FIVE ESTUARIES OFFSHORE WIND FARM

ENVIRONMENTAL STATEMENT

VOLUME 6, PART 2, CHAPTER 8: COMMERCIAL FISHERIES

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CONTENTS

TABLES

FIGURES

DEFINITION OF ACRONYMS

Term	Definition
AIS	Automatic Identification System
BEIS	Department for Business, Energy & Industrial Strategy
CAA	Civil Aviation Authority
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFWG	Commercial Fisheries Working Group
CSIP	Cable Specification and Installation Plan
DCF	Data Collection Framework
DCO	Development Consent Order
DECC	Department of Energy & Climate Change
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electro-magnetic Field
ES	Environmental Statement
ESCA	European Subsea Cables Association
EU	European Union
FLCP	Fisheries Liaison and Coexistence Plan
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authority
IPC	Infrastructure Planning Commission
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MPS	Marine Policy Statement
NFFO	National Federation of Fishermen's Organisations

Term	Definition
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Projects
NtM	Notice to Mariners
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PLN	Port Letter and Numbers
SAC	Special Area of Conservation
SSC	Suspended Sediment Concentration
TAC	Total Allowable Catch
UK	United Kingdom
UKFEN	UK Fisheries Economic Network
VE	Five Estuaries Offshore Wind Farm
VMS	Vessel Monitoring System
WTG	Wind Turbine Generator

Units	Definition
EUR (€)	Euros
GBP (£)	British pound sterling
km	Kilometres
m	Metres
NM	Nautical Mile
t	Tonne

GLOSSARY OF TERMS

Term	Definition
Beam trawl	A method of bottom trawling with a net that is held open by a beam, which is generally a heavy steel tube supported by steel trawl heads at each end. Tickler chains or chain mats, attached between the beam and the ground rope of the net, are used to disturb fish and crustaceans that rise up and fall back into the attached net.
Bycatch	Catch which is retained and sold but is not the target species for the fishery.
Commercial Fisheries Working Group (CFWG)	Group formed to allow dialogue between VE OWFL (the Applicant) and local fisheries stakeholders.
Demersal	Living on or near the sea bed.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Fish stock	Any natural population of fish which an isolated and self-perpetuating group of the same species.
Fishery	A group of vessel voyages which target the same species or use the same gear.
Fishing ground	An area of water or sea bed targeted by fishing activity.
Fishing mortality	Mortality due to fishing; death or removal of fish from a population due to fishing.
Fleet	A physical group of vessels sharing similar characteristics (e.g., nationality).
Flyseine	Flyseining, also known as flyshooting or demersal seining, is a fishing method involving use of long weighted ropes to herd fish into the mouth of the trawl net to target demersal species which live or feed on or near the sea bed.
Gear type	The method / equipment used for fishing.
Hooked gear	Fishing gears using hooks include longlines and handlines. Longlining involves setting of a long length of line with baited hooks attached at regular intervals; this rig is set on the seabed or in midwater with a

Term	Definition
	marker buoy at either end and allowed to fish for a set period. Handlining involves fishing using a rod and line or a hand-held line.
ICES statistical rectangles	ICES standardise the division of sea areas to enable statistical analysis of data. Each ICES statistical rectangle is ’30 min latitude by 1 degree longitude’ in size (approximately 30 x 30 nautical miles). A number of rectangles are amalgamated to create ICES statistical areas.
Landings	Quantitative description of amount of fish returned to port for sale, in terms of value or weight.
Maximum Sustainable Yield	Maximum sustainable yield (MSY) is the largest yield (catch, in tonnes) that can be taken from a specific fish stock over an indefinite period under constant environmental conditions. Fishing at MSY levels should ensure the capacity of the stock to continue to produce this level in the long term.
Metier	A homogenous subdivision, either of a fishery by vessel type or a fleet by voyage type.
Minimum Landing Size (MLS)	Is a technical measure that limits the size of fish or shellfish species that can be legally landed and sold. The MLS varies per species. With the implementation of the Landings Obligation, the existing MLS are changed into minimum conservation reference sizes (MCRS), but they will remain largely the same.
Mitigation	Mitigation measures, or commitments, are commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project.
Nets	Nets refers to a wall of netting that hangs in the water column, typically made of monofilament or multifilament nylon. Net mesh size and position in the water column vary depending upon the target species. Nets are deployed and left to soak before being hauled. In the context of this document, ‘nets’ includes both anchored (fixed to seabed) and suspended (drift, moves with tide or current) nets.
Otter trawl	A net with large rectangular boards (otter boards) which are used to keep the mouth of the trawl net open. Otter boards are made of timber or steel and are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, pushes them outwards and prevents the mouth of the net from closing.
Preliminary Environmental Information Report (PEIR)	The written output of the preliminary Environmental Impact Assessment for the Proposed Development. It is developed to support public consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Project, the assessment approach that has been undertaken, draw preliminary conclusions on the likely significant effects of the Project and environmental measures proposed.

Term	Definition
Pelagic	Of or relating to the open sea.
Pelagic trawl	A net used to target fish species in the mid water column.
Pots	Pots and traps are generally rigid structures into which fish or shellfish are guided or enticed through funnels that make entry easy but from which escape is difficult. There are many different styles and designs, each one has been designed to suit the behaviour of its target species.
Quota	A proportion of the Total Allowable Catch for a fish stock.
Recruitment	Recruitment can be defined as the number of fish surviving to enter the fishery or to some life history stage such as settlement or maturity.
Scallop dredge	A method to catch scallop using steel dredges with a leading bar fitted with a set of spring loaded, downward pointing teeth. Behind this toothed bar (sword), a mat of steel rings is fitted. A heavy net cover (back) is laced to the frame, sides and after end of the mat to form a bag.
Spawning	The act of releasing or depositing eggs (fish).
Spawning stock biomass	The combined weight (in tonnes) of all the fish of one specific stock that are old enough to spawn. It provides an indication of the status of the stock and the reproductive capacity of the stock.
Stock assessment	An assessment of the biological stock of a species and its status in relation to defined references points for biomass and fishing mortality.
String	A series of static fishing gear (pots) joined together to form a single deployable linear line of pots.
Swept Area Ratio (SAR)	SAR (derived from VMS data) indicates the number of times in an annual period that a fishing gear makes contact with (or sweeps) the seabed surface. Surface SAR provides a proxy for fishing intensity.
Total Allowable Catch (TAC)	TACs are catch limits, expressed in tonnes or numbers, that are set for some commercial fish stocks.
Vessel Monitoring System (VMS)	A system used in commercial fishing to allow environmental and fisheries regulatory organizations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels.

8 COMMERCIAL FISHERIES

8.1 INTRODUCTION

8.1.1 This chapter of the Environmental Statement (ES) presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the Five Estuaries Offshore Wind Farm project (hereafter referred to as VE) on commercial fisheries. Specifically, this chapter considers the potential impact of VE seaward of Mean High Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases.

8.1.2 This chapter has been prepared by Poseidon Aquatic Resource Management Ltd for GoBe Consultants on behalf of Five Estuaries Offshore Windfarm Ltd (the Applicant).

8.1.3 It should be read in conjunction with the project description provided in Volume 6, Part 2, Chapter 1: Offshore Project Description, and Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report.

8.1.4 This chapter has been informed by the following ES chapters:

- Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology where impacts on the ecology of fish and shellfish, including species of commercial interest, are assessed; and
- Volume 6, Part 2, Chapter 9: Shipping and Navigation where impacts on the navigational safety aspects of fishing activity are assessed.

8.1.5 This chapter considers commercial fisheries activity, which is understood as fishing activity legally undertaken where the catch is sold for taxable profit. Potential impacts of VE on charter angling, defined as fishing for marine species where the purpose is recreation and not sale or trade, are assessed in Volume 6, Part 2, Chapter 12: Infrastructure and Other Marine Users.

8.2 STATUTORY AND POLICY CONTEXT

8.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to commercial fisheries. Further information on legislation and policies relevant to the EIA and their status is provided in Volume 6, Part 1, Chapter 2: Policy and Legislation.

8.2.2 This document has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations 2017), of relevance to Nationally Significant Infrastructure Projects (NSIPs), and the Marine Works (Environmental Impact Assessment) Regulations 2007, of specific relevance to marine licensing under the Marine and Coastal Access Act (MCAA) 2009.

NATIONAL PLANNING POLICY

8.2.3 The assessment of potential impacts on commercial fisheries has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision-making documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to VE, and which came into force in January 2024, are:

- Overarching NPS for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023a); and
- NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023b).

8.2.4 The specific assessment requirements for commercial fisheries, as detailed in the NPS, are summarised in Table 8.1 together with an indication of the section of the ES chapter where each is addressed.

OTHER RELEVANT POLICIES

8.2.5 The UK Marine Policy Statement (MPS; HM Government 2011) explicitly expresses support for the fishing sector, and with regard to displacement, advocates "seeking solutions such as co-location of activity wherever possible". Specifically, paragraphs 3.8.1, 3.8.2, and 2.3.1.5 stipulate that the process of marine planning should "enable the co-existence of compatible activities wherever possible" and supports the reduction of real and potential conflict as well as maximising compatibility and encouraging co-existence of activities (Defra, 2014).

8.2.6 The South East Inshore Marine Plan (Defra, 2021) supports sustainable fishing and its diversification. The East Inshore and East Offshore Marine Plans (Defra, 2014) support fishing activity by avoiding adverse impacts resulting from development and activities; it's relevant policies specifically focus on access to fishing grounds. A summary of regional Marine Plan policies relevant to commercial fisheries is provided in Table 8.1.

Table 8.1 Legislation and policy context.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023b)	*"Applicants should consider guidance on best practice for fisheries liaison, which has been jointly agreed by the renewables industry and fishing community."* (paragraph 2.8.159 of NPS EN-3)	The commercial fisheries impact assessment takes account of relevant guidance, as confirmed below this table, in Section 8.2.7.
NPS EN-3	*"In some circumstances, transboundary issues may be a consideration as fishing vessels from other coastal States may fish in waters within which offshore wind farms are sited. Applicants should seek advice from Defra in such circumstances."* (paragraph 2.8.160 of NPS EN-3)	Potential transboundary effects are considered in Section 8.16.
NPS EN-3	*"Applicants should undertake early consultation with a cross-section of the fishing industry, as well as MMO, SNCBs, Defra and*	Consultation with statutory advisors and representatives of the fishing industry has

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	Welsh Government, to identify impacts, and actively encourage input from active fishermen to provide evidence of their use of the area to support the impact assessments." (paragraph 2.8.154 of NPS EN-3)	commenced and is ongoing. Engagement is summarised in Section 8.3.
NPS EN-3	*"Where any part of a proposal involves a grid connection to shore, appropriate inshore fisheries groups should also be consulted."* (paragraph 2.8.155 of NPS EN-3)	Consultation with representatives of the fishing industry has commenced and is ongoing. Engagement is summarised in Section 8.3.
NPS EN-3	*"Applicants will be expected to undertake dialogue with the fishing industry during the planning and design of individual offshore wind farm proposals to maximise the potential for co-existence/co-location and reduce potential displacement."* (paragraph 2.8.158 of NPS EN-3)	Consultation with representatives of the fishing industry has commenced and is ongoing. Engagement is summarised in Section 8.3.
NPS EN-3	*"Applicant assessments should include robust baseline data and detailed surveys of the effects on fish stocks of commercial interest and any potential reduction in such stocks, as well as any likely constraints on fishing activity within the project's boundaries."* (paragraph 2.8.157 of NPS EN-3)	Relevant surveys and data are detailed in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology. In addition, consultation with the fishing industry (see Section 8.3) has identified key concerns as well as available data and potential impacts, which have been taken into account within the commercial fisheries assessment (see Section 8.10 to 8.13).
NPS EN-3	*"In some circumstances, applicants may seek declaration of safety zones around wind*	The Applicant will apply for safety zones post-consent. Safety zones of up to 500m

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	turbines and other infrastructure. Although these might not be applied until after consent to the wind farm has been granted. *The declaration of a safety zone excludes or restricts activities within the defined sea areas including commercial fishing.* *Where there is a possibility that safety zones will be sought applicant assessments should include potential effects on commercial fishing.* *Where the precise extents of potential safety zones are unknown, a realistic worst-case scenario should be assessed. Applicants should consult the Maritime and Coastguard Agency (MCA) as part of this process.* (paragraph 2.8.161 to 2.8.164 of NPS EN-3)	will be sought during construction, maintenance and decommissioning phases, as described in both the maximum design scenario and environmental measures presented in Section 8.9. The need for safety zones has been considered by the Navigational Risk Assessment (NRA) completed for VE as presented in Volume 6, Part 2, Chapter 9: Shipping and Navigation. The risk assessment results have been taken into account within the commercial fisheries assessment (see Section 8.10 to 8.13). Consultation has also been undertaken with the Maritime and Coastguard Agency (MCA) (see Volume 6, Part 2, Chapter 9: Shipping and Navigation).
NPS EN-3	*Offshore wind farms can have a negative impact on some fish stocks and fishing activity, and/or a positive impact on other fish stocks and/or other types of commercial fishing. Whilst the footprint of an offshore wind farm and any associated infrastructure may be a hindrance to certain types of commercial fishing activity such as trawling, other fishing activities, such as potting, may be able to take place within operational wind farms without unduly disrupting or compromising navigational safety.*	The VE assessment has considered the effects on commercial fish stocks (see Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology), both potentially negatively and positively.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	(paragraph 2.8.156 of NPS EN-3)	
NPS EN-3	*"Any mitigation proposals should result from the applicant having detailed consultation with relevant representatives of the fishing industry, the MMO and the relevant Defra policy team in England and NRW and the relevant Welsh Government policy team in Wales."* (paragraph 2.8.250 of NPS EN-3)	A range of commitments are presented within Section 8.9, including development of an Outline Fisheries Liaison and Co-existence Plan (FLCP), which it is intended will be developed in collaboration with the local fishing industry.
NPS EN-3	*"Mitigation should be designed to enhance where reasonably possible any potential medium and long-term positive benefits to the fishing industry, commercial fish stocks and the marine environment."* (paragraph 2.8.251 of NPS EN-3)	
NPS EN-3	*"The Secretary of State should be satisfied that the site selection process has been undertaken in a way that reasonably minimises adverse effects on fish stocks, including during peak spawning periods and the activity of fishing itself."* (paragraph 2.8.318 of NPS EN-3)	The effects arising from VE have been and will be discussed with statutory bodies during pre- and post-application consultation. The Applicant is, and will continue to, take steps to minimise the effects upon the fishing industry in the area through appropriate mitigation where required. Commitments related to commercial fisheries and adopted as part of VE are provided in Section 8.9. Further information on site selection is provided in Volume 6, Part 1, Chapter 4: Site Selection and Alternatives.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
		Potential adverse effects on specific species and spawning areas, and any relevant mitigation, is discussed further in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.
NPS EN-3	*"The Secretary of State should consider the extent to which the proposed development occupies any recognised important fishing grounds and whether the project would prevent or significantly impede protection of sustainable commercial fisheries or fishing activities.* *Where the Secretary of State considers the wind farm would significantly impede protection of sustainable fisheries or fishing activity at recognised important fishing grounds, this should be attributed a correspondingly significant weight."* (paragraph 2.8.318 and 2.8.319 of NPS EN-3)	The extent to which VE impacts on recognised and important fishing grounds has been considered and consultation with fishing stakeholders in order to fully understand any potential impacts has been undertaken (see Section 8.3). The results of the commercial fisheries assessment are presented in see Section 8.10 to 8.13.
NPS EN-3	*"The Secretary of State should consider adverse or beneficial impacts on different types of commercial fishing on a case-by-case basis."* (paragraph 2.8.321 of NPS EN-3)	The assessment outputs presented in this chapter are intended to support this consideration by assessing the impacts upon different commercial fishing fleets. See Sections 8.10, 8.11 and 8.12.
NPS EN-3	*"The Secretary of State should be satisfied that the applicant has sought to design the proposal having consulted the MMO or NRW in Wales, Defra or Welsh Government in Wales and representatives of the fishing industry with the intention of minimising the loss of fishing*	Consultation with representatives of the fishing industry has commenced and is ongoing. Engagement is summarised in Section 8.3. Existing guidance regarding liaison is noted (Section 8.2.7) and

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	opportunity taking into account effects on other marine interests. Guidance has been jointly agreed by the renewables and fishing industries on how they should liaise with the intention of allowing the two industries to successfully co-exist." (paragraph 2.8.323 of NPS EN-3)	is being applied by the Applicant.
NPS EN-3	*"The Secretary of State will need to consider the extent to which disruption to the fishing industry, whether short term during preconstruction (e.g. surveying) or construction or long term over the operational period, including that caused by the future implementation of any safety zones, has been mitigated where reasonably possible."* (paragraph 2.8.323 of NPS EN-3)	The extent to which the Project may cause disruption to the fishing industry has been considered and consultation with fishing stakeholders in order to fully understand any potential impacts has been undertaken (see Section 8.3). The results of the commercial fisheries assessment are presented in Section 8.10 onwards. A range of commitments to minimise and mitigate adverse impacts are presented within Section 8.9.
NPS EN-3	*"Where an offshore wind farm could affect a species of fish that is of commercial interest, but is also of ecological value, the Secretary of State should refer to Section 2.8.109 of this NPS with regard to the latter."* (paragraph 2.8.324 of NPS EN-3)	The VE assessment has considered the ecological effects on commercial fish stocks (see Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology).
East Inshore and East Offshore Marine Plans (Defra, 2014)	Policy FISH1 Within areas of fishing activity, proposals should demonstrate in order of preference:	The extent to which VE impacts on recognised and important fishing grounds has been considered and consultation with fishing stakeholders in order to fully

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	a) that they will not prevent fishing activities on, or access to, fishing grounds b) how, if there are adverse impacts on the ability to undertake fishing activities or access to fishing grounds, they will minimise them c) how, if the adverse impacts cannot be minimised, they will be mitigated d) the case for proceeding with their proposal if it is not possible to minimise or mitigate the adverse impacts	understand any potential impacts has been undertaken (see Section 8.3). The results of the commercial fisheries assessment are presented in see Section 8.10 to 8.13. A range of commitments to mitigation are presented within Section 8.9.
South East Inshore Marine Plan (Defra, 2021)	Policy SE-FISH-1 Proposals that support a sustainable fishing industry, including the industry's diversification, should be supported.	The Applicant is committed to supporting a sustainable fishing industry. The Applicant will develop a Fisheries Liaison and Co-existence Plan (an outline of which will be submitted with the Application) that sets out measures to promote the co-existence of sustainable fishing and offshore wind farm development. The Outline FLCP is available in Volume 9, Report 16.
South East Inshore Marine Plan (Defra, 2021)	Policy SE-FISH-2 Proposals that enhance access for fishing activities should be supported. Proposals that may have significant adverse impacts on access for fishing activities must demonstrate that they will, in order of preference: a) avoid b) minimise	The extent to which VE impacts on recognised and important fishing grounds has been considered and consultation with fishing stakeholders in order to fully understand any potential impacts has been undertaken (see Section 8.3). The results of the commercial fisheries assessment are presented in see Section 8.10 to 8.13. A range of commitments to

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	c) mitigate adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	mitigation are presented within Section 8.9.

OTHER RELEVANT INFORMATION AND GUIDANCE

8.2.7 In addition to the above the following documents have been used to inform the assessment of potential impacts of VE on commercial fisheries. These include:

- Good Practice Guidance for Assessing Fisheries Displacement (Xodus, 2022);
- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network (UKFEN) and Seafish, 2012);
- Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014 and BERR, 2008);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015);
- Damage to Gear Compensation Claim Forms (Marine Scotland, 2021);
- Guidance on completing Damage to Gear Compensation Claim Forms (Marine Scotland, 2021);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);
- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b);
- Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms (RenewableUK, 2013);
- Fishing and Submarine Cables – Working Together (International Cable Protection Committee, 2009);
- Guidance on preparing a Fisheries Management and Mitigation Strategy ("FMMS") (draft) (Marine Scotland, 2020); and
- Planning Inspectorate Scoping Opinion (Planning Inspectorate, 2022) which included scoping responses from statutory consultees.

8.2.8 It is noted that at the time of ES preparation FLOWW Best Practice Guidance is intended to be revised with revision currently ongoing.

8.3 CONSULTATION

8.3.1 This section describes the outcome of, and response to, the Scoping Opinion and the Preliminary Environmental Information Report (PEIR) in relation to commercial fisheries assessment and also provides details of the ongoing informal consultation that has been undertaken with stakeholders and individuals.

8.3.2 The Applicant submitted a Scoping Report and request for a Scoping Opinion in September 2021. A Scoping Opinion was received from the Planning Inspectorate in November 2021. The Scoping Report set out the proposed commercial fisheries assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. Table 8.2 sets out the comments received in Section 4.7 of the PINS Scoping Opinion and how these have been addressed in this ES.

8.3.3 The Applicant commenced Section 42 (S42) consultation on the PEIR - the first main output of the EIA process - in March 2023. The consultation closed in May 2023. Table 8.2 sets out the comments received in S42 responses relevant to commercial fisheries and how these have been addressed in this ES.

8.3.4 Informal engagement has been ongoing with a number of stakeholders in relation to commercial fisheries. A summary of the informal engagement undertaken between March 2021 up to and including June 2023 is outlined in this section. Informal engagement is ongoing at the time of ES preparation.

Table 8.2: Summary of consultation relating to commercial fisheries

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
March 2021 Commercial Fisheries Working Group Meeting	Attendees from: Orford and District Fishermen's Association; Harwich Fishermen's Association; Felixstowe ferry Fisherman's Association; Thanet Fishermen's Association; West Mersea Fishermen's Association. Topics covered: VE update; surveys and cooperation payment methodology; charts provided to fishermen to annotate fishing grounds.	VE is described in Volume 6, Part 2, Chapter 1: Offshore Project Description. Other issues raised not relevant to the commercial fisheries assessment.
July 2021 Commercial Fisheries Working Group Meeting	Topics covered: VE update; planned VE survey campaign.	VE is described in Volume 6, Part 2, Chapter 1: Offshore Project Description. Other issues raised not relevant to the commercial fisheries assessment.
November 2021 PINS Scoping Opinion	Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the Proposed Development area – on the basis of justification provided in the Scoping Report, the Inspectorate agrees this matter can be scoped out of further assessment in the ES.	Noted; potential impact scoped out of further assessment.
November 2021 PINS Scoping Opinion	Data sources – The baseline in the ES should be robust and should if possible be agreed with the relevant stakeholders. The MMO has identified several additional data sources in their advice which VE OWFL should consider incorporating into their baseline data.	A number of baseline data sources, identified in Section 8.10, have been analysed and used to inform the assessment in this chapter. Consultation with fishing stakeholders has been undertaken to identify data sources and to seek validation that the baseline is sufficiently robust (see Section 8.3).

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
November 2021 PINS Scoping Opinion	Baseline – It is proposed that the baseline will be informed by the most up-to-date versions of publicly available data and consultation with fleets active in the study area. The ES should clearly state the limitations associated with any data used.	Noted and agreed. Data sources and limitations associated with them are identified in Section 8.10.
November 2021 PINS Scoping Opinion	Baseline – Efforts should be taken to agree the baseline with relevant consultees and outcomes should be evidenced within the ES.	A number of baseline data sources, identified in Section 8.10, have been analysed and used to inform the assessment in this chapter. Consultation with fishing stakeholders has been undertaken to identify data sources and to seek validation that the baseline is sufficiently robust (see Section 8.3).
November 2021 PINS Scoping Opinion	Baseline – landings data. When using landings data, any conservation or management measures for species captured in the vicinity of the windfarm should be considered and acknowledged, as this may affect the species abundance and distribution within the windfarm area, but also within the fisheries dependent and interdependent data.	Commercial species conservation and management measures are described where relevant in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline (see 'key species' accounts). Fisheries management measures associated with designated sites are also described in Section 8.7 below.
November 2021 PINS Scoping Opinion	Socio-economic effects – Given that the scale of any potential impacts from the Proposed Development on commercial fishing is not yet known, the ES should report on any socio-economic effects in the appropriate chapter or provide a justification as to why LSE would not arise.	The assessment presented in Section 8.10 to 8.13 does not predict any significant (in EIA terms) effects on commercial fisheries. Wider socio-economic effects resulting from VE are assessed in Volume 6, Part 2, Chapter 12: Infrastructure and Other Marine Users, and Volume 6, Part 2, Chapter 3: Socio-

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		Economics, Tourism and Recreation.
March 2022 Commercial Fisheries Working Group (CFWG) Meeting	Attendees: Kent & Essex Inshore Fisheries and Conservation Authority (IFCA); Orford and District Fishermen's Association; Harwich Fishermen's Association; Felixstowe Ferry Fisherman's Association Topics covered: EIA scoping outcomes; baseline data sources; plans for ongoing CFWG engagement; VE update.	EIA scoping outcomes and the scope of the EIA is confirmed in Section 8.10. A number of baseline data sources, identified in Section 8.10, have been analysed and used to inform the assessment in this chapter. An extended baseline description is provided in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline. Consultation with fishing stakeholders has been undertaken to identify data sources and to seek validation that the baseline is sufficiently robust (see Section 8.3). The CFWG has been identified as the preferred means of engagement with the local fishing community, and VE OWFL engagement with the group is ongoing.
December 2022 Commercial Fisheries Working Group Meeting	Attendees from: Harwich Fishermen's Association; Thanet Fishermen's Association; West Mersea Fishermen's Association; Kent and Essex IFCA. Topics covered: VE update; presentation and discussion of additional baseline commercial fisheries data newly available since previous CFWG meeting; presentation of preliminary impact assessment outcomes; charts provided again to fishermen to provide any update on previously annotated fishing grounds.	Baseline data sources are described in Section 8.10 and baseline commercial fisheries activity is described in Section 8.7. An extended baseline description is provided in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline. Preliminary impact assessment outcomes were presented in the PEIR, which was subject to consultation (see S42 consultation responses above).

