered to have a low sensitivity to displacement.

The value and effort for scallop dredging within the PFOWF Array Area are considered to be low, with higher levels of value / effort within the OECC. Displacement will likely occur from the PFOWF Array Area and along the 12.5 km areas of the Offshore Export Cable(s) which may require additional remedial protection, as described in Section 13.6.2.1.4. There are considered to be higher value grounds for this fishing method in the areas surrounding the Offshore Site and considering the wide availability of grounds for scallop dredges, and the small proportion of the grounds that the Offshore Site represents, the impact is defined as being of **low magnitude**. Secondary displacement impacts are also considered to be low for the same reasons described in Section 13.6.1.2.4.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.6.2.2.5 Non-UK fishing vessels

For the same reasons described for construction, non-UK fishing vessels are considered to have a **low sensitivity** to displacement.

Very low levels of effort are recorded by non-UK fishing vessels within the Offshore Site. The Offshore Site represents a very small proportion of the available grounds for this method and there is a wide availability of alternative grounds for these vessels. Considering this, the impact is defined as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **minor** and **not significant**.

13.6.2.3 Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage or loss of fishing gear

Entanglement or snagging of fishing gear engaged in active fishing may result in damage or loss of gear and in severe cases, loss of life. Safety risks associated with the potential collision of fishing vessels with maintenance vessels as well as the WTGs themselves, are addressed in Chapter 14: Shipping and Navigation and within Offshore EIAR (Volume 3): Appendix 14.1: Navigational Risk Assessment.

The criteria for the assessment of safety issues differ from other impacts. Impacts relating to health and safety are assessed in terms of potential risk, in line with the criteria used in Chapter 14: Shipping and Navigation, as described in Section 13.5.3.

The floating structures and the portion of the inter-array cables and mooring lines located within the water column may present a potential entanglement risk for fishing gear. The worst case scenario considers a minimum WTG spacing of 800 m between seven WTGs and a mooring line radius of up to 1,500 m for up to nine mooring lines per WTG. Up to 500 m of each inter-array cable will also be located within the water column. For the worst case scenario, it is assumed that some fishing activity within or in close proximity to the PFOWF Array Area occurs during the operation and maintenance phase. It is acknowledged that fishing within the Offshore Development will be at the discretion of the skipper and their perception of risk. Pots and traps deployed by creelers are less vulnerable to entanglement, although this may occur in the strong currents that are present in the Pentland Firth. This could present a safety risk as pots and traps entangled with mooring lines or dynamic cables are hauled. This was highlighted as a concern by local creelers during consultation.

Vessels operating mobile gear, including demersal trawlers, seine netters and scallop dredgers are potentially vulnerable to gear entanglement, due to the action of these gear types being towed from the vessel.

Entanglement of fishing gear with the sections of mooring lines and inter-array cables within the water column could result from a powered vessel engaging in fishing within or in close proximity to the PFOWF Array Area, or with a drifting vessel which has had a machinery failure. The locations of the mooring lines and inter-array cables will be marked on Admiralty charts and all works will be communicated to the fishing industry through the communication channels listed in Section 13.5.5, including via Kingfisher bulletins and United Kingdom Hydrographic Office charts. Structures will also be adequately lit to make fishers aware of their presence and the associated risks, in line with industry best practices. It is also possible that a 50-m safety zone will be in place around the WTGs (although the mooring lines could extend beyond this zone).

The Emergency Response Cooperation Plan will detail the emergency response procedures in place during the operation and maintenance phase and this will be developed in consultation with fisheries stakeholders. This is expected to minimise the risk of potential entanglement of fishing gear, resulting in damage or loss of fishing gear.

Structures on or near the seabed (e.g. areas of the export or inter-array cable not adequately buried) present a potential snagging risk to fishing gear which is towed along the seabed. Areas of the Offshore Export Cable(s) and buried inter-array cables could become exposed over time, particularly in areas where the seabed is highly mobile and where there is intensive demersal trawling or scallop dredging.

Commercial fisheries stakeholders will be informed of the locations of any areas of exposed and unburied cable via the communication channels listed within the embedded mitigation in Section 13.5.5, such as the circulation of information through NtMs. A company FLO will be in place to coordinate communications with the fishing industry. Guard vessels and an OFLO will also be onsite, if required, during maintenance works where the works vessel is restricted in its ability to manoeuvre, to aid offshore communications and warnings of any hazards associated with the Offshore Development.

Maintenance activities are expected to be required infrequently, and post-installation surveys will provide detailed information on the condition and location of the subsea structures, any additional remedial protection which is required for the Offshore Export Cable(s) and / or the buried portions of the inter-array cables, as well as the status of burial material. The requirement for overtrawl surveys will also be discussed with fisheries stakeholders. If required, the approach and methodologies for the overtrawl surveys will be developed with MS-LOT, in consultation with fisheries stakeholders and presented within the FMMS.

The frequency of this impact is considered to be **remote**, taking into account all mitigation. Since this impact could lead to significant damage to one of the vessels involved and potential injury to crew members, the severity is ranked as **serious**.

Therefore, the overall risk is considered to be **tolerable**, and therefore within acceptable limits and **not significant** in EIA terms.

13.6.2.4 Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings

The presence of the WTGs and the associated mooring lines may result in fishing vessels being required to use alternative routes to access fishing grounds, potentially increasing steaming times with associated increases in fuel costs. The worst case scenario assumes that the seven WTGs are spread out over the PFOWF Array Area. Further details on the impact of the Offshore Development on transiting vessels is provided in Chapter 14: Shipping and Navigation.

Any obstruction of regular fishing vessel transit routes in association with the OECC would be associated with any potential advisory safety zones associated with major maintenance activities. This is likely to be localised and is therefore unlikely to result in significant re-routing of transiting vessels.

13.6.2.4.1 Creelers (pots and traps)

Creelers are expected to be more sensitive to this impact than larger vessels operating mobile gear, considering the smaller operational range for this fleet. However, their operating range is considered to extend beyond the PFOWF Array Area that the WTGs will be developed over, and therefore, creelers are considered to be of **low sensitivity** to increased steaming times.

Small fishing vessels may be able to steam through the PFOWF Array Area, although this is subject to the risks perceived by the skipper. The exception to this would be the implementation of any 500-m safety zones for maintenance works during the operation and maintenance phase. However, the location of all infrastructure and maintenance works within the Offshore Site will be charted and communicated to the fishing community, as described in Section 13.5.5. With adequate notification of any works, it is expected that vessels will be able to route around the PFOWF Array Area without any substantial increase in steaming times. Therefore, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.6.2.4.2 All other fleets

All other receptors are considered to be of **negligible sensitivity** to increased steaming times, given the large operational ranges of these vessels.

