FIVE ESTUARIES OFFSHORE WIND FARM

ENVIRONMENTAL STATEMENT

VOLUME 6, PART 5, ANNEX 8.1 COMMERCIAL FISHERIES TECHNICAL REPORT

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Five Estuaries Offshore Wind Farm

Volume 6, Part 5, Annex 8.1

Commercial Fisheries Technical Report

March 2024

Report Information

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Acronyms used

Term	Definition
AIS	Automatic Identification System
CFWG	Commercial Fisheries Working Group
DCF	Data Collection Framework
ECC	Export Cable Corridor
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMSA	European Maritime Safety Agency
ES	Environmental Statement
EU	European Union
FLO	Fisheries Liaison Officer
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authority
IOM	Isle of Man
KEIFCA	Kent and Essex Inshore Fisheries and Conservation Authority
MAP	Multi Annual management Plan
MCRS	Minimum Conservation Reference Size
MLS	Minimum Landing Size
MMO	Marine Management Organisation
MSY	Maximum Sustainable Yield
NRA	Navigational Risk Assessment
PEIR	Preliminary Environmental Information Report
PLN	Port Letter and Number
RBS	Registration of Buyers and Sellers
SAR	Swept Area Ratio
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
TCA	Trade and Cooperation Agreement
UK	United Kingdom
UKFEN	UK Fisheries Economic Network

VE	Five Estuaries Offshore Wind Farm
VMS	Vessel Monitoring System

Units

Term	Definition
€	Euros
cm	Centimetres
hp	Horsepower
kg	Kilograms
km	Kilometres
knots	Nautical mile per hour
kW	Kilowatts
m	Metres
mm	Millimetres
NM	Nautical Mile
t	Tonne

1. Introduction

1.1 Overview and Purpose of this Report

This document has been prepared by Poseidon Aquatic Resource Management Ltd (Poseidon) to support the Environmental Impact Assessment (EIA) of the Five Estuaries Offshore Wind Farm (hereafter referred to as VE).

The information on commercial fisheries activity presented in this document is intended to inform the EIA for VE by providing a detailed understanding of the commercial fisheries baseline, against which the potential impacts of VE can be assessed. An overview of the information presented in this Technical Report is provided in Volume 6, Part 2, Chapter 8: Commercial Fisheries of the Environmental Statement (ES).

This document describes commercial fisheries activity, defined as fishing activity legally undertaken where the catch is sold for taxable profit. A description of charter angling activity, defined as fishing for marine species where the purpose is recreation and not sale or trade, is provided in Volume 6, Part 3, Chapter 3: Socio-Economic, Tourism and Recreation. The ecology of the fish and shellfish species targeted by commercial fishing activity is described in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology.

1.2 Report Structure

This report is structured as per Table 1.1.

Table 1.1 Report structure

Section Number	Section Title	Overview
1	Introduction	Introduces the report and outlines its purpose.
2	Methodology	Presents the methodology and data sources applied to characterise the baseline environment.
3	Baseline Environment	Presents the characterisation of the existing environment for the commercial fisheries assessment.
4	Future Baseline Environment	Presents the characterisation of the likely future baseline environment.
5	Summary	Summarises the findings of this Report.

2. Methodology

2.1 Approach

This technical report has been developed following a detailed and rigorous desk-based assessment of data and literature. Both publicly available data sets and data resultant from specific requests have been analysed. Landings statistics have been analysed using Excel and Vessel Monitoring System (VMS) data have been evaluated using ArcMap Geographic Information System (GIS) software.

This quantitative data has been augmented by qualitative information gained through VE site surveys, direct consultation with the fishing industry, and communication and discussion between the company Fisheries Liaison Officer (FLO) and the fishing industry.

2.2 Study Area

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.

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 2.1.

Since the northern 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.
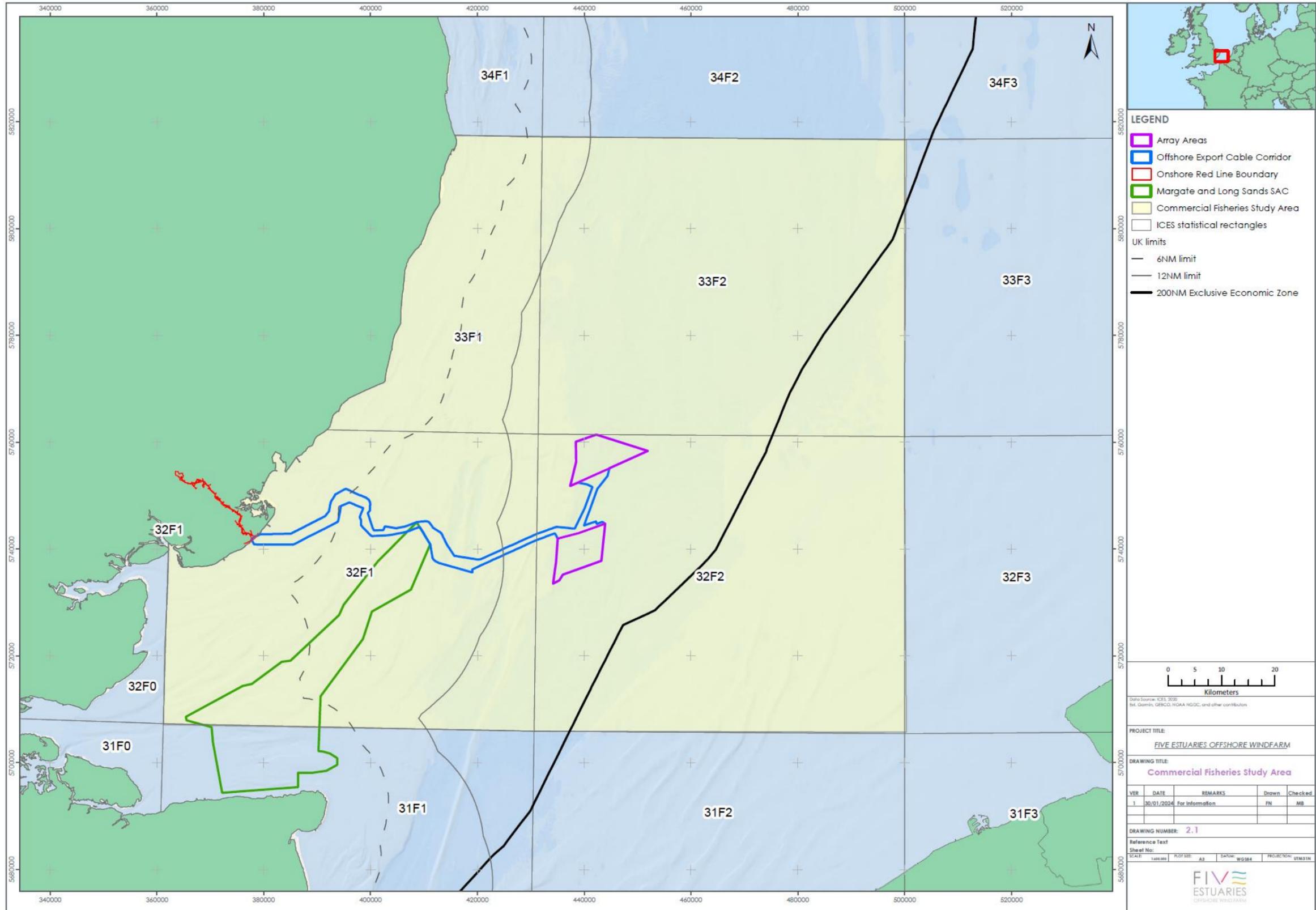
Figure 2.1 Commercial fisheries study area

2.3 Data Sources

A range of data sources have been analysed and presented within this Technical Report; these are listed in Table 2.1.

Data has been sourced from ICES, the EU Data Collection Framework (DCF), the UK Marine Management Organisation (MMO) and the European Maritime Safety Agency (EMSA).

Where data sources allow, a minimum five-year trend analysis has been undertaken, using the most recent annual datasets available at the time of writing. The temporal extent of this five-year period is dependent on each data source analysed, e.g. 2012 to 2016 or 2016 to 2022, as annotated in Table 2.1.

Relevant literature from a number of sources has also been reviewed in the preparation of this Technical Report. A full list of references is provided at the end of this document and are cited within the text where appropriate. Information on fishing activity across VE has also been provided by the company Fisheries Liaison Officer; this includes the findings of scouting surveys undertaken in 2021 and charts identifying fishing grounds as annotated by fishermen active in the study area. Supplementary information is also provided by VE marine traffic surveys undertaken in 2021 and 2022.