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
May 2023 S42 Consultation National Federation of Fishermen's Organisations (NFFO)	Further displacement of commercial fishing in the region will result in local economic harm, through lost earnings and additional operating costs due to increased steaming times during construction and operation of the project.	The assessment presented in Impact 5 (Section 8.10), Impact 11 (Section 8.11), Impact 16 (Section 8.12) has been updated to include consideration of additional steaming, in response to NFFO S42 feedback.
May 2023 S42 Consultation NFFO	The approach to assessing impacts in Chapter 2 is insufficiently precautionary and cannot be considered robust. The spatial distribution of the fishing fleet over the reference period presented in Annex 8.1 demonstrates how the stocks move, even at a regional scale, over a four-year period. The use of data that is over a decade old in some cases, or from other developments beyond the assessment area, is not acceptable when characterising a site-specific baseline.	The limitations of individual commercial fisheries datasets are acknowledged and described in Section 8.10 and more fully in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline. Multiple datasets have been sourced and analysed to build up a robust understanding of fishing activity in the study area, over a minimum five-year time series where data allows. Datasets used represent those that are publicly available and contain the most recent data that is available. The ES has given further consideration to presenting a longer time series of data where possible to enable overlap/further corroboration of datasets; this includes consideration of a ten-year series of UK landings statistics (see Section 8.10 and Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline). Engagement with fisheries stakeholders has also informed the description of fishing activity in the study area.
May 2023	We agree with the inclusion of the impacts that have been	The assessment presented in Impact 5 (Section 8.10), Impact

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
S42 Consultation NFFO	scoped in for the assessment but disagree with the decision to scope out the impact of having to steam to new fishing areas. The justification given is that the impacts will be limited to the areas immediately surrounding structures and their associated safety zones. Whilst this is technically correct, it ignores the fact that fishing activity within the array area (as defined in Annex 8.1) predominantly employs mobile gear. There is minimal evidence to suggest that such gear can safely and economically be operated within wind turbine arrays. We can assume, therefore, that mobile gear fishing vessels will have to steam to new fishing grounds: a potentially significant impact which must be assessed as part of the EIA.	11 (Section 8.11), Impact 16 (Section 8.12) has been updated to include consideration of additional steaming, in response to NFFO S42 feedback.
May 2023 S42 Consultation NFFO	It is unclear what level of fisheries exclusion is envisaged in Section 8.10.2, which refers to "…. where construction activities are taking place."? Does this equate to the whole site, or to individual turbine locations? Clarity on this matter is essential to ensure the impact on the receptors is accurately assessed.	The ES wording has been amended to clarify that exclusion during construction will apply where construction vessels and partially installed infrastructure are present, and within the footprint of Safety Zones of 500 m diameter (see Section 8.10).
May 2023 S42 Consultation NFFO	We feel that the assumption that the mobile gear fishing fleet will experience no displacement effects during construction (8.10.73 – 8.10.80) vastly underestimates the probable impact. The conclusion is justified by the belief that these vessels can freely disperse into other areas. This is demonstrably incorrect, especially in regions	Baseline data analysis has identified relatively (relative to adjacent waters) low levels of mobile fleet activity in the array areas (Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline). The assessment presented in Section 8.1 (Impact 2) confirms that effects on access to fishing

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	such as this, with extensive existing offshore developments, alongside regulatory and conservation-based restrictions. This was supported by evidence presented in 8.11.10 but appears not to be accounted for within the displacement impact assessments. It is disappointing to see that displacement of all gear types is assessed as having no significant effects. It should be self evidence that this is highly unlikely when a diverse fishing fleet is dispersed into an already crowded marine space.	grounds during construction will be short-term and temporary. The Applicant commits to ensuring that exclusion impacts during construction are appropriately mitigated such that any displacement effect is managed and minimised. This commitment is reflected in the assessment of displacement. Potential cumulative displacement effects are also assessed, as presented in Section 8.13.
May 2023 S42 Consultation NFFO	Non-site-specific studies (8.11.7 – 8.11.10) should be used only with caution. The study presented here related to a particular site, in a region characterised by a very different benthic environment and regional fishery.	The ES wording has been amended to acknowledge that cited study conclusions are specific to particular sites and fisheries (see Section 8.11).
May 2023 S42 Consultation NFFO	We welcome the commitment to the development of a Fisheries Liaison and Co-Existence Plan and the suite of mitigation measures identified. Mitigation measures should be designed to benefit all affected fishers and the FLCP should be developed in cooperation with all relevant regional stakeholders, through continued and meaningful engagement throughout the lifetime of the project.	An outline FLCP has been prepared to accompany the Application in consultation with the CFWG (see Volume 9, Report 16). Engagement with the CFWG has proactively sought to identify meaningful approaches to mitigation.
May 2023 S42 Consultation NFFO	The commercial fisheries in the region can expect to see a vastly changing landscape through the lifespan of the Five Estuaries project. The spatial squeeze on fisheries due to offshore developments in the region is	It is understood that the commercial fisheries baseline may evolve (such evolution being a driver for looking at baseline datasets over a minimum five-year time series and often over a longer one),

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	already extensive (as identified in Table 8.13) and it is possible that further restrictions will follow, if the proposed exclusion of mobile gear fisheries from MCZs is enacted. The uncertain outcome of the renegotiation of the UK-EU Trade and Cooperation Agreement will also affect opportunities in the region. Whilst these elements are acknowledged in the PEIR as possible factors, they are not accounted for in the assessments.	and likely evolution is described in Section 8.7 and Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline. The assessment takes account of this potential evolution, assessing effects on those fishing fleets that are currently active and may be expected to be active in the future. The NFFO concern regarding potential for 'spatial squeeze' is noted. The cumulative impact assessment presented in Section 0 considers the potential interaction of VE with other planned developments and identifies the contribution that VE is expected to have in terms of cumulative loss of access to fishing grounds and associated displacement.
May 2023 S42 Consultation NFFO	It is recognised that the PEIR attempts to characterise a commercial fisheries baseline and to assess likely impacts by analysing many different data sources, including stakeholder expertise. The limitations of the data are well understood and described, with confidence levels assigned to the different data sources. The assumptions made and impact assessments subsequently based on these data, do not seem to be influenced by their pedigree or confidence levels used, however. As a result, impacts are adjudge to have "minor/possibly adverse" or "no significant effect" in all cases. It is submitted that this is unduly optimistic.	The assessment presented in the ES does take account of the confidence levels associated with baseline commercial fisheries data. To build confidence in the baseline, multiple datasets have been sourced and analysed to build up a robust understanding of fishing activity in the study area, over a five-year time series where data allows. Datasets used represent those that are publicly available and contain the most recent data that is available. Engagement with fisheries stakeholders has also informed the description of fishing activity in the study area.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
May 2023 S42 Consultation NFFO	In fisheries management, a precautionary principle is applied where there is a paucity of data, or where the outcome of decisions is uncertain. This does not seem to be the case for offshore development impact assessments. Limitations of data are acknowledged but do not seem to influence the outcomes of assessed impacts: a flaw in the methodological design and interpretation.	The assumptions made in the assessment are presented in the ES; evidence is provided to justify these assumptions. The assessment presented in the ES is based on a maximum design scenario for VE and identifies the potential for significant impacts on UK potting and netting fleets during construction and proposes further mitigation to address these impacts (see Section 8.10). Approaches to mitigation have been discussed with the CFWG.
May 2023 S42 Consultation Marine Management Organisation (MMO)	The MMO note that the Summary of effects for Commercial Fishing provided in the Non-Technical Summary (NTS) is stated as having "no significant effects upon Commercial Fisheries receptors". The MMO consider that the proposed works are likely to disrupt access to fishing grounds both during construction and after completion so the effect might be higher than stated and should be considered further. The MMO note that the Applicant has identified 6 main impacts to fisheries receptors for the construction, operational and decommissioning phases, however one has been scoped out for all three phases, with another absent from the construction phase but its scoping out has not been justified.	The NTS has been prepared to reflect the assessment presented in Section 8.1 to 0. It recognises the potential for significant impacts and further mitigation is proposed in response. The assessment presented in Section 8.10 to 8.13 has been updated to include consideration of additional steaming, in response to NFFO S42 feedback.
May 2023 S42 Consultation	Reduction in access to, or exclusion: The MMO generally agree with this assessment,	Noted, KEIFCA have been engaged by the Applicant via the CFWG, where discussion

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
MMO	however, regarding impacts to inshore commercial fisheries, the MMO defer to the Kent and Essex IFCA for their local knowledge of fishing activity in inshore waters where data on fishing activity, intensity and landings are limited. Relying on fisher behavioural information from the MMO, which is largely based on catch landings and VMS/AIS tracking data, can often leave fishers in the small-scale and inshore fleets disproportionately under-represented when compared to other fleets/sectors (Chuenpagdee, 2012, Metcalfe et al., 2017).	has sought to inform understanding of smaller vessels activity in inshore waters. KEIFCA have provided data to inform the commercial fisheries baseline (see Section 8.10). KEIFCA did not provide a S42 consultation response.
May 2023 S42 Consultation MMO	Displacement: As per paragraph 8.1.5, on the whole, MMO agree with this assessment but defer to Kent and Essex Inshore Fisheries Conservation Authority (KEIFCA) for their comments in the likelihood of significant impacts of displacement to the inshore commercial fishing fleet.	Noted, KEIFCA have been engaged by the Applicant via the CFWG, where discussion has sought to inform understanding of smaller vessels activity in inshore waters. KEIFCA did not provide a S42 consultation response.
May 2023 S42 Consultation MMO	Disturbance of commercially important fish resources: In general, the MMO agree with the Applicants assessment. Although the impacts of underwater noise to herring could be significant without mitigation (see paragraphs 6.1.6 - 6.1.18), these constitute a relatively small proportion of the catch from rectangles 32F1, 33F1, 32F2 and 33F2. Therefore, reduction in available herring is unlikely to cause a significant impact to fisheries receptors. However,	Noted, KEIFCA have been engaged by the Applicant via the CFWG, where discussion has sought to inform understanding of smaller vessels activity in inshore waters. KEIFCA did not provide a S42 consultation response. The impacts of underwater noise, and associated mitigation, are discussed in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	smaller vessels fishing in inshore waters which have a limited fishing grounds may be adversely affected by works in inshore waters, e.g. construction along the ECC. Again, the MMO defer to KEIFCA for further comments on how disturbance of commercially important fishes is likely to impact the inshore fleet.	
May 2023 S42 Consultation MMO	Increased vessel traffic associated with VEs: The Applicant has assessed this impact to fisheries receptors as minor adverse, MMO agree with this assessment.	Noted, no further action required.
May 2023 S42 Consultation MMO	Physical presence of infrastructure leading to gear snagging: The Applicant has assessed the impacts to fisheries receptors as minor adverse (not significant), MMO agree with the assessment. In addition, MMO agree with the scoping out of this impact for the construction phase as fisheries receptors will be required to keep 500m distance from construction operations and therefore snagging is unlikely to occur.	Noted, no further action required.
May 2023 S42 Consultation MMO	Additional steaming to alternative fishing grounds: This impact has been scoped out of all three phases and has therefore been not assessed by the Applicant. The MMO agree that small additions to steaming to navigate the array-area are unlikely to have significant impacts on fisheries receptors in this area.	The assessment presented in Section 8.10 to 8.13 has been updated to include consideration of additional steaming, in response to NFFO S42 feedback.
May 2023 S42 Consultation	Although the MMO consider The project description to be clearly presented. We could find no	The total array area covers 128 km^2, for further project information see Volume 6, Part

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
MMO	reference to the total array area in the documents provided. The MMO would appreciate it if we could either be provided the information or signposted to where it is within the ES.	2, Chapter 1: Offshore Project Description.
May 2023 S42 Consultation MMO	For fisheries receptors the Applicant has considered all the developments/works in the fisheries study area. All impacts to fisheries receptors have been assessed as negligible to minor adverse (not significant) and the MMO agree with this assessment.	Noted, no further action required.
May 2023 S42 Consultation Harwich Haven Authority	We draw attention of the negative impact some elements of your proposal would have on the local fishing fleet as fishing stocks might be impacted. We have been working closely with the fishing community and CEFAS to introduce lobster hatchlings into the waters of the Haven. The failure of this project would see us with a significant financial loss.	For consideration of impacts on shellfish stocks, see Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology. The assessment presented in Section 8.10 to 8.13 does not predict any significant (in EIA terms) effects on commercial fisheries as a result of impacts on commercially targeted fish and shellfish stocks.
May 2023 Commercial Fisheries Working Group Meeting	Attendees from: Harwich Fishermen's Association; Thanet Fishermen's Association; West Mersea Fishermen's Association. Topics covered: VE update; presentation and discussion of preliminary impact assessment outcomes.	Preliminary impact assessment outcomes were presented in the PEIR, which was subject to consultation (see S42 consultation responses above).
June 2023 Commercial Fisheries Working Group Meeting	Attendees from: Harwich Fishermen's Association; Thanet Fishermen's Association; West Mersea Fishermen's Association. Topics covered: VE update; presentation and discussion of approaches to	An outline FLCP has been prepared to accompany the Application and is presented in Volume 9, Report 16: Outline Fisheries Liaison and Co-Existence Plan.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
	mitigation to be delivered via the FLCP.	
February 2023 Commercial Fisheries Working Group Meeting	Attendees from: Harwich Fishermen's Association; Thanet Fishermen's Association, West Mersea Fishermen's Association and Kent and Essex IFCA Topics covered: VE Update, upcoming surveys, in depth run through of the Outline FLCP ahead of application and approaches to fisheries mitigation.	An outline FLCP has been prepared to accompany the Application and is presented in Volume 9, Report 16: Outline Fisheries Liaison and Co-Existence Plan .

8.4 SCOPE AND METHODOLOGY

SCOPE OF THE ASSESSMENT

8.4.1 This section sets out the scope of the ES assessment for commercial fisheries. This scope has been developed as VE design has evolved and responds to feedback received to-date as set out in Section 8.3.

IMPACTS SCOPED IN FOR ASSESSMENT

8.4.2 Potential impacts on commercial fisheries receptors that have been scoped in for further assessment are summarised below, in line with the Scoping Opinion.

8.4.3 The following impacts have been scoped into this assessment:

- Construction:
  - Impact 1: Reduction in access to, or exclusion from established fishing grounds;
  - Impact 2: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds;
  - Impact 3: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity;
  - Impact 4: Increased vessel traffic associated with VE within fishing grounds leading to interference with fishing activity;
  - Impact 5: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area;
- Operation and maintenance:
  - Impact 6: Reduction in access to, or exclusion from established fishing grounds;
  - Impact 7: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds;
  - Impact 8: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity;
  - Impact 9: Increased vessel traffic associated with VE within fishing grounds leading to interference with fishing activity;
  - Impact 10: Physical presence of infrastructure leading to gear snagging;
  - Impact 11: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area.
- Decommissioning:
  - Impact 12: Reduction in access to, or exclusion from established fishing grounds;

- Impact 13: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds;
- Impact 14: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity;
- Impact 15: Increased vessel traffic associated with VE within fishing grounds leading to interference with fishing activity;
- Impact 16: Physical presence of infrastructure leading to gear snagging;
- Impact 17: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area.

8.4.4 Whilst not aligned with the outcome of the scoping exercise, following receipt of the NFFO response to S42 consultation and for completeness, the following impacts (impacts 5, 11 and 17 above) were scoped back in and are assessed in the ES:

- Construction and decommissioning:
  - Impact: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area;
- Operation and maintenance:
  - Impact: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area.

IMPACTS SCOPED OUT OF ASSESSMENT

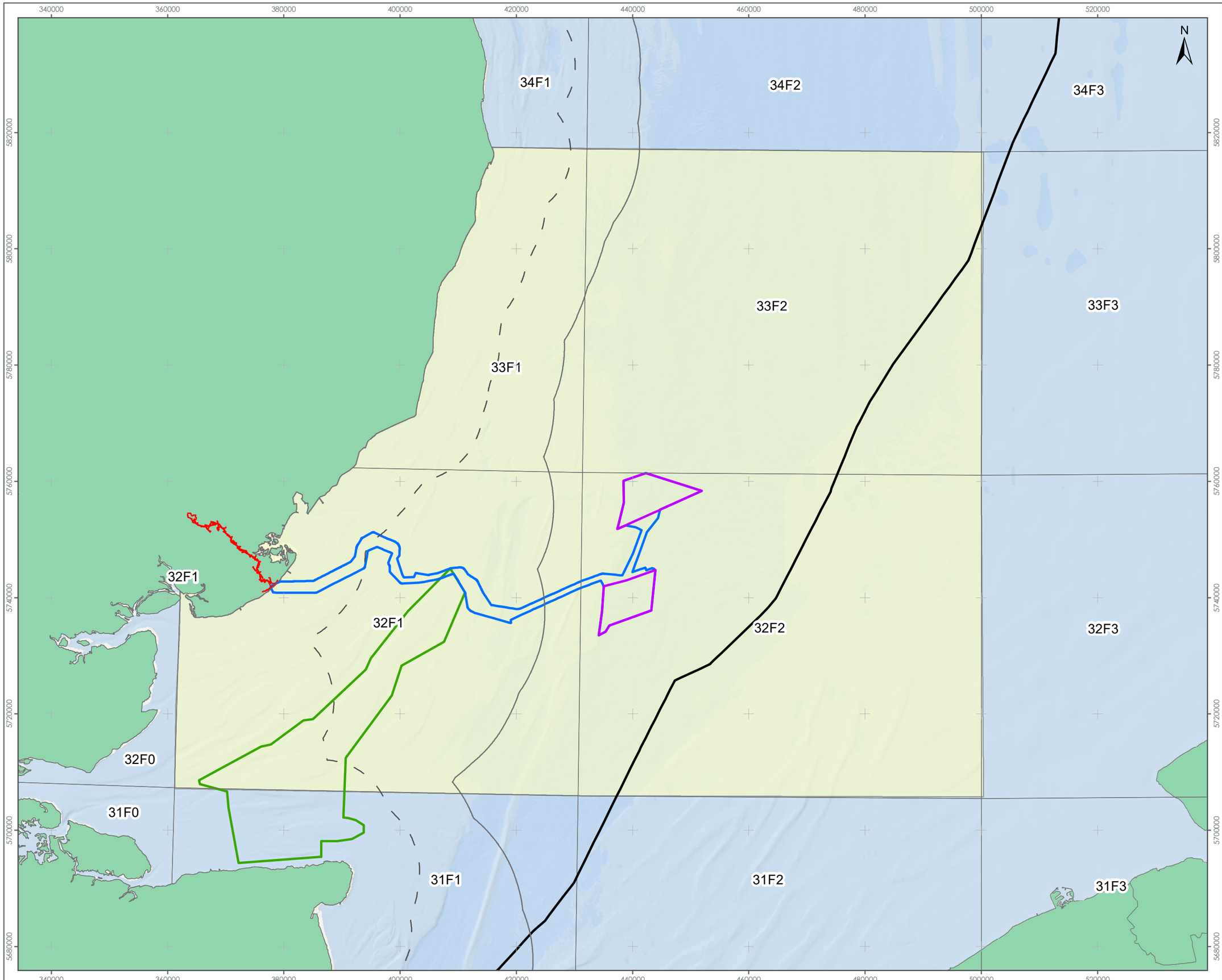
8.4.5 No potential impacts have been scoped out of assessment.

STUDY AREA

8.4.6 VE is located within the southern portion of the International Council for the Exploration of the Sea (ICES) Division 4c (Southern North Sea) statistical area; within the UK Exclusive Economic Zone (EEZ) waters, with the array areas located outside the 12 nautical mile (NM) limit. For the purpose of recording fisheries landings, ICES Division 4c is divided into statistical rectangles which are consistent across all Member States operating in the North Sea.

8.4.7 The VE array areas are located within ICES rectangle 32F2 and the majority of the offshore Export Cable Corridor (ECC) is within rectangle 32F1, as shown in Figure 8.1.

8.4.8 Since the northernmost VE array area lies immediately adjacent to ICES rectangle 33F2, the commercial fisheries study area has been defined as ICES rectangles 32F2, 33F2, 32F1 and 33F1. The VE array areas occupy 1.03% of this study area and the offshore ECC occupies 1.36% of this study area.



LEGEND

- Array Areas
- Offshore Export Cable Corridor
- Onshore Red Line Boundary
- Margate and Long Sands SAC
- Commercial Fisheries Study Area
- ICES statistical rectangles

UK limits

- 6NM limit
- 12NM limit
- 200NM Exclusive Economic Zone

0 5 10 20
Kilometers

Data Source: ICES, 2020
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

Commercial Fisheries Study Area

VER	DATE	REMARKS	Drawn	Checked
1	30/01/2024	For Information	FN	MB

DRAWING NUMBER: 8.1

Reference Text

Sheet No:

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:400,000	A3	WGS84	UTM31N

FIVE ESTUARIES
OFFSHORE WIND FARM

DATA SOURCES

8.4.9 Baseline data collection has been undertaken to obtain information over the study area shown in Figure 8.1.

8.4.10 The data sources that have been collected and used to inform this commercial fisheries assessment are summarised in Table 8.3 and fully presented in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline Report.

8.4.11 Baseline data has been further gathered and validated via engagement with fisheries stakeholders (see Section 8.3). Engagement has confirmed that stakeholders are in broad agreement that all available and appropriate baseline data sources have been utilised.

Table 8.3: Data sources used to inform the assessment.

Data	Time period	Source
Landings statistics data for UK-registered vessels, with data query attributes for: landing year; landing month; vessel length category; ICES rectangle; vessel/gear type; port of landing; species; live weight (tonnes); and value.	2016 to 2022 (a ten-year time series of landings data from 2012 to 2022 is also considered, providing a high-level overview of long-term trends in fishing activity in the study area)	Marine Management Organisation (MMO)
Landings statistics for EU registered vessels with data query attributes for: landing year; landing quarter; ICES rectangle; vessel length; gear type; species; and, landed weight (tonnes).	2012 to 2016	European Union (EU) Data Collection Framework (DCF) database
VMS data for UK registered vessels ≥15m length. Note that UK vessels ≥12 m in length have VMS on board, however, to date, the MMO provide amalgamated VMS datasets for ≥15 m vessels only. VMS data sourced from MMO displays the first sales value (£) of catches.	2016 to 2019	MMO

Data	Time period	Source
VMS data for EU registered vessels ≥12m length. VMS data sourced from ICES displays the surface Swept Area Ratio (SAR) of catches by different gear types and covers EU (including UK) registered vessels 12m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. Surface SAR provides a proxy for fishing intensity.	2017 to 2020	ICES
Fishing vessel route density, based on vessel Automatic Information System (AIS) positional data. AIS is required to be fitted on fishing vessels ≥15m length.	2019 to 2022	European Maritime Safety Agency (EMSA)
VE marine traffic (AIS and radar) survey data.	Summer 2022 and Winter 2022	Anatec
VE fisheries scouting survey data, noting fishing gear and vessel observations.	Summer 2021	Brown and May Marine
Annotated Admiralty Charts, with fishing grounds identified by CFWG members (confidential data).	Summer 2021	The Applicant
IFCA fisheries surveillance data, showing records of fishing vessel observations from IFCA patrol vessels.	2015 to 2020	Kent and Essex IFCA

Data	Time period	Source
Landings statistics for Dutch registered fishing vessels with data query attributes for: vessel length; fishing method; ICES rectangle; year; species; weight; value; days fished. VMS data for Dutch registered fishing vessels ≥12m length.	2019 to 2022	Wageningen University & Research

8.4.12 Landings statistics for UK registered vessels were obtained from the Marine Management Organisation (MMO) with the following parameters: year; month; gear type; ICES rectangle; species; live weight (tonnes) and first sales value (£) across a seven-year period (2016 to 2022). During ES preparation, 2022 UK landings statistics have become available and have been incorporated into the existing baseline description below and in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline Report.

8.4.13 Landings data for all species are collected via the European Union (EU) logbooks scheme and recorded by ICES statistical rectangle and stored in the EU DCF database, accessible through the EU Joint Research Committee. Landings data has been collated for all EU Member States for the ICES statistical rectangle that overlap the commercial fisheries study area. Landing statistics were collated across five years (2012 to 2016). Landing statistics include all landings by that country's nationally registered vessels into all ports. The following parameters were examined: year; season (quarter); gear type; ICES rectangle; species; effort (hours fished); and live weight (tonnes).

8.4.14 Vessel Monitoring System (VMS) is a form of satellite tracking using transmitters on board fishing vessels. Annual VMS data are collated by the MMO for all vessels ≥15m registered to the UK, including all gear types. VMS data for UK vessels have been analysed for 2016 to 2019.

8.4.15 All EU fishing vessels (i.e., fishing vessels flying the flag of an EU Member State), and third-party fishing vessels operating in EU waters, that are ≥12 m in length, are required to have a VMS on board. This reports the vessels' position to fisheries management authorities, in the case of EU fishing vessels, every two hours. Since 1 January 2012, this obligation has applied to vessels that are ≥12 m in length (before 1 January 2012 it applied to vessels ≥15 m in length, see Council Regulation (EC) No 1224/2009).