As described above, vessels may be able to steam through the PFOWF Array Area, although this is subject to the risks perceived by the skipper. Vessels may also be more constrained when safety zones are in place during major maintenance works. Therefore, vessels may be required to route around the PFOWF Array Area to target grounds in the areas surrounding the Offshore Site. However, with the implementation of the embedded mitigation measures described in Section 13.5.5, including charting and communicating the locations of infrastructure and any maintenance works, the impacts are defined as being of **low magnitude**.

Therefore, the overall effect to all fleets except creelers is considered to be **negligible** and **not significant**.

13.6.2.5 Summary of effects during operation and maintenance

A summary of the assessment of effects during operation and maintenance is provided in Table 13.15.

Table 13.15 Summary of significance of effects from operation and maintenance impacts

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effects
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range; > Moderate value of fishing grounds at the Offshore Site; > Long-term impact within the PFOWF Array Area. However, it is assumed that fishing can resume over the Offshore Export Cable(s) once constructed; and > The PFOWF Array Area represents a small extent of the available grounds in the area. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Low	Moderate	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range; > Moderate to high value of fishing grounds at the Offshore Site; and > Long-term impact within the PFOWF Array Area. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > The Offshore Site represents a small proportion of the available grounds for this fishery. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range with the potential to adapt their gear to target other species; > Low value of fishing grounds at the Offshore Site; > Long-term impact within the PFOWF Array Area. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > The Offshore Site represents a small proportion of the available grounds for this fishery. 	Minor Effects	Not Significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range; > Low to moderate value of fishing grounds at the Offshore Site; > Long-term impact within the PFOWF Array Area. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > The Offshore Site represents a small proportion of the available grounds for this fishery. 	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Low	Low	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Moderate value of fishing grounds at the Offshore Site, mainly in the OECC; > Long-term impact within the PFOWF Array Area. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > The Offshore Site represents a small proportion of the available grounds for this fishery. 	Minor Effects	Not Significant		Not Significant
	Non-UK fishing vessels	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels at the Offshore Site; > Long-term impact within the PFOWF Array Area. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > The Offshore Site represents a small proportion of the available grounds for this fishery. 	Negligible Effects	Not Significant		Not Significant

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effects
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zone	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range and leave gear unattended on the seabed, making it vulnerable to gear conflict; > Moderate value of fishing grounds at the PFOWF Array Area to be displaced to alternative grounds. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; > Long-term impact with effort from the PFOWF Array Area being displaced for the operational life of the Offshore Development. It is assumed that fishing will resume over where sections of cable are buried to the minimum target depth; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of vessels operating mobile gear, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range and availability of grounds; > Moderate to high value of fishing grounds at the PFOWF Array Area to be displaced to alternative grounds. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; > Long-term impact with effort from the PFOWF Array Area being displaced for the operational life of the Offshore Development. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range and availability of grounds with the potential to adapt their gear to target other species; > Low value of fishing grounds at the PFOWF Array Area to be displaced to alternative grounds. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; > Long-term impact with effort from the PFOWF Array Area being displaced for the operational life of the Offshore Development. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Seine netters have a wide operational range but are constrained to areas of soft seabed; > Low to moderate value of fishing grounds at the PFOWF Array Area to be displaced to alternative grounds. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; > Long-term impact with effort from the PFOWF Array Area being displaced for the operational life of the Offshore Development. It is assumed that fishing will resume over the Offshore Export Cable(s) where sections of cable are buried to the minimum target depth; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effects
	Scallop dredgers	Low	Low	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Low value of fishing grounds in the PFOWF Array Area with higher value areas in the OECC. It is assumed that scallop dredging will not occur over areas of additional protection. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Non-UK fishing vessels	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels in the PFOWF Array Area. Temporary displacement during major maintenance works for the Offshore Export Cable(s) may also occur; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Negligible Effects	Not Significant		Not Significant
Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage or loss of fishing gear	All Fleets	Remote	Serious	<ul style="list-style-type: none"> > Remote likelihood as adequate liaison and charting of the PFOWF Array Area and areas of exposed cable is expected to reduce the potential for gear to become entangled in mooring lines and mid-water inter-array cables and for snagging of the Offshore Export Cable(s); and > Serious severity as this impact could lead to significant damage or potential injury. 	Tolerable with Mitigation (Not Significant)	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	Creelers (Pots and Traps)	Low	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range; > Potential for smaller vessels to steam through the PFOWF Array Area, at the discretion of the skipper's perception of risk; and > Adequate liaison and charting of infrastructure are expected to reduce the potential impact. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All other fleets	Negligible	Low	<ul style="list-style-type: none"> > Vessels operating mobile gear are mostly larger vessels with wide operational ranges; and > Adequate liaison and charting of infrastructure are expected to reduce the potential impact. 	Minor Effects	Not Significant		Not Significant

13.6.3 Effects during Decommissioning

Decommissioning will involve the dismantling and removal of the seven WTGs and associated floating substructures, anchoring systems and the removal of the dynamic and seabed laid cables (unless there is compelling evidence to leave the buried sections *in situ*). Scour protection may also be left *in situ* as it may not be practical to remove; anchor piles may also be cut to a depth of 1 m below the seabed and left *in situ*. Detail on the decommissioning of the Offshore Development infrastructure is limited at this time as this will occur after the 30-year operational life of the Offshore Development. A Decommissioning Programme will be developed pre-construction to address the principal decommissioning measures for the Offshore Development, this will be written in accordance with applicable guidance and will detail the management, environmental management and schedule for decommissioning. The decommissioning programme will be reviewed and updated throughout the lifetime of the Offshore Development to account for changing best practices.

Given the nature of the decommissioning activities, which will largely be a reversal of the installation process, the impacts during decommissioning are expected to be similar to or less than those assessed for the construction phase. Therefore, the magnitude of impacts assigned to Commercial Fisheries receptors during the construction stage is also applicable to the decommissioning stage. It is also assumed that the receptor sensitivities will not materially change over the lifetime of the Offshore Development. Therefore, the decommissioning effects are not expected to exceed those assessed for construction.

13.6.3.1 Loss of access to fishing grounds due to the presence of vessels and safety zones during decommissioning

The loss of access to fishing grounds is expected to be the same or similar to construction (see Section 13.6.2.1). Therefore, the same sensitivity and magnitude of impact as construction apply to decommissioning (Table 13.16). Therefore, no significant effects are anticipated from loss of access to fishing grounds during the decommissioning stage. Vessels may also benefit from the removal of the seven WTGs and associated floating substructures, as fishing may be able to resume within the PFOWF Array Area.