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

Table 2.1 Data sources used to inform this Technical Report

Country	Data	Time period	Source
UK	Landings statistics data for UK-registered vessels of all lengths, 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. These landings statistics are published annually by the MMO and include vessels registered to the following UK administrations and British crown dependencies: England, Wales, Scotland, Northern Ireland, Isle of Man (IOM), Guernsey and Jersey. Commercial fishing vessels that are registered to the IOM are required to hold both IOM and UK fishing licences.	2016 – 2022 (2021 and 2022 landings statistics became available during report drafting and have been incorporated, extending the 5-year study period to seven years for this dataset) (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)	MMO
All Europe	Landings statistics for EU registered vessels of all lengths with data query attributes for: landing year; landing quarter; ICES rectangle; vessel length; gear type; species; and, landed weight (tonnes).	2012 - 2016	European Union (EU) Data Collection Framework (DCF) database
UK	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 - 2020	MMO
All Europe	VMS data for EU registered vessels ≥12m length.	2017 - 2020	ICES

Country	Data	Time period	Source
	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.		
All Europe	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 - 2022	European Maritime Safety Agency (EMSA)
UK	IFCA fisheries surveillance data, showing records of fishing vessel observations from IFCA patrol vessels.	2015 - 2020	Kent and Essex IFCA (KEIFCA)
UK	VE marine traffic (AIS and radar) survey data.	Summer 2022 & Winter 2022	Anatec
UK	VE fisheries scouting survey data, noting fishing gear and vessel observations.	Summer 2021	Brown and May Marine
Netherlands	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 - 2022	Wageningen University & Research
UK	Annotated Admiralty Charts, with fishing grounds identified by VE Commercial Fisheries Working Group members (confidential data).	Summer 2021	Brown and May Marine

2.3.1   Data Limitations and Uncertainties

A range of different data limitations and uncertainty exist for all of the commercial fisheries datasets assessed within this technical report. The level of uncertainty and confidence associated with each dataset is defined in Table 2.2 based on judgement of the assessment team. 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 Volume 6, Part 2, Chapter 8: Commercial Fisheries and understanding of the baseline environment is sufficiently robust for the purposes of EIA.

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 these data.

It is noted that all commercial landings by UK registered vessels are subject to the Register of Buyers and Sellers legislation and therefore landings by UK vessels of all lengths are recorded within the MMO iFISH database. 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 (RBS) 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 Number (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).

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. To assist in mitigating this risk, recent Dutch landings and VMS data have been requested from Wageningen Marine Research; this data will be purchased and incorporated into the baseline assessment once available.

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 areas (i.e. which typically comprises 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 (Anatec, 2022a and 2022b). Following Commercial Fisheries Working Group (CFWG) engagement, local fishermen have also provided annotated charts noting their fishing grounds.

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 do this has inherent uncertainties whereby actual fishing intensities may vary slightly to those depicted in the VMS data.

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.

Table 2.2 Data limitations and uncertainty (the uncertainty and confidence levels are defined based on judgement and are intended to inform the appropriateness of data used to inform the EIA)

Data source	Type of data	Limitations and uncertainty
Landing statistics		
MMO	Landings statistics (2016-2021) data for UK-registered vessels.	The data are recorded from sales notes and landing declarations for all vessel lengths. Due to the UK legislation of Registration of Buyers and Sellers, data are considered accurate and verifiable. • Data assessed with: low uncertainty and high confidence.
EU DCF	Landings statistics (2012-2016) data for EU landings from ICES rectangle	The data are submitted by individual member states and therefore limitations vary per country. Vessels

Data source	Type of data	Limitations and uncertainty
	36E6 by country, species and gear type.	under 10 m may be omitted or mis-represented by the data. Accuracy is likely to be greater for landings from larger vessels. ▪ For UK vessels under 10 m length, data are assessed with: high uncertainty and low confidence. • For all other EU vessels data are assessed with: low uncertainty and high confidence.
Wageningen University & Research	Landings statistics for Dutch registered fishing vessels with data query attributes for: vessel length; fishing method; ICES rectangle; year; species; weight; value; days fished.	The data are recorded from logbooks. It is understood that landed quantities may be estimated. The value of landings is based on the landings volume per species and the average auction prices per month and species from Dutch auctions. • Data assessed with: medium uncertainty and medium confidence.
Spatial data		
MMO	UK VMS data for vessels ≥15 m length.	The data are only available for 15 m and over vessels, so are not representative of <15 m vessels. • Data assessed with: medium uncertainty and medium confidence.
ICES	EU SAR data for vessels ≥12 m length.	The data are only available for 12 m and over vessels, so are not representative of <12 m vessels. • Data assessed with: medium uncertainty and medium confidence.
EMSA	AIS data for fishing vessels ≥15 m length.	The data are only available for 15 m and over vessels, so are not representative of <15 m vessels. • Data assessed with: medium uncertainty and medium confidence.
KEIFCA	Patrol vessel observations of fishing vessels within Kent and Essex IFCA boundaries.	Patrol data are gathered for enforcement purposes and may not be reflective of fishing activity. • Data is assessed with: high uncertainty and low confidence.
Anatec	Marine traffic (AIS and radar) survey data (2022).	An assessment undertaken into fishing vessel activity to inform the Navigational Risk Assessment (NRA) undertaken for VE. Based on a 14 day AIS and radar survey in winter 2022 and summer 2022. • Data assessed with: low uncertainty and high confidence.
Brown and May Marine	Fisheries scouting survey data (2021).	Two boat-based surveys of five and six days, during summer 2021 to identify potting areas and observe static gear and fishing vessel activity in VE ahead of site investigation surveys. • Data assessed with: low uncertainty and high confidence.
Wageningen University & Research	VMS data for Dutch registered fishing vessels ≥12m length	The data are available for 12 m and over vessels, so are considered representative of the Dutch fleet operating in the study area. • Data assessed with: low uncertainty and high confidence.