8.4.16 Through a European wide data call, ICES collated VMS data for vessels ≥12 m operating mobile gear that has contact with the seabed. This VMS data set includes vessels registered to the following countries: Belgium, Denmark, France, Germany, the Netherlands, Ireland, Sweden and UK. Data is amalgamated for all countries and not available on a country-by-country basis; data has been analysed over a five-year period from 2016 to 2020.

8.4.17 In addition to analysis of fisheries data, various sources of literature have been reviewed to inform the assessment. These include Kent and Essex IFCA publications, species stock assessments published by ICES and Cefas, and the commercial fisheries assessment presented in the Galloper and Greater Gabbard Environmental Statement. Literature sources are cited and fully referenced in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline Report.

DATA LIMITATIONS

8.4.18 Limitations of landings data include the spatial size of ICES rectangles which can misrepresent actual activity across VE and care is therefore required when interpreting the data. The level of uncertainty and confidence of each data set is defined in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline Report.

8.4.19 While it is recognised that there is no statutory requirement for owners of vessels 10 m and under to declare their catches, registered buyers are legally required to provide sales notes of all commercially sold fish and shellfish due to the 2005 Registration of Buyers and Sellers of First-Sale Fish Scheme (RBS legislation) (MMO, 2021). The RBS legislation is applicable to licenced fishing vessels of all lengths and requires name and port letter and numbers (PLN) of the vessel which landed the fish to be recorded in relation to each purchase. For the 10 m and under sector, landing statistics are recorded on sales notes provided by the registered buyers (MMO, 2021). Information that may not be formally recorded on the sales note, such as gear and fishing area, is added by coastal staff based on local knowledge of the vessels they administer – for example, from observations of the vessel during inspections at ports or from air and sea surveillance activities as well as discussions with the owner and/or operator of the vessel (MMO, 2021).

8.4.20 Lack of recent landings statistics for EU (non-UK) fleets is also recognised as a data limitation; based on the most recent European Commission data call, more recent landings data (2017-2019) is no longer available by ICES rectangle. Data at a scale of ICES division (i.e., the whole of the southern North Sea) is less useful to understand fishing activity specific to the area overlapping VE. Data requests made direct to member state agencies to address this.

8.4.21 Limitations of VMS data are primarily focused on the coverage being limited to larger vessels 15 m and over for UK fishing vessels. It is important to be aware that where mapped VMS data may appear to show inshore areas as having lower (or no) fishing activity compared with offshore areas, this is not necessarily the case because VMS data do not include vessels typically operating in inshore area (i.e., which typically comprises of vessels <15 m in length). To assist in mitigating the risk of under-representing smaller inshore vessels, site-specific marine traffic survey data comprising information on vessel movements gathered by Automatic Identification System (AIS) and radar has been analysed alongside VMS data. Following CFWG engagement, local fishermen have also provided annotated charts noting their fishing grounds.

8.4.22 VMS data for Dutch vessels that are ≥12 m in length has been analysed. It is noted by the data provider that VMS mapping relies on differentiation between fishing and non-fishing activity by vessels and that the statistical approach used to this has inherent uncertainties whereby actual fishing intensities may vary slightly to those depicted in the VMS data.

8.4.23 IFCA surveillance data has also been obtained to provide further insight into fishing activity from shore out to the 6 NM limit. Limitations of IFCA patrol data are primarily focused on the frequency and spatial coverage of patrols. The data cannot be considered to give a complete picture of the actual level of activity and have a number of limitations, including the following:

- patrol efforts by IFCA vessels are localised for enforcement purposes and not collection of sightings data. Areas with fewer fisheries enforcement issues are therefore likely to be visited less often and result in lower data confidence;
- patrol data are only indicative of areas where fishing activities occur, as there is no continuous monitoring of activities;
- patrol data present a snapshot of activity in an area and it cannot be assumed that if no vessels have been sighted then no fishing takes place; and
- vessels fishing at night would likely remain undetected.

8.4.24 Data limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources and consultation with the fishing industry. As data form only part of the evidence base, the limitations identified are not considered to significantly affect the certainty or reliability of the impact assessments in Sections 8.10 to 8.12.

8.5 ASSESSMENT METHODOLOGY

8.5.1 The project-wide generic approach to assessment is set out in Volume 6, Part 1, Chapter 3: EIA Methodology. The assessment methodology for commercial fisheries is consistent with the approach, but additionally is informed by the topic-specific guidance listed in Section 8.2.

ASSESSMENT CRITERIA AND ASSIGNMENT OF SIGNIFICANCE

8.5.2 The method for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts.

8.5.3 In assessing the magnitude of the impact, the value and vulnerability of the receptor, i.e., the fishing fleet under assessment, together with the reversibility of the impact, are considered. Due to the range in scale, value (in terms of both landings and income/profit) and operational practises, within the commercial fishing fleets assessed, specific economic criteria were not set for defining value within the categories of high, medium or low. Instead, these classifications were based on judgement informed by the baseline characterisation and consultation with the industry. Magnitude of impact is defined in Table 8.4. The definitions employed in assigning receptor sensitivity are provided in Table 8.5.

8.5.4 The significance of the effect upon commercial fisheries is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in Table 8.6.

Table 8.4: Impact magnitude definitions.

Magnitude	Description/ reason
High (adverse)	Impact is of long-term duration (e.g., greater than 8 years duration) and/or is of extended physical extent; and Impact is expected to result in one or more of the following: > substantial loss of target fish or shellfish biological resource (e.g., loss of substantial proportion of resource within project area); > substantial loss of ability to carry on fishing activities (e.g., substantial proportion of effort within project area); and > substantial loss of economic value of commercial landings, that is nationally/regionally significant.
High (beneficial)	Impact is expected to result in one or more of the following: > large scale or major improvement of resource quality, measurable against biomass reference points; > extensive restoration or enhancement of habitats supporting commercial fisheries resources; and > substantial gain of economic value of commercial landings.
Medium (adverse)	Impact is of medium-term duration (e.g., less than 8 years) and/or is of moderate physical extent; and Impact is expected to result in one or more of the following: > partial loss of target fish or shellfish biological resource (e.g., moderate loss of resource within project area); > partial loss of ability to carry on fishing activities (e.g., moderate reduction of fishing effort within project area); and > partial loss of economic value of commercial landings, that is locally significant.
Medium (beneficial)	Impact is expected to result in one or more of the following: > moderate improvement of resource quality; > moderate restoration or enhancement of habitats supporting commercial fisheries resources; and > partial gain of economic value of commercial landings.
Low (adverse)	Impact is of short-term duration (e.g., less than 2-3 years) and/or is of limited physical extent; and Impact is expected to result in one or more of the following:

Magnitude	Description/ reason
	> minor loss of target fish or shellfish biological resource (e.g., minor loss of resource within project area); > minor loss of ability to carry on fishing activities (e.g., minor reduction of fishing effort within project area); and > minor loss of economic value of commercial landings that is not locally significant.
Low (beneficial)	Impact is expected to result in one or more of the following: > minor benefit to or minor improvement of resource quality; > minor restoration or enhancement of habitats supporting commercial fisheries resources; and > minor gain of economic value of commercial landings.
Negligible (adverse)	Impact is of very short-term duration (e.g., less than 1 year) and/or physical extent of impact is negligible; and Impact is expected to result in one or more of the following: > slight loss of target fish or shellfish biological resource (e.g., slight loss of resource within project area); > slight loss of ability to carry on fishing activities (e.g., slight loss of fishing effort within project area); and > minimal loss of economic value of commercial landings.
Negligible (beneficial)	Impact is expected to result in one or more of the following: > very minor benefit to or very minor improvement of resource quality; > very minor restoration or enhancement of habitats supporting commercial fisheries resources; and > minimal gain of economic value of commercial landings.

Table 8.5: Sensitivity/importance of the environment.

Receptor sensitivity/ importance	Definition
High	Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. And/or: No alternative fishing grounds are available.

Receptor sensitivity/ importance	Definition
Medium	Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. And/or: Low levels of alternative fishing grounds are available and/or fishing fleet has low operational range.
Low	Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability. And/or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.
Negligible	Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. And/or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.

Table 8.6: Matrix to determine effect significance.

			Sensitivity			
			High	Medium	Low	Negligible
Magnitude	Adverse	High	Major	Major	Moderate	Minor
		Medium	Major	Moderate	Minor	Negligible
		Low	Moderate	Minor	Minor	Negligible
	Neutral	Negligible	Minor	Minor	Negligible	Negligible
	Beneficial	Low	Moderate	Minor	Minor	Negligible
		Medium	Major	Moderate	Minor	Negligible
		High	Major	Major	Moderate	Minor

Note: shaded cells are defined as significant with regards to the EIA Regulations 2017[1].

[1] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

8.6 UNCERTAINTY AND TECHNICAL DIFFICULTIES ENCOUNTERED

8.6.1 Limitations associated with the data used to inform the description of the existing environment are described in Sections 8.1 and 8.6 above, and further in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report. As explained above, these limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources and input from the fishing industry. As data form only part of the evidence base, the limitations identified are not considered to significantly affect the certainty or reliability of the impact assessments in Sections 8.10, 8.11 and 8.12.

8.6.2 VE is in development and the final design of the project is not yet defined (as is standard practice within the industry for projects at this stage of development). To manage this uncertainty and allow a robust impact assessment to be undertaken, the assessment presented in this chapter is based on a maximum design scenario for VE. Through adoption of this maximum (or 'realistic worst case') scenario, there is confidence that the maximum potential adverse impact has been assessed, and as a result impacts of greater adverse significance would not arise should any other development scenario to that assessed within this Chapter be taken forward in the final scheme design.

8.7 EXISTING ENVIRONMENT

8.7.1 This section provides a brief overview of all landings from the VE commercial fisheries study area followed by a summary analysis on a fishery-by-fishery basis.

8.7.2 A detailed description of the existing environment is provided within Volume 6, Part 5, Annex 8.1: Commercial Fisheries Technical Baseline Report, which includes detailed landings statistics analysis, consideration of the seasonality of fishing activity, fishing activity spatial mapping, descriptions of fishing gear and vessel characteristics, and profiles of the fishing activity on a country-by-country basis. To avoid duplication, this section provides a succinct overview and should be read in conjunction with the Annex.

OVERVIEW OF LANDINGS FROM THE STUDY AREA

8.7.3 The annual average value of landings from the four ICES rectangles that comprise the study area by UK registered vessels is shown in Figure 8.2 below. Of the four rectangles, landings across the seven-year period have been consistently of greatest value in ICES rectangle 32F1 within which the offshore ECC is located. Average annual landings value in ICES rectangle 32F1 from 2016 to 2022 were £2.5 million whilst equivalent values across the other three rectangles ranged between £510,000 and £685,000. Landings are dominated by shellfish and demersal species.

8.7.4 A longer ten-year time series of landings by UK registered vessels from the study area is shown in . The data indicates annual variation in the value of landings from each ICES rectangle within the study area, and relative consistency in terms of ICES rectangle 32F1 supporting the highest value landings across the study area, and ICES rectangle 32F2 the lowest.

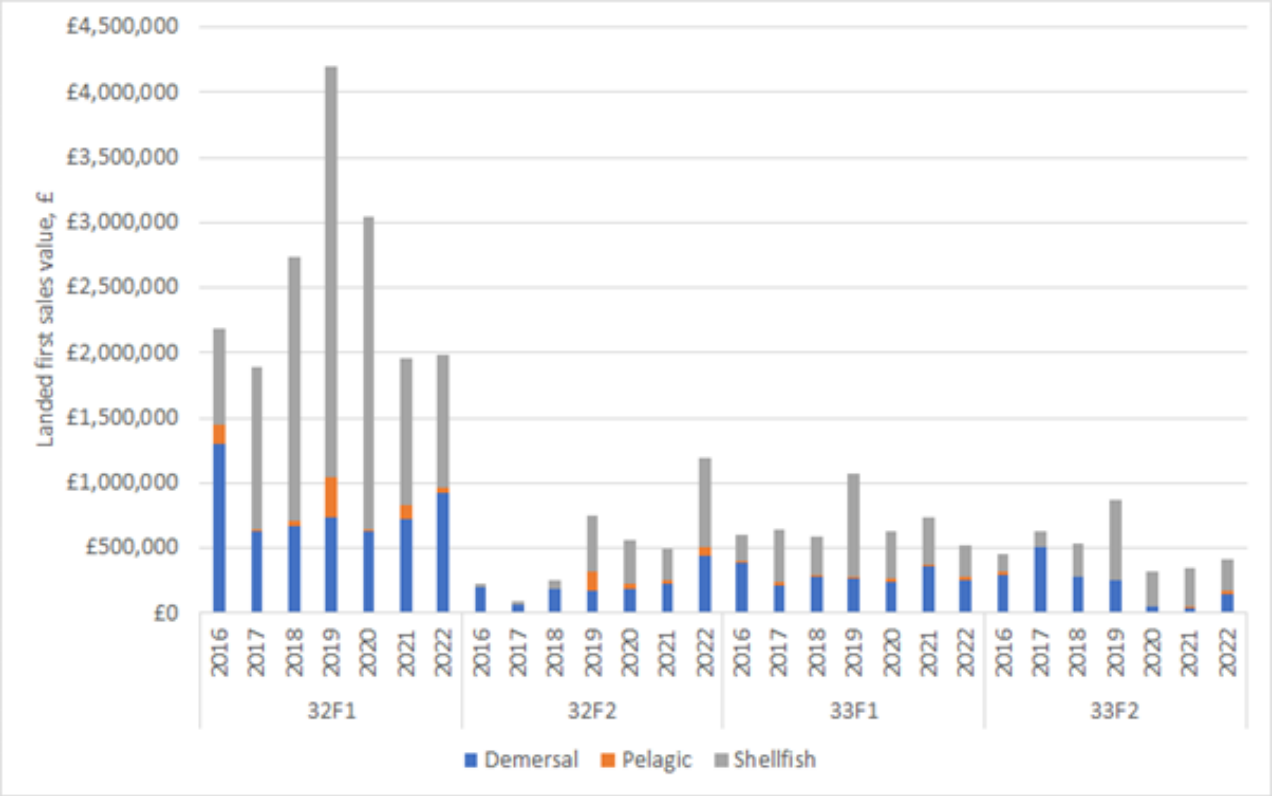


Figure 8.2: Value of UK vessel landings (2016 to 2021) by ICES rectangle and species group (Source: MMO, 2022).

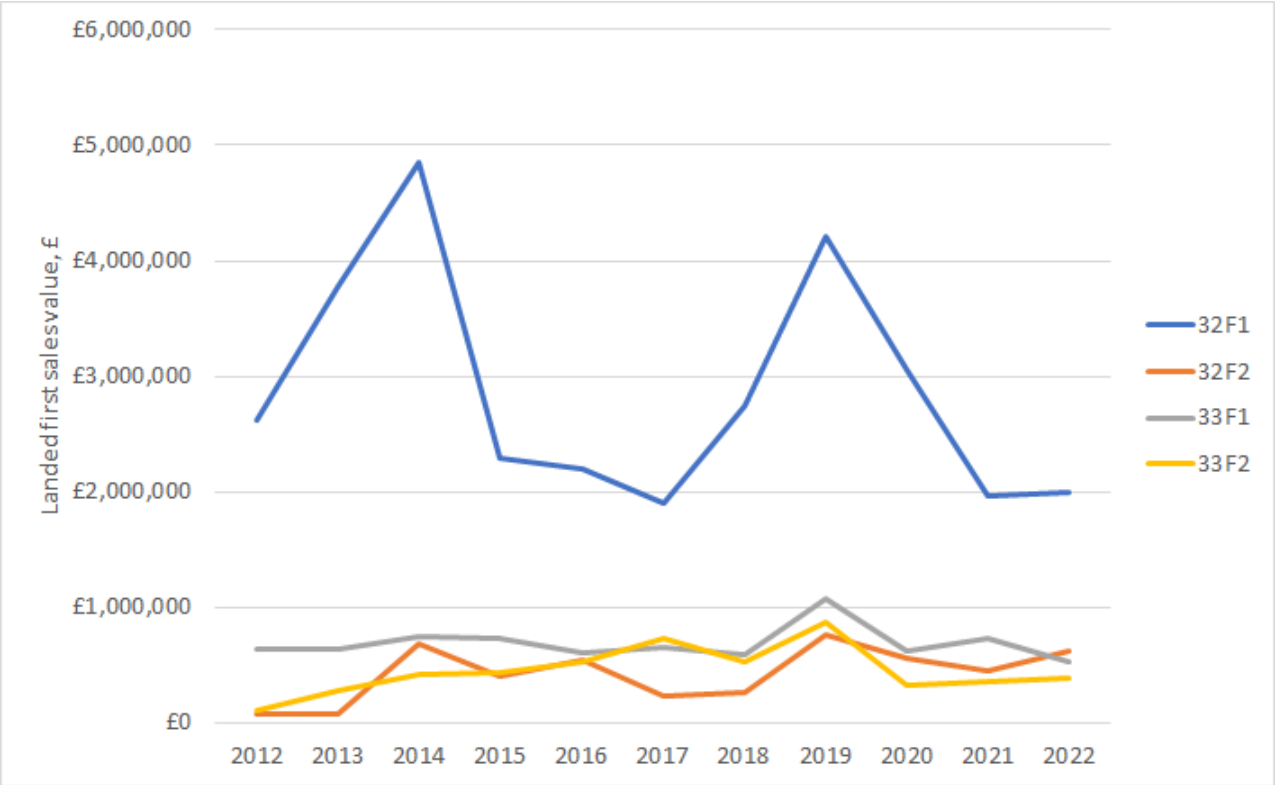


Figure 8.3 Value of UK vessel landings (2012-2022) by ICES rectangle (MMO, 2023)

8.7.5 Focusing in on those ICES rectangles where the VE array areas and offshore ECC are located, Figure 8.4 and Figure 8.5 indicate that the key species landed from ICES rectangle 32F1 (inclusive of the majority of the offshore ECC) are cockles *Cerastoderma edule*, sole *Solea solea*, whelks *Buccinum undatum*, bass *Dicentrarchus labrax*, thornback ray *Raja clavata* and lobsters *Homarus gammarus*, and from ICES rectangle 32F2 (inclusive of the array areas) are whelks, sole, red mullet *Mullus surmuletus*, horse mackerel *Trachurus trachurus* and plaice *Pleuronectes platessa*. By both weight and value, landings from both rectangles have shown some fluctuation across the seven-year time series, with a relative peak in 2019. In offshore rectangle 32F2, landings data indicates a recent increase in landings from 2021 of squid *Loligo* and mullets *Mugilidae*.

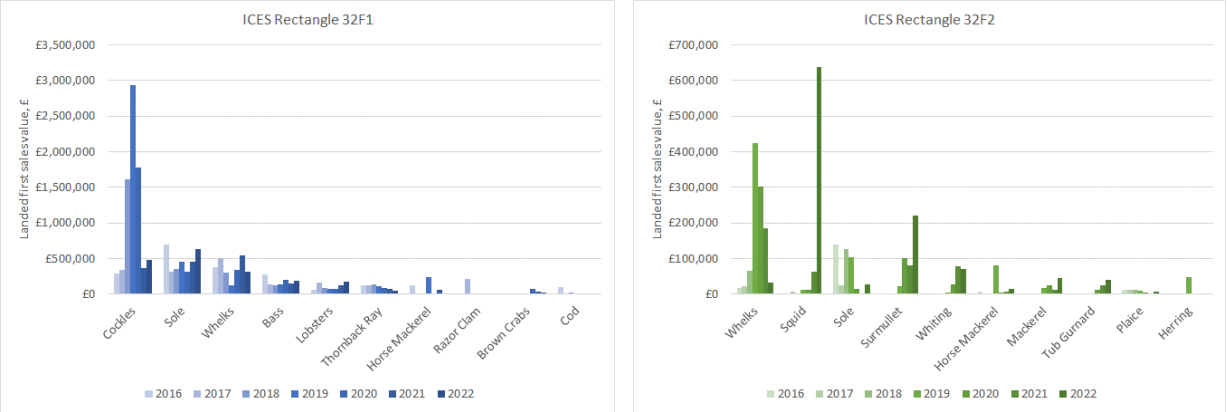


Figure 8.4: Key species by annual landed value (GBP) (2016 to 2022) from ICES rectangles 32F1 and 32F2 (Source: MMO, 2023).

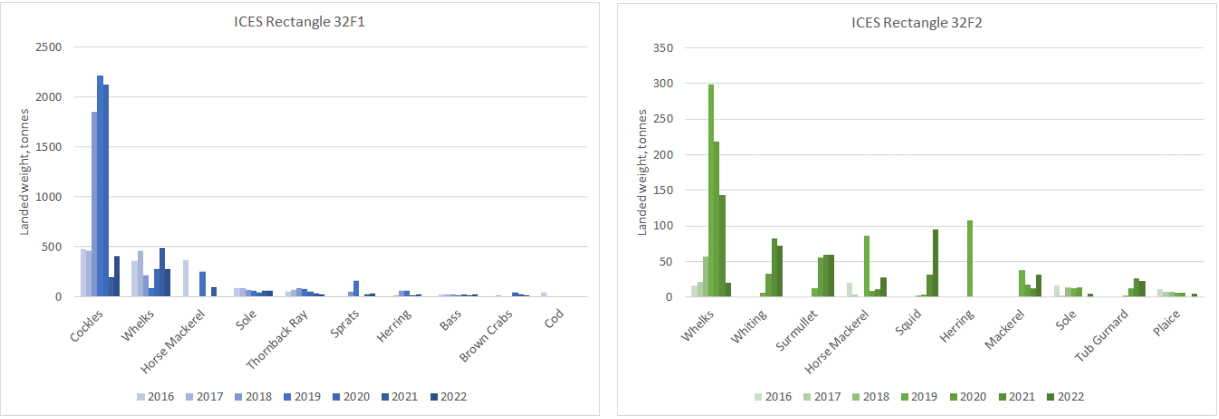


Figure 8.5: Key species by annual landed weight (tonnes) (2016 to 2022) from ICES rectangles 32F1 and 32F2 (Source: MMO, 2023).

8.7.6 Within the UK exclusive economic zone, fishing activity from the shore to 6 NM is only permissible for UK-registered vessels. A number of restrictions are in place based on byelaws set by English Inshore Fisheries and Conservation Authorities that control fisheries out to 6 NM. From 6 NM to 12 NM, non-UK vessels may fish if they have acquired historical rights to do so. Outside 12 NM, international vessels are permitted to fish subject to quota allocation and other EU level restrictions including technical gear measures and effort restrictions such as days at sea.

8.7.7 Landings data sourced from the EU DCF database (Figure 8.6 and Figure 8.7) indicates that there is likely to be some non-UK fishing activity in ICES rectangle 32F1, but that activity is dominated by English vessels. Non-UK vessels active in this rectangle include Belgian and Dutch trawlers targeting demersal species, primarily sole and plaice, and French trawlers targeting pelagic species, namely herring *Clupea harengus*. It is understood that these non-UK vessels hold historical access rights in the 6-12 NM zone. Further offshore, beyond the 12 NM limit and in ICES rectangle 32F2, landings across the period 2012 to 2016 were dominated by catches from Dutch trawlers targeting plaice and sole. Again, Belgian and French trawlers are also likely to be active, targeting plaice and sole, and whiting *Merlangius merlangus* and herring respectively. Across the 2012 to 2016 time series, landings by EU vessels peaked in 2014, at 3,000 tonnes from ICES rectangle 32F1 (27% of this accounted for by plaice and sole, and 48% by herring) and 13,000 tonnes from ICES rectangle 32F2 (60% of this accounted for by plaice and sole, and 10% by herring).

8.7.8 Landings data specific to the Dutch fishing fleet sourced from Wageningen University and Research confirms the presence of Dutch fishing vessels in the study area. Landings by weight are shown in Figure 8.8 and indicate that across the study area, the greatest volume of landings are taken from ICES rectangle 32F2. The dataset indicates that the greatest landings values are associated with catches of sole taken by beam trawlers. Data also indicates fishing activity by demersal otter trawlers and demersal seine netters. Across the four ICES rectangles that comprise the study area, the data indicates that the annual average number of fishing days for Dutch vessels across 2019 to 2022 was 20 days.

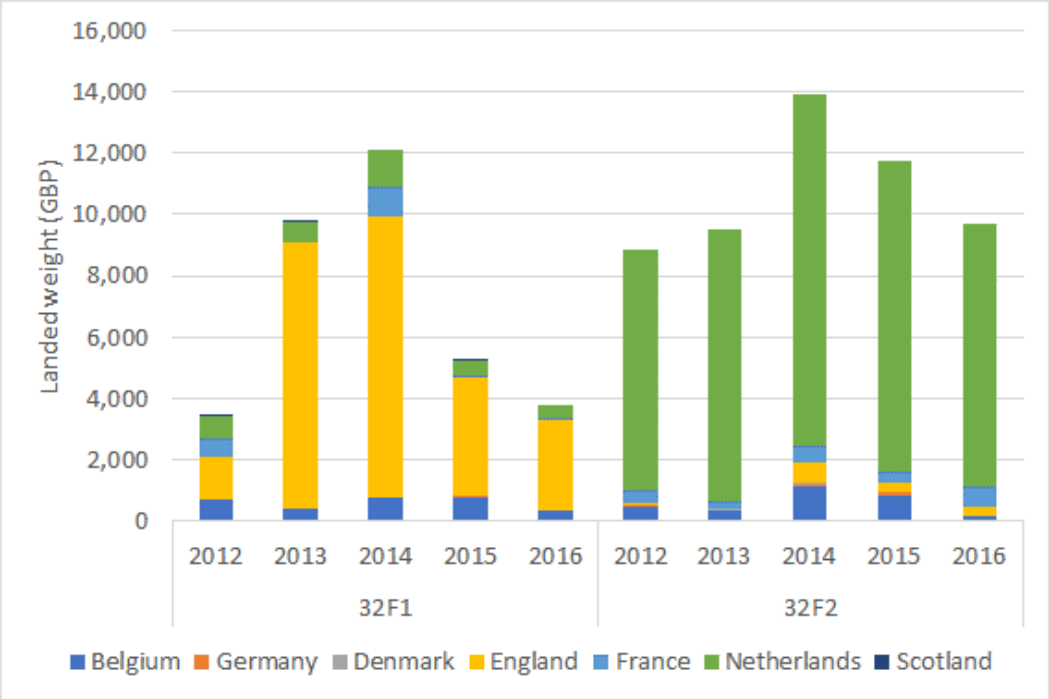


Figure 8.6: Average annual landed weight (tonnes) landed by all UK and EU countries from ICES rectangles 32F1 and 32F2 (2012 to 2016) (Source: EU DCF, 2022).