All demersal trawlers and scallop dredgers are considered to be of **low sensitivity**, whereas creelers and seine netters are considered to be of **moderate sensitivity** and non-UK fishing fleets of **negligible sensitivity**. The impact is defined as being of **low magnitude** for all receptors except for non-UK fishing fleets, which is defined as being of **negligible magnitude**. Therefore, the overall effect is minor for all fleets except for non-UK fishing fleets, which is considered to be negligible. Therefore, the effects are **not significant** for all receptors.

13.6.3.2 Displacement of fishing activity into other areas

The loss of access to fishing grounds is expected to be the same or similar to construction (see Section 13.6.1.2). Therefore, the same sensitivity and magnitude of impact as construction apply to decommissioning (Table 13.16). Therefore, no significant effects are anticipated from loss of displacement of fishing activity during the decommissioning stage.

All demersal trawlers and scallop dredgers are considered to be of **low sensitivity**, whereas creelers and seine netters are considered to be of **moderate sensitivity** and non-UK fishing fleets of **negligible sensitivity**. The impact is defined as being of **low magnitude** for creelers and seine netters, of **moderate magnitude** for demersal trawlers and scallop dredgers and **negligible magnitude** for non-UK fishing fleets. Therefore, the overall effect is considered to be **minor** for all fleets except for non-UK fishing fleets, which is considered to be **negligible**. Therefore, the effects are **not significant** for all receptors.

13.6.3.3 Summary of effects during decommissioning

A summary of the assessment of effects during decommissioning is provided in Table 13.16.

Table 13.16 Summary of significance of effects from decommissioning impacts

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effects
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range; > Moderate value of fishing grounds at the Offshore Site; and > Temporary impact which would occur throughout the Offshore Site for the duration of decommissioning, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range; > Moderate to high value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Low	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range and can adapt their gear to target other species; > Low value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Seine netters have a wide operational range but are constrained to areas of soft seabed; > Low to moderate value of fishing grounds at the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Low	Low	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Moderate value of fishing grounds in the Offshore Site, mainly in the OECC; and > Temporary impact which would occur in safety zones and in areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels in the Offshore Site; and > Temporary impact which would occur in safety zones and areas of pre-installed infrastructure, representing a small extent of the available grounds in the area. 	Negligible Effects	Not Significant		Not Significant
Displacement of fishing activity into other areas	Creelers (pots and traps)	Moderate	Low	<ul style="list-style-type: none"> > Creelers have a limited operational range and leave gear unattended on the seabed, making it vulnerable to gear conflict; > Moderate value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact with effort from the Offshore Site being displaced for the duration of decommissioning; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of vessels operating mobile gear that could be displaced into grounds already established by creelers, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that the effect was not significant.	Not Significant

Summary of Effect	Receptor	Sensitivity of Receptor	Magnitude of Impact	Rationale	Consequence	Significance of Effect	Additional Mitigation Requirements	Significance of Residual Effects
	Demersal trawlers - whitefish	Low	Moderate	<ul style="list-style-type: none"> > Demersal trawlers targeting whitefish have a wide operational range and availability of grounds; > Moderate to high value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones; and > Offshore Site represents a small extent of the available grounds in the area and considering wide operational range of these vessels, potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Low	Moderate	<ul style="list-style-type: none"> > Demersal trawlers targeting squid have a wide operational range and availability of grounds and can adapt their gear to target other species; > Low value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Seine netters	Moderate	Low	<ul style="list-style-type: none"> > Seine netters have a wide operational range but are constrained to areas of soft seabed; > Low to moderate value of fishing grounds at the Offshore Site to be displaced to alternative grounds; > Temporary impact which would occur in safety zones; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Low	Moderate	<ul style="list-style-type: none"> > Scallop dredgers are nomadic with a wide operational range; > Moderate value of fishing grounds in the Offshore Site, mainly in the OECC; > Temporary impact which would occur in safety zones; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, potential for gear conflict and increased competition is low. 	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible	Negligible	<ul style="list-style-type: none"> > Non-UK vessels have a wide availability of fishing grounds; > Very low value of fishing grounds for non-UK vessels in the Offshore Site; > Temporary impact which would occur in safety zones; and > Offshore Site represents a small extent of the available grounds in the area and considering the wide operational range of these vessels, the potential for gear conflict and increased competition is low. 	Negligible Effects	Not Significant		Not Significant

13.7 Assessment of Cumulative Effects

13.7.1 Introduction

The consideration of projects which could result in potential cumulative impacts is based on the results of the Offshore Development specific impact assessment together with the expert judgement of the specialist consultant.

Projects within 100 km of the Offshore Site are considered to have the potential to result in cumulative impacts for all fishing methods with the exception of scallops, that may be affected beyond this distance. The potential for a cumulative impact on Commercial Fisheries receptors depends on the extent of the fishing grounds for the receptors potentially affected. 100 km is considered to represent a conservative distance for the fishing methods operational within the Offshore Site. As such, the cumulative impact assessment will focus on the projects in the vicinity of the Offshore Site, as these have the greatest potential to affect local fisheries with smaller operational ranges, that are generally more sensitive to the impacts from the Offshore Site.

Developments beyond 100 km will be considered qualitatively with regards to the potential to impact scallop dredgers, as these have wide operational ranges and typically fish nomadically at scallop beds throughout UK waters on a cyclical basis. Therefore, additional developments have been considered when assessing potential impacts to scallop dredgers. The projects that will be considered for the cumulative impact assessment are listed in Table 13.17 and shown in Figure 13.12.

The approach to the assessment of projects includes:

- > Quantitative assessment of projects submitted to Scoping up to six months prior to PFOWF application submission;
- > Qualitative assessment of projects submitted to Scoping up to five months prior to PFOWF application submission; and
- > Acknowledgement of projects submitted to Scoping between five and two months prior to PFOWF application submission.