3. Baseline Environment

3.1 Overview of Landings

The annual average value of landings from the four ICES rectangles that comprise the study area by UK registered vessels is shown in Figure 3.1 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 £2.57 million whilst equivalent values across the other three rectangles ranged between £510,000 and £685,000. Landings are dominated by shellfish and demersal species.
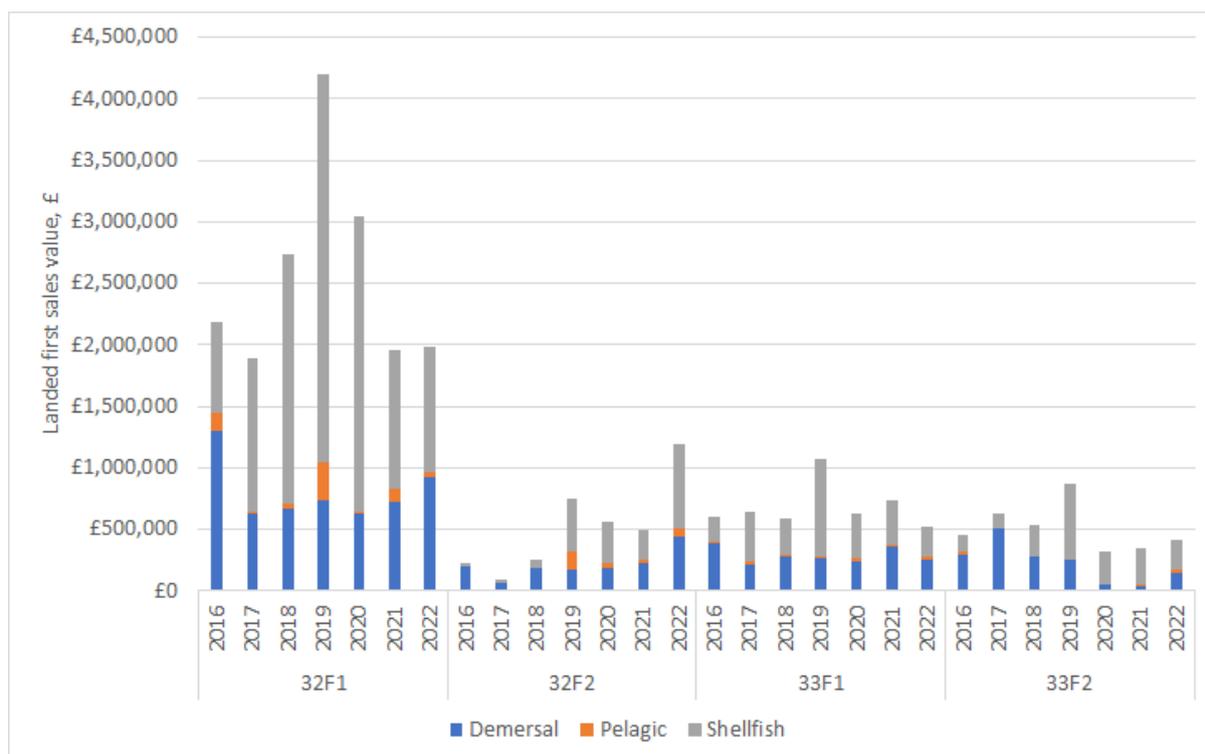
Figure 3.1 Value of landings (2016 to 2022) by ICES rectangle and species group (MMO, 2023)
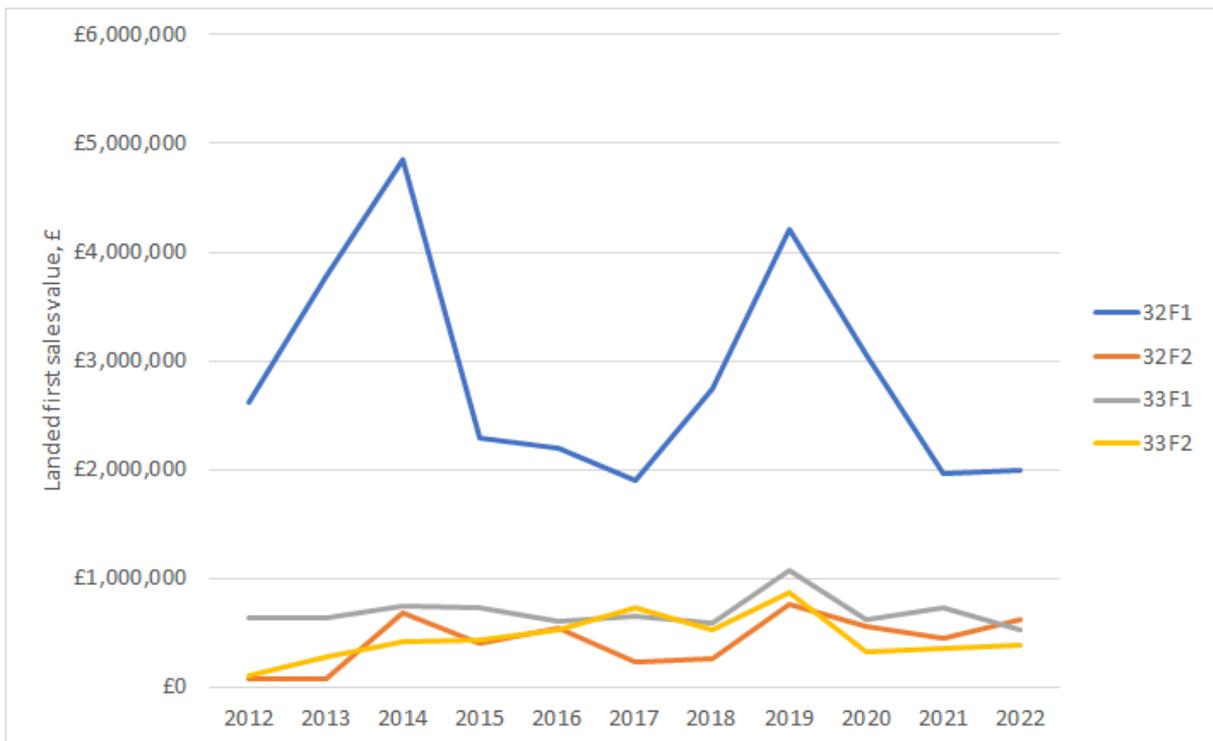
Figure 3.2 Value of landings (2012 to 2022) by ICES rectangle (MMO, 2023)

Focusing in on those ICES rectangles where the VE array areas and offshore ECC are located, Figure 3.3 and Figure 3.4 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 five-year time series, with a relative peak in 2019. Fluctuations are likely to be attributable to a number of factors including changes in market demand and prices, fisheries restrictions and the COVID pandemic. In offshore rectangle 32F2, landings data indicates a notable increase in landings from 2021 of squid *Loligo* and mullets *Mugilidae*.
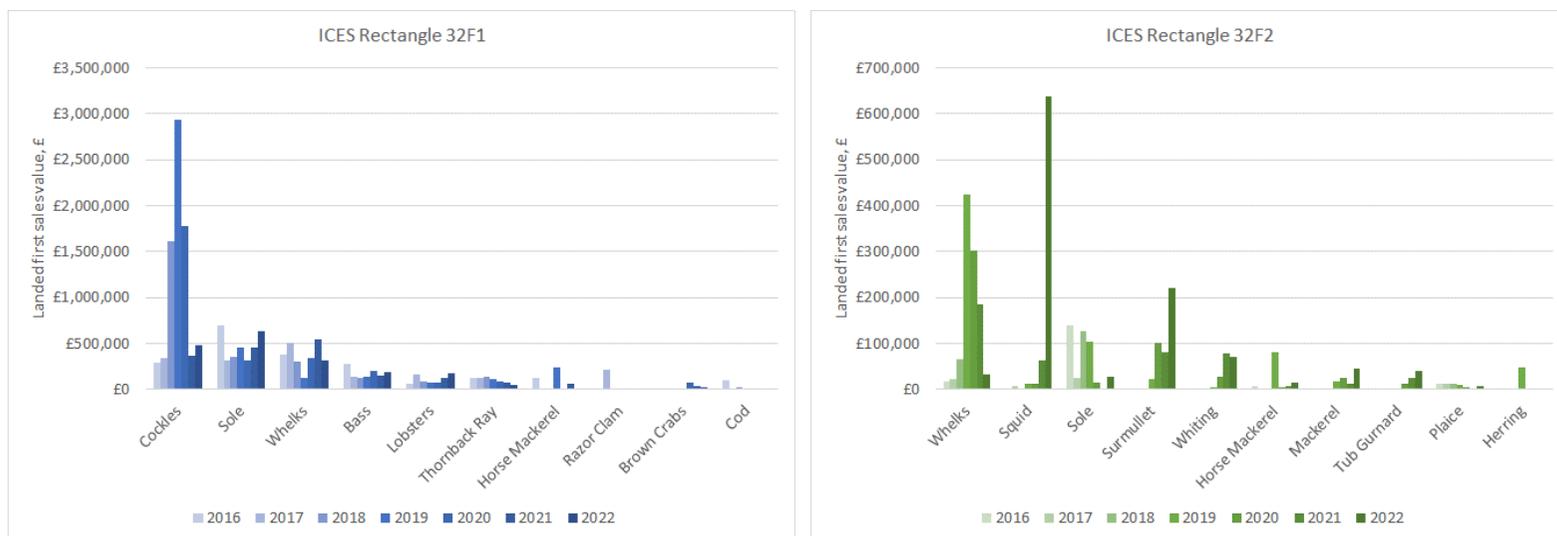
Figure 3.3 Key species by annual landed value (GBP) (2016 to 2022) from ICES rectangles 32F1 and 32F2 (MMO, 2023)
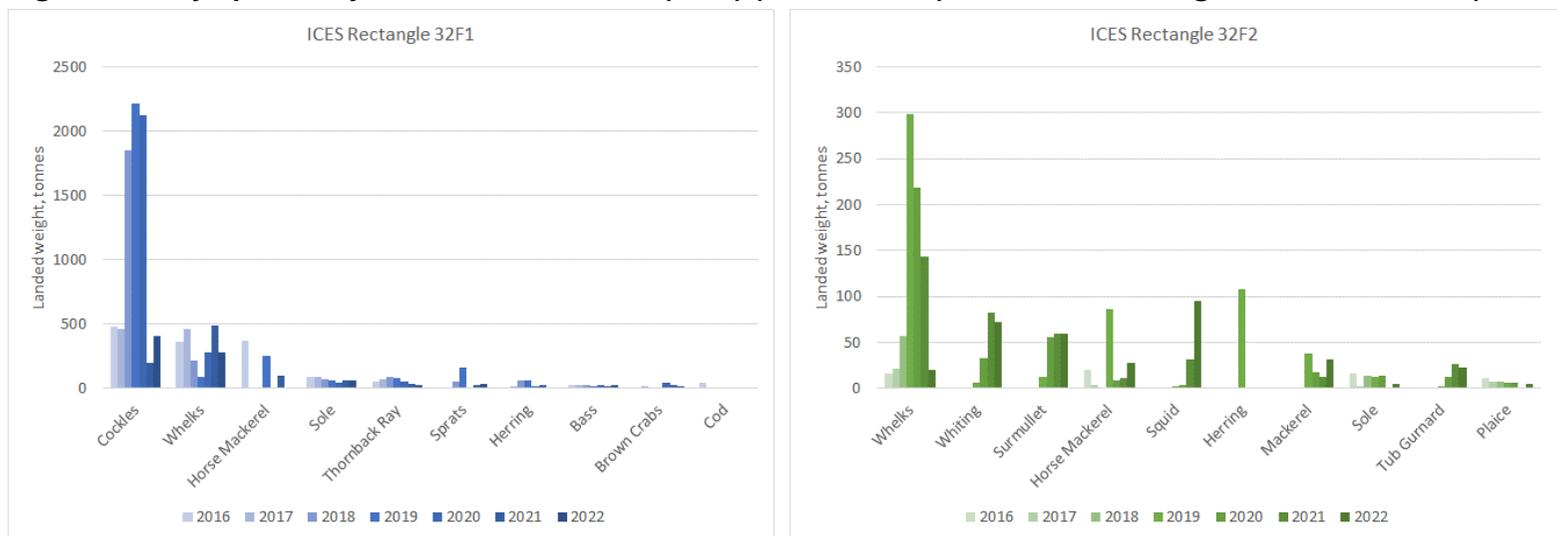
Figure 3.4 Key species by annual landed weight (tonnes) (2016 to 2022) from ICES rectangles 32F1 and 32F2 (MMO, 2023)

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.