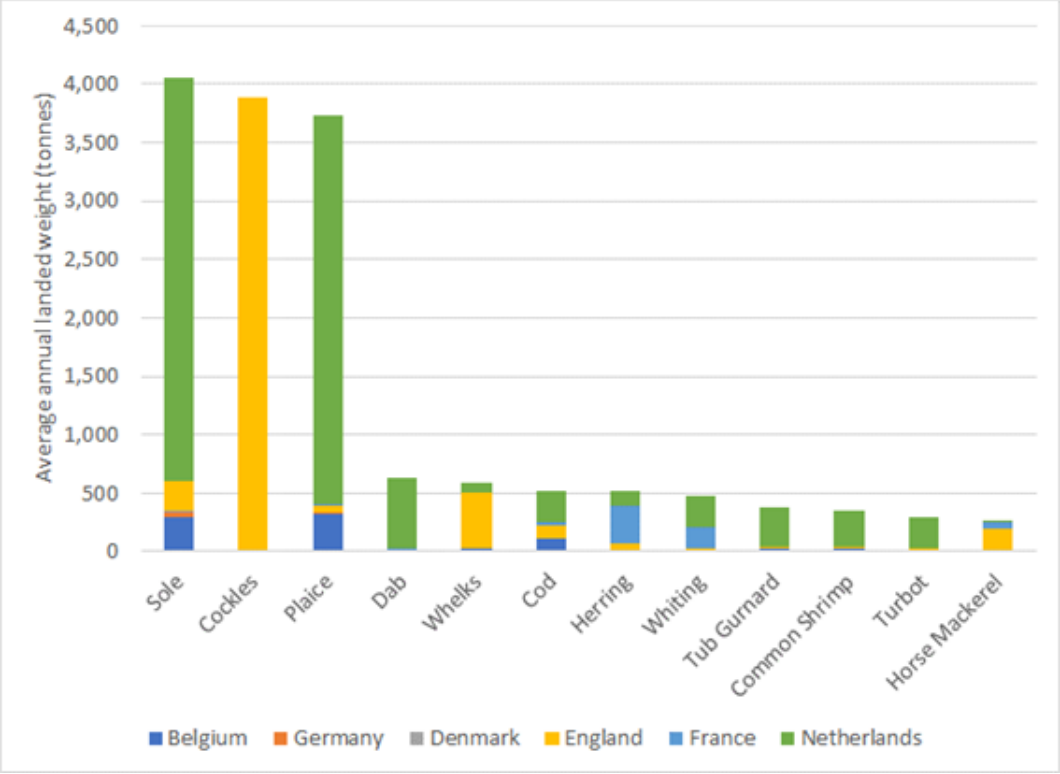


Figure 8.7: Average annual landed weight (tonnes) of species landed by all UK and EU countries from ICES rectangles 32F1 and 32F2 (2012 to 2016) (Source: EU DCF, 2022).

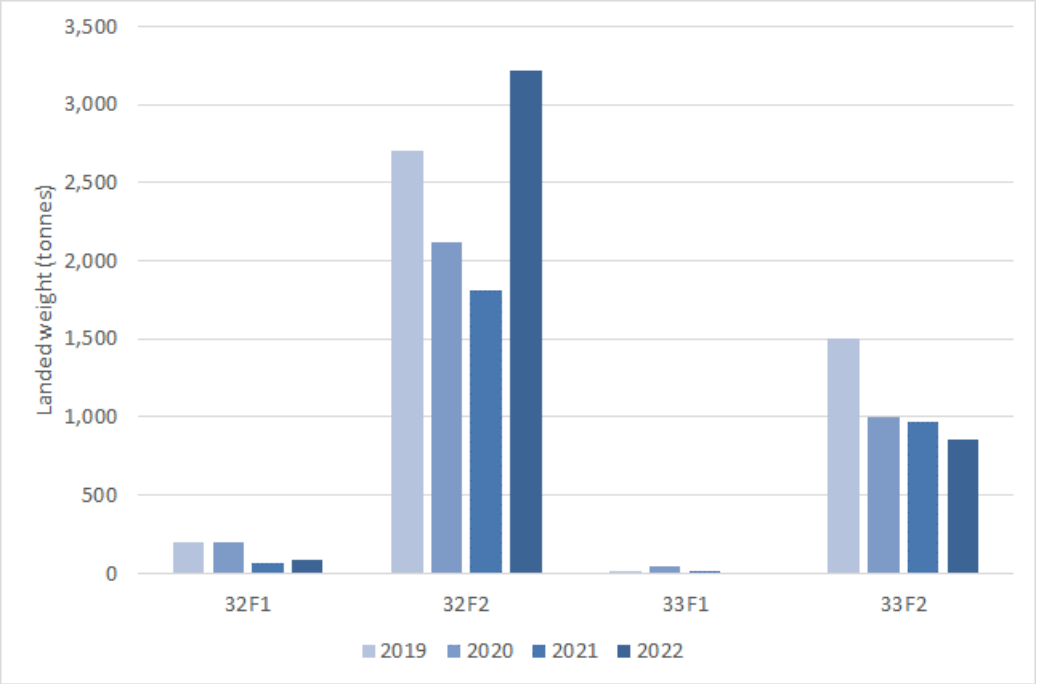


Figure 8.8: Annual landed weight (tonnes) (2019 to 2022) from the commercial fisheries study area for Dutch-registered fishing vessels (Source: Wageningen University & Research, 2023).

DESCRIPTION OF FISHING FLEETS ACTIVE IN THE STUDY AREA

STATIC GEAR

POTS AND TRAPS

8.7.9 In ICES rectangles 32F1 and 32F2 UK potting vessels target whelk, lobster and brown crab with an average annual value of £667,000 landed almost entirely by English-registered vessels. Over 70% of this annual landing value is associated with catches from ICES rectangle 32F1.

8.7.10 In these two ICES rectangles, the principal species caught by potting vessels are whelk (82% of total value), followed by lobster (14%) and brown crab (3%).

8.7.11 Whelk fisheries have typically been expanding around the UK in recent years as prices have increased and export to non-EU countries has grown. Whelk landings from the study area indicate a seasonal peak across spring and winter months, though they are landed year-round. In 2021, approximately 630 tonnes of whelk were landed from ICES rectangles 32F1 and 32F2. In 2022, this declined to 300 tonnes.

8.7.12 Lobster is one of the highest value per kilogram, commercially exploited shellfish species found in UK waters. Fishing activity typically peaks across summer months in the study area. Landings from ICES rectangles 32F1 and 32F2 fluctuated across 2016 to 2021, peaking at ~12 tonnes in 2017 and again in 2022 and averaging 7 tonnes annually across the six-year study period.

8.7.13 Activity mapping for potting activity is shown in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report in Figure 3.19. VMS data indicates potting activity for vessels ≥15 m in length and is therefore not fully representative of the fleet. The UK VMS data indicates potting activity within and around the VE array areas and offshore ECC. This is corroborated by scouting survey data (see Section 3.4.4, Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report), which showed the presence of potting gear markers in the VE array areas and portions of the offshore ECC in the nearshore. IFCA fisheries surveillance data also indicates potting activity in the offshore ECC. It is understood that whelk are the key species targeted further offshore in the VE array areas.

8.7.14 Smaller potting vessels active in ICES rectangles 32F1 and 32F2 are understood to operate from a number of local ports including West Mersea, Kings Lynn and Wells. Larger vessels, almost exclusively targeting whelk further offshore, land their catch to east and south coast ports including Lowestoft and Portsmouth.

FIXED NETS

8.7.15 In ICES rectangles 32F1 and 32F2 UK netting vessels target bass, sole and rays with an average annual value of £422,000 landed almost entirely by English-registered vessels of 10 m length or less. Over 99% of this annual landing value is associated with catches from ICES rectangle 32F1.

8.7.16 In ICES rectangle 32F1, the principal species caught by potting vessels are bass (36% of total value), followed by sole (31%) and thornback ray (10%).

8.7.17 Bass are a high value species, important to UK inshore fisheries. Bass landings from ICES rectangle 32F1 indicate a strong seasonal peak during April and May, though they are landed in lesser volumes throughout summer and autumn. In 2021, approximately 19 tonnes of bass were landed from ICES rectangles 32F1, and in 2022, approximately 16 tonnes were landed.

8.7.18 Fishing for sole typically peaks across summer months in the study area. Landings from ICES rectangle 32F1 fluctuated across 2016 to 2020, peaking at ~31 tonnes in 2017 and averaging 21 tonnes annually across the five-year study period.

8.7.19 Thornback ray are targeted seasonally, or as bycatch in net fisheries.

8.7.20 Landings data indicates netting activity is focused on inshore waters, in ICES rectangle 32F1. Netting activity is expected to take place across the inshore portion of the offshore ECC, as indicated by IFCA fisheries surveillance data (see Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report) and fishing grounds as indicated by local fishermen on annotated charts.

8.7.21 Smaller netting vessels active in ICES rectangles 32F1 are understood to operate from several local ports including West Mersea, Leigh-on-Sea, Kings Lynn, Harwich and Felixstowe. Stakeholder engagement has confirmed that some inshore vessels are understood to alternate between gear types seasonally or use net catches as bait for pots.

GEARS USING HOOKS

8.7.22 In ICES rectangles 32F1 and 32F2 UK vessels use gear with hooks to target bass, sole and rays with an average annual value of £53,000 landed almost entirely by English-registered vessels of 10 m length or less. Over 92% of this annual landing value is associated with catches from ICES rectangle 32F1.

8.7.23 The principal species caught by potting vessels are bass (37% of total value), followed by sole (21%) and thornback ray (34%) and fishing activity seasonality is as described for netting activity above.

8.7.24 In 2020, approximately 4 tonnes of bass were landed from ICES rectangles 32F1 and 32F2 by gears using hooks (2 tonnes in 2021 and 6 tonnes in 2022), with 0.3 tonnes of sole and 7 tonnes of thornback ray landed in the same year.

8.7.25 Landings data indicates that gears using hooks – typically set longlines - are primarily deployed in inshore waters, in ICES rectangle 32F1, with fishing vessels operating from a number of local ports identified in the above sections describing potting and netting activity. It is understood that some inshore vessels will shift between gears, for example working both nets and hooked gear at alternative times.

MOBILE GEAR

BEAM TRAWL

8.7.26 In ICES rectangles 32F1 and 32F2 UK beam trawlers target demersal flatfish species with an average annual value of £266,000 landed almost entirely by English-registered vessels of 10 m length or more. Over 70% of this annual landing value is associated with catches from ICES rectangle 32F2.

8.7.27 The principal species caught by UK beam trawlers are sole (71% of total value, average landings of 25 tonnes per annum), followed by plaice (8%, average landings of 16 tonnes per annum) and then brill *Scophthalmus rhombus* and turbot *Scophthalmus maximus* (7% each). Landings from UK beam trawlers are highly seasonal and peak notably in spring.

8.7.28 EU landing statistics indicate that the Dutch and Belgian beam trawl fleets, comprising vessels over 15 m length, are also active in ICES rectangles 32F1 and 32F2 (over 90% of landings by EU beam trawlers across the two rectangles originate from 32F2). Dutch and Belgian beam trawlers primarily target sole and plaice, with average annual landings of 1,800 tonnes each of sole and plaice. Data indicates relatively greater fishing activity in spring and winter months.

8.7.29 Activity mapping for beam trawl activity is shown in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report in Figures 3.17 and 3.21. Beam trawl fishing takes place throughout the study area, including within VE with a greater intensity of activity in the array areas relative to the offshore ECC. Data indicates that most of the activity by the larger vessels captured in the VMS data is associated with non-UK vessels.

DEMERSAL OTTER TRAWL

8.7.30 In ICES rectangles 32F1 and 32F2 UK otter trawlers target a variety of fish species with an average annual value of £453,000 landed almost entirely by English-registered vessels of both under and over 10 m length. Over 92% of this annual landing value is associated with catches from ICES rectangle 32F1.

8.7.31 The principal species caught by UK otter trawlers are sole (51% of total value, average landings of 43 tonnes per annum), followed by horse mackerel (21%, average landings of 153 tonnes per annum) and then thornback ray (12%). Landings from UK otter trawlers are made year-round. Landings of horse mackerel are sporadic, with substantial landings made in 2016 and 2019 and no landings recorded in 2017, 2018 or 2020.

8.7.32 EU landing statistics indicate that the Dutch, French and Belgian otter trawl fleets, comprised of vessels over 15 m length, are also active in ICES rectangles 32F1 and 32F2. Dutch, French and Belgian beam trawlers primarily target whiting *Merlangius merlangus*, sole, cod and thornback ray. Data indicates relatively greater fishing activity in spring and summer months.

8.7.33 Activity mapping for otter trawl activity is shown in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report in Figures 3.18 and 3.22. Otter trawl fishing takes place throughout the study area. As for beam trawl activity, a small proportion of this activity appears to be accounted for by UK vessels occasionally active across the offshore ECC, with relatively more activity across both the offshore ECC and array areas ascribed to non-UK vessels.

DEMERSAL SEINE

8.7.34 Demersal seine netting (also referred to as flyseine) by UK vessels targets demersal non-quota species such as red mullet and gurnards, and also lands whiting, mackerel and horse mackerel. An average annual value of £122,000 is landed from ICES rectangles 32F1 and 32F2.

8.7.35 Across ICES rectangles 32F1 and 32F2, demersal seine netting activity is focused on rectangle 32F2, and undertaken by Scottish and English vessels of over 10 m length.

8.7.36 Flyseine activity in the Channel and southern North Sea is understood to be increasing, involving a relatively small number of powerful vessels, which are either purpose-built or converted beam trawlers. This trend is reflected in landings statistics, which show a marked increase in demersal seine landings from zero in 2016 to approximately 160 tonnes in 2020 and 250 tonnes in 2021.

8.7.37 Landings show a seasonal peak during late summer and autumn months.

PELAGIC TRAWL

8.7.38 Across ICES rectangles 32F1 and 32F2, landings data indicates no pelagic trawl activity by UK-registered fishing vessels. EU landing statistics indicate that Dutch and French pelagic trawlers of over 15 m length may be active in the two rectangles.

8.7.39 Landings data indicates sporadic catches of pelagic species, including herring and horse mackerel. Reflecting the transient and highly mobile nature of pelagic shoaling fish, across the 2012 to 2016 period, landings of herring from ICES rectangles 32F1 and 32F2 fluctuated annually between zero in 2016 and a peak of approximately 1,600 tonnes in 2014. Similarly, landings of horse mackerel fluctuated from just over zero in 2015 to approximately 700 tonnes in 2016.

COCKLE DREDGE

8.7.40 The Thames Estuary supports an important cockle fishery, with distinct fishing grounds located outside of and to the south of VE. Licensed cockle fishing vessels, of length up to 14 m, operate suction dredges for the harvesting of cockles. No cockle dredging activity is expected to take place within the offshore ECC or array areas.

SUMMARY

8.7.41 A summary of fishing fleets active in the study area, with a focus on those expected to be active in the VE array areas and offshore ECC, is provided in Table 8.7. Stakeholder engagement has indicated that the inshore fishing fleet comprised primarily of vessels of 10 m length and under are adaptable and can be expected to switch between gear types and fishing grounds in response to several factors including market prices and fishing restrictions.

Table 8.7: Summary of fishing fleets.

Fishing Fleet	Array Areas	Offshore Export Cable Corridor
UK fishing fleets		
UK potting	English registered vessels, over 10 m length, primarily targeting whelk. Potential for some activity by vessels under 10 m length.	English registered vessels, under and over 10 m length, targeting whelk, lobster and brown crab.
UK netting	Limited netting activity.	English registered vessels, under 10 m length, primarily targeting bass, sole and rays.
UK beam trawl	English registered vessels, over 10 m length, primarily targeting sole and plaice, also taking other demersal species including brill and turbot.	
UK demersal otter trawl	Limited otter trawl activity.	English registered vessels of under and over 10 m length, primarily targeting sole, also taking other demersal species.
UK demersal seine	English and Scottish registered vessels, over 10 m length, targeting mullet, whiting, mackerel and squid.	Limited demersal seine activity.
UK gear with hooks	Very limited hooked gear activity.	English registered vessels, under 10 m length, primarily targeting bass, sole and rays.
UK cockle dredge	Whilst activity in wider study area, no cockle dredge activity within or immediately proximate to VE. Not considered further in assessment.	
Non-UK fishing fleets		
Dutch beam trawl	Dutch beam trawl activity, with vessels over 15 m in length targeting sole and plaice	Low levels of Dutch beam trawl activity, with vessels over 15 m in length targeting sole and plaice
Belgian beam trawl	Low levels of Belgian beam trawl activity, with vessels over 15 m in length targeting sole and plaice.	Low levels of Belgian beam trawl activity, with vessels over 15 m in

Fishing Fleet	Array Areas	Offshore Export Cable Corridor
		length targeting sole and plaice.
Dutch demersal otter trawl	Low levels of Dutch otter trawl activity, with vessels over 15 m length targeting whiting and red mullet and gurnards.	Very limited Dutch otter trawl activity.
French demersal otter trawl	Low levels of French otter trawl activity, with vessels over 15 m in length targeting whiting.	Very limited French otter trawl activity.
Belgian demersal otter trawl	Very limited Belgian otter trawl activity.	Low levels of Belgian otter trawl activity, with vessels over 15 m in length targeting sole and rays.
Dutch pelagic trawl	Very limited Dutch pelagic trawl activity; sporadic landings of high volumes of herring and horse mackerel.	
French pelagic trawl	Very limited French pelagic trawl activity; sporadic landings of high volumes herring and horse mackerel.	

DESIGNATED SITES

8.7.42 In order to protect particular features of designated sites, fisheries management mechanisms may be put in place. These mechanisms can include spatial closures, permit schemes, effort controls, vessel size and fishing gear restrictions and seasonal fishing restrictions. These mechanisms are implemented by the relevant IFCA in waters out to 6 NM and by the MMO in waters between 6 and 12 NM.

8.7.43 Within designated sites that are coincident or proximate to VE, several spatial closures to protect designated features have been established via IFCA byelaws that are relevant to fisheries activity within the study area. These include closures to fishing vessels >15 m length using towed nets within 3 NM of the coast, and closures to vessels >14m length fishing for molluscs using towed gear with 6 NM of the coast.

8.7.44 Within specified areas of the Margate and Long Sands Special Area of Conservation (SAC), a byelaw prohibits the use of bottom towed gear. Any fisheries management measures within Marine Conservation Zones (MCZs) designated in 2019 and coincident with the study area (i.e., Orford Inshore MCZ and Kentish Knock East MCZ) are yet to be determined.

8.7.45 Those areas with fishing restrictions relevant to the study area are mapped in Volume 6, Part 5, Annex 8.1: Commercial Fisheries Baseline Technical Report in Figure 3.27.

EVOLUTION OF THE BASELINE

8.7.46 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that "A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of VE (operational lifetime anticipated to be approximately 40 years from commissioning), long-term trends mean that the condition of the baseline environment is expected to evolve. Commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors. This includes the following:

- Market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, an example being the COVID pandemic;
- Market prices: commercial fishing fleets respond to market prices by focusing effort on higher value target species when prices are high and markets in demand;
- Stock abundance: fluctuation in the biomass of individual species stocks in response to status of the stock, recruitment, natural disturbances (e.g., due to storms, sea temperature etc.), changes in fishing pressure etc.;
- Fisheries management: including new management for specific species where overexploitation has been identified, or changes in Total Allowable Catches leading to the relocation of effort, and/or an overall increase/decrease of effort and catches from specific areas;
- Environmental management: including the potential restriction of certain fisheries within protected areas;
- Improved efficiency and gear technology: with fishing fleets constantly evolving to reduce operational costs e.g., by moving from beam trawl to demersal seine; and
- Sustainability: with seafood buyers more frequently requesting certification of the sustainably of fish and shellfish products, such as the Marine Stewardship Council certification, industry is adapting to improve fisheries management and wider environmental impacts.

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

8.7.48 Following the withdrawal of the UK from the EU, the UK and the EU have agreed to a Trade and Cooperation Agreement (TCA), applicable on a provisional basis from 1 January 2021. The TCA sets out fisheries rights and confirms that from 1 January 2021 and during a transition period until 30 June 2026, UK and EU vessels will continue to access respective Exclusive Economic Zones (EEZs, 12-200 NM) to fish. In this period, EU vessels will also be able to fish in specified parts of UK waters between 6-12 NM.

8.7.49 25% of the EU's fisheries quota in UK waters will be transferred to the UK over the five-year transition period; a significant proportion of this (60% by 2021) has already been transferred. Overall, the biggest gains in terms of UK quota share by volume relevant to the study area are for North Sea horse mackerel and whiting. In terms of additional quota value, the relevance of North Sea sole, herring and cod UK uplifts are noted.

8.7.50 Based on changes in quota allocation, it could be expected that between 2021 and 2026, UK vessels could be catching relatively more quota species, with EU fleets catching relatively less. In summary, levels of fishing activity within the study area are likely to remain consistent with the current baseline but be undertaken in a slightly greater proportion by UK vessels.

8.7.51 In relation to EU access to UK territorial waters, provision has been made for EU vessels with a track record of fishing between 6NM and 12 NM to be issued with licences to continue fishing. This licencing process is ongoing, and it is unknown how many EU vessels this is applicable to. Therefore, fishing activity within the study area is likely to remain consistent with the current baseline in terms of the fleets and Member States in operation.

8.7.52 In relation to the effects of the COVID pandemic, MMO annual reporting notes that the effects of the pandemic on the UK fishing industry were felt from March 2020. The MMO UK Sea Fisheries Statistics 2021 report observes that an increase in overall UK landings quantity and value in 2021 (relative to 2020) largely reflected recovery from the COVID period and additional quota available to the UK fleet after leaving the EU (MMO, 2022).

8.8 KEY PARAMETERS FOR ASSESSMENT

8.8.1 This section identifies the Maximum Design Scenario (MDS) upon which the commercial fisheries impact assessment is based. The assessment of the MDS for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance would not arise should any other development scenario (as described in Volume 6, Part 2, Chapter 1: Offshore Project Description) to that assessed within this Chapter be taken forward in the final scheme design.

8.8.2 The design parameters that have been identified to be relevant to commercial fisheries are outlined in Table 8.8 below and are in line with the VE design envelope (Volume 6, Part 2, Chapter 1: Offshore Project Description).

Table 8.8: Maximum design scenario for the project alone.

Potential effect	Maximum design scenario assessed	Justification
Construction		
Impact 1: Reduction in access to, or exclusion from established fishing grounds	**Total temporary reduction:** > Total area of seabed disturbed by boulder clearance: 1.78 km^2 (or 1,779,750 m^2) > Total area of seabed disturbed by pre-lay grapnel run: 11.87 km^2 (or 11,865,000 m^2) > Total area of seabed disturbed by sandwave clearance: 15.74 km^2 (or 15,744,059 m^2) > Burial of 200 km of inter-array cables: 3.6 km^2 (or 3,600,000 m^2) total disturbance > Burial of 196 km of export cables: 3.52 km^2 (or 3,520,000 m^2) total disturbance > Seabed preparation area for foundations: 0.29km^2 (or 298,400 m^2) **Construction vessel anchoring:** > Jack-up Vessel (JUV) footprint: 0.55 km^2 (or 554,400m^2) > Vessel anchoring footprint: 1.52km^2 (or 1,516,320m^2) **Safety Zones:** > 500 m Safety Zones around construction activities = 0.79 km^2 per structure under construction at any one time > 50 m Safety Zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time > Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works > Construction buoyage deployed around the maximum extent of the array areas > Construction Duration: > Offshore construction over a 2-year period.	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential to restrict access to fishing grounds. The construction footprint comprises the full permanent seabed area of structures, scour protection, cable crossings and cable protection plus the temporary footprint of preparatory works including seabed preparation, sandwave clearance and boulder clearance. The impact area also incorporates Safety Zones around major activities. It is important to note that the temporal aspect of temporary works will not apply in full throughout the 2-year offshore construction phase, as activities will be completed sequentially.