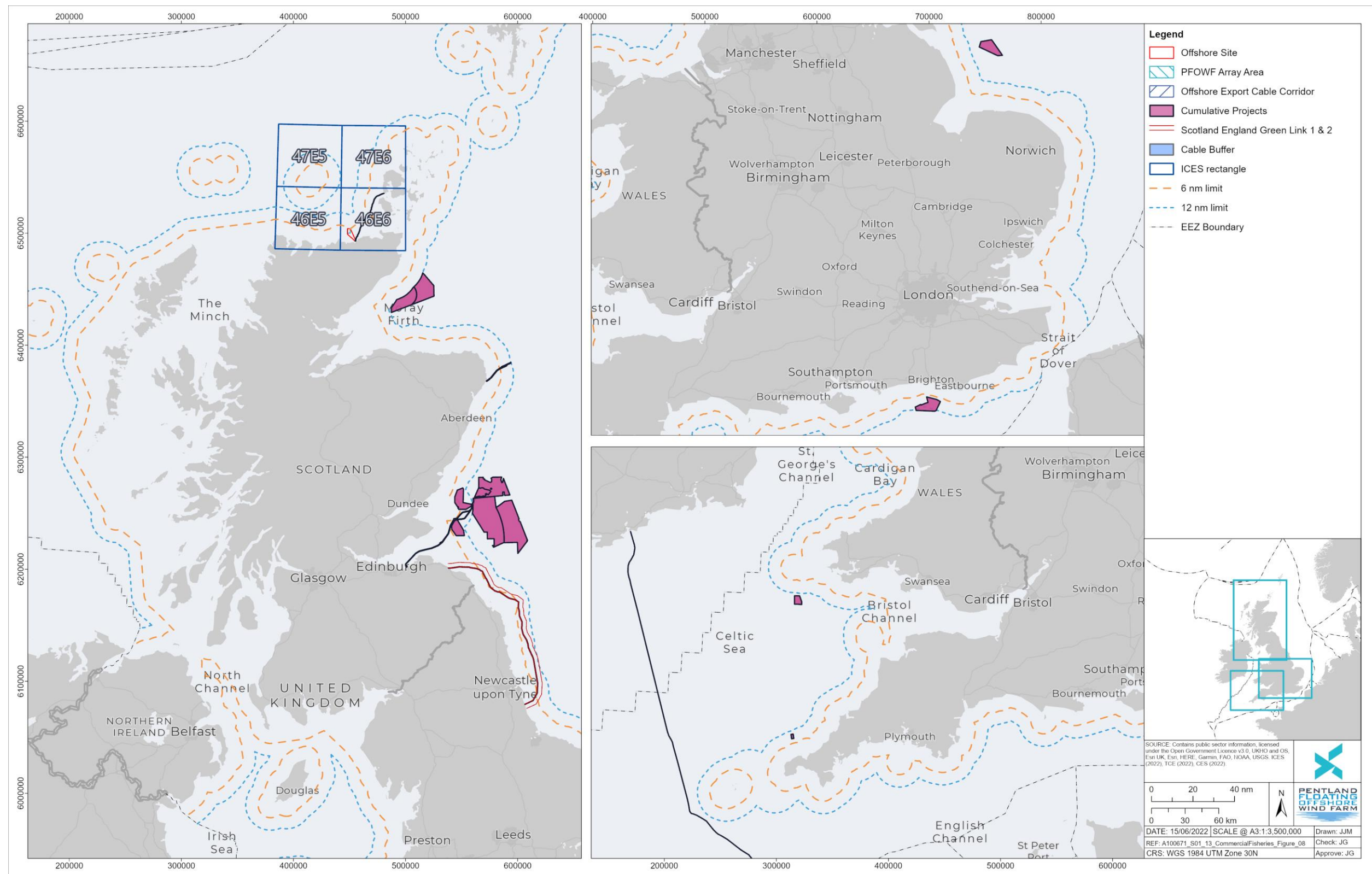
This approach was shared and agreed with MS-LOT and agreement was confirmed via email on 6th December 2021. The approach to the cumulative assessment is set out in Offshore EIAR (Volume 3): Appendix 6.1. The approach and list of cumulative projects screened into the assessment were provided to MS-LOT and consultees and comments were received on 16th May 2022. These comments have been taken into account within this assessment.

There are limited project details for offshore wind farm sites awarded Option Agreements within the ScotWind leasing round or for Offshore Wind Leasing Round 4 Projects in English waters. As noted above, the cut-off date for a qualitative assessment of projects in the Scoping stage was February 2022; therefore, the ScotWind Projects and Offshore Wind Round 4 Projects will be acknowledged but no assessment will be conducted. The sites with the greatest potential to act cumulatively with the Offshore Development include the West of Orkney Windfarm (within the N1 Plan Option [PO]) as well as other sites along the north, north-east, and east coasts of Scotland (e.g. those sites within the N2, N3, NE2, NE3, and NE4 POs). These projects will undertake more detailed cumulative assessments that include the Project to support their application for development consent.

Table 13.17 List of projects considered for the Commercial Fisheries cumulative impact assessment

Development Type	Project Name	Status	Phase	Location	Distance to Offshore Site (km)	Data Confidence	Relevant Receptors
Cable	Scottish Hydro Electric (SHE Transmission) Orkney-Caithness Project	Consented	Consented (construction timelines unknown)	Pentland Firth (overlap with OECC)	0	Medium	All
Offshore wind farm	Moray West Offshore Wind Farm	Consented	Construction planned for 2022 / 2023	Moray Firth	64	Medium	All
Offshore wind farm	Moray East Offshore Wind Farm	Under construction	Construction commenced in 2019	Moray Firth	66	High	All
Cable	NorthConnect	Consented	Construction due to commence in 2024 to 2026	North-east coast of Scotland	170	Medium	Nomadic scallop dredgers
Offshore wind farm	Seagreen	Under construction	Construction period: 2021 to 2022 / 2023	Forth and Tay region	254	High	Nomadic scallop dredgers
Offshore wind farm	Seagreen 1A	Consented	Construction due to commence in 2023.	Forth and Tay region	254	Medium	Nomadic scallop dredgers
Offshore wind farm	Inch Cape offshore wind farm	Consented	Construction due to commence in 2025.	Forth and Tay region	240	Medium	Nomadic scallop dredgers
Offshore wind farm	Berwick Bank offshore wind farm	Pre-consent	Scoping (construction expected to begin in 2027)	Forth and Tay region	268	Low	Nomadic scallop dredgers

Development Type	Project Name	Status	Phase	Location	Distance to Offshore Site (km)	Data Confidence	Relevant Receptors
Offshore wind farm	Neart na Gaoithe offshore wind farm	Under construction	Construction period: 2020 – 2022.	Forth and Tay region	264	High	Nomadic scallop dredgers
Cable	Scotland England Green Link 1	Pre-consent	Scoping (construction expected to begin in 2023)	East coast of Scotland and England	303	Low	Nomadic scallop dredgers
Cable	Scotland England Green Link 2	Pre-consent	Scoping (construction expected to begin in 2024)	East coast of Scotland and England	167	Low	Nomadic scallop dredgers
Offshore wind farm	Triton Knoll	Under construction	Construction period: 2019 – 2022	South-east coast of England	627	High	Nomadic scallop dredgers
Offshore wind farm	Rampion 2	Pre-consent	Preliminary Environmental Information Report (PEIR) stage (construction expected to begin in 2026)	English Channel	905	High	Nomadic scallop dredgers
Offshore wind farm	TwinHub	Consented	Construction expected to begin in 2023.	Celtic Sea	918	Medium	Nomadic scallop dredgers
Offshore wind farm	Erebus	Pre-consent	Consent application submitted in December 2021. Construction expected to begin in 2026.	Celtic Sea	796	Medium	Nomadic scallop dredgers
Cable	Celtic Interconnector	Pre-consent	Consent application submitted in July 2021. Construction expected to begin in 2024.	Celtic Sea	781	Medium	Nomadic scallop dredgers



Fisheries restricted areas (e.g. closures), including those associated with designated sites, may also act cumulatively with the Offshore Development by further restricting access to fishing grounds or resulting in displaced effort. The Kingfisher Information Service UK Fishing Restrictions Map^{iv} was reviewed to identify any proposed fisheries management measures that came into force within 100 km of the Offshore Site after 2020 (the last year of available baseline data). No such management measures were identified. Already active fisheries restrictions are considered to be part of the existing baseline.