Landings data sourced from the EU DCF database indicates that there is likely to be some non-UK fishing activity in ICES rectangle 32F1, however, the majority of fishing activity is 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[1] 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).
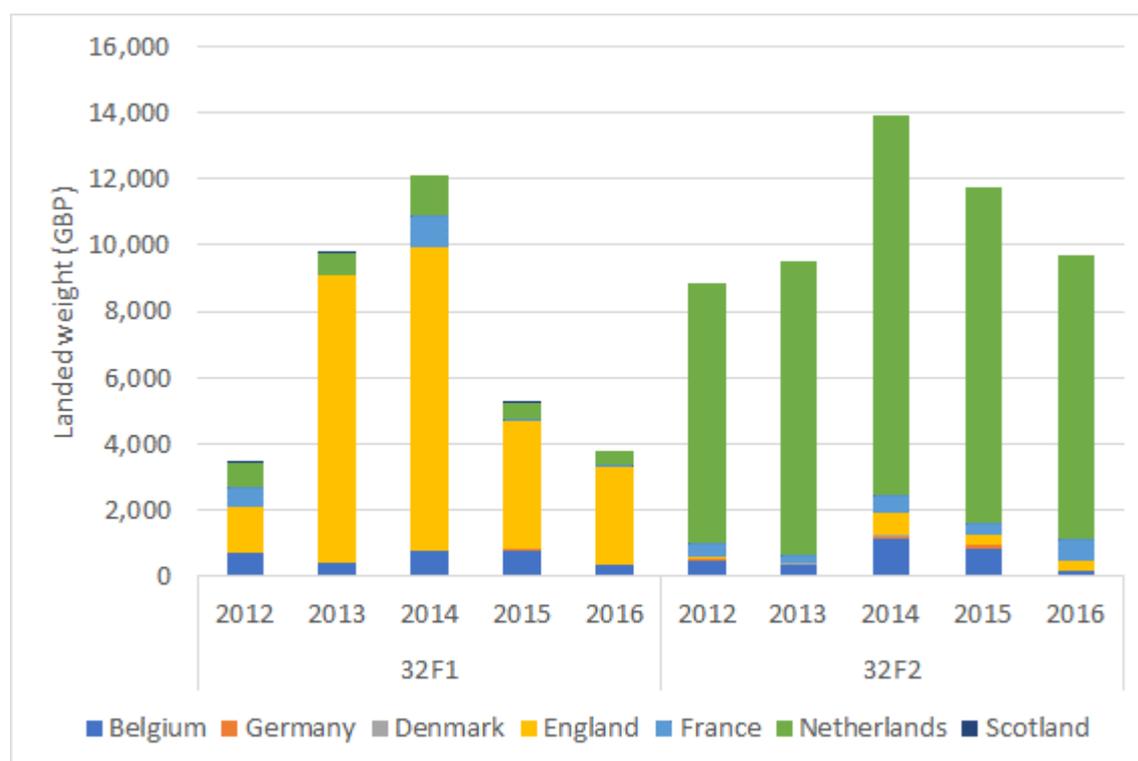
Figure 3.5 Average annual landed weight (tonnes) landed by all UK and EU countries from ICES rectangles 32F1 and 32F2 (2012 to 2016) (EU DCF, 2022)

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[1] From 2017 onwards landings data in the EU DCF database by country are not available by ICES rectangle, hence the presentation of data from 2012 to 2016 to ensure focus on the commercial fisheries study area.
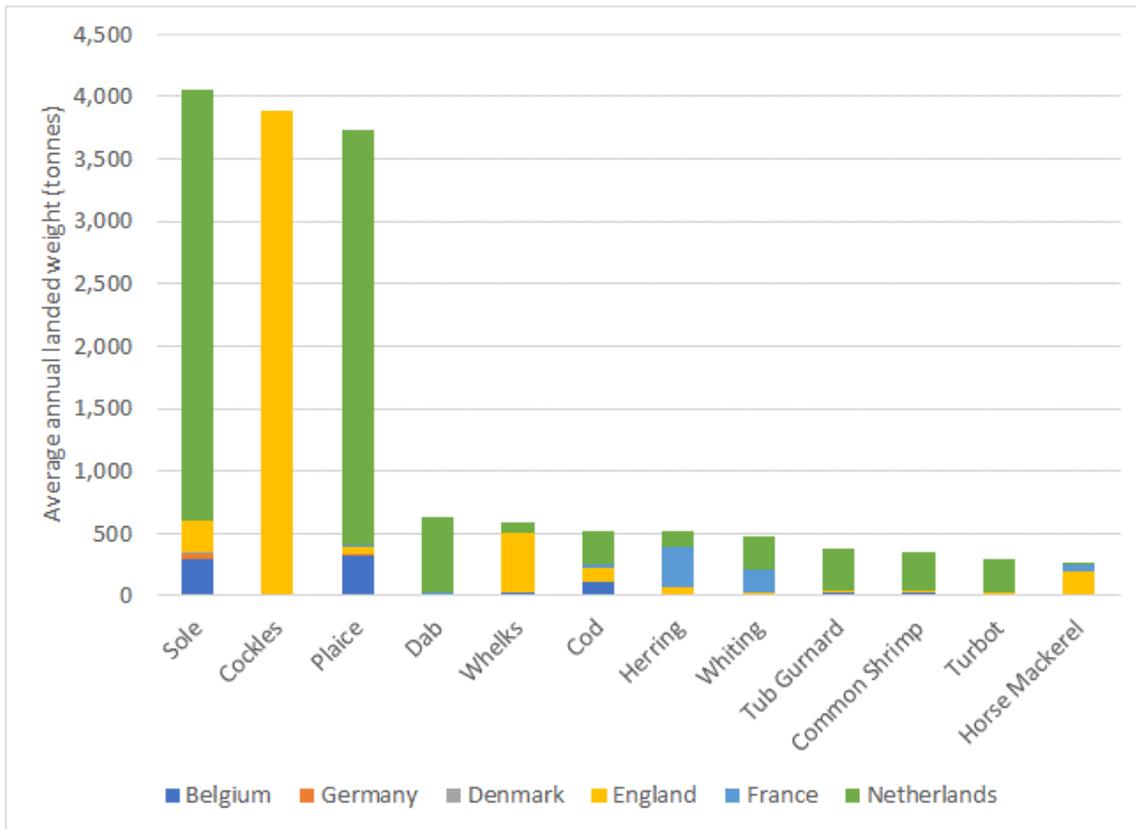
Figure 3.6 Average annual landed weight (tonnes) of species landed by all UK and EU countries from ICES rectangles 32F1 and 32F2 (2012 to 2016) (EU DCF, 2022)