Potential effect	Maximum design scenario assessed	Justification
	Total permanent reduction: > WTG footprint (jacket with gravity base), based on up to 79 x smaller WTG type: 0.28 km^2 (284,400 m^2) > Offshore substation footprint (monopile with gravity base) based on up to two offshore substations: 0.014 km^2 (or 14,000 m^2) > Maximum scour protection area for all foundations: 1.39 km^2 (or 1,395,268 m^2) > Maximum rock protection area for all cables: 0.49 km^2 (or 499,904 m^2) > Total area of seabed covered by cable crossings: 0.22 km^2 (or 222,700m^2)	
Impact 2: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	> As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential for displacement.
Impact 3: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	> See fish and shellfish ecology maximum design scenario presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.	The scenarios presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for the fish and shellfish chapter, rather than

Potential effect	Maximum design scenario assessed	Justification
		any one impact in particular.
Impact 4: Increased vessel traffic associated with VE within fishing grounds leading to interference with fishing activity	**Foundation installation:** > 38 vessels (1,359 round trips) **WTG installation:** > 10 vessels (71 round trips) **OSP installation:** > 4 vessels (8 round trips) **Offshore export cable installation:** > 12 vessels (166 round trips) **Inter-array cable installation:** > 12 vessels (166 round trips) > Total of 4,311 round trips across 2-year construction duration > Indicative peak number vessels on-site simultaneously: 35	The maximum number of WTGs and associated infrastructure will lead to the highest level of construction activities and therefore highest level of construction vessel round trips. The maximum number of vessels transits and the maximum duration of the construction will result in the greatest potential for interference.
Impact 5: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area	> As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential for additional steaming to alternative grounds.
Operation		
Impact 6: Reduction in access to, or exclusion from established fishing grounds	**Total permanent reduction:** > WTG footprint (jacket with gravity base), based on up to 79 x smaller WTG type: 0.28 km^2 (284,400 m^2) > Offshore substation footprint (monopile with gravity base) based on up to two offshore substations: 0.014 km^2 (or 14,000 m^2) > Maximum scour protection area for all foundations: 1.39 km^2 (or 1,395,193 m^2)	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential to restrict access to fishing grounds. It comprises the

Potential effect	Maximum design scenario assessed	Justification
	> Maximum rock protection area for all cables: 0.49 km^2 (or 499,904 m^2) > Total area of seabed covered by cable crossings: 0.50 km^2 (or 502,260 m^2) > Minimum spacing between WTGs: 830 m **Temporary reduction from maintenance activities:** > Number of major component replacements requiring JUVs: 284 over project lifetime > Seabed disturbance associated with inter-array cable repair/remediation over project lifetime: 0.28 km^2 (or 276,656 m^2) > Seabed disturbance associated with export cable repair/remediation over project lifetime: 0.15 km^2 (or 145,842m^2) **Safety Zones:** > 500 m safety zones around manned offshore platforms and temporary 500 m safety zones around WTGs and offshore platforms undergoing major maintenance. > Duration: Operational design life of approximately 40 years.	maximum footprint of infrastructure on the seabed plus maintenance activities throughout the operational and maintenance phase and associated temporary safety zones. The smaller the spacing between WTGs the greater the potential for vessels to have restricted access to the site. The assessment assumes that fishing will resume around and between infrastructure within VE where possible, with the exception of an assumed 50m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance or replacement. Furthermore, the individual decisions made by skippers with their own perception of risk will determine the likelihood of whether their fishing will resume within VE. Inclement weather will be a significant

Potential effect	Maximum design scenario assessed	Justification
		contributor to this risk perception. In addition, certain gear types including trawls will not be practically deployed within the operational array.
Impact 7: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	> As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above).
Impact 8: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	> See fish and shellfish ecology maximum design scenario presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.	The scenarios presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for fish and shellfish chapter, rather than any one impact in particular.
Impact 9: Increased vessel traffic associated with VE within fishing grounds	> 3 JUVs (9 annual round trips) > 2 Service Operation Vessels (SOVs) (52 annual round trips) > 9 Crew Transfer Vessels (CTVs) (1,642 annual round trips)	The maximum number of WTGs and associated infrastructure will lead to the highest level of operation

Potential effect	Maximum design scenario assessed	Justification
leading to interference with fishing activity	> 3 Heavy Lift Vessels (HLVs) (8 annual round trips) > 2 cable maintenance vessels (1 annual round trip) > 8 auxiliary vessels (64 annual round trips) > Total of 1,776 round trips > Indicative peak number vessels on-site simultaneously: 27 > Duration: Operational design life of 40 years.	and maintenance activities and therefore highest level of operation and maintenance vessel round trips.
Impact 10: Physical presence of infrastructure leading to gear snagging	> As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum potential for interactions between infrastructure and fishing gear.
Impact 11: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area	> As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential for additional steaming to alternative grounds.
Decommissioning		
Impact 12: Reduction in access to, or exclusion from established fishing grounds	> In the absence of detailed methodologies and schedules, decommissioning works and associated implications for commercial fisheries are considered analogous with those assessed for the construction phase.	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned. Decommissioning is likely to include removal of all of the WTG components and part of the foundations (those above seabed level) and removal of all

Potential effect	Maximum design scenario assessed	Justification
		other surface infrastructure. Some or all of the array cables, interconnector cables, and offshore export cables may be removed. Scour and cable protection will likely be left in situ.
Impact 13: Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	> As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.
Impact 14: Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	> See fish and shellfish ecology maximum design scenario presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.	The scenarios presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for fish and shellfish chapter, rather than any one impact in particular.
Impact 15: Increased vessel traffic	> As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	The scenario which represents the potential for the

Potential effect	Maximum design scenario assessed	Justification
associated with VE within fishing grounds leading to interference with fishing activity		maximum level of infrastructure to be decommissioned.
Impact 16: Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area	> As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.

8.9 MITIGATION

8.9.1 As part of the VE design process, a number of embedded mitigation measures have been included to reduce the potential for impacts on commercial fisheries. These mitigation measures will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process.

8.9.2 The mitigation in Table 8.9 are mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design or relevance to the topic, these include project design measures, compliance with elements of good practise and use of standard protocols. The assessment of impacts presented in Sections 8.10, 8.11 and 8.12 takes account of these measures. Where the assessment determined significant effects accounting for embedded mitigation, further measures may be required, which are presented as additional mitigation. Table 8.9 presents additional mitigation measures. These have typically been put forward where:

- An effect is significant in EIA terms, even with embedded mitigation, but additional mitigation measures are available to reduce the level of effect; or
- Mitigation has been proposed but has not yet been agreed with regulators, stakeholders, etc. or it is unproven.

Table 8.9: Mitigation relating to commercial fisheries.

Project phase	Mitigation measures
Project design	The Applicant has reduced the project design significantly in order to reduce the potential impacts as far as practicable. The area in which turbines are proposed to be installed has been reduced from the design proposed during the scoping phase. See Volume 6, Part 2, Chapter 1: Offshore Project Description and Volume 6, Part 1, Chapter 4: Site Selection and Alternatives.
Fisheries liaison	The Applicant is committed to ongoing liaison with fishermen throughout all stages of the project, based upon FLOWW (2014, 2015) guidance and the following: > Appointment of a company Fisheries Liaison Officer (FLO) to maintain effective communications between the project and fishermen; > Appropriate liaison with relevant fishing interests to ensure that they are fully informed of development planning and any offshore activities and works; > Timely issue of notifications including Notice to Mariners (NtMs), Kingfisher Bulletin notifications and other navigational warnings to the fishing community to provide advance warning of project activities and associated Safety Zones and advisory safety distances; > Prior to any survey, pre-construction, construction or major O&M works, it may be necessary to remove or re-locate static fishing gear (for example pots). Other users of the sea, including commercial fisheries, will be contacted in advance via Notices to Mariners (NtMs), to inform them of upcoming activities to allow time for removal or re-location of static gear to take place, this will be secured in the deemed Marine Licence; and > Development, prior to construction, of a Fisheries Liaison and Co-existence Plan (FLCP), setting out in detail the planned approach to fisheries liaison and means of delivering any other relevant mitigation measures. The plan will be secured in the deemed Marine Licences. An Outline FLCP is presented in Volume 9, Report 16 as part of the Application.

Project phase	Mitigation measures
Marking and lighting	The array construction and decommissioning area will be marked by buoyage as required by Trinity House, this will be secured in the deemed marine licence. The Applicant is committed to marking and lighting the project in accordance with relevant industry guidance and as advised by relevant stakeholders including the Maritime and Coastguard Agency (MCA), Civil Aviation Authority (CAA) and Trinity House, this will be secured in the deemed marine licence. The Applicant will also ensure all infrastructure associated with VE (including subsea cables) will be shown on appropriately scaled UKHO admiralty charts.
Cable Specification Installation Plan (CSIP)	Development of, and adherence to, a Cable Specification and Installation Plan (CSIP), relating to the offshore ECC, post consent. The CSIP will set out appropriate cable burial depth in accordance with industry good practice, minimising the risk of cable exposure. The CSIP will also ensure that cable crossings are appropriately designed to mitigate environmental effects, these crossings will be agreed with relevant parties in advance of CSIP submission. The CSIP will be conditioned in the deemed Marine Licence. An Outline CSIP has been provided as part of this DCO Application (Volume 9, Report 12).
Cable Burial Risk Assessment (CBRA)	A detailed CBRA to enable informed judgements regarding burial depth to optimise the chance of cables remaining buried whilst seeking to limit the amount of sediment disturbance to that which is necessary. An Outline CBRA is provided within Volume 9, Report 9),
Safety zones	The Applicant will apply for safety zones post consent. Safety zones of up to 500m will be sought during construction, maintenance and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning phases. Such impacts may include partially installed

Project phase	Mitigation measures
	structures or cables, extinguished navigation lights or other unmarked hazards.
Project vessels	Marine coordination will be implemented to manage movement of project vessels. A guard vessel(s) will be deployed where deemed appropriate by risk assessment.

8.10 ENVIRONMENTAL ASSESSMENT: CONSTRUCTION PHASE

8.10.1 A description of the potential effects on commercial fisheries receptors caused by each identified impact is given below.

8.10.2 The current project design includes an offshore ECC to shore to facilitate power export from the array areas to the national electricity grid. Under the Offshore Transmissions Network Review (OTNR) options, work to consider the potential for an offshore connection has been commenced but is not well advanced. An offshore connection is not a viable or deliverable alternative at this time. However, in order to allow the identification of impacts that be relevant were this to become an option, the assessment for each potential impact has been split into "Array Area Impacts" and "Offshore Export Cable Corridor Impacts." Further details on the OTNR process are outlined in Volume 9, Report 29: Offshore Connection Scenario.

IMPACT 1: PRE-CONSTRUCTION AND CONSTRUCTION ACTIVITIES AND PHYSICAL PRESENCE OF CONSTRUCTED WIND FARM INFRASTRUCTURE LEADING TO REDUCTION IN ACCESS TO, OR EXCLUSION FROM ESTABLISHED FISHING GROUNDS

ARRAY AREA IMPACTS

8.10.3 During construction of VE, commercial fisheries will be prevented from fishing where construction activities are taking place (i.e. where construction vessels and partially installed infrastructure are present, and within the footprint of Safety Zones of 500 m diameter, which will be sought around significant infrastructure under construction). The total offshore construction duration will be approximately two years, with some pre-construction preparatory survey and seabed clearance/preparation works being undertaken prior to the main construction works, and with a number/range of construction activities being undertaken simultaneously across the site. As noted in Table 8.9 the area in which construction will take place has been considerably reduced in response to stakeholder feedback received during the scoping phase, see Volume 6, Part 1, Chapter 4: Site Selection and Alternatives.

MAGNITUDE OF IMPACT

8.10.4 This impact will lead to a localised reduction of access to fishing grounds and the fish and shellfish resources within these grounds for a range of fishing opportunities during the period of construction, which will directly affect fleets over a short-term duration (e.g., less than 2-3 years). The impact is predicted to be intermittent with localised exclusion surrounding construction activities.

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

8.10.6 UK potting fishery: the UK potting fleet targets whelk and other shellfish species across a wide area from inshore grounds extending out into and beyond the array areas. VMS data indicates that vessels over 15 m length, understood to be primarily targeting whelk, are active in the array areas and across grounds to the north and south of VE. An average annual first sales value of £179,000 landings is taken from ICES rectangle 32F2 by UK potting vessels. From the wider study area inclusive of the four ICES rectangles, the equivalent value is £1.3 million. Noting that the array areas overlap with approximately 1.03% of this study area, this equates to a pro-rata value of approximately £13,700 (based on uniform landings across the entire study area). While such a simplistic calculation brings higher level of uncertainty to the resulting figure, it does demonstrate the potential opportunity within the array areas. During construction, potting vessels will be required to remove pots from areas under construction and either relocate or bring to shore depending on available grounds and fishing preferences. Potting fishermen will therefore experience loss of earnings for the time taken to relocate gear, and (potentially) a loss of earnings associated with not being able to fish the specific grounds under construction (e.g., if alternative grounds are either not available, or not as productive). Potting typically involves a number of fleets of pots being deployed across a range of areas, and while it is highly unlikely that 100% of pots deployed by a single vessel will be impacted at any one time, it is understood that specific potting grounds may be targeted by specific operators. In this case, individual fishing businesses that routinely target the site will be impacted to a higher extent and this is accounted for within the assessment.

8.10.7 UK netting fishery: the UK netting fleet targets bass, sole, thornback ray and variety of other demersal species using fixed nets. An average annual first sales value of £350 landings is taken specifically within ICES rectangle 32F2 by English netting vessels. Limited spatial data is available for netting activity, though the majority of netting vessels are under 10 m length and expected to predominantly operate in waters inshore of the VE array areas.

8.10.8 UK beam trawl fishery: UK beam trawlers target plaice, sole and other demersal species across a wide area from inshore grounds extending out into and beyond the array areas. Almost all landings by UK beam trawlers in the study area are made by vessels over 10 m length. VMS data indicates that vessels over 15m length are active throughout the study area, with key grounds indicated to the north and east of the VE array areas and limited active beam trawling within the array areas. An average annual first sales value of £157,000 landings is taken from ICES rectangle 32F2 by UK beam trawlers. From the wider study area inclusive of the four ICES rectangles, the equivalent value is £470,000. Noting that the array areas overlap with approximately 1.03% of this study area, this equates to a pro-rata value of approximately £4,900 (based on uniform landings across the entire study area). While such a simplistic calculation brings higher level of uncertainty to the resulting figure, it does demonstrate the potential opportunity within the array areas.

8.10.9 UK demersal otter trawl fishery: UK otter trawlers target sole and other demersal species across a wide area from inshore grounds extending out into and beyond the array areas. An average annual first sales value of £55,000 landings is taken from ICES rectangle 32F2 by UK otter trawlers. All landings by UK otter trawlers from ICES rectangle 32F2 are made by vessels over 10 m length based on MMO landings statistics. VMS data indicates that vessels over 15 m length are active across grounds throughout the study area, predominantly located inside of 12 NM, with no indication of active otter trawling in the VE array areas.

8.10.10 UK demersal seine fishery: The UK (Scottish and English-registered vessels) demersal seine fleet target mullet, whiting, mackerel and squid. An average annual first sales value of £116,000 is taken specifically within ICES rectangle 32F2 by the demersal seine fishery. No landings from this fishery were recorded in 2016 and a substantial increase in landings value was recorded in 2020, demonstrating the recent expansion of the UK demersal seine fishery, which is reported to have become more active across the English Channel and southern North Sea, with fleet size growing from six vessels prior to 2018 to around 11 vessels in 2022 (Defra, 2022). Limited spatial data is available for demersal seine activity, though all vessels are over 10 m length (reported to be typically 24 m to 40 m in length) and expected to predominantly operate in waters further offshore, potentially in and around the VE array areas.

8.10.11 UK hooked gear fishery: the UK hooked gear fleet targets bass, sole, thornback ray and variety of other demersal species. An average annual first sales value of £9,000 landings is taken specifically within ICES rectangle 32F2 by English vessels. Limited spatial data is available for hooked gear activity, though the majority of netting vessels are under 10 m length and expected to predominantly operate in waters inshore of the VE array areas.

8.10.12 Dutch beam trawl fishery: Dutch beam trawlers target plaice and sole across wide areas of the southern North Sea, including across the study area. VMS data indicates that EU-registered beam trawlers are likely to be active within the VE array areas, though that more actively targeted fishing grounds are located to the south and east. An annual average landed weight of 8,900 tonnes is taken specifically within ICES rectangle 32F2 by Dutch beam trawlers (compared to the average of 47 tonnes landed by UK beam trawlers). Based on average first sales prices, landings of sole from ICES rectangle 32F2 by Dutch beam trawlers in 2016 would have been valued at approximately €45 million, and landings of plaice at €7 million.

8.10.13 Belgian beam trawl fishery: Belgian beam trawlers are understood to operate similarly to Dutch beam trawlers (see paragraph above), targeting fishing grounds throughout the southern North Sea. An annual average landed weight of 548 tonnes is taken specifically within ICES rectangle 32F2 by Belgian beam trawlers, indicating substantially less activity than for the Dutch fleet.

8.10.14 Dutch, French and Belgian demersal otter trawl fishery: EU-registered demersal otter trawlers active in the study area target a variety of species including whiting, mullets and gurnards. VMS data indicates that EU-registered otter trawlers are active throughout the southern North Sea, with potential to be active across the VE array areas. The data indicates that key fishing grounds are located to the south of the study area. An annual average landed weight of 208 tonnes is taken specifically within ICES rectangle 32F2 by Dutch otter trawlers, 163 tonnes by French trawlers and 13 tonnes by Belgian trawlers.

8.10.15 Dutch and French pelagic trawl fishery: Any activity by pelagic vessels within the array areas is highly likely to be a sporadic, transitory event, as corroborated by EU landings statistics, which show occasional large volumes of landings of herring, horse mackerel and mackerel by Dutch and French pelagic trawlers. Highly mobile pelagic species, that move in shoals and are not associated with specific seabed habitats, are assumed to be available to catch across large areas i.e., if a shoal of mackerel cannot be caught within the VE array areas, this shoal is expected to move to an area where they can be caught. Therefore, while the access to the water column within the VE array areas may be affected; the opportunity to catch pelagic fish is not lost.

8.10.16 The impact is predicted to be of regional spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **medium adverse** for UK potting and Dutch beam trawl fleets, **negligible adverse** for EU pelagic fleets, and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.10.17 The UK potting, gear with hooks and netting fleets are typically <15 m in length and operate across more distinct areas of ground, typically 0 to 12 NM from shore, but (relevant for potting in this area) also extending beyond 12 NM, in areas that are already heavily exploited and are therefore more sensitive to disruption. The UK potting fleet is deemed to be of medium vulnerability and medium recoverability across the VE study area, though it is noted that the potting vessels active in the VE array areas and targeting whelk are expected to operate across a number of fishing grounds with their activity not restricted to the VE array areas. Taking a precautionary approach, the sensitivity of the receptor is therefore, considered to be **medium**. The hooked gear and netting fleets typically operate inshore of the array areas and on this basis are deemed to be of low vulnerability and medium recoverability, with receptor sensitivity considered to be **low**.

8.10.18 The other mobile fleets including beam trawl, demersal otter trawl, pelagic trawl targeting fish and shellfish resources across the VE study area are typically >15 m in length and operate across large areas of the North Sea, as well as waters around the UK. Given adequate notification, it is expected that these vessels will be in a position to avoid construction areas. The beam trawl, demersal otter trawl and demersal seine fleets are considered to have a medium to large operational range; medium to high levels of alternative fishing grounds; and are deemed to be of low vulnerability and high recoverability. The sensitivity of these receptors is therefore, considered to be **low**. All pelagic gear fleets are considered to have an extensive operational range, be highly adaptive and resilient to change. The sensitivity of the pelagic fleets is considered to be **negligible**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.19 Mitigation measures include advance notification of planned construction activities to fishermen and ongoing liaison throughout construction. Taking account of these measures, the residual effect on each fishery is set out immediately below, noting that the effect in all cases will be direct and temporary.

8.10.20 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is medium. The effect is of **moderate adverse** significance, which is potentially significant in EIA terms. In response to this, and specific to the UK potting fleet where there is a significant impact, further mitigation has been identified and is presented below. Upon application of this additional mitigation, the residual effect is reduced to **minor adverse** significance, which is not significant in EIA terms.

8.10.21 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.22 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.23 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.24 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.25 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.26 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low-medium. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.27 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.28 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.29 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

FURTHER MITIGATION

8.10.30 UK potting fishery: Specific to the UK potting fleet where there is a significant impact, the outline FLCP (see Section 8.8) will explore options to encourage co-existence and further mitigate the effect, including cooperation agreements and associated payments, alongside mitigation such as (but not limited to):

- Fisheries resource or habitat enhancement schemes; and
- Fisheries community support or 'adaptation' scheme, which could support specific projects relevant to the local fishing community.

8.10.31 Following PEIR, suitable and effective mitigation options have been discussed and with the Commercial Fisheries Working Group. Discussion of preferred mitigation approaches is ongoing with confirmed approaches to be presented in the FLCP.

8.10.32 With respect to any cooperation agreements and associated payments, the procedures as outlined in the FLOWW guidance documents (2014 and 2015), will be followed.).

8.10.33 Through the application of the FLCP, together with justifiable disturbance payments where relevant, the residual effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

8.10.34 Fishing activity will be locally and temporarily excluded at the location of construction owing to the presence of construction vessels, construction operations and the need to observe The Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS).

MAGNITUDE OF IMPACT

8.10.35 This impact will lead to a loss of access to fishing grounds and the fish and shellfish resources within these grounds for a range of fishing opportunities during the construction activities, which will directly affect various fishing fleets over a short-term duration. The impact is predicted to be intermittent with localised exclusion surrounding construction activities.

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

8.10.37 UK potting fishery: the UK potting fleet targets whelk, lobster and brown crab across inshore grounds that include the nearshore portion of the offshore ECC. An average annual first sales value of £179,000 landings is taken from ICES rectangle 32F2 and £487,000 from ICES rectangle 32F1 by UK potting vessels. From the wider study area inclusive of the four ICES rectangles, the equivalent value is £1.3 million. Noting that the offshore ECC overlaps with approximately 1.36% of this study area, this equates to a pro-rata value of approximately £18,000 (based on uniform landings across the entire study area). While such a simplistic calculation brings higher levels of uncertainty to the resulting figure, it does demonstrate the potential opportunity within the offshore ECC. As described for the array areas, during construction, potting vessels will be required to remove pots from areas under construction and either relocate or bring to shore depending on available grounds and fishing preferences. Potting fishermen will therefore experience loss of earnings for the time taken to relocate gear, and (potentially) a loss of earnings associated with not being able to fish the specific grounds under construction (e.g., if alternative grounds are either not available, or not as productive). Potting typically involves a number of fleets of pots being deployed across a range of areas, and while it is highly unlikely that 100% of pots deployed by a single vessel will be impacted at any one time, it is understood that specific potting grounds may be targeted by specific operators. In this case, individual fishing businesses that routinely target the site will be impacted to a higher extent and this is accounted for within the assessment.

8.10.38 UK netting fishery: the UK netting fleet targets bass, sole, thornback ray and variety of other demersal species using fixed nets. An average annual first sales value of £420,000 is taken specifically within ICES rectangle 32F1 and £350 within ICES rectangle 32F2 by English netting vessels. From the wider study area inclusive of the four ICES rectangles, the equivalent value is approximately £1 million. Noting that the offshore ECC overlaps with approximately 1.36% of this study area, this equates to a pro-rata value of approximately £14,000 (based on uniform landings across the entire study area). While such a simplistic calculation brings a higher level of uncertainty to the resulting figure, it does demonstrate the potential opportunity within the offshore ECC. Limited spatial data is available for netting activity, though the majority of netting vessels are under 10 m length and expected to predominantly operate inside of 6 NM. IFCA fisheries surveillance data indicates netting activity within the offshore ECC and net fishing grounds have been identified within the offshore ECC during stakeholder engagement.

8.10.39 UK hooked gear fishery: the UK hooked gear fleet targets bass, sole, thornback ray and variety of other demersal species. An average annual first sales value of £45,000 is taken specifically within ICES rectangle 32F1 and £9,400 within ICES rectangle 32F2 by English vessels. Limited spatial data is available for hooked gear activity, though the majority of vessels are under 10 m length and expected to predominantly operate in waters inside of 6 NM.

8.10.40 UK beam trawl fishery: UK beam trawlers target plaice, sole and other demersal species across a wide area from inshore grounds extending out into and beyond the array areas. Almost all landings by UK beam trawlers in the study area are made by vessels over 10 m length. VMS data indicates that vessels over 15 m length are active throughout the study area, with key grounds indicated to the north and south of the offshore ECC and very limited active UK beam trawling within the offshore ECC. An average annual first sales value of £157,000 landings is taken from ICES rectangle 32F2, and £64,000 from rectangle 32F1 by UK beam trawlers.

8.10.41 UK demersal otter trawl fishery: UK otter trawlers target sole and other demersal species across a wide area from inshore grounds extending out into and beyond the array areas. An average annual first sales value of £55,000 landings is taken from ICES rectangle 32F2 and £436,000 from rectangle 32F1 by UK otter trawlers. Landings by UK otter trawlers from these two ICES rectangles are made by vessels both over and under 10m length. VMS data indicates that vessels over 15 m length are active across grounds throughout the study area, predominantly located inside of 12 NM, with indication of limited otter trawling by these larger vessels in the offshore ECC.

8.10.42 UK demersal seine fishery: The UK (Scottish and English-registered vessels) demersal seine fleet target mullet, whiting, mackerel and squid. An average annual first sales value of £77,000 is taken specifically within ICES rectangle 32F2 by the demersal seine fishery. In ICES rectangle 32F1, no landings by demersal seine were made between 2016 and 2018, with annual average landings equating to £10,400 across 2019 to 2021. Limited spatial data is available for demersal seine activity, though all vessels are over 10 m length (reported to be typically 24 m to 40 m in length) and expected to predominantly operate in waters further offshore, potentially in the eastern most extent of the offshore ECC.