It is acknowledged that management measures in designated sites could come into effect in the future and act cumulatively with the Offshore Development. However, it is not certain as to whether restrictions will be implemented for these sites, or indeed what these restrictions would entail, and therefore, a meaningful cumulative impact assessment cannot be conducted. Furthermore, considering that there are no designated sites in the immediate vicinity of the Offshore Site, in conjunction with the small spatial extent of the Offshore Site when compared to the wider availability of grounds, cumulative impacts from these designated sites are not expected to be significant.

The following sections summarise the nature of the potential cumulative impacts for each potential stage of the Offshore Development.

The following impacts have been taken forward for the cumulative assessment:

- > Construction:
 - Loss of access to fishing grounds due to the presence of vessels and safety zones during construction; and
 - Displacement of fishing activity into other areas.
- > Operation and Maintenance:
 - Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone;
 - Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users; and
 - Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings.
- > Decommissioning:
 - Loss of access to fishing grounds due to the presence of vessels and safety zones during decommissioning; and
 - Displacement of fishing activity into other areas.

13.7.2 Cumulative Construction Effects

13.7.2.1 *Loss of access to fishing grounds due to the presence of vessels and safety zones during construction*

There is the potential for a cumulative loss of access from fishing grounds associated with the construction activities of the Offshore Development if the same receptors are affected by loss of access associated with other projects.

The cumulative loss of access associated with the construction activities within the PFOWF Array Area would occur over the two seven-month construction stages (Stage 1 and Stage 2).

The cumulative loss of access associated with the OECC would occur over a seven-month construction stage, planned for either in Stage 1 or Stage 2.

^{iv} <https://kingfisherrestrictions.org/>.

13.7.2.1.1 Creelers (pots and traps)

As described above for the Offshore Development alone, creelers are considered to have a **moderate sensitivity** to loss of access to fishing grounds.

Smaller creelers are more limited in their operational range and are mainly constrained to within the 22-km (12-nm) limit. It is therefore expected that the SHE Transmission Orkney-Caithness Project will have the most potential to result in cumulative impacts for this fleet. The construction timelines for the SHE Transmission Orkney-Caithness Project are not known and have the potential to overlap with the Offshore Development.

Creelers fishing within the PFOWF Array area may also fish within the proposed corridor for the SHE Transmission Orkney-Caithness Project. Therefore, there may be additional loss of access to fishing grounds for creelers, in addition to that which was assessed for the Offshore Development alone.

The OECC overlaps with the proposed corridor for the SHE Transmission Orkney-Caithness Project. Therefore, if the construction phase of the OECC and the SHE Transmission Orkney-Caithness Project overlap, it is likely that the vessels that fish the OECC would be affected by both projects. This would increase the spatial extent or duration of the impact associated with temporary loss of access during construction.

It is acknowledged that an increase in the spatial extent or duration of the potential temporary loss of access may increase if the construction of the SHE Transmission Orkney-Caithness Project overlapped with that of the Offshore Development. However, this overlap in construction timelines is uncertain and the SHE Transmission Orkney-Caithness Project covers a small proportion of the grounds available to creelers. Considering this, the impact is defined as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.7.2.1.2 All demersal trawlers and seine netters

As described for the Offshore Development alone, demersal trawlers are considered to have a **low sensitivity** to loss of access to fishing grounds and seine netters are considered to have a **moderate sensitivity**.

Demersal trawlers and seine netters have larger operational ranges than creelers and projects within 100 km of the Offshore Site have the most potential to result in cumulative impacts for this fleet. This includes the offshore developments within the Pentland Firth, including the SHE Transmission Orkney-Caithness Project as well as the proposed offshore wind farms within the Moray Firth, including Moray East and Moray West.

Demersal trawlers and seine netters are mainly active within the PFOWF Array Area. Therefore, vessels active in the PFOWF Array Area may also be affected by any loss of access associated with other projects.

Effort by demersal trawlers and seine netters within the OECC is low. Therefore, the potential for significant cumulative effects associated with the construction activities within the OECC is low.

Except for the SHE Transmission Orkney-Caithness Project, the cumulative projects listed above are expected to be operational at the time of the construction of the Offshore Development and represent a small proportion of the grounds available to these vessels which have wide operational ranges. Effort by demersal trawls is also relatively low across the Offshore Development and the SHE Transmission Orkney-Caithness Project, with effort along the northern coast of Scotland mainly concentrated along the continental shelf, to the northwest of Orkney, within the Outer Hebrides and in the south of the Moray Firth. Considering this and the small proportion of the grounds represented by these projects, the impact remains as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers and seine netters is considered to be **minor** and **not significant**.

13.7.2.1.3 Scallop dredgers

As described for the Offshore Development alone, scallop dredgers are considered to be of **low sensitivity** to loss of access to fishing grounds.

Scallop dredgers are nomadic and fish opportunistically along the UK coastline. Effort is mainly concentrated around the west and east coast of Scotland, around the Isle of Man, along the west coast of Wales and Cornwall and within the English Channel. Therefore, cumulative impacts are most likely to arise with projects

within these areas. It is also acknowledged that several fisheries management measures may be implemented for dredging throughout the UK, including within designated sites to reduce seabed disturbance to sensitive benthic features / species and that more may be implemented in the future. This could also act cumulatively with any loss of access resulting from the Offshore Development during construction.

Scallop dredging within the PFOWF Array Area is low. Therefore, the potential for a cumulative effect associated with the construction activities in the PFOWF Array Area is low.