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 3.7 and indicate that across the study area, the greatest volume of landings are taken from ICES rectangle 32F2. The average annual value of landings by Dutch vessels from ICES rectangle 32F2 is recorded as €10.5 million (approximately £9 million). 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 average number of fishing days for Dutch vessels across 2019 to 2022 was 20 days.
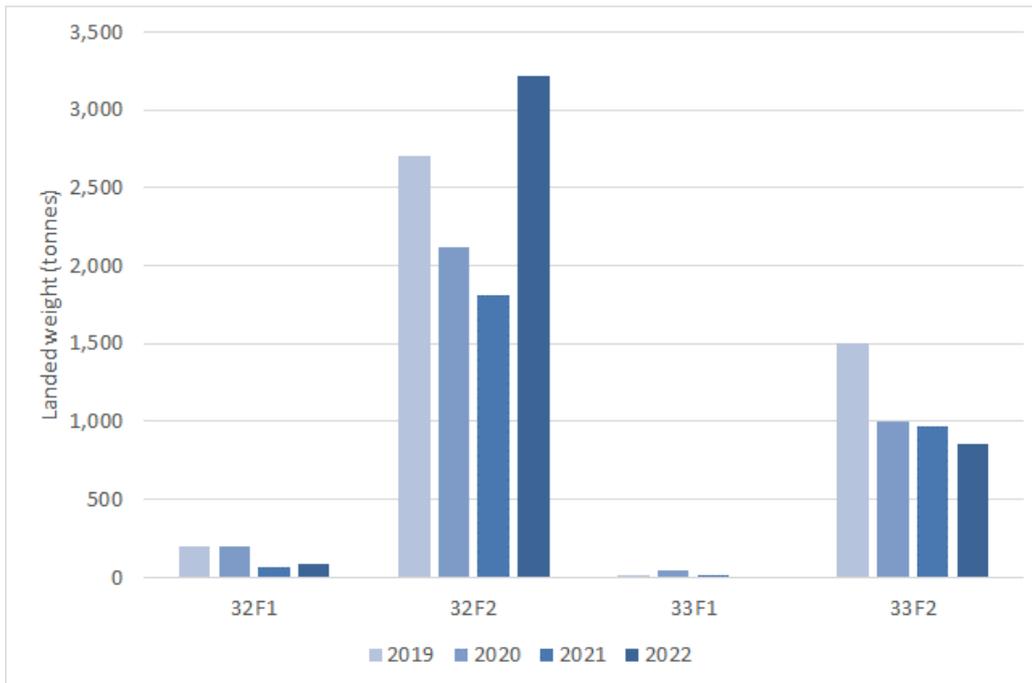
Figure 3.7 Annual landed weight (tonnes) (2019 to 2022) from the commercial fisheries study area for Dutch-registered fishing vessels (Source: Wageningen University & Research, 2023)
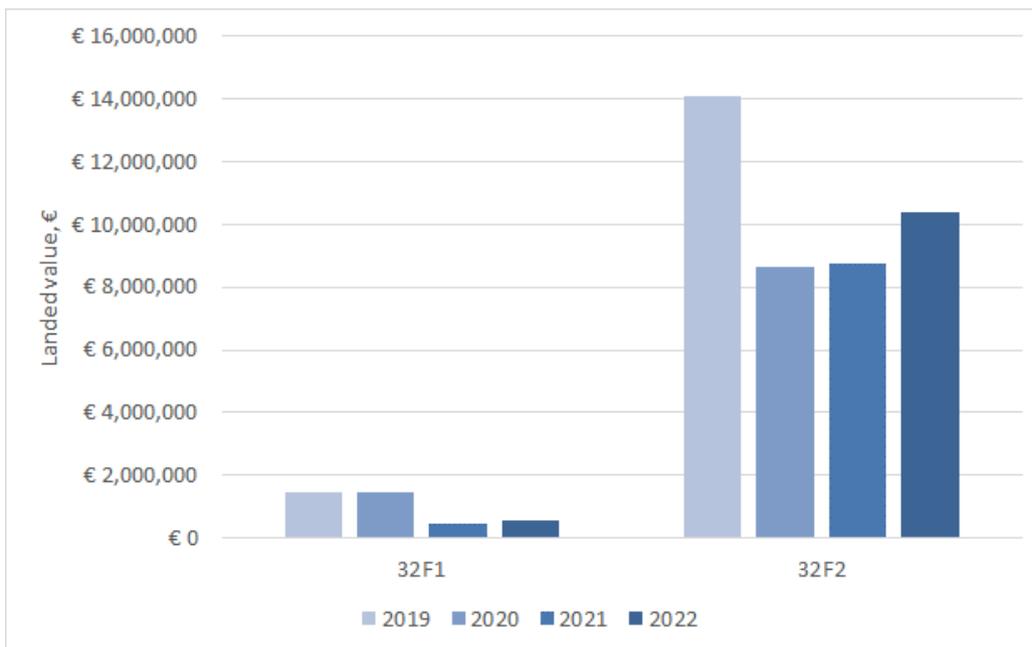
Figure 3.8 Annual landed value (Euros) (2019 to 2022) for Dutch-registered fishing vessels in ICES rectangles 32F1 and 32F2 (Source: Wageningen University & Research, 2023)

3.2 Key Species

3.2.1 Shellfish

Cockles

Cockles are small edible molluscs which live buried in sandy sediments. They have a thick equivalve shell, roughly heart shaped in profile, which can be up to 5 cm in length. Cockles

feed by extending a siphon through which they extract plankton and other organic matter from the water column.

Cockles reproduce by mass spawning events in late spring with spat reaching approximately 10 mm length by the first winter. Cockles are generally found buried up to 5 cm below the surface of clean sand, muddy sands and muddy gravel; on middle to lower intertidal and sub-tidal sediments.

The Thames Estuary cockle fishery is managed by the KEIFCA. KEIFCA has conducted annual cockle surveys in the Thames Estuary since 1988, to determine the distribution, density and population of cockles in the district. This information in turn informs the management strategy of the cockle fishery. Analysis of the cockle population since surveys commenced in 1998 indicate periodic fluctuations, with typical peaks and troughs. The most recently reported stock survey found the adult cockle stocks recorded in 2021 represented a decline of the adult stock size, returning to normal levels following three bumper years in terms of sock size (2017 – 2019, which followed three preceding years of very high spatfall levels). The stock however remains within what is considered its normal range and high spatfall was recorded in 2021, expected to result in increases in the adult stock in 2022/23 (Haupt, 2022).

Cockles are targeted using suction dredges in intertidal areas of the Thames Estuary, out with and to the south of the offshore ECC. Across the 2016 to 2022 period, landings from the study area peaked at 2,200 tonnes in 2019 and were at their lowest in 2021 at 200 tonnes. Fisheries effort is focused across later summer and autumn (Figure 3.9).

Whelks

Common whelk are a gastropod mollusc that inhabit mixed sediment from the low water mark down to 1,200 m, being most common in 0-50 m water depths between 0 and 50 m. Whelk reach reproductive maturity at different sizes depending on their geographical location and environmental conditions. Whelks grow to 150 mm and live for up to 15 years, reaching maturity at two to three years of age. European populations are understood to breed from autumn to winter (Kideys et al., 1993). Eggs are fertilised internally and laid on hard benthic substrata, with juveniles emerging after approximately three to five months. The life cycle therefore has no pelagic phase, leading to limited dispersal between populations.

Whelk pot fisheries have been expanding around the UK in recent years as prices have increased and export to non-EU countries has grown. No Total Allocated Catch (TAC) or quotas are in place for whelk. The current EU-wide Minimum Landing Size (MLS) for whelks is 45 mm, noting that around the UK, whelks typically reach maturity between 45 mm and 78 mm. The Whelk Fishery Flexible Permit Byelaw 2020 requires IFCAs to review flexible permit conditions not less than once every three years; current technical measures applied within the KEIFCA district include limits on pot numbers and pot design requirements (i.e. number and size of escape holes and riddle size).

Whelk landings from the study area have increased markedly from 2010. Across the 2016 to 2022 period, MMO data indicates that landings from ICES rectangles 32F1 and 32F2 peaked at 630 tonnes in 2021 and were at their lowest in 2018 at 275 tonnes. Fisheries effort is focused across winter and spring months (Figure 3.9).

Lobsters

Lobsters are a long-lived decapod crustacean. Lobsters breed once per year in the summer and newly berried females begin to appear from September to December. Lobsters do not undertake any significant migrations and juveniles in the first three to four years of life may be particularly sedentary. From hatching it takes approximately five years for a lobster to recruit to the fishery. Lobsters typically inhabit rocky reef and rough ground, sheltering in crevices between rocks and boulders. The availability of suitable habitat is considered to influence the carrying capacity and size structure of lobster populations.

Cefas defines six Lobster Fishery Units for England and publishes stock status reports for each area every 2 years. In the latest stock assessment in 2019 (Cefas, 2020a), fishing

mortality in the 'Southeast South Coast' is above the level required for Maximum Sustainable Yield (MSY) and the overall status of the stock is described as moderate. There are no TACs or quotas in place for lobster. Primary management is by the technical measure of a MLS of 87 mm (Council Regulation 850/98).

Lobsters are 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 (no landings were recorded for offshore rectangle 32F2) within which the offshore ECC is located fluctuated across 2016 to 2021, peaking at ~12 tonnes in 2017 and lowest in 2019 at 5 tonnes.