8.10.43 Dutch beam trawl fishery: Dutch beam trawlers target plaice and sole across wide areas of the southern North Sea, including across the study area. VMS data indicates that EU-registered beam trawlers are most active outside of the 6 NM limit, with Dutch beam trawlers potentially active in the easternmost extent of the offshore ECC. An annual average landed weight of 8,900 tonnes is taken specifically within ICES rectangle 32F2 by Dutch beam trawlers (compared to the average of 47 tonnes landed by UK beam trawlers). Further inshore, an annual average landed weight of 560 tonnes is taken specifically within ICES rectangle 32F1, again indicating relatively low levels of Dutch beam trawl activity across much of the offshore ECC.

8.10.44 Belgian beam trawl fishery: Belgian beam trawlers are understood to operate similarly to Dutch beam trawlers (see paragraph above), targeting fishing grounds throughout the southern North Sea. An annual average landed weight of 548 tonnes is taken specifically within ICES rectangle 32F2 and 320 tonnes from rectangle 32F1 by Belgian beam trawlers.

8.10.45 Dutch, French and Belgian demersal otter trawl fishery: EU-registered demersal otter trawlers active in the study area target a variety of species including whiting, mullets and gurnards. VMS data indicates that EU-registered otter trawlers are active throughout the southern North Sea, with potential to be active across the offshore ECC. The data indicates that key fishing grounds are located to the south of the study area. An annual average landed weight of 208 tonnes is taken specifically within ICES rectangle 32F2 by Dutch otter trawlers, 163 tonnes by French trawlers and 13 tonnes by Belgian trawlers. Within ICES rectangle 32F1, further inshore, equivalent values are 5 tonnes by Dutch trawlers, 30 tonnes by French trawlers and 150 tonnes by Belgian trawlers.

8.10.46 Dutch and French pelagic trawl fishery: Any activity by pelagic vessels within the array areas is highly likely to be a sporadic, transitory event, as corroborated by EU landings statistics, which show occasional large volumes of landings of herring, horse mackerel and mackerel by Dutch and French pelagic trawlers. Highly mobile pelagic species, that move in shoals and are not associated with specific seabed habitats, are assumed to be available to catch across large areas i.e., if a shoal of mackerel cannot be caught within the offshore ECC, this shoal is expected to move to an area where they can be caught. Therefore, while the access to the water column within the offshore ECC may be affected; the opportunity to catch pelagic fish is not lost.

8.10.47 The impact is predicted to be of regional spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **medium adverse** for UK potting, UK netting and UK hooked gear fleets, **negligible adverse** for EU pelagic fleets, and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.10.48 The sensitivity of receptors is broadly as described in paragraphs 8.10.17 and 8.10.18.

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

8.10.50 The mobile fleets targeting pelagic fisheries are considered to have very high levels of alternative fishing grounds; are deemed to be of low vulnerability, high recoverability and low value. The sensitivity of these receptors is therefore, considered to be **negligible**.

8.10.51 The UK potting fleet are deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**. The UK netting fleet and hooked gear fleet, understood to be more active inside of the 6 NM limit, are deemed to be of medium vulnerability, medium recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be **medium**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.52 Mitigation measures include advance notification of planned construction activities to fishermen and ongoing liaison throughout construction. Taking account of these measures, the residual effect on each fishery is set out immediately below, noting that the effect in all cases will be direct and temporary.

8.10.53 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is medium. The effect is of **moderate adverse** significance, which is potentially significant in EIA terms. In response to this, and specific to the UK potting fleet where there is a significant impact, further mitigation has been identified and is presented below. Upon application of this additional mitigation, the residual effect is reduced to **minor adverse** significance, which is not significant in EIA terms.

8.10.54 UK netting and hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is medium. The effect is of **moderate adverse** significance, which is potentially significant in EIA terms. In response to this, and specific to the UK netting and hooked gear fleet where there is a significant impact, further mitigation has been identified and is presented below. Upon application of this additional mitigation, the residual effect is reduced to **minor adverse** significance, which is not significant in EIA terms.

8.10.55 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.56 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.57 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.58 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is medium. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.59 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.60 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.61 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

FURTHER MITIGATION

8.10.62 UK potting and netting fishery: Specific to the UK potting, netting and hooked gear fleets where there is a significant impact, the outline FLCP (see Section 8.9) will explore options to encourage co-existence and further mitigate the effect, including cooperation agreements and associated payments, alongside mitigation such as (but not limited to):

- Fisheries resource or habitat enhancement schemes; and
- Fisheries community support or 'adaptation' scheme, which could support specific projects relevant to the local fishing community.

8.10.63 Following PEIR, suitable and effective mitigation options have been discussed and with the Commercial Fisheries Working Group. Discussion of preferred mitigation approaches is ongoing with confirmed approaches to be presented in the FLCP.

8.10.64 With respect to any cooperation agreements and associated payments, the procedures as outlined in the FLOWW guidance documents (2014 and 2015), will be followed.).

8.10.65 Through the application of the FLCP, together with justifiable disturbance payments where relevant, the residual effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

IMPACT 2: DISPLACEMENT LEADING TO GEAR CONFLICT AND INCREASED FISHING PRESSURE ON ADJACENT GROUNDS

ARRAY AREA IMPACTS

8.10.66 Localised exclusion from fishing grounds during construction in the VE array areas may lead to temporary increases in fishing effort in other areas that may already be exploited thereby leading to gear conflict and increased fishing pressure on adjacent grounds.

8.10.67 In terms of the area impacted by construction activities within the VE array areas, in total a maximum of 21.7 km^2 of seabed will be temporarily disturbed during construction, with a permanent reduction of approximately 1.4 km^2 of seabed during construction. In addition, there will be a 500 m safety distance around infrastructure under construction (equating to 0.79 km^2 per structure) and 500 m safe passing distance around construction vessels (equating to 0.79 km^2 per vessel).

MAGNITUDE OF IMPACT

8.10.68 The impact is predicted to be of regional spatial extent, short-term duration and intermittent. The impact is of relevance to national and international fishing fleets and is described below on a fishery-by-fishery basis.

8.10.69 UK potting fishery: Conflict over diminished grounds may occur if displaced vessels operating mobile gear (e.g., beam trawl) explore grounds traditionally fished by potters; and/or displaced potting gear is relocated into actively fished potting grounds. Displacement of mobile gear may therefore increase the risk of interaction with potting gear. For mobile gear, displacement could be expected to be focused on alternative established grounds both in the vicinity of VE and throughout the southern North Sea, thereby reducing displacement onto potting grounds. However, it is understood that gear conflict between mobile and potting gear has the potential to occur and impact fishing patterns (e.g., seasonally when pots are moved out of specific areas in anticipation of effort from mobile gear vessels).

8.10.70 When considering the impact of potters being displaced from the array areas into grounds already targeted by potters two scenarios are feasible:

- Alternative fishing grounds are available to relocate gear, in which case gear conflict and displacement effects will be low; or
- Alternative fishing grounds are not available as adjacent areas are already being fished by potters, in which case the gear already on the ground limits the level of displacement. While there remains potential for gear conflicts and increased fishing pressure to arise, appropriately mitigated exclusion impacts will limit this.

8.10.71 The Applicant commits to ensuring that exclusion impacts are appropriately mitigated to minimise the displacement effect e.g., such that displaced pots are not actively deployed during the period of mitigation (e.g., left open, or stored on land), or if deployed, they are done so in a matter that avoids or minimises gear interaction.

8.10.72 On balance, the displacement effect to potters targeting the VE array areas is considered likely to have a lower magnitude of impact than the exclusion impact causing the displacement. Taking all of these aspects into consideration, the magnitude of the displacement impact is assessed to be **low adverse** for UK potters.

8.10.73 UK netting fishery: Displacement from VE array areas is not expected to affect the netting fishery since it is understood to predominantly take place in waters inside of the 6NM limit.

8.10.74 UK beam trawl fishery: VMS data indicate that there are large areas surrounding the VE array areas that are targeted by the same beam trawl gear types that may occasionally be used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.75 UK demersal otter trawl fishery: VMS data indicate that there are large areas surrounding the VE array areas that are targeted by the same otter trawl gear types that may occasionally be used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.76 UK demersal seine fishery: It is understood that large areas surrounding the VE array areas are targeted by the same seine gear types that may occasionally be used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.77 UK hooked gear fishery: Displacement from VE array areas is not expected to affect the hooked gear fishery since it is understood to predominantly take place in waters inside of the 6NM limit.

8.10.78 Dutch beam trawl fishery: VMS data indicate that there are extensive areas surrounding the VE array areas that are targeted by the same beam trawl gear types used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.79 Belgian beam trawl fishery: VMS data indicate that there are extensive areas surrounding the VE array areas that are targeted by the same beam trawl gear types used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.80 Dutch, French and Belgian demersal otter trawl fishery: VMS data indicate that there are large areas surrounding the VE array areas that are targeted by the same otter trawl gear types that may occasionally be used within the array areas. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.81 Dutch and French pelagic trawl fishery: Pelagic trawlers that may very occasionally operate within the VE array areas, fish throughout the southern North Sea and beyond, across a range of established fishing grounds. Displacement is not expected to affect mobile fleets.

8.10.82 The impact is predicted to be of regional spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **negligible adverse** for EU pelagic fleets and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.10.83 All mobile commercial fisheries fleets, and the netting and hooked gear fleets (which predominantly operate inshore of the array areas), operating within the VE array areas are considered to have high availability of alternative fishing grounds (including current focus of effort), and an operational range that is not limited to the VE array areas. All mobile fleets are deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of all mobile fleets and the UK netting and hooked gear fleets is therefore, considered to be **low**. Given the very high availability of alternative fishing grounds and sporadic/transient nature of pelagic trawling in the study area, the sensitivity of EU pelagic trawl fleets is considered to be **negligible**.

8.10.84 The UK potting fleet operates across large areas inshore from and within the VE array areas. This form of static fishing gear is considered to have a high vulnerability to gear conflict interactions since it is left unattended on the seabed. It is expected that any displacement from mobile vessels may lead to exploring other fishing grounds outside the VE array areas, which includes areas currently targeted by potters. The UK potting fleet are, therefore, deemed to be of high vulnerability, with medium recoverability and medium value. The sensitivity of the UK potting fleet is therefore, considered to be **medium**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.85 Mitigation measures include advance notification of planned construction activities to fishermen and ongoing liaison throughout construction. Taking account of these measures, the residual effect on each fishery is set out immediately below.

8.10.86 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.87 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.88 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.89 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.90 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.91 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.92 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.93 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.94 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.95 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

8.10.96 Exclusion from fishing grounds during construction in the offshore cable corridor may lead to temporary increases in fishing effort in other areas that may already be exploited, thereby leading to gear conflict.

MAGNITUDE OF IMPACT

8.10.97 The impact is predicted to be of regional spatial extent, short-term duration and intermittent. The impact is of relevance to national and international fishing fleets and is described below on a fishery-by-fishery basis.

8.10.98 UK potting fishery: Conflict over diminished grounds may occur if displaced vessels operating mobile gear (e.g., beam trawl or otter trawl) explore grounds traditionally fished by potters; and/or displaced potting gear is relocated into actively fished potting grounds. Displacement of mobile gear may therefore increase the risk of interaction with potting gear.

8.10.99 For mobile gear, displacement could be expected to be focused on alternative established grounds both in the vicinity of VE and throughout the southern North Sea, thereby reducing displacement onto potting grounds. However, it is understood that gear conflict between mobile and potting gear has the potential to occur and impact fishing patterns (e.g., seasonally when pots are moved out of specific areas in anticipation of effort from mobile gear vessels).

8.10.100 When considering the impact of potters being displaced from the offshore ECC into grounds already targeted by potters two scenarios are feasible:

- Alternative fishing grounds are available to relocate gear, in which case gear conflict and displacement effects will be low; or
- Alternative fishing grounds are not available as adjacent areas are already being fished by potters, in which case the gear already on the ground limits the level of displacement. While there remains potential for gear conflicts and increased fishing pressure to arise, appropriately mitigated exclusion impacts will limit this.

8.10.101 The Applicant commits to ensuring that exclusion impacts are appropriately mitigated to minimise the displacement effect e.g., such that displaced pots are not actively deployed during the period of mitigation (e.g., left open, or stored on land), or if deployed, they are done so in a matter that avoids or minimises gear interaction.

8.10.102 On balance, the displacement effect to potters targeting the offshore ECC is considered likely to have a lower magnitude of impact than the exclusion impact causing the displacement. Taking all of these aspects into consideration, the magnitude of the displacement impact is assessed to be **low adverse** for UK potters.

8.10.103 UK netting fishery: Displacement from VE offshore ECC is expected to have some effect on the netting fishery. Fixed nets are considered to be static gear since they remain in situ for a period of time, and there is some potential for vessels being required to temporarily relocate gear to other grounds during the construction phase. Netting activity is understood to take place across a wide inshore area. On balance, the displacement effect to netters targeting the offshore ECC is considered likely to have a lower magnitude of impact than the exclusion impact causing the displacement. The magnitude of the displacement impact is assessed to be **low adverse** for the UK netting fishery.

8.10.104 UK beam trawl fishery: VMS data indicate that there are large areas surrounding VE that are targeted by the same beam trawl gear types that may occasionally be used within the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.105 UK demersal otter trawl fishery: VMS data indicate that there are large areas surrounding VE that are targeted by the same otter trawl gear types that may occasionally be used within the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.106 UK demersal seine fishery: It is understood that large areas surrounding the VE are targeted by the same seine gear types that may occasionally be used within the easternmost extent of the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.107 UK hooked gear fishery: Hooked gear includes longlines and handlines. Fishing with hooks is understood to take place across a wide inshore area. On balance, the displacement effect to the hooked gear fishery targeting the offshore ECC is considered likely to have a lower magnitude of impact than the exclusion impact causing the displacement. The magnitude of the displacement impact is assessed to be **low adverse** for the UK hooked gear fishery.

8.10.108 Dutch beam trawl fishery: VMS data indicate that there are large areas surrounding VE that are targeted by the same beam trawl gear types that may occasionally be used within the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.109 Belgian beam trawl fishery: VMS data indicate that there are large areas surrounding VE that are targeted by the same beam trawl gear types that may occasionally be used within the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.110 Dutch, French and Belgian demersal otter trawl fishery: VMS data indicate that there are large areas surrounding VE that are targeted by the same otter trawl gear types that may occasionally be used within the offshore ECC. Whether or not displaced vessels are likely to disperse into these areas depends on the normal fishing patterns of the fleets targeting the area. Displacement is not expected to affect mobile fleets.

8.10.111 Dutch and French pelagic trawl fishery: Pelagic trawlers that may very occasionally operate within the easternmost extent of the offshore ECC, fish throughout the southern North Sea and beyond, across a range of established fishing grounds. Displacement is not expected to affect mobile fleets.

8.10.112 The impact is predicted to be of regional spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **negligible adverse** for EU pelagic fleets and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.10.113 The sensitivity of the fishing fleets is as assessed in paragraphs 8.10.49 to 8.10.51 above, and is **medium** for the UK potting, netting and hooked gear fleets, **negligible** for EU pelagic fleets, and **low** for all other mobile fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.114 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.115 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.116 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.117 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.118 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.119 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.120 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.121 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.122 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.123 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

IMPACT 3: CONSTRUCTION ACTIVITIES LEADING TO DISTURBANCE OF COMMERCIALLY IMPORTANT FISH AND SHELLFISH RESOURCES LEADING TO DISPLACEMENT OR DISRUPTION OF FISHING ACTIVITY

8.10.124 Temporary displacement due to noise and seabed disturbances during construction activities may decrease or displace commercially important fish and shellfish populations from the area. This section assesses the potential temporary subsequent impact for the owners of fishing vessels, where commercially important stocks may be disturbed or displaced to a point where normal fishing practices will be affected.

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.10.125 Detailed assessments of the following potential construction impacts have been undertaken in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology:

- mortality, injury, behavioural changes and auditory masking arising from noise and vibration;
- temporary increases in suspended sediment concentrations (SSC) and sediment deposition;
- direct and indirect seabed disturbances leading to the release of sediment contaminants;
- direct damage and disturbance from construction operations;
- accidental pollution events; and
- temporary habitat loss and disturbance.

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

8.10.127 Details of the fish and shellfish ecology assessment are summarised in Table 8.10; justifications for this assessment will not be repeated in this chapter. Evidence, modelling and justifications for these assessments are provided in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.

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

Table 8.10: Significance of effects of construction impacts on fish and shellfish species relevant to commercial fisheries receptors.

Potential Impact	Magnitude	Sensitivity	Significance of Effect
Mortality, injury, behavioural changes and auditory masking arising from noise and vibration	Negligible to Low	Low to Medium	Minor adverse
Temporary increases in SSC and sediment deposition	Negligible to Low	Low to Medium	Minor adverse
Direct and indirect seabed disturbances leading to the release of sediment contaminants	Negligible to Low	Medium	Minor adverse
Direct damage and disturbance from construction operations	Negligible to Low	Medium	Negligible to Minor adverse
Accidental pollution events	Low	Medium	Minor adverse
Temporary habitat loss and disturbance	Negligible to Low	Low to Medium	Negligible Minor adverse

SENSITIVITY OF RECEPTOR

8.10.129 There is potential for fishing grounds beyond the immediate construction activities to be affected by these impacts. Exposure to the impact is likely and commercial fleets targeting key species will be affected, including those targeting shellfish species.

8.10.130 There is potential for shellfish grounds beyond the immediate construction activities to be affected by increased suspended sediment and sediment deposition, impacting potting fleets. The potting fleet is deemed to be of medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

8.10.131 There is potential for herring to be impacted by underwater noise generated during the construction phase, associated with pile installation. It is predicted that herring may be impacted up to 39 km from the noise source, with potential impacts including mortality, injury and behavioural change across varying impact ranges. The EU pelagic trawl fleet that may target herring are active across extensive fishing grounds throughout the southern North Sea and beyond and are deemed to be of low vulnerability and high recoverability. The sensitivity of the receptor is therefore considered to be **low**.

8.10.132 Due to the range of alternative areas targeted and the distribution of key commercial species throughout the southern North Sea, all other fleets are deemed to be of low vulnerability and high recoverability. The sensitivity is considered to be **low** for all other mobile fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.133 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.134 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.135 All other fleets: the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.10.136 Detailed assessments of potential construction impacts have been undertaken in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology. As described above for Array Area Impacts, with respect to the magnitude of this impact on commercial fisheries, the overall significance of the effect on fish and shellfish species is considered and the assessment outcomes for the Offshore ECC are as per those presented in Table 8.10 for the Array Areas. The magnitude is therefore considered to be **low adverse** for all species and all potential impacts.

SENSITIVITY OF RECEPTOR

8.10.137 The sensitivity of receptors is as described above in paragraphs 8.10.129 to 8.10.132 and is **medium** for the potting fleet and **low** for all other fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.138 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.139 All other fleets: the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

IMPACT 4: INCREASED VESSEL TRAFFIC ASSOCIATED WITH VE WITHIN FISHING GROUNDS LEADING TO INTERFERENCE WITH FISHING ACTIVITY

8.10.140 This assessment focuses on the potential impact of VE related vessel traffic and changes to shipping patterns as a result of navigational channels leading to interference with fishing activity (i.e., reduced access) during construction.

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.10.141 Vessel movements (i.e., construction vessels transiting to and from areas undergoing construction works) related to the construction of VE will add to the existing level of shipping activity in the area (see Volume 6, Part 2, Chapter 9: Shipping and Navigation for a full assessment of additional vessel movements).

8.10.142 Continuous liaison with the fishing industry will be undertaken including location and duration of construction activities; further details will be provided in an outline FLCP.

8.10.143 All fishing fleets are considered to be able to avoid vessel movements related to VE construction. The impact is predicted to be of regional spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **low adverse** for all fisheries.

SENSITIVITY OF RECEPTOR

8.10.144 Construction traffic is likely to constrain potting and netting activity across established construction supply routes due to the vulnerability of the marker buoys to the propellers of passing construction vessels. It is noted that shipping routes do currently exist in the vicinity of VE, and that the construction vessels are likely to follow these existing routes where possible and avoid any observed static gear markers. The UK potting and netting fisheries are deemed to be of medium vulnerability, high recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be **low-medium**.

8.10.145 All other fishery fleets are expected to be able to avoid the VE construction areas. The sensitivity of the receptors is therefore **low** for all mobile fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.146 Mitigation measures include advance notification of planned construction activities to fishermen and ongoing liaison throughout construction. Taking account of these measures, the residual effect on each fishery is set out immediately below.

8.10.147 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.148 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.149 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.150 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.151 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.152 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.153 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.154 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.155 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.156 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.10.157 The assessment outcomes presented above for the Array Areas are also applicable to the offshore export cable corridor, noting that vessels engaged in works in either area are likely to utilise the same or similar navigational channels.

8.10.158 On this basis the impact magnitude is therefore considered to be **low adverse** for all fisheries.

SENSITIVITY OF RECEPTOR

8.10.159 The sensitivity of the receptors is as described for the Array Areas. The UK potting and netting fisheries are deemed to be of medium vulnerability, high recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be **low-medium**.

8.10.160 All other fishery fleets are expected to be able to avoid the VE construction areas. The sensitivity of the receptors is therefore **low** for all mobile fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.161 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.162 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.163 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.164 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.165 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.166 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.167 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.168 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.169 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.170 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

IMPACT 5: ADDITIONAL STEAMING TO ALTERNATIVE FISHING GROUNDS FOR VESSELS THAT WOULD OTHERWISE FISH WITHIN THE VE AREA

8.10.171 A detailed Navigational Risk Assessment has been undertaken and its outcomes presented in Volume 6, Part 2, Chapter 9: Shipping and Navigation, which includes full consideration of commercial fishing vessels while transiting (e.g., from a collision and allision perspective). This assessment focuses on the potential impact of longer steaming distances to alternative fishing grounds while construction processes are ongoing in both the array areas and offshore export cable corridor.

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.10.172 The impact is predicted to be of regional spatial extent, of relevance to national and international fishing fleets, and of short-term duration. It is predicted that the impact will affect the receptor directly.

8.10.173 Details of VE construction activities will be promulgated in advance of, and during construction via the usual means (e.g., Notice to Mariners, Kingfisher bulletin) to ensure mariners are aware of the ongoing works. Construction works will only necessitate minor deviations for fishing vessels transiting through the site during the construction phase. Localised impacts are anticipated but will be limited to the immediate area of construction activity. The magnitude is therefore considered to be **low adverse** for all fisheries.

SENSITIVITY OF RECEPTOR

8.10.174 The UK potting and netting fleet active in the VE area operate across a range of grounds to haul and re-set different fleets of traps/pots/nets on a daily basis. Their normal operating range is expected to extend well beyond the 500m exclusion zones that will be in place around active installation works and advisory safety distances around construction vessels. Given adequate notification it is expected that these vessels will be in a position to avoid construction areas with limited impact upon steaming times.

8.10.175 All commercial fisheries fleets are considered to have medium to high availability of alternative fishing grounds and an operational range that is not limited to the VE area. The sensitivity of the receptor is therefore, considered to be **low** for the UK potting and netting fleet and **negligible** for all other fisheries.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.176 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.177 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.178 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.179 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.180 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.181 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.182 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.183 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.184 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.185 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.10.186 The assessment outcomes presented above for the Array Areas are also applicable to the offshore ECC.

8.10.187 On this basis the impact magnitude is therefore considered to be **low adverse** for all fisheries.

8.10.188

SENSITIVITY OF RECEPTOR

8.10.189 The sensitivity of the receptors is as described for the Array Areas. All commercial fisheries fleets are considered to have medium to high availability of alternative fishing grounds and an operational range that is not limited to the VE area. The sensitivity of the receptor is therefore, considered to be **low** for the UK potting and netting fleet and **negligible** for all other fisheries.

SIGNIFICANCE OF RESIDUAL EFFECT

8.10.190 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.191 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.10.192 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.193 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.194 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.195 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.196 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.197 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.198 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.10.199 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11 ENVIRONMENTAL ASSESSMENT: OPERATIONAL PHASE

8.11.1 A description of the potential effects on commercial fisheries receptors caused by each identified impact is given below.

IMPACT 6: PHYSICAL PRESENCE OF INFRASTRUCTURE LEADING TO REDUCTION IN ACCESS TO, OR EXCLUSION FROM ESTABLISHED FISHING GROUNDS

ARRAY AREA IMPACTS

8.11.2 The assessment assumes that commercial fisheries will be prevented from actively fishing within the footprint of installed infrastructure within VE, together with associated safety zones for maintenance activities and assumed safe operating distances, as set out in Table 8.8. Minimum turbine spacing is 830 m, including between turbines and all other infrastructure.

8.11.3 Outwith this area, the assessment assumes that fishing will be possible within the VE array areas where turbine spacing and turbine layout allow productive grounds to be targeted, with the exception of an assumed 50 m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance or replacement. In addition, the individual decisions made by the skippers of fishing vessels with their own perception of risk will determine the likelihood of whether their fishing will resume within VE. Inclement weather will be a significant contributor to this risk perception. The type and dimension of fishing gear also influences the potential opportunities within the array area. For example, twin-rigged trawl gears typically require a greater distance for safe operation and these gears are unlikely to target grounds in the vicinity of infrastructure.