Scallop dredging mainly occurs along the OECC in the Offshore Site. Any loss of access would be temporary and represents a small proportion of the grounds available to this fleet. Considering the number of existing restrictions and other plans and projects, whilst acknowledging the wide availability of grounds to this fleet, the impact is considered to change to be of **moderate magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.7.2.1.4 Non-UK fishing vessels

As described for the Offshore Development alone, non-UK fishing vessels are considered to be of **negligible sensitivity** to loss of access to fishing grounds.

Considering the wide availability of grounds for non-UK fishing vessels and the low value of the Offshore Site for these vessels, the impact remains as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **negligible** and **not significant**.

13.7.2.2 Displacement of fishing activity into other areas

As noted for the assessment of displacement for the Offshore Development alone, displacement is directly linked to loss of access, as loss of access will lead to displacement.

Cumulative displacement associated with the construction activities within the PFOWF Array Area would occur over the two seven-month construction stages (Stage 1 and Stage 2).

Cumulative displacement associated with the OECC would occur over a seven-month construction stage, planned for either Stage 1 or Stage 2.

13.7.2.2.1 Creelers (pots and traps)

As described for the Offshore Development alone, creelers are considered to be of **moderate sensitivity** to displacement.

As noted for the assessment of cumulative loss of access, the greatest potential for cumulative displacement effects is expected to arise from the SHE Transmission Orkney-Caithness Project, especially for the OECC which overlaps with this project. The construction timelines for this SHE Transmission Orkney-Caithness Project are not known.

Considering that the other projects in the vicinity of the Offshore Site represent a small proportion of the grounds available to this fleet, alongside the fact that the majority of projects are expected to already be operational (reducing the spatial extent of displacement impacts as the Offshore Development is being constructed), the impact remains as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.7.2.2.2 All demersal trawlers and seine netters

As described for the Offshore Development alone, demersal trawlers and seine netters are considered to have a **low and moderate sensitivity** to displacement, respectively.

The cumulative projects or plans represent a small proportion of the grounds available to these fleets. As noted for the assessment of cumulative loss of access, demersal trawling and seine netting within the OECC is low, and therefore the greatest potential for a cumulative impact is associated with the construction activities in the PFOWF Array Area.

Considering the cumulative projects are also considered to mostly be located in areas of low to moderate value for demersal trawlers, with more valuable grounds available in other areas of the Scottish coastline, the impact remains as being of **moderate magnitude** for demersal trawlers and **low magnitude** for seine netters.

Therefore, the overall effect to demersal trawlers and seine netters is considered to be **minor** and **not significant**.

13.7.2.2.3 Scallop dredgers

As described for the Offshore Development alone, scallop dredgers are considered to be of **low sensitivity** to displacement.

It is recognised that there are several projects and fisheries management measures from which access for scallop dredging has been lost which limits the grounds within which fishing can be displaced to. However, the wide availability of grounds available to this fleet is still considered to be able to accommodate displacement from the construction phase without a significant increase in gear conflict or increased competition. Therefore, the impact remains as being of **moderate magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.7.2.2.4 Non-UK fishing vessels

For the same reasons described for loss of access, non-UK fishing vessels are considered to have a **negligible sensitivity** to displacement and the impact remains as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **negligible** and **not significant**.

13.7.3 Cumulative Operation and Maintenance Effects

13.7.3.1 Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone

As noted for the assessment of the Offshore Development alone, loss of access during the operation and maintenance of the PFOWF Array Area is assumed to be long-term (i.e. the operational life of the Offshore Development) for vessels towing mobile gear. Static fishing is assumed to have the potential to resume with restrictions. A cumulative loss of access from the operation and maintenance of the PFOWF Array Area may occur if the same receptors are affected by loss of access associated with other projects.

With respect to the OECC, fishing is assumed to be able to safely resume over the cables where the Offshore Export Cable(s) is buried to a target depth of 0.6 m (informed by a cable burial risk assessment). However, as noted for the assessment of the Offshore Development in isolation, some receptors may experience loss of access associated with areas of the Offshore Export Cable(s) where remedial protection is used, or if cable exposures occur and require rectifying. If these same receptors are affected by loss of access associated with other projects, cumulative impacts may arise.

A cumulative loss of access may also occur as a result of any safety zones implemented for major maintenance activities.

13.7.3.1.1 Creelers (pots and traps)

As described above for the Offshore Development alone, creelers are considered to have a **moderate sensitivity** to loss of access to fishing grounds.

It is expected that creeling along the OECC, and to a certain extent within the PFOWF Array Area itself, will be able to continue in the operation and maintenance phase. As the cumulative projects relevant to creelers, mainly the SHE Transmission Orkney-Caithness Project, represent a small proportion of the available grounds to this fleet, the impact remains as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.7.3.1.2 All demersal trawlers and seine netters

As described for the Offshore Development alone, demersal trawlers are considered to have a **low sensitivity** to loss of access to fishing grounds and seine netters are considered to have a **moderate sensitivity**.

Fishing by vessels operating mobile gear within the PFOWF Array Area is unlikely to resume in operation, however, fishing over the Offshore Export Cable(s) is expected to be possible, where the target burial is met.

Fishing within other wind farms / projects may be possible, depending on the technology employed and the WTG layout. However, it is recognised that the area lost to demersal trawlers and seine netters may temporarily increase when the cumulative projects are considered alongside the Offshore Development and that this could be a long-term impact. Considering the lower value of the fishing grounds for demersal trawls within the area covered by the cumulative projects alongside the Offshore Development, the impact remains as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers and seine netters is considered to be **minor** and **not significant**.

13.7.3.1.3 Scallop dredgers

As described for the Offshore Development alone, scallop dredgers are considered to have a **low sensitivity** to loss of access to fishing grounds.

Scallop dredging is considered unlikely to resume within the PFOWF Array Area when operational and in the sections along the Offshore Export Cable(s) where the target burial depth is met. There is the potential for a cumulative loss of access to result from projects outside the Pentland Firth, including those in English waters, increasing the overall area lost to this fleet. Scallop dredging within the PFOWF Array Area and in nearby offshore wind farms to the Offshore Development is relatively low and any impact from loss of access would be limited. However, when considering the potential loss of access from offshore wind farms and interconnectors across the UK the impact is considered to change to be of **moderate magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.7.3.1.4 Non-UK Fishing Vessels

As described for the Offshore Development alone, non-UK fishing vessels are considered to be of **negligible sensitivity** to loss of access to fishing grounds.

Considering the wide availability of grounds for non-UK fishing vessels and the low value of the Offshore Site for these vessels, the impact remains as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **negligible** and **not significant**.

13.7.3.2 Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users

13.7.3.2.1 Creelers (pots and traps)

As described for the Offshore Development alone, creelers are considered to be of **moderate sensitivity** to displacement.