Brown Crabs

Brown crabs are a long-lived, large decapod crustacean. Brown crabs are very productive animals and each female can hatch between one and four million eggs. Post larvae are known to settle inshore and juvenile crabs are more common in shallow waters. Adult crabs undertake extensive migrations, which may be associated with their reproductive cycle. Brown crabs are found across a wide range of habitat types, ranging from rocky reefs to soft mud and sand.

As with lobsters, brown crabs are caught by pots and have no TACs or quotas in place. Primary management is by the technical measure of a MLS of 140 mm carapace width inside 6 NM and 130 mm outside 6 NM (Council Regulation 850/98). Cefas stock status reports indicate that in the Southern North Sea, fishing mortality is high and above the maximum reference point. Spawning stock biomass has been increasing in recent years but remains below the MSY target (Cefas, 2020b).

Fishing activity typically peaks across late summer and autumn in the study area. Landings from ICES rectangles 32F1 (no landings were recorded for offshore rectangle 32F2), within which the offshore ECC is located, fluctuated markedly across 2016 to 2021, peaking significantly at ~50 tonnes in 2020 and lowest in 2016 at less than 0.5 tonnes (averaging 15 tonnes across the seven-year period).

3.2.2 Demersal Finfish

Sole

Sole are a flatfish that belongs to the family of flatfishes known as Soleidae. They spawn in spring and early summer in shallow coastal water, from April to June in the southern North Sea and from May to June off the coast of Ireland and southern England. The larvae remain in shallow inshore nursery areas such as estuaries, tidal inlets and shallow sandy bays, moving to join the spawning adult population at two to three years old. Adults are usually found at a depth range of between 10 and 60 m; in winter, adults move further offshore and can reach depths of up to 120 m. The juveniles can undertake extensive migrations, although once they reach maturity, will only carry out seasonal migrations from deeper water to shallower spawning habitat. They can reach 70 cm in length but are commonly between 30 and 40 cm.

Catches of sole have declined since the mid-1990s, with decline attributed to a number of factors including declining fish stocks, changes in stock distribution, reduced fishing fleet size and restricted fishing opportunities. The latest ICES stock assessment observes that spawning stock biomass is estimated to be above the maximum sustainable yield trigger point (ICES, 2022a). Sole are subject to a North Sea TAC (set at 15,330 tonnes in 2022 and advised to be less than 10,000 tonnes in 2023) and technical measures are applicable to the mixed demersal beam-trawl fishery (relevant to both sole and plaice), namely a minimum mesh size of 80 mm. A minimum conservation reference size of 24 cm is in place.

Sole are caught in a mixed fishery with other flatfish as well as gadoids. In the study area, they are targeted using nets and beam and otter trawls, with landings peaking across spring and summer months. Across the 2016 to 2022 period, MMO data indicates that landings by UK-registered from ICES rectangles 32F1 and 32F2 peaked in 2016 at ~130 tonnes and have declined annually, reaching between 60 and 70 tonnes in 2020,2021 and 2022. Landings by

non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 4,000 tonnes annually, with most landings attributable to Dutch vessels.

Plaice

Plaice are bottom-dwelling flatfish. They spawn in the early months of the year (January to March) and sometimes make long spawning migrations. They grow to around 50 to 60 cm in length but have been recorded up to 90 cm. Plaice are most commonly found on sandy bottoms but can live on gravel or mud. They are active at night and remain stationary during the day, usually buried within the sediment leaving only the eyes protruding. They have been recorded from between 0 and 200 m depth, but are mostly between 10 and 50 m.

The North Sea plaice stock is in a healthy state and fishing pressure is considered sustainable (ICES, 2022b). The TAC in recent years have been set in line with advice, and catches are usually below TACs, owing to limited market demand. The fishery is subject to technical measures including minimum net mesh sizes and a minimum conservation reference size of 27 cm.

Across the period 2016 to 2022, landings of plaice by UK-registered vessels from ICES rectangles 32F1 and 32F2 declined from ~20 tonnes to ~4 to 6 tonnes. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 3,700 tonnes annually, with most landings attributable to Dutch vessels.

Thornback ray

Thornback rays or roker belong to the Rajidae family of skates and rays. Thornback rays have been described as showing philopatric behaviour (tendency of a migrating animal to return to a specific location in order to breed or feed). Females can grow to 118 cm in length and 18 kg in weight, while males can reach 98 cm in length. Thornback rays frequent a wide variety of grounds from mud, sand, shingle to gravel. It may be found to a depth of 300 m but is most common between 10 and 60 m. They move offshore to deeper waters in the autumn and winter, and back to shallower inshore waters in spring. However, the number of thornbacks remaining in inshore waters is reported to be extending further into the winter months in recent years in the Thames estuary area, with some thought to be resident all year round (KEIFCA website, 2022).

Information on the status of the stock is limited but there is currently no concern over fishing pressure. Skates and rays are managed under five regional TACs which are applied to a group of species, rather than individual skate and ray species. There are no official minimum landing sizes.

Thornback rays are targeted seasonally or as bycatch in trawl and gillnet fisheries. Across the period 2016 to 2022, landings of thornback rays from ICES rectangles 32F1 (minimal landings were recorded for offshore rectangle 32F2) by UK-registered vessels averaged 61 tonnes per annum, reaching 90 tonnes in 2018. Smaller landed volumes may be attributed to French vessels based on EU landings data covering the period 2012 to 2016.

Bass

Bass are a streamline bodied fish with a large head and mouth. They have small silver scales covering their body and two dorsal fins, the front one has 8-9 sharp spiny rays. Spines are also noticeable on the lower part of the gill plate. Bass are found sub-tidally down to around 100 m water depth around most of the UK. Young fish are often found schooling in shallow waters, estuaries and the lower reaches of rivers.

Larger adult bass are found in deeper water but come closer inshore to warmer waters from March to mid-June. Bass are a relatively slow growing species with males reaching minimum landing size at a mean age of 4 years and females from 5 years in the UK.

Bass spawning stock biomass has historically declined since 2005, showing signs of slow increase in recent years (ICES, 2022e), and fishing pressure has been reduced by a series of management measures, developed since 2015 when emergency measures were brought into

force (e.g., increasing the MLS to 42 cm from 36 cm, stopping the offshore pelagic trawl fishery on spawning aggregations in 2015). Further measures were introduced in 2020, and in the North Sea commercial fishing for bass can only take place at certain times of the year (January; April-December) with authorisation from the MMO. Fishing for bass is prohibited during February and March (spawning season). Bass are not subject to EU TACs or quotas.

Bass are targeted seasonally using nets and gears with hooks. Across the period 2016 to 2022, landings of bass from ICES rectangle 32F1 (minimal landings were recorded for offshore rectangle 32F2) averaged 24 tonnes per annum, peaking at 30 tonnes in 2020.

Red Mullet

Red mullet *Mullus surmuletus* is a warm-temperate species reaching its northern distribution limit in the North Sea. They migrate through the Channel and into the southern North Sea in spring. They can reach over 30 cm in length and in the North Sea are found on sandy or muddy bottoms in depths down to 90 m, but also at times on rocky ground.

Stock data is limited. There is concern for fishing mortality and concern for the biomass (ICES, 2019). There are no specific management objectives and no total allowable catch set for this stock. There is also no minimum conservation reference size for red mullet.

Red mullet are typically taken as bycatch from seines targeting demersal fish. Across the period 2016 to 2022, landings of red mullet by UK-registered vessels from ICES rectangle 32F2 (minimal landings were recorded for inshore rectangle 32F1) averaged 29 tonnes per annum, peaking at 63 tonnes in 2021. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 90 tonnes annually, with most landings attributable to Dutch vessels and small volumes to French and Belgian vessels.

Brill

Brill are a flat fish which are part of the Turbot family. This species usually lives on sandy seabed but is sometimes encountered on gravel or mud. Adult fish can grow to 75 cm in length although most are less than 50 cm. Juveniles favour shallow, coastal areas whereas mature adults can be found to depths of 100 m. Mature brill migrate inshore to spawn at depths between 10 m and 20 m from February to August with the majority of individuals having spawned by the end of July in the North Sea.

Data on brill stock status are limited but the stock size is considered to be above the MSY trigger (ICES, 2022g). Brill are currently managed by a combined TAC) with turbot.

Brill are mostly taken as bycatch in demersal fisheries targeting other flatfish species such as sole and plaice. Across the period 2016 to 2022, landings of turbot from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged two tonnes per annum. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 170 tonnes annually, with most landings attributable to Dutch vessels.

Turbot

Turbot *Scophthalmus maximus* are large flatfish typically found at a depth range of 10 m to 70 m, on sandy, rocky or mixed bottoms. Juveniles are commonly found in shallow coastal waters with the adults in deeper offshore waters. This is variable throughout the year with sexually mature turbot migrating into shallower inshore areas between April and August to reproduce.