8.11.4 As presented in Volume 6, Part 2, Chapter 9: Shipping and Navigation, marine traffic data indicate that fishing vessels are able to transit through and actively fish in the existing adjacent Galloper offshore wind farm.

MAGNITUDE OF IMPACT

8.11.5 This impact will lead to localised loss of access to fishing grounds and the fish and shellfish resources within these grounds for a range of fishing opportunities during the operational and maintenance phase, which will directly affect fleets over a long-term duration. The impact is predicted to be continuous with low reversibility for the lifetime of VE and is of relevance to international fishing fleets.

8.11.6 Evidence on the value and importance of the VE array areas to commercial fishing fleets is the same as that presented for construction in paragraphs 8.10.6 to 8.10.16.

8.11.7 UK potting fishery: A recent study by Roach *et al*. (2018) investigated the effect of the construction and operation of the Westermost Rough offshore wind farm on established lobster fishing grounds (noting that this site lies approximately 8km off the Holderness coast). The study concluded that:

- the temporary closure during the construction period offered some respite from fishing pressure for adult lobsters and led to an increase in abundance and size of lobster in the wind farm area;
- reopening of the site to fishing exploitation saw a decrease in catch rates and size structure, but this did not reach levels below that of the surrounding area;
- opening the site to exploitation allowed the fishery to recuperate some of the economic loss during the closure; and
- finally, the authors concluded that temporary closures of selected areas may be beneficial to lobster fisheries and should be considered as a management option for lobster fisheries.

8.11.8 A more recent study by Roach *et al.* (2022) examined further Westermost Rough lobster fisheries monitoring data gathered in 2019. The study reiterated that the increased catch rates and proportion of larger lobsters observed following wind farm construction could be attributed to temporary closure of the wind farm area during construction. During the operational phase of the wind farm, monitoring data indicates no long-term effect of the wind farm on lobster catch rates or size distribution, though it is acknowledged that the findings of this study are specific to the study location. Based on minimum spacing between VE structures and awareness that potting fisheries do operate in some operational wind farms[2], it is expected that potting activity will resume within the VE array areas during the operation and maintenance phase and that catch rates will, most likely, initially be higher than comparable grounds outside the array area, before returning to similar baseline levels.

8.11.9 UK netting fishery: Based on the predominance of netting located in inshore areas, and not within the array areas, the presence of VE is not expected to restrict the baseline operation of static netting activity.

[2] https://www.nffo.org.uk/can-fisheries-co-exist-with-offshore-wind-in-the-race-to-carbon-net-zero/#:~:text=Under%20current%20fixed%20wind%20farm,operate%20in%20some%20constructed%20projects.

8.11.10 UK beam trawl fishery: The degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors including gear type, width of gear spread when in seabed contact and the vessel skipper's risk perception. A study by Gray *et al*. (2016) explored changes to fishing practices as a result of the development of offshore wind farms in the Irish Sea. Through industry interviews with mobile demersal otter trawlers targeting Nephrops grounds, it was found that for those fishermen who claimed to have operated on fishing grounds now occupied by WTGs, the majority stated they had not returned or had reduced their fishing effort within the wind farm area two or more years after construction. The main reason for the reduction in effort was increased actual risk associated with the presence of wind farm infrastructure and overall heightened perceived risk (Gray *et al*., 2016). The study did find a small number of fishermen operating inside the wind farm areas.

8.11.11 Beam trawl fisheries are typically less likely to operate within a wind farm due to the depth of ground penetration of the gear, coupled with the spread of gear either side of the vessel. VMS data indicate that key fishing grounds targeted by larger UK beam trawlers are located to the northeast and south of the VE array areas. Overall, whilst a degree of access will be restricted, the presence of the VE array areas is unlikely to lead to an overall decline in landings for these fisheries.

8.11.12 UK demersal otter trawl fishery: As described for the UK beam trawl fishery above, the degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors. While otter trawl fisheries are expected to experience reduced access to the VE array areas, the evidence indicates that the array areas are not heavily targeted in comparison to areas outside the array areas. Overall, the presence of the VE array areas is unlikely to lead to an overall decline in landings for this fishery.

8.11.13 UK demersal seine fishery: As described for the UK demersal otter trawl fishery above, the degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors. While demersal seine fisheries are expected to experience reduced access to the VE array areas, there is no evidence to indicate that the array areas represent important demersal seine fishing grounds. Overall, the presence of the VE array areas is unlikely to lead to an overall decline in landings for this fishery.

8.11.14 UK hooked gear fishery: Based on the predominance of hooked gear fishing in inshore areas, and not within the array areas, the presence of VE is not expected to restrict the baseline operation of hooked gear activity.

8.11.15 Dutch beam trawl fishery: As described for the UK beam trawl fishery above, the degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors. Beam trawl fisheries are typically less likely to operate within a wind farm due to the depth of ground penetration of the gear, coupled with the spread of gear either side of the vessel. VMS data indicate that the large majority of beam trawl effort in the region is by non-UK, EU Member State vessels. The degree to which these EU registered vessels will have access to UK territorial waters during the operational phase of VE is uncertain. The beam trawl fishery primarily targets sole and plaice, which are both quota species, exploited across a range of grounds throughout the North Sea and English Channel. Overall, whilst a degree of access will be restricted, the presence of the VE array areas is unlikely to lead to an overall decline in landings for these fisheries.

8.11.16 Belgian beam trawl fishery: As described for the Dutch beam trawl fishery above, the degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors. Overall, whilst a degree of access will be restricted, the presence of the VE array areas is unlikely to lead to an overall decline in landings for these fisheries.

8.11.17 Dutch, French and Belgian demersal otter trawl fishery: As described for the UK otter trawl fishery above, the degree to which demersal mobile gear can resume within VE array areas is uncertain and dependant on a number of factors. While otter trawl fisheries are expected to experience reduced access to the VE array areas, the evidence indicates that the array areas are not heavily targeted in comparison to areas outside the array areas. Overall, the presence of the VE array areas is unlikely to lead to an overall decline in landings for this fishery.

8.11.18 Dutch and French pelagic trawl fishery: Midwater trawls are designed to catch species living anywhere in the water column above the seafloor, including at the surface. Acoustic technology is used to locate the position and depth of the target fish shoal and the path of the boat and depth of the net are adjusted accordingly. Based on the gear width and operational method that requires space to set the trawl net and move into the path of the fish shoal, it is unlikely that pelagic gear will be operated within the array areas. However, given the infrequent nature of pelagic fisheries, together with the opportunity to catch the target, highly mobile species when it moves outside the area, the presence of the VE array areas is not expected to restrict the baseline operation of pelagic fisheries throughout the southern North Sea and beyond.

8.11.19 The impact is predicted to be of regional spatial extent, long term duration, continuous and with low reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore, considered to be **medium adverse** for beam trawl fleets and **low adverse** for all other fisheries.

SENSITIVITY OF RECEPTOR

8.11.20 The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 8.10.17 and 8.10.18, summarised as **medium** for the UK potting fleet, **negligible** for EU pelagic trawl fleets, and **low** for all other fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.21 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.22 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.23 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is medium. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.24 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.25 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.26 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.27 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is medium. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.28 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.29 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.30 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

8.11.31 Temporary 500 m advisory safety distances requested around vessels engaged in export cable repair works, could limit fishing opportunities within localised areas.

8.11.32 The European Subsea Cables Association notes that cables are potentially subsea hazards, and that while great effort is made to bury and protect them, mariners should never assume that cables are completely buried. Furthermore, the Mariners Handbook advises that: *“every care should be taken to avoid anchoring, trawling, fishing, dredging, drilling or carrying out any other activity in the vicinity of cables which might damage them”.*

8.11.33 Notwithstanding this, subsea cables are widespread throughout the waters of Europe, providing power and telecommunications links, and it is understood that fishing does take place in the vicinity of subsea cables (KIS-ORCA, 2022).

MAGNITUDE OF IMPACT

8.11.34 For the purposes of this assessment, it is assumed that fishermen will be well informed of the location and integrity of the offshore export cables i.e., locations of protection, details of routine cable integrity surveys and location and schedule for any maintenance works, and that based on this knowledge will seek to exploit grounds across the offshore export cables with caution. The assessment therefore assumes that fishing will resume within the vicinity of the export cables.

8.11.35 Notices to Mariners will be issued in advance of any maintenance works. Potting and to a lesser extent fixed netting vessels may be required to temporarily relocate pots during maintenance works, although such works are likely to be infrequent.

8.11.36 The impact is predicted to be of local spatial extent and of short-term duration for maintenance works that may be required along the export cables. It is predicted that the impact will affect the receptor directly. Given that fishing is likely to resume across the majority of the VE offshore ECC, the magnitude is considered to be **low adverse** for UK potting and netting fisheries and **negligible** for all other fleets.

SENSITIVITY OF RECEPTOR

8.11.37 The mobile fleets targeting demersal fisheries are considered to have high levels of alternative fishing grounds; are deemed to be of low vulnerability, high recoverability and low-medium value. The sensitivity of these receptors is therefore, considered to be **low**. The UK potting and netting fleets are deemed to be of medium vulnerability, medium recoverability and low-medium value. The sensitivity of the receptor is therefore, considered to be **medium**. EU pelagic fleets are not expected to be active across the majority of the offshore ECC and the sensitivity of this receptor is considered to be **negligible**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.38 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.39 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.40 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.41 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.42 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.43 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.44 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.45 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.46 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

8.11.47 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

IMPACT 7: DISPLACEMENT FROM ARRAY AREAS AND OFFSHORE CABLE CORRIDOR LEADING TO GEAR CONFLICT AND INCREASED FISHING PRESSURE ON ADJACENT GROUNDS

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

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.11.49 The magnitude of impact of displacement during the operational and maintenance phase is expected to be the same or similar to that during construction for all commercial fishing fleets deploying mobile demersal or pelagic gear, summarised as **low adverse** for all demersal trawl and dredge fleets and **negligible** for vessels deploying pelagic gear.

8.11.50 Given that potting and netting can resume across the VE area, the magnitude of displacement impacts for UK potters and netters is considered to be **low adverse**.

SENSITIVITY OF RECEPTOR

8.11.51 The sensitivity of the commercial fisheries receptors is the same as that presented for construction, summarised as **medium** for potting, netting and gears with hooks, **negligible** for pelagic trawl and **low** for all other fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.52 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The justification of this minor adverse significance is based on the very high likelihood of resumption of fishing by potting vessels across VE.

8.11.53 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The justification of this minor adverse significance is based on the very high likelihood of resumption of fishing by netting vessels across VE.

8.11.54 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.55 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.56 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.57 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.58 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.59 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.60 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.61 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.11.62 The assessment outcomes presented above for the Array Areas are also applicable to the offshore ECC, summarised as **low adverse** for UK potters and netters, **low adverse** for all demersal trawl and dredge fleets and **negligible adverse** for vessels deploying pelagic gear.

SENSITIVITY OF RECEPTOR

8.11.63 The sensitivity of the receptors is as described for the Array Areas, summarised as **medium** for potting, netting and gears with hooks, **negligible** for pelagic trawl and **low** for all other fleets.

8.11.64 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The justification of this minor adverse significance is based on the very high likelihood of resumption of fishing by potting vessels across VE.

8.11.65 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The justification of this minor adverse significance is based on the very high likelihood of resumption of fishing by netting vessels across VE.

8.11.66 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.67 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.68 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.69 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.70 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.71 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.72 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.73 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is negligible. The effect is of **negligible** significance, which is not significant in EIA terms.

IMPACT 8: OPERATION AND MAINTENANCE ACTIVITIES LEADING TO DISPLACEMENT OR DISRUPTION OF COMMERCIALLY IMPORTANT FISH AND SHELLFISH RESOURCES

8.11.74 Permanent and temporary impacts from operation of VE and maintenance activities may displace commercially important fish and shellfish populations from the area. This section assesses the potential subsequent impact for the owners of fishing vessels, where commercially important stocks may be disturbed or displaced to a point where normal fishing practices would be affected.

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.11.75 Detailed assessments of the following potential operation and maintenance impacts have been undertaken in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology:

- Mortality, injury, behavioural impacts and auditory masking arising from noise and vibration;
- Temporary increases in SSC and sediment deposition arising from operation and maintenance activities;
- Long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection;
- Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection;
- EMF effects arising from cables during the operational phase;
- Direct damage and disturbance to mobile, demersal and pelagic fish and shellfish receptors from operation and maintenance activities;
- Accidental pollution events during the operation and maintenance phase resulting in potential effects on fish and shellfish receptors; and
- Temporary habitat loss/ physical disturbance, long-term loss of habitat and increased hard substrate and structural complexity due to the presence of WTG foundations, scour protection and cable protection.

8.11.76 The approach to this assessment follows that outlined for construction, with details of the fish and shellfish ecology assessment summarised in Table 8.11. The impact is predicted to be of regional spatial extent, of relevance to international fishing fleets, and of short-term duration. It is predicted that the impact will affect the receptor directly through loss of resources. The magnitude is considered to be **low adverse** in relation to all potential impacts.

Table 8.11: Significance of effects of operation and maintenance impacts on fish and shellfish species relevant to commercial fisheries receptors.

Potential Impact	Magnitude	Sensitivity	Significance of Effect
Mortality, injury, behavioural changes and auditory masking arising from noise and vibration	Negligible	Low to High	Minor adverse
Temporary increases in SSC and sediment deposition	Negligible	Low to High	Minor adverse
Long-term loss of habitat	Low	Negligible to Medium	Negligible to Minor adverse
Increased hard substrate and structural complexity	Low	Low to Medium	Negligible to Minor adverse
EMF effects	Low	Low	Minor adverse
Direct damage and disturbance to mobile, demersal and pelagic fish and shellfish receptors	Low	Negligible to Medium	Minor adverse
Accidental pollution events	Low	Negligible to Medium	Minor adverse
Temporary habitat loss and disturbance	Negligible	Negligible to Medium	Minor adverse

SENSITIVITY OF RECEPTOR

8.11.77 The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 8.10.130 to 8.10.132, summarised as **medium** for the UK potting fisheries, and **low** for all other fisheries.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.78 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.79 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.80 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.81 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.82 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.83 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.84 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.85 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.86 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.87 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.11.88 Detailed assessments of potential operation and maintenance impacts have been undertaken in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology. As described above for Array Area Impacts, with respect to the magnitude of this impact on commercial fisheries, the overall significance of the effect on fish and shellfish species is considered and the assessment outcomes for the Offshore ECC are as per those presented in Table 8.11Table 8.10 for the Array Areas. The magnitude is therefore considered to be **low adverse** for all species and all potential impacts.

SENSITIVITY OF RECEPTOR

8.11.89 The sensitivity of receptors is as described above for the Array Areas and is **medium** for the potting fleet and **low** for all other fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.90 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.91 All other fleets: the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

IMPACT 9: INCREASED VESSEL TRAFFIC WITHIN FISHING GROUNDS AS A RESULT OF CHANGES TO SHIPPING ROUTES AND MAINTENANCE VESSEL TRAFFIC FROM VE LEADING TO INTERFERENCE WITH FISHING ACTIVITY

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.92 The effects of the operational and maintenance phase are expected to be the same or similar to the effects from construction (see paragraphs 8.10.146 and 8.10.156). The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.93 The effects of the operational and maintenance phase are expected to be the same or similar to the effects from construction and as for the Array Areas. The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

IMPACT 10: PHYSICAL PRESENCE OF INFRASTRUCTURE LEADING TO GEAR SNAGGING

ARRAY AREA IMPACTS

8.11.94 The inter-array cables and associated cable protection, together with any structures (and associated scour protection) on the seabed represent potential snagging points for fishing gear and could lead to damage to, or loss of, fishing gear. The safety aspects including potential loss of life as a result of snagging risk are assessed within Volume 6, Part 2, Chapter 9: Shipping and Navigation.

MAGNITUDE OF IMPACT

8.11.95 In the instance that snagging does occur, the Applicant will work to the protocols laid out within the guidance produced by the FLOWW group and ''Recommendations for Fisheries Liaison: Best Practice'' guidance for offshore renewable developers, in particular section 9: Dealing with claims for loss or damage of gear.

8.11.96 Snagging poses a risk to fishing equipment and in extreme cases may potentially lead to capsize of vessel and crew fatalities, as well as damage to subsea infrastructure. Three phases of interaction are possible: initial impact of gear and subsea infrastructure; pullover of gear across subsea infrastructure; and snagging or hooking of gear on the subsea infrastructure. The snagging or hooking of fishing gear with infrastructure/cables on the seabed is the most hazardous to the vessel and crew due to the possibility of capsizing.

8.11.97 It is considered likely that fishermen will operate appropriately (i.e., avoiding the indicated infrastructure and cable protection at the defined location) given adequate notification of the locations of any snagging hazards; and are highly likely to avoid the infrastructure and cable protection within the VE area.

8.11.98 Based on the measures that will be implemented as part of the project and the commitment to follow standard protocols should snagging occur, the magnitude is considered to be **low adverse** for all fleets.

SENSITIVITY OF RECEPTOR

8.11.99 Due to the nature and operation of mobile demersal gear (i.e., it is actively towed and directly penetrates the seabed with near continuous contact) there is increased vulnerability to this impact and the sensitivity is therefore considered to be **medium** for all mobile demersal fisheries.

8.11.100 UK potters, gear with hooks and netters show a low vulnerability as the gear is placed, not towed and is less likely to penetrate the seabed. The sensitivity of UK potters and netters and hooked gear fleets is considered to be **low**.

8.11.101 Pelagic gear does not come into contact with the seabed and therefore has low vulnerability to snagging seabed infrastructure. The sensitivity of the EU pelagic trawl fleet is considered to be **low**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.102 VE mitigation measures include adherence to FLOWW guidance, a commitment to cable burial as the preferred option for cable protection, and appropriate marking and charting of infrastructure. Taking account of these measures, the residual effect on each fishery is set out immediately below, noting that that effect in all cases will be direct and temporary.

8.11.103 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.104 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.105 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.106 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.107 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.108 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.109 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.110 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.111 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.112 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.11.113 The impact is predicted to be of regional spatial extent, long term duration, continuous and with low reversibility. It is predicted that the impact will affect the receptor directly. Based on the measures that will be implemented as part of the project (see Table 8.9) and the commitment to follow standard protocols should snagging occur, the magnitude is considered to be **low adverse** for all fleets.

SENSITIVITY OF RECEPTOR

8.11.114 Due to the nature and operation of mobile demersal gear (i.e., it is actively towed and directly penetrates the seabed with near continuous contact) there is increased vulnerability to this impact and the sensitivity is therefore considered to be **medium** for all mobile demersal fisheries.

8.11.115 UK potters, gear with hooks and netters show a low vulnerability as the gear is placed, not towed and is less likely to penetrate the seabed. The sensitivity of UK potters and netters and hooked gear fleets is considered to be **low**.

8.11.116 Pelagic gear does not come into contact with the seabed and therefore has low vulnerability to snagging seabed infrastructure. The sensitivity of the EU pelagic trawl fleet is considered to be **low**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.117 The VEmitigation measures include adherence to FLOWW guidance, a commitment to cable burial as the preferred option for cable protection, and appropriate marking and charting of infrastructure. Taking account of these measures, the residual effect on each fishery is set out immediately below, noting that that effect in all cases will be direct and temporary.

8.11.118 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.119 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.120 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.121 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.122 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.123 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.124 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.125 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.126 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.127 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

IMPACT 11: ADDITIONAL STEAMING TO ALTERNATIVE FISHING GROUNDS FOR VESSELS THAT WOULD OTHERWISE FISH WITHIN THE VE AREA

8.11.128 A detailed Navigational Risk Assessment has been undertaken and its outcomes are presented in Volume 9, Report 10: Navigational Risk Assessment, which includes full consideration of commercial fishing vessels while transiting (e.g., from a collision and allision perspective). This assessment focuses on the potential impact of longer steaming distances to alternative fishing grounds during operational and maintenance phase.

ARRAY AREA IMPACTS

MAGNITUDE OF IMPACT

8.11.129 The impact is predicted to be of regional spatial extent, of relevance to national and international fishing fleets, and of long-term duration. It is predicted that the impact will affect the receptor directly.

8.11.130 During the operation and maintenance phase, fishing will be possible across the VE area for those principal fleets currently active within it, with the exception of in the footprint of installed infrastructure and in Safety Zones around infrastructure undergoing major maintenance and advisory safety distances around vessels undertaking major maintenance activities. Such activities will be communicated through NtMs and Kingfisher Bulletins with ample warning provided.

8.11.131 It is understood that the individual decisions made by the skippers of fishing vessels with their own perception of risk will determine the likelihood of whether their fishing will resume within the VE area. As such, it is acknowledged that whilst additional steaming to alternative grounds will not be necessary, skippers may choose to steam to grounds outside of the VE area.

8.11.132 The magnitude is considered to be **low adverse** for all fishing fleets.

SENSITIVITY OF RECEPTOR

8.11.133 The sensitivity of commercial fishing fleets to this impact is expected to be the same or similar to that for construction and is therefore considered to be **low** for the UK potting fleet and **negligible** for all other fisheries.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.134 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.135 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.136 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.137 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.138 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.139 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.140 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.141 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.142 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.143 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

MAGNITUDE OF IMPACT

8.11.144 The assessment outcomes presented above for the Array Areas are also applicable to the offshore ECC.

8.11.145 On this basis the impact magnitude is therefore considered to be **low adverse** for all fisheries.

SENSITIVITY OF RECEPTOR

8.11.146 The sensitivity of the receptors is as described for the Array Areas. All commercial fisheries fleets are considered to have medium to high availability of alternative fishing grounds and an operational range that is not limited to the VE area. The sensitivity of the receptor is therefore, considered to be **low** for the UK potting and netting fleet and **negligible** for all other fisheries.

SIGNIFICANCE OF RESIDUAL EFFECT

8.11.147 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.148 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.11.149 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.150 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.151 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.152 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.153 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.154 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.155 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.11.156 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is negligible, and the magnitude of impact is low. The effect is of **negligible adverse** significance, which is not significant in EIA terms.

8.12 ENVIRONMENTAL ASSESSMENT: DECOMMISSIONING PHASE

8.12.1 A description of the potential effects on commercial fisheries receptors caused by each identified impact is given below.

IMPACT 12: REDUCTION IN ACCESS TO, OR EXCLUSION FROM ESTABLISHED FISHING GROUNDS

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.2 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 8.10.20 to 8.10.29, and 8.10.53 to 8.10.61). The residual significance of effect is therefore **minor adverse** for the potting and netting fleet (subject to further mitigation), **negligible** for pelagic trawl and **minor adverse** for all other fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.3 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The residual significance of effect is therefore **minor adverse** for the potting and netting fleet (subject to further mitigation), **negligible** for pelagic trawl and **minor adverse** for all other fleets, which is not significant in EIA terms.

IMPACT 13: DISPLACEMENT LEADING TO GEAR CONFLICT AND INCREASED FISHING PRESSURE ON ADJACENT GROUNDS

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.4 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 8.10.85 to 8.10.95, and 8.10.114 to 8.10.123). The significance of effect is therefore **negligible** for EU pelagic trawl fleets and **minor adverse** for all fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.5 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **negligible** for EU pelagic trawl fleets and **minor adverse** for all fleets, which is not significant in EIA terms.

IMPACT 14: DISPLACEMENT OR DISRUPTION OF COMMERCIALLY IMPORTANT FISH AND SHELLFISH RESOURCES

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.6 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 8.10.133 to 8.10.135). The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.7 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

IMPACT 15: INCREASED VESSEL TRAFFIC ASSOCIATED WITH THE PROJECT WITHIN FISHING GROUNDS LEADING TO INTERFERENCE WITH FISHING ACTIVITY

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.8 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 8.10.146 to 8.10.156). The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.9 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor adverse** for all fleets, which is not significant in EIA terms.

IMPACT 16: ADDITIONAL STEAMING TO ALTERNATIVE FISHING GROUNDS FOR VESSELS THAT WOULD OTHERWISE FISH WITHIN THE VE AREA

ARRAY AREA IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.10 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 8.10.155 to 8.10.164). The significance of effect is therefore minor adverse for the UK potting and netting fleets and negligible adverse for all other fleets, which is not significant in EIA terms.

OFFSHORE EXPORT CABLE CORRIDOR IMPACTS

SIGNIFICANCE OF RESIDUAL EFFECT

8.12.11 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore minor adverse for the UK potting and netting fleets and negligible adverse for all other fleets, which is not significant in EIA terms.

8.13 ENVIRONMENTAL ASSESSMENT: CUMULATIVE EFFECTS

8.13.1 Cumulative effects can be defined as effects upon a single receptor from VE when considered alongside other proposed and reasonably foreseeable projects and developments. This includes all projects that result in a comparative effect that is not intrinsically considered as part of the existing environment and is not limited to offshore wind projects.

8.13.2 A screening process has identified a number of reasonably foreseeable projects and developments which may act cumulatively with VE. The full list of such projects that have been identified in relation to the offshore environment are set out in Volume 6, Part 1, Annex 3.1: Cumulative Effects Assessment Methodology.