Cumulative displacement impacts may arise as creelers may choose to not fish within the PFOWF Array Area and may also be displaced during the construction or decommissioning periods from other developments. It would also be expected that fishing over the SHE Transmission Orkney-Caithness Project would resume when operational. Taking this into account, as well as the small proportion of the available fishing grounds associated with other cumulative projects for this fleet, the impact remains as being of **low magnitude**.

Therefore, the overall effect to creelers is considered to be **minor** and **not significant**.

13.7.3.2.2 All demersal trawlers and seine netters

As described for the Offshore Development alone, demersal trawlers and seine netters are considered to have a **low and moderate sensitivity** to displacement, respectively.

Cumulative displacement impacts may arise if demersal trawlers and seine netters are displaced from other sites alongside the PFOWF Array Area. As described in Section 13.7.3.1.2, demersal trawling and seine netting may not resume within operational wind farms. The fishing grounds associated with the Offshore Development are considered to be of low to moderate value, with more valuable grounds in other areas. Considering this and the wide availability of grounds for these vessels, it would be expected that displacement impacts would be limited. Therefore, the impact remains as being of **low magnitude**.

Therefore, the overall effect to demersal trawlers and seine netters is considered to be **minor** and **not significant**.

13.7.3.2.3 Scallop dredgers

As described for the Offshore Development alone, scallop dredgers are considered to be of **low sensitivity** to displacement.

As described for construction, it is acknowledged that several offshore wind farms are proposed to be located within scallop dredge grounds and that it may not be possible for fishing to resume over these sites. It is expected that fishing will also be displaced from the PFOWF Array Area and in areas of additional remedial protection along the Offshore Export Cable(s). The value of grounds within the PFOWF Array Area is relatively low. However, it is recognised that there are offshore wind farms across the UK located within more valuable grounds (e.g. English Channel). Therefore, whilst acknowledging the wide operational range of nomadic scallop dredgers, the area available for effort to be displaced to is becoming relatively limited. Considering this, the impact changes to be of **moderate magnitude**.

Therefore, the overall effect to scallop dredgers is considered to be **minor** and **not significant**.

13.7.3.2.4 Non-UK fishing vessels

As described for the Offshore Development alone, non-UK fishing vessels are considered to have a **negligible sensitivity** to displacement.

Considering the wide availability of grounds for non-UK fishing vessels and the low value of the Offshore Site for these vessels, the impact remains as being of **negligible magnitude**.

Therefore, the overall effect to non-UK fishing vessels is considered to be **negligible** and **not significant**.

13.7.3.3 *Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings*

As noted for the Offshore Development alone, some obstruction of fishing vessel transit routes may occur as a result of the presence of WTGs and associated mooring lines in the PFOWF Array Area. If the same transit routes are affected by other projects, there is the potential for a cumulative impact to arise.

The obstruction of fishing vessel transit routes associated with the OECC is limited to any advisory safety zones associated with major maintenance activities.

13.7.3.3.1 All fleets

As described for the Offshore Development alone, creelers are considered to be of **low sensitivity** to increased steaming times and all other fleets are considered to be of **negligible sensitivity**.

It is expected that all other offshore wind farms will be required to adequately chart infrastructure and communicate with the fishing industry and that steaming through wind farms could be possible. The only exception to this would be when safety zones are in place for major maintenance activities. However, these would extend over a relatively small area and are not expected to result in a significant increase in fuel costs associated with route alterations. Therefore, the impact remains as being of **low magnitude**.

Therefore, the overall effect is considered to be **minor** for creelers and **negligible** for all other fleets, and therefore **not significant** in all instances.

13.7.4 Cumulative Decommissioning Effects

There is limited information on cumulative projects applicable to the decommissioning phase of the Offshore Development. As there is limited information on the decommissioning of the Offshore Development and that of other projects, it is not possible to provide a meaningful cumulative assessment. However, the cumulative impacts are expected to be less than or equal to the construction phase and decommissioning of multiple other projects would not be expected to occur at the same time as the decommissioning phase of the Offshore Development.

A Decommissioning Programme will be developed pre-construction to address the principal decommissioning measures for the Offshore Development, this will be written in accordance with applicable guidance and detail the management, environmental management, and schedule for decommissioning. The decommissioning programme will be reviewed and updated throughout the lifetime of the Offshore Development to account for changing best practices.

13.8 Assessment of Transboundary Effects

As described in Section 13.4.3.2, there is very limited non-UK fishing activity in the PFOWF Array Area and OECC. Therefore, transboundary impacts are not expected in respect of Commercial Fisheries.

13.9 Assessment of Impacts Cumulatively with the Onshore Development

The Onshore Development components are summarised in Chapter 5: Project Description. These Project aspects have been considered in relation to the impacts assessed within this Chapter.

The Onshore Development will undertake HDD operations from above mean high water spring tide, with an HDD exit point occurring approximately 700 m offshore. The impacts from the installation of the Offshore Export Cable(s) (including the landfall activities) have been assessed in full in Section 13.6. It is not anticipated that there will be any additional impacts from the Onshore Development on Commercial Fisheries receptors as all other activities from the Onshore Development are fully terrestrial.

13.10 Mitigation and Monitoring Requirements

13.10.1 Additional Specific Mitigation

There is no requirement for additional mitigation over and above the embedded measures for the Offshore Development proposed in Section 13.5.5.

13.10.2 Monitoring Requirements

No monitoring specific to Commercial Fisheries receptors is proposed. However, the outcomes of this Chapter will be consulted upon and any requirement for commercial fisheries monitoring would be discussed and agreed with relevant stakeholders.

13.11 Inter-relationships

Interrelated effects describe the potential interaction of multiple project impacts upon one receptor which may interact to create a more significant impact on a receptor than when considered in isolation. Interrelated effects may have a temporal or spatial element and may be short-term, temporary, or longer-term over the lifetime of the Offshore Development.

In line with the Scoping Opinion and Scoping Addendum Opinion received, this chapter has assessed all impacts that are relevant to Commercial Fisheries receptors during construction, operation and maintenance and decommissioning phases of the Offshore Development. Therefore, it is considered that the assessment and conclusions presented in Section 13.6 provide a complete and robust assessment of all potential impacts relevant to Commercial Fisheries receptors. The assessment has also considered the potential for inter-related effects in relation to Commercial Fisheries, and no additional inter-related effects beyond those presented in Section 13.6 have been identified.

Where the assessment contained in this chapter is considered within other assessment chapters, a summary of these interrelationships is presented below in Table 13.18.