Stock status is understood to be good, and fishing mortality below the MSY (ICES, 2022c). Turbot in the North Sea are managed under a combined TAC together with brill (advised to be no more than 2,432 tonnes in 2023) (ICES, 2022c).

Turbot in the North Sea are high value bycatch species in trawl fisheries for other demersal species. Across the period 2016 to 2022, landings of turbot from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged two tonnes per annum. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 290 tonnes annually, with most landings attributable to Dutch vessels.

Tub Gurnards

The tub gurnard *Chelidonichthys lucerna* is the largest of the European gurnards, found on sandy seabed down to 140 m. It can reach up to 30 cm in length.

The stock status of tub gurnard is unknown (Marine Conservation Society, 2022). Relatively little data are collected for gurnards, and even less data are collected for tub gurnard as they are often misidentified with the red gurnard. There is concern for the biomass, as there is no available biomass data, and no concern for fishing pressure. There is currently no fisheries management for any of the gurnard species.

Tub gurnard is normally caught as bycatch in mixed demersal fisheries for flatfish and roundfish. Across the period 2016 to 2022, landings of turbot from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged 11 tonnes per annum, increasing notably in 2021 and 2022. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 370 tonnes annually, with most landings attributable to Dutch vessels.

Whiting

Whiting are widely distributed both inshore and offshore throughout the North Sea. Whiting are commonly found on mud and gravel bottoms, but also on sand and rock. Whiting spawn between January and July with spikes in their breeding activity during the spring. Juveniles inhabit inshore nursery areas for their first year and then they migrate to deeper waters offshore.

ICES stock assessments indicate that catches of whiting have decreased since the late 1970s, and whilst the spawning stock has fluctuated significantly, it is presently considered by ICES to be above maximum sustainable yield with the stock not subject to overfishing (ICES, 2022d).

Whiting stocks are subject to a TAC, which is set for stock across both the North Sea and Norwegian Sea. Whiting is also subject to technical management measures, including an EU minimum conservation reference size of 27 cm and a minimum mesh size of 80 mm is applied to gears specifically targeting whiting.

Whiting are typically targeted during spring and summer months as part of both targeted and mixed demersal fisheries. Across the period 2016 to 2022, landings of whiting by UK-registered vessels from ICES rectangles 32F1 and 32F2 averaged 29 tonnes per annum, peaking at ~80 tonnes in 2021. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 480 tonnes annually, with most landings attributable to Dutch and French trawlers.

Dabs

Dab *Limanda limanda* are a small and common flatfish, similar in general shape to the plaice and flounder. Dab live in sandy areas from the shore down to 150 m but are most common between 20 m and 40 m. The young live close inshore, usually in less than 1 m of water and the adults migrate inshore from deeper water in the warmer summer months.

The latest stock assessment undertaken by ICES (ICES, 2022h) indicates that overfishing is not occurring, and the biomass was not overfished. Dab is considered an under-utilised species. Under-utilised species are those that fishers do not' catch their full quota of, or they catch them but then discard the fish because there is little market demand. There are no specific management objectives for this species.

In the study area, dab are mainly taken as a bycatch species in fisheries for other demersal species. Across the period 2016 to 2022, landings of dab by UK-registered vessels from ICES rectangles 32F1 and 32F2 averaged four tonnes per annum. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged 620 tonnes annually, with most landings attributable to Dutch vessels.

Flounder or Flukes

Flounder *Platichthys flesus* are a widespread coastal European fish species. They divide their life cycles between brackish and freshwater habitats. They move offshore into deeper water of higher salinity in winter where they spawn in the spring. Spawning takes place at depths of between 20 and 50 m from February to May. After spawning they migrate to inshore and sometimes brackish waters. Like plaice, they spend most of the day buried in the sand but become very active at night and move into shallower water to feed. Flounder attain a length of 50 to 60 cm and can live up to 15 years.

Flounder are mainly taken as a bycatch species in fisheries for plaice and sole (though also caught in shore-based fixed nets in inshore waters) and data on the status of the stock is limited. There is currently no total allowable catch for this species and there is no minimum conservation reference size.

Across the period 2016 to 2022, landings of flounder from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged ~3 tonnes. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged ~200 tonnes annually. Most non-UK landings were attributable to Dutch vessels.

3.2.3 Pelagic Finfish

Herring

The North Sea herring stock, which collapsed in the 1970s and was closed to fishing for several years, subsequently recovered, and although it fell back in the mid-1990s, it has again been rehabilitated. Since 1998 spawning stock biomass has been above MSY and fishing pressure has remained below the maximum sustainable yield benchmark (ICES, 2022), though there are concerns that future low recruitment could alter this trend. Applicable to directed herring fisheries in the North Sea there is a Minimum Conservation Reference Size of 20 cm (3 cm above the size of maturity). Catches below this size must be landed but cannot be sold for human consumption, and so are less valuable.

Herring schools move between spawning and wintering grounds in coastal areas and feeding grounds in open water. Herring populations are known to use traditional spawning grounds, many of which are along shallow coastal areas (15 m to 40 m depth), or on offshore banks down to 200 m. Spawning usually occurs on gravel or rock bottoms.

Herring form distinct breeding stocks, known as races, categorised by their separate spawning grounds and some distinguishing features. The race found off Essex is referred to as the Downs group and spawns from November to January. A small discrete coastal herring stock, referred to as Thames-Blackwater herring, spawn in spring in the Blackwater Estuary. Herring schools move between spawning and wintering grounds in coastal areas and feeding grounds in open water. Herring spawning activity is described in additional detail in Volume 6, Part 5, Annex 6.1: Fish and Shellfish Ecology Technical Report.

Herring are caught using nets in inshore waters and pelagic trawls further offshore, operated from English, French and Dutch vessels, with landings data indicating peaks in autumn/winter months. Across the period 2016 to 2022, landings of turbot from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged ~40 tonnes, peaking at 170 tonnes in 2019 and recorded as 6 tonnes in 2022. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged ~500 tonnes annually, fluctuating significantly and peaking in 2014 at 1,600 tonnes. All non-UK landings were attributable to French and Dutch vessels.

Mackerel

Mackerel are a pelagic species that live near the surface of the sea in large shoals. North Sea mackerel overwinter in the deep water, to the east and north of Shetland and on the edge of the Norwegian Deep. In the springtime, they migrate south to spawn in the central part of the North Sea from May until July.

Current fishing pressure is considered to be below the maximum sustainable yield, though spawning stock biomass has been in decline since 2015. In terms of fisheries management measures, a TAC is in place that covers all northeast Atlantic fisheries and in North Sea waters and latest ICES advice proposes a reduction in catch allowances. A minimum conservation reference size of 30 cm is in place.

Across the period 2016 to 2022, landings of mackerel from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged ~15 tonnes, peaking at ~40 tonnes in 2019. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged ~90 tonnes annually. Non-UK landings were attributable to French and Dutch vessels.

Horse Mackerel

Horse mackerel is a broad vernacular term for a range of species of fish throughout the English-speaking world. It is commonly applied to pelagic fishes, especially of the Carangidae (jack mackerels and scads) family. Reported landings of Atlantic horse mackerel, European horse mackerel or common scad are, for the purposes of this report, considered to refer to the same species.

In common with mackerel, horse mackerel overwinter in dense shoals along the edge of the continental shelf and also in localised waters. The North Sea stock spawns in the southern North Sea in summer, then migrates to the central North Sea, Skagerrak and Kattegat.

ICES assesses that fishing pressure on the horse mackerel stock is above maximum sustainable yield and its advice on catch allowance reflects this (ICES, 2022). Beyond TACs the fishery is managed by a minimum landing size of 15 cm.

Across the period 2016 to 2022, landings of horse mackerel from ICES rectangles 32F1 and 32F2 by UK-registered vessels averaged ~130 tonnes, with significant peaks in landings in 2016 and 2019 and a lesser peak in 2021. Landings by non-UK European registered vessels across the same area over the period 2012 to 2016 averaged ~80 tonnes annually. Non-UK landings were attributable to French and Dutch vessels.

Sprats

Sprat *Sprattus sprattus* are a short-lived clupeoid species with large inter-annual fluctuations in stock biomass, mainly driven by recruitment variability. Sprat in the North Sea have a prolonged spawning season ranging from early spring to the late autumn and is triggered by the water temperature.

The majority of the sprat landings are taken in highly targeted trawl fisheries with juvenile herring; landings of sprat are typically limited by herring bycatch restrictions. The North Sea and Norwegian Sea sprat stock is considered to be above target levels, though fishing mortality has been high in recent years. ICES advises that catches in the period from 1 July 2022 to 30 June 2023 should be no more than 68,690 tonnes; a significant reduction on advice in previous years (ICES, 2022f).