8.13.3 In assessing the potential cumulative impacts for VE, it is important to bear in mind that some projects, predominantly those 'proposed' or identified in development plans, may not actually be taken forward, or fully built out. There is therefore a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposals. For example, those projects under construction are likely to contribute to cumulative impacts (providing effect or spatial pathways exist), whereas those proposals not yet approved are less likely to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

8.13.4 With this in mind, all projects and plans considered alongside VE have been allocated into 'tiers' reflecting their current stage within the planning and development process. This allows the cumulative impact assessment to present several future development scenarios, each with a differing potential for being ultimately built out. This approach also allows appropriate weight to be given to each scenario (tier) when considering the potential cumulative impact. The proposed tier structure that is intended to ensure that there is a clear understanding of the level of confidence in the cumulative assessments is provided in Volume 6, Part 1, Annex 3.1: Cumulative Effects Assessment Methodology, and outlined here in Table 8.12.

Table 8.12: Description of Tiers of other developments considered for cumulative effect assessment.

Tiers	Development Stage
Tier 1	Projects under construction.
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented.
	Submitted applications, whether under the Planning Act 2008 or other regimes, but not yet determined.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
	Projects under the Planning Act 2008 where a PEIR has been submitted for consultation.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted.
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward.

8.13.5 The plans and projects selected as relevant to the Cumulative Effects Assessment (CEA) of impacts to commercial fisheries are based on an initial screening exercise undertaken on the long list as set out in Volume 6, Part 1, Annex 3.1: Cumulative Effects Assessment Methodology. Consideration of effect-receptor pathways, data confidence and temporal and spatial scales has allowed the selection of the relevant projects for a topic-specific cumulative short-list.

8.13.6 For the potential effects for commercial fisheries, other planned developments were screened into the assessment based on a CEA study area encompassing the southern North Sea and eastern English Channel for mobile gear fleets, and the full study area shown in Figure 8.1 for the potting and netting fleets, to provide appropriate coverage of relevant fishing grounds.

8.13.7 Only those developments in the short list that fall within the commercial fisheries CEA study area have the potential to result in cumulative effects with VE. All other developments falling outside the commercial fisheries CEA study area are excluded from this assessment. Where the effect of other developments is already captured within the time period covered by baseline data collection, these are also excluded from CEA since their effect on commercial fisheries activity has already been captured in the baseline description presented in Section 8.7.

8.13.8 The CEA includes designated sites as a project or plan in the context of commercial fisheries, as management measures such as seasonal and/or gear exclusions implemented to protect designated features in these sites may lead to reduced access for commercial fisheries, amongst other impacts. The Marine Protected Areas (MPAs) considered in the assessment include all Special Areas of Conservation (SACs), Marine Conservation Zones (MCZs), Special Protected Areas (SPAs) and non-UK Sites of Community Importance (SCI) within the CEA study area.

8.13.9 Developments screened into the CEA for commercial fisheries are presented in presented in Table 8.13.

Table 8.13: Projects considered within the commercial fisheries cumulative effect assessment.

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
2	Offshore wind farm	North Falls	Pre-planning Application	0.0	0.0	High – Third party project details published in the public domain.
1	Offshore wind farm	East Anglia TWO	Consented	5.3	11.6	High – Consented
1	Offshore wind farm	Mermaid	Consented	39.6	41.0	High – Consented
1	Offshore wind farm	East Anglia ONE NORTH	Consented	36.0	41.3	High – Consented
2	Offshore wind farm	Borssele	Planned	41.3	42.2	High – Third party project details published in the public domain.
3	Offshore wind farm	Windener giegebied Borssele noordzijde	Planned	45.2	47.9	High – Third party project details published in

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
						the public domain.
3	Offshore wind farm	Windenergiegebied Borssele zuidzijde	Planned	40.4	42.2	High – Third party project details published in the public domain.
2	Offshore wind farm	Dunkerque	Planned	64.0	71.0	High – Third party project details published in the public domain.
1	Offshore wind farm	East Anglia THREE	Consented	68.6	75.3	High – Consented
1	Offshore wind farm	Norfolk Vanguard West	Consented	91.1	97.9	High – Consented
2	Offshore wind farm	Hollandse Kust (West)	Planned	89.2	97.1	High – Third party project details published in the public domain.
1	Offshore wind farm	Norfolk Vanguard East	Consented	92.2	97.9	High – Consented
2	Offshore wind farm	Ijmuiden Ver	Planned	94.4	101.6	High – Third party project details published in the public domain.
1	Offshore wind farm	Norfolk Boreas	Consented	104.6	110.0	High – Consented

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
2	Offshore wind farm	Ijmuiden Ver 2021 – Y-VER	Planned	113.4	120.4	High – Third party project details published in the public domain.
2	Offshore wind farm	Hollandse Kust (Zuid)	Planned	116.5	124.3	High – Third party project details published in the public domain.
1	Offshore wind farm	HKZ Kavel II	Construction	116.8	124.6	High – Third party project details published in the public domain.
1	Offshore wind farm	HKZ Kavel III	Construction	116.5	124.3	High – Third party project details published in the public domain.
1	Offshore wind farm	HKZ Kavel I	Construction	119.1	127.0	High – Third party project details published in the public domain.
1	Offshore wind farm	Sheringham Shoal Extension	In Planning – Application submitted	134.8	132.5	High – Third party project details published in the public domain.
1	Offshore wind farm	HKZ Kavel IV	Construction	125.4	133.2	High – Third party project

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
						details published in the public domain.
1	Offshore wind farm	Dudgeon Extension	In Planning – Application submitted	136.3	139.1	High – Third party project details published in the public domain.
1	Offshore wind farm	Hollandse Kust (Noord)	Approved	144.0	151.9	High – Third party project details published in the public domain.
1	Offshore wind farm	HKN Kavel V	Approved	145.9	153.8	High – Third party project details published in the public domain.
1	Offshore wind farm	Rampion 2 (Zone 6)	In Planning – Application submitted	188.8	153.8	High – Third party project details published in the public domain.
2	Offshore wind farm	Outer Dowsing	Planned	175.0	176.0	High – Third party project details published in the public domain.
1	Offshore wind farm	Dieppe – Le Treport	Approved	181.5	176.8	High – Third party project details published in

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
						the public domain.
1	Offshore wind farm	Hornsea Project Three (HOW03)	Consented	192.7	198.3	High – Consente.
1	Offshore wind export cables	EA1N Transmission Asset	Consented	32.8	31.3	High – Consented by applicant.
1	Offshore wind export cables	East Anglia Three Transmission Asset	Construction	19.5	6.6	High – Consented by applicant.
1	Offshore wind export cables	Norfolk Boreas and Vanguard Transmission Asset	Construction	79.3	85.8	High – Consented by applicant.
1	Offshore wind export cables	Hornsea 3 Transmission Asset	Consented	125.6	118.9	High – Consented by applicant.
2	Interconnector	NeuConnect Interconnector	Proposed	0.0	0.0	Medium
2	Interconnector	Nautilius MPI	Proposed	0.0	0.0	Medium
2	Interconnector	Lionlink	Proposed	0.0	5.0	Medium
3	Interconnector	Sea Link (Kent-Suffolk SCDI)	Proposed (pre-scoping)	26.5	0.0	Medium
3	Interconnector	Belgium Energio	Proposed	25.5	32.2	Medium

Tier	Development type	Project	Status	Distance from Array Areas (km)	Distance from Offshore Export Cable Corridor (km)	Data confidence assessment/ phase
		Nordsoon Denmark				
3	Interconnector	Gridlink	Proposed	51.9	37.8	Medium
3	Interconnector	Mercator	Proposed	31.9	30.2	Medium
2	Designated site	Orford Inshore MCZ	Existing – confirmation of fisheries management measures is awaited			Low – management measures not yet defined.
2	Designated site	Kentish Knock East MCZ	Existing – confirmation of fisheries management measures is awaited			Low – management measures not yet defined.
1	Designated site	Dogger Bank SAC Byelaw (bottom towed fishing gear prohibitio)	Existing			High – byelaw introduced in 2022.

8.13.10 Certain impacts assessed for VE alone are not considered in the cumulative assessment due to:

- the highly localised nature of the impacts (i.e., they occur entirely within VE only);
- management measures in place for VE (Table 8.9) will also be in place on other projects reducing their risk of occurring; and/or
- where the potential significance of the impact from VE alone has been assessed as negligible.

8.13.11 The impacts excluded from the CEA for the above reasons are:

- increased risk of gear snagging; and

- increased vessel traffic within fishing grounds as a result of changes to shipping routes and project related vessel traffic leading to interference with fishing activity.

8.13.12 Therefore, the impacts that are considered in the CEA during construction and operation and maintenance are as follows:

- reduction in access to, or exclusion from established fishing grounds;
- displacement leading to gear conflict and increased fishing pressure on established fishing grounds; and
- displacement or disruption of commercially important fish and shellfish resources.

8.13.13 Table 8.14 sets out the basis for the CEA relevant to commercial fisheries. A description of the significance of cumulative effects upon commercial fisheries arising from each identified impact is given below.

Table 8.14: Cumulative MDS.

Impact	Scenario	Justification
Cumulative reduction in access to, or exclusion from established fishing grounds	Construction phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects Operation and maintenance phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects	Outcome of the CEA will be greatest when the greatest number of other developments are considered.
Cumulative displacement leading to gear conflict and increased fishing pressure on established fishing grounds	Construction phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects Operation and maintenance phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects	Outcome of the CEA will be greatest when the greatest number of other developments are considered.
Cumulative displacement or disruption of commercially important fish and shellfish resources	Construction phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects Operation and maintenance phase: Tier 1: all Tier 1 projects Tier 2: all Tier 2 projects	Outcome of the CEA will be greatest when the greatest number of other developments are considered.

CUMULATIVE REDUCTION IN ACCESS TO, OR EXCLUSION FROM ESTABLISHED FISHING GROUNDS

8.13.14 There is potential for cumulative reduction in access to or exclusion from established fishing grounds as a result of construction activities associated with VE and other projects/activities. This additive impact has been assessed within the southern North Sea and eastern English Channel, which is considered to be representative of the fishing grounds exploited by the fleets active across the study area.

8.13.15 The projects identified under Tier 1 include a number of offshore wind farms. Most of these will be operational at the time that VE enters construction, with project assessments assuming fishing can resume within these operational sites. Of those projects whose construction is planned to overlap with VE construction, two are located within less than ~100km of VE; these are East Anglia TWO and East Anglia ONE NORTH.

8.13.16 Also identified as a Tier 1 activity is the Dogger Bank SAC Bottom Towed Fishing Gear Byelaw, introduced in 2022 to prohibit use of bottom towed gear in the specific area in order to protect the sandbank marine habitat.

8.13.17 Tier 2 and 3 projects and activities include proposed offshore wind farm projects - including the proximate North Falls offshore wind farm - subsea cables and designated sites for which any fisheries management measures are yet to be determined.

MAGNITUDE OF IMPACT

8.13.18 UK potting and netting fisheries: It is not anticipated that the UK potting fleet operating in VE will routinely target grounds in other Tier 1 project areas. In relation to Tier 2 and 3 projects, some of which are more proximate to VE, notably the North Falls offshore wind farm, the UK potting fleet demonstrates a limited degree of vulnerability to cumulative impacts of exclusion where construction activity overlaps temporally. Any effect will be short-term and temporary and fishing will be able to resume once construction activities are complete.

8.13.19 UK beam trawl fishery: It is possible that the UK beam trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. Mobile gear fleets operate over relatively wide areas and are not restricted to the footprint of VE or other Tier 1 projects. Data indicates limited UK beam trawl activity within VE boundaries.

8.13.20 UK demersal otter trawl fishery: It is possible that the UK otter trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. Mobile gear fleets operate over relatively wide areas and are not restricted to the footprint of VE or other Tier 1 projects. Data indicates limited UK beam trawl activity within VE boundaries and the wider VE study area.

8.13.21 UK demersal seine fishery: It is possible that the UK demersal seine fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. Mobile gear fleets operate over relatively wide areas and are not restricted to the footprint of VE or other Tier 1 projects.

8.13.22 UK hooked gear fishery: It is not anticipated that the UK hooked gear fleet operating in VE will target grounds in other Tier 1 project areas. In relation to Tier 2 and 3 projects, some of which are more proximate to VE, notably the North Falls offshore wind farm, the UK hooked gear fleet demonstrates some limited vulnerability to cumulative impacts of exclusion.

8.13.23 Dutch beam trawl fishery: It is likely that the Dutch beam trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. The relevance of the Dogger Bank byelaw is noted in terms of recent exclusion of the activity of this fleet. EU mobile gear fleets operate over wide areas and are not restricted to the footprint of VE or other Tier 1 projects.

8.13.24 Belgian beam trawl fishery: It is likely that the Belgian beam trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. The relevance of the Dogger Bank byelaw is noted in terms of recent exclusion of the activity of this fleet. EU mobile gear fleets operate over wide areas and are not restricted to the footprint of VE or other Tier 1 projects.

8.13.25 Dutch, French and Belgian demersal otter trawl fishery: It is likely that the EU otter trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. The relevance of the Dogger Bank byelaw is noted in terms of recent exclusion of the activity of this fleet. EU mobile gear fleets operate over wide areas and are not restricted to the footprint of VE or other Tier 1 projects.

8.13.26 Dutch and French pelagic trawl fishery: It is likely that the EU pelagic trawl fleet operating in the VE study area will target grounds in other Tier 1, 2 and 3 project areas. It is noted that the majority of these projects are expected to be operational at the point of VE construction and that fishing will have resumed within them to some degree, limiting the scale of cumulative impact. EU mobile gear fleets operate over very wide areas and are not restricted to the footprint of VE or other Tier 1 projects.

8.13.27 The magnitude of impact is considered to be **low - medium adverse** for the Dutch beam trawl fleet, understood to target grounds within the offshore areas of VE and throughout the wider North Sea and English Channel. The magnitude is considered to be **negligible adverse** for EU pelagic fleets, and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.13.28 Based on the operating ranges of the receptors and availability of alternative fishing grounds, the UK potting, netting and hooked gear fleets, which are deemed to be of medium vulnerability and have medium recoverability, are considered to have **medium** sensitivity.

8.13.29 Mobile fleets targeting demersal and pelagic species are deemed to be of low vulnerability and medium to medium recoverability and to have high levels of alternative fishing grounds. The sensitivity of these receptors is considered to be **low**.

SIGNIFICANCE OF RESIDUAL EFFECT

8.13.30 In the case of potential effects arising from the presence of Tier 1 projects, it is considered that the combined magnitude does not raise the cumulative impact of VE with other developments above that already assessed for VE alone.

8.13.31 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The application of VE-specific mitigation relevant to this fleet during construction (see 'Further Mitigation' at paragraphs 8.10.30 and 8.10.62) limits the contribution of VE to this potential effect.

8.13.32 UK netting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms. The application of VE-specific mitigation relevant to this fleet during construction (see 'Further Mitigation' at paragraph 8.10.62) limits the contribution of VE to this potential effect.

8.13.33 UK beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.34 UK demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.35 UK demersal seine fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.36 UK hooked gear fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the impact magnitude is medium. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.37 Dutch beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.38 Belgian beam trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.39 Dutch, French and Belgian demersal otter trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.40 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

CUMULATIVE DISPLACEMENT LEADING TO GEAR CONFLICT AND INCREASED FISHING PRESSURE ON ESTABLISHED FISHING GROUNDS

8.13.41 The effect of displacement leading to gear conflict and increased fishing pressure is directly correlated to the previous impact of reduced access to fishing grounds (i.e., if there is no reduction in access, then there will be no displacement).

MAGNITUDE OF IMPACT

8.13.42 As described above in relation to reduced access effects, the magnitude of impact is considered to be **low - medium adverse** for the Dutch beam trawl fleet, **negligible adverse** for EU pelagic fleets and **low adverse** for all other fleets.

SENSITIVITY OF RECEPTOR

8.13.43 The sensitivity of the receptors is consistent with the assessment of reduced access to fishing grounds. The sensitivity is therefore **medium** for UK potting, netting and hooked gear fleets and **low** for all other commercial fishing fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.13.44 In the case of potential effects arising from the presence of Tier 1 projects, it is considered that the combined magnitude does not raise the cumulative impact of VE with other developments above that already assessed for VE alone.

8.13.45 In relation to all fishing fleets and in line with paragraphs 8.13.31 to 8.13.40 the effect is of **minor adverse** significance, which is not significant in EIA terms.

CUMULATIVE DISPLACEMENT OR DISRUPTION OF COMMERCIALLY IMPORTANT FISH AND SHELLFISH RESOURCES

MAGNITUDE OF IMPACT

8.13.46 Detailed assessments of the following potential operation and maintenance impacts have been undertaken in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology:

- Cumulative mortality, injury, behavioural impacts and auditory masking arising from noise and vibration;
- Cumulative temporary increases in SSC and sediment deposition arising from operation and maintenance activities;
- Cumulative temporary habitat loss; and
- Cumulative long-term habitat loss.

8.13.47 The approach to this assessment follows that outlined for the project-alone assessment detailed in earlier sections, with details of the fish and shellfish ecology assessment summarised in Table 8.16. The impact is predicted to be of regional spatial extent and of relevance to national and international fishing fleets. It is predicted that the impact will affect the receptor directly through loss of resources. The magnitude is considered to be **low adverse** in relation to all potential cumulative impacts.

Table 8.15: Significance of cumulative effects on fish and shellfish species relevant to commercial fisheries receptors.

Potential Impact	Magnitude	Sensitivity	Significance of Effect
Cumulative mortality, injury, behavioural impacts and auditory masking arising from noise and vibration	Low	Low to Medium	Minor adverse
Cumulative temporary increases in SSC and sediment deposition arising from operation and maintenance activities	Low	Medium	Minor adverse
Cumulative temporary habitat loss	Low	Medium	Minor adverse
Cumulative long-term habitat loss	Negligible	Medium	Minor adverse

SENSITIVITY OF RECEPTOR

8.13.48 There is potential for fishing grounds beyond immediate construction activities associated with Tier 1, 2 and 3 projects to be affected by these impacts. Exposure to the impact is likely and commercial fleets targeting key species will be affected.

8.13.49 There is potential for shellfish grounds beyond the immediate construction activities to be affected by increased suspended sediment and sediment deposition, impacting potting fleets. The potting fleet is deemed to be of medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

8.13.50 There is potential for pelagic fish species to be impacted by additive underwater noise generated during the construction phase of Tier 1 and 2 projects, associated with impact piling. The EU pelagic trawl fleet that may target herring are active across extensive fishing grounds throughout the southern North Sea and beyond and are deemed to be of low vulnerability and high recoverability. The sensitivity of the receptor is therefore considered to be **low**.

8.13.51 Due to the range of alternative areas targeted and the distribution of key commercial species throughout the southern North Sea, all other fleets are deemed to be of low vulnerability and high recoverability. The sensitivity is considered to be **low** for all other mobile fleets.

SIGNIFICANCE OF RESIDUAL EFFECT

8.13.52 UK potting fishery: Overall, it is predicted that the sensitivity of the receptor is medium, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.53 Dutch and French pelagic trawl fishery: Overall, it is predicted that the sensitivity of the receptor is low, and the magnitude of impact is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.13.54 All other fleets: the sensitivity of the receptor is low, and the impact magnitude is low. The effect is of **minor adverse** significance, which is not significant in EIA terms.

8.14 CLIMATE CHANGE

8.14.1 Commercial fisheries receptors (i.e. relevant fishing fleets) could theoretically be impacted by climate change over the lifetime of the project. This section succinctly assesses the following aspects:

- The effect of climate change on the local area in which the proposed development will take place; and
- The likely impacts of climate change and the project in-combination on the receiving environment.

8.14.2 The two main climate trends which could affect commercial fisheries receptors are described in the text below.

8.14.3 Increased sea temperature/change in pH levels have the potential to affect the distribution of commercially targeted fish and shellfish stocks in the commercial fisheries study area. Changes may result from changes in seabed habitat or natural disturbance events. Changes would be expected to have limited effects on mobile species, but with potential for effects on substrate-dependent species such as herring and sandeel, and on shellfish. Changes may in turn affect commercial fishing activity in the study area over the long-term; for example, altering fishing methods, targeted grounds and seasonal patterns in activity.

8.14.4 An increase in storm events may also directly impact fishing activity in the study area, with changes with seasonal fishing patterns in response to changes in weather and periods of safe fishing conditions.

8.14.5 Climate change could potentially cause changes in patterns of fishing activity over the lifetime of the project. However, the project will not contribute to the impacts of climate change to any significant extent. Accordingly, climate change does not alter the basis or conclusions of the assessments made in relation to commercial fisheries as presented in this chapter.

8.14.6 The information provided in this section is drawn upon and further discussed in Volume 6, Part 4, Chapter 1: Climate Change. As outlined in Volume 6, Part 4, Chapter 1: Climate Change, the operational phase of VE would enable the use of renewable electricity which would result in a positive greenhouse gas impact, resulting in a significant beneficial effect.

8.15 INTER-RELATIONSHIPS

8.15.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and decommissioning of VE on the same receptor, or group of receptors. Such inter-related effects include both:

- project lifetime effects: i.e., those arising throughout more than one phase of the project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and

- receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

8.15.2 A description of the likely inter-related effects arising from VE on commercial fisheries is provided in Volume 6, Part 4, Chapter 3: Inter-Relationships. In summary, effects on commercial fisheries are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual project phase.

8.16 TRANSBOUNDARY EFFECTS

8.16.1 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state affects the environment of another EEA state(s). A screening of transboundary effects has been carried out by PINS (PINS, 2022). The screening exercise identified the following potential transboundary effects on commercial fisheries:

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

8.16.2 Effects on biological resources could occur over a range of 10s of kilometres from VE but are considered unlikely to interact with other EEA states, with French and Belgian coastlines located over 50km away and potential underwater noise effects not extending to such a distance. Furthermore, based on the minor significance of disruption to commercial species during all phases of VE, it is expected that any impact on stocks in non-UK EEZs is negligible to minor. Therefore, the potential transboundary impact of effects on commercial fish stocks in the waters of other EEA States on commercial fisheries is concluded to be of negligible to minor significance and is therefore considered to be Not Significant in EIA terms.

8.16.3 Effects on commercial fishing fleets could occur over a range of 100s of kilometres from VE and could therefore interact with the following EEA states: the Netherlands, Germany, Belgium and France. Effects on these foreign commercial fishing fleets from EEA states, in terms of reduction in access to grounds within VE and displacement into alternative grounds including other EEZs have been considered in the assessment presented in this chapter and were found to be minor for all non-UK EEA states. Therefore, the potential transboundary impact of constraints on foreign commercial fishing activities is concluded to be of minor significance and is therefore considered to be Not Significant in EIA terms.

8.17 SUMMARY OF EFFECTS

8.17.1 Table 8.16 presents a summary of the assessment of significant impacts, any relevant environmental measures and residual effects on commercial fisheries receptors.

Table 8.16: Summary of effects for commercial fisheries.

Description of Impact		Receptor	Additional mitigation measures	Residual effect
Construction				
1A	Reduction in access to, or exclusion from established fishing grounds (Array Areas)	UK potting fishery	Yes – implementation of evidence-based mitigation in line with FLOWW guidelines, following procedures to be set out within the outline Fisheries Liaison and Coexistence Plan	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
1B	Reduction in access to, or exclusion from established fishing grounds (Offshore ECC)	UK potting fishery	Yes – implementation of evidence-based mitigation in line with FLOWW guidelines, following procedures to be set out within the outline Fisheries Liaison and Coexistence Plan	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		UK netting fishery	Yes – implementation of evidence-based mitigation in line with FLOWW guidelines, following procedures to be set out within the outline Fisheries Liaison and Coexistence Plan	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Yes – implementation of evidence-based mitigation in line with FLOWW guidelines, following procedures to be set out within the outline Fisheries Liaison and Coexistence Plan	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
2A	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds (Array Areas)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
2B	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds (Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
3	Displacement or disruption of commercially important fish and shellfish resources (applicable to Array Areas and Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
4	Increased vessel traffic associated with	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
	the Project within fishing grounds leading to interference with fishing activity (applicable to Array Areas and Offshore ECC)	UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
5	Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area (applicable to Array Areas and Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
Operation				
6A	Reduction in access to, or exclusion from	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
	established fishing grounds (Array Areas)	UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
6B	Reduction in access to, or exclusion from established fishing grounds (Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
7	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds (applicable to Array Areas and Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
8	Displacement or disruption of commercially important fish and shellfish resources	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
	(applicable to Array Areas and Offshore ECC)	UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
9	Increased vessel traffic associated with the Project within fishing grounds leading to interference with fishing activity (applicable to Array Areas and Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
10A	Physical presence of under construction infrastructure leading to gear snagging (Array Areas)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
10B	Physical presence of under construction infrastructure leading to gear snagging (Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
11	Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the VE area (applicable to Array Areas and Offshore ECC)	UK potting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK netting fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK demersal seine fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		UK hooked gear fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Dutch pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		Belgian beam trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
		Belgian demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French demersal otter trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
		French pelagic trawl fishery	Not Applicable – no additional mitigation required	No significant adverse residual effects
Decommissioning				
12 to 16	As per construction phase. The magnitude of effect is considered to be no greater, and in all probability less, than in the construction phase. Therefore, it is anticipated that any decommissioning impacts would be no greater, and probably less than that assessed for the construction phase.			
Cumulative effects				
17	Reduction in access to, or exclusion from established fishing grounds	All fishing fleets	Not Applicable – no additional mitigation required	No significant adverse residual effects
18	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	All fishing fleets	Not Applicable – no additional mitigation required	No significant adverse residual effects
19	Displacement or disruption of commercially	All fishing fleets	Not Applicable – no additional mitigation required	No significant adverse residual effects

Description of Impact		Receptor	Additional mitigation measures	Residual effect
	important fish and shellfish resources			

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