Table 13.18 Inter-relationships identified with Commercial Fisheries and other receptors in this Offshore EIAR

Receptor	Impact	Description
Fish and Shellfish Ecology	Impacts on commercially important fish and shellfish species from loss of spawning/ nursery grounds.	Direct habitat loss due to disturbance of spawning and nursery grounds during the installation of cables and placement of anchors and mooring lines on seabed may result in impacts to fishing for these commercially important species. These commercially important species and potential changes to their spawning and nursery ground from habitat loss are assessed within Chapter 10: Fish and Shellfish Ecology.
	Potential for fishing gear to become entangled with subsea structures, resulting in ghost fishing.	There is potential for lost gear to become entangled with Offshore Development infrastructure leading to ghost fishing, and consequently impacting fish and shellfish species. The potential for this to occur and the significance of the impact to fish and shellfish species are assessed within this chapter.
Marine Mammals and other Megafauna	In-direct impacts on marine mammals and other megafauna associated with entanglement from secondary interactions with derelict fishing gears	There is potential for lost gear to become entangled with Offshore Development infrastructure leading to an in-direct impact on marine mammals and other megafauna which may become entangled in the fishing gear. These impacts are assessed within Chapter 11: Marine Mammals and other Megafauna.
Shipping and Navigation	Direct impacts from safety issues through vessel-to-vessel collision, vessel to structure collision and loss of WTG station.	Safety issues may arise from vessel-to-vessel collision, vessel to structure collision and loss of WTG station are also relevant to fishing vessels. These safety issues are discussed in Chapter 14: Shipping and Navigation.
	Direct impact on fishing vessel displacement.	Vessel displacement assessed in Chapter 14: Shipping and Navigation is also relevant to fishing vessels. This impact is discussed within this chapter with reference to increased steaming times.

13.12 Summary and Residual Effects

Table 13.19 summarises the effects for all impacts assessed.

Table 13.19 Summary of residual effects for Commercial Fisheries

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction / Decommissioning					
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement of fishing activity into other areas	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	All Fleets	Tolerable with Mitigation (Not Significant)	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Operation and Maintenance					
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	All fleets	Tolerable with Mitigation (Not Significant)	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All other fleets	Negligible Effects	Not Significant		Not Significant
Cumulative					
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction and decommissioning	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement of fishing activity into other areas during construction and decommissioning	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users during operation and maintenance	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded mitigation listed in Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All other fleets	Negligible Effects	Not Significant		Not Significant

13.13 References

- Blyth-Skyrme (2010). Options and opportunities for marine fisheries mitigation associated with wind farms. Final report for Collaborative Offshore Wind Research Into the Environment contract FISHMITIG09. COWRIE Ltd, London. 125 pp.
- European Commission (2020). Information about access of EU fishing vessels to the UK waters as of 1 January 2021. https://ec.europa.eu/oceans-and-fisheries/news/information-about-access-eu-fishing-vessels-uk-waters-1-january-2021-2020-12-31_en [Accessed 30/11/2021].
- European Council (2021). Fish Stocks Shared Between the EU and the United Kingdom. <https://www.consilium.europa.eu/en/policies/eu-fish-stocks/eu-uk-fishing-quotas/> [Accessed 30/11/2021].
- Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) (2014). FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison. <https://www.sff.co.uk/wp-content/uploads/2016/01/FLOWW-Best-Practice-Guidance-for-Offshore-Renewables-Developments-Jan-2014.pdf> [Accessed 20/07/2022].
- FLOWW (2015). Best Practice Guidance for Offshore Renewables Developments: Recommendation for Fisheries Disruption Settlements and Community Funds. <https://www.thecrownestate.co.uk/media/1776/floww-best-practice-guidance-disruption-settlements-and-community-funds.pdf>.
- Gibin, M., Zanzi, A., and Hekim, Z. (2021): Fisheries landings & effort: data by c-square. European Commission, Joint Research Centre (JRC). <http://data.europa.eu/89h/00ae6659-ddde-4314-a9da-717bb2e82582> [Accessed 10/02/2021].
- International Cable Protection Committee (ICPC) (2009). Fishing and Submarine Cables - Working Together. <https://www.iscpc.org/documents/?id=142> [Accessed 20/07/2022].
- Marine Scotland (2015). Scotland's National Marine Plan. <https://www.gov.scot/publications/scotlands-national-marine-plan/> [Accessed 20/07/2022].
- Marine Scotland (2021a). Salmon Fishery Statistics 2020. <https://www.gov.scot/publications/salmon-fishery-statistics-2020/documents/> [Accessed 10/12/2021].
- Marine Scotland (2021b). Salmon and Sea Trout Fishery Statistics: 1952-2020 Season – reported catch and effort by method. <https://data.marine.gov.scot/dataset/salmon-and-sea-trout-fishery-statistics-1952-2020-season-reported-catch-and-effort-method> [Accessed 10/12/2021].
- MMO (2019). Anonymised derived track lines 2017.
- MMO (2020a). Surveillance sightings data from 2015 to 2019.
- MMO (2021a). UK Sea Fisheries Statistics 2020. <https://www.gov.uk/government/statistics/uk-sea-fisheries-annual-statistics-report-2020> [Accessed 12/11/2021].
- MMO (2021b). Fishing Activity for over 15 m United Kingdom Vessels (2016 – 2019).
- Scottish Government (2020). Productive: Living Resources – Salmon and Sea Trout Fishing. https://marine.gov.scot/sma/sites/default/files/sma2020_-_salmon_and_sea_trout_fishing_-_productive.pdf [Accessed 10/12/2021].
- Scottish Government and Xodus Group Limited (2022). Good Practice Guidance for assessing fisheries displacement by other licensed marine activities: Literature Review. <https://www.gov.scot/publications/good-practice-guidance-assessing-fisheries-displacement-licensed-marine-activities/> [Accessed 05/07/2022].
- Shelmerdine R.L. and Mouat B. (2021): Mapping fisheries and habitats in the North and East Coast RIFG area. NAFC Marine Centre UHI report. pp. 70.
- UK Fisheries Economics Network (UKFEN) (2012). Best practice guidance for fishing industry financial and economic impact assessments. <https://www.yumpu.com/en/document/read/26166829/best-practice-guidance-for-fishing-industry-financial-and-seafish> [Accessed 20/07/2022].

Youngson, A. Fishermen's Knowledge: Salmon in the Pentland Firth.
<https://caithness.dsfb.org.uk/files/2017/06/FCRTThe-Fishmongers-Company-reportfinal-version.pdf>
[Accessed 23/11/2021].

Zanzi, A, and Holmes, S. (2017): Fisheries data from DCF Fishing Effort Regimes data calls. European Commission, Joint Research Centre (JRC) <http://data.europa.eu/89h/9f8002cc-c6fc-4adb-86cd-466f935a7bda> [Accessed 11/01/2021]