Across the period 2016 to 2022, landings of sprats from ICES rectangle 32F1 (no landings were recorded for offshore rectangle 32F2) by UK-registered vessels peaked at ~170 tonnes in 2019 and was at its lowest, with less than 1 tonne landed, in 2017. EU landings data indicates minimal (~6 tonnes across the period 2012 to 2016) landings of sprat by non-UK vessels.
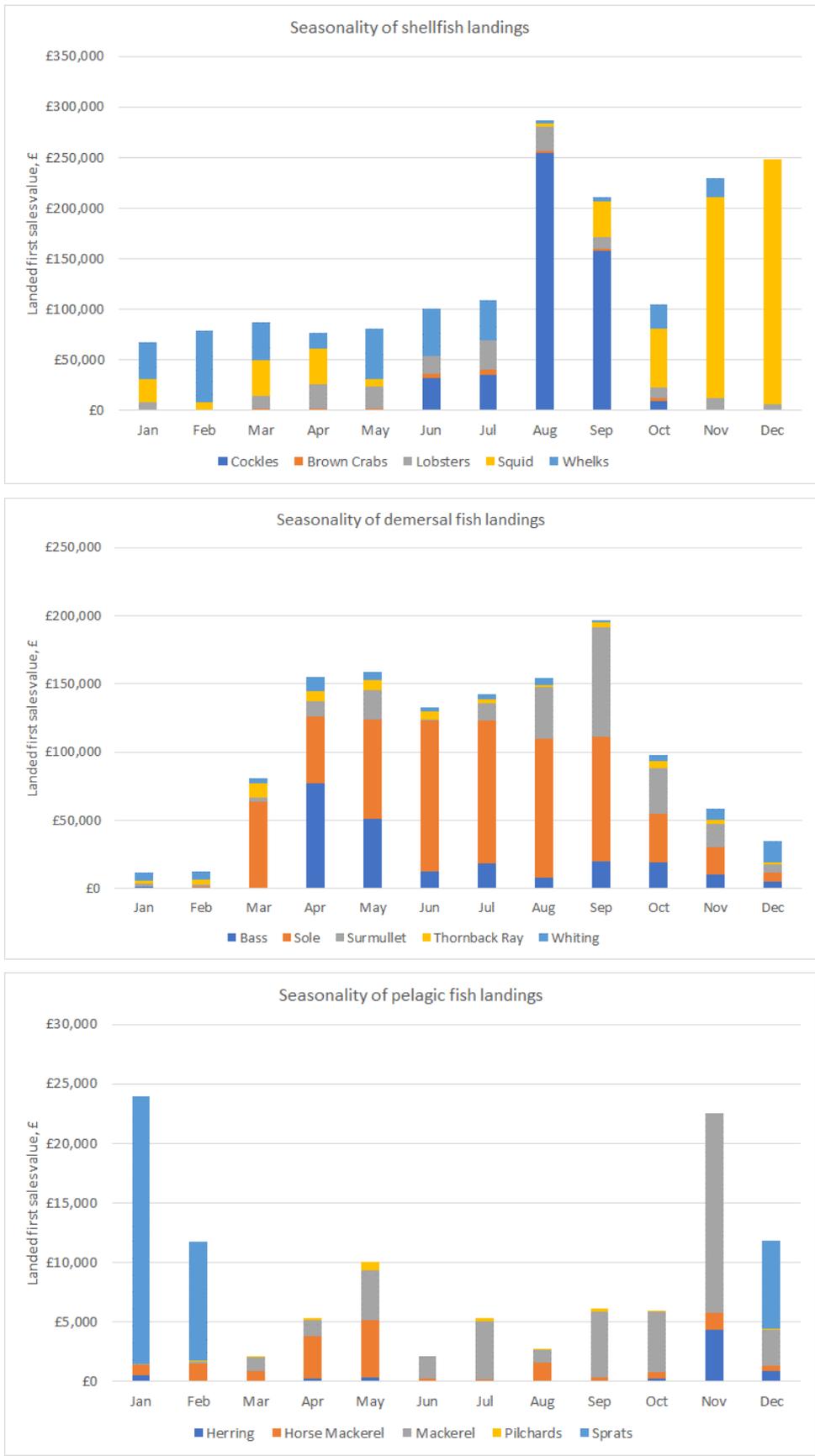
Figure 3.9 Seasonality of landings of key shellfish, demersal and pelagic species based on landed value (GBP)) in 2022 from ICES rectangles 32F1 and 32F2 by UK vessels (MMO, 2023)

3.3 Key Fishing Gears

There are three descriptive units used for defining fisheries (Marchal, 2008):

- **fishery** – a group of vessel voyages which target the same species or use the same gear;
- **fleet** – a physical group of vessels sharing similar characteristics (e.g., nationality); and
- **métier** – a homogenous subdivision, either of a fishery by vessel type or a fleet by voyage type.

A range of fleets target different fisheries across the study area, as indicated by landings statistics for registered vessel nationality and gear type (Figure 3.10). Across the study area, in ICES rectangle 32F1, English vessels dominate landings with dredges, pots, otter trawls and nets accounting for the majority of landings. Further offshore in ICES rectangle 32F2, Dutch beam trawlers account for a large proportion of landings.

Vessel and gear types within the key fleets and fisheries that operate across the study area are described within this section.
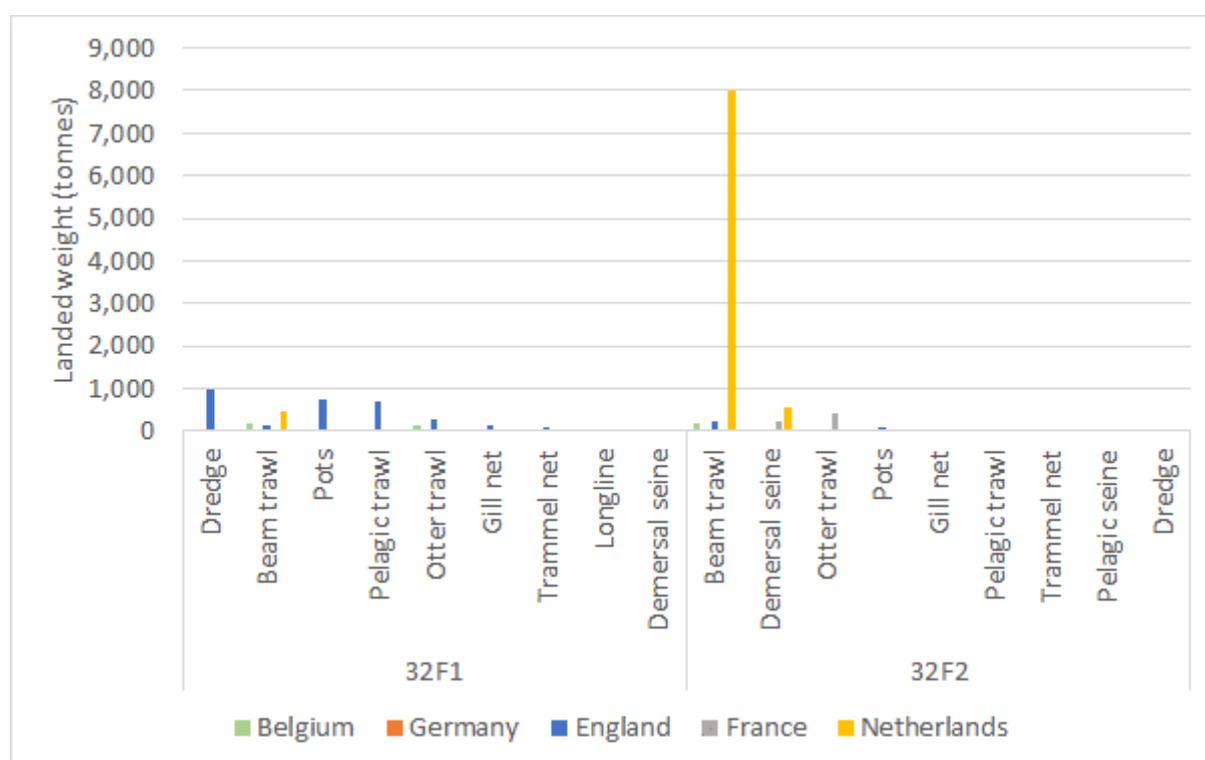

Figure 3.10 Landed weight in 2016 by gear type and vessel origin (EU vessels, including UK vessels) for the study area (Data source: EU DCF, 2022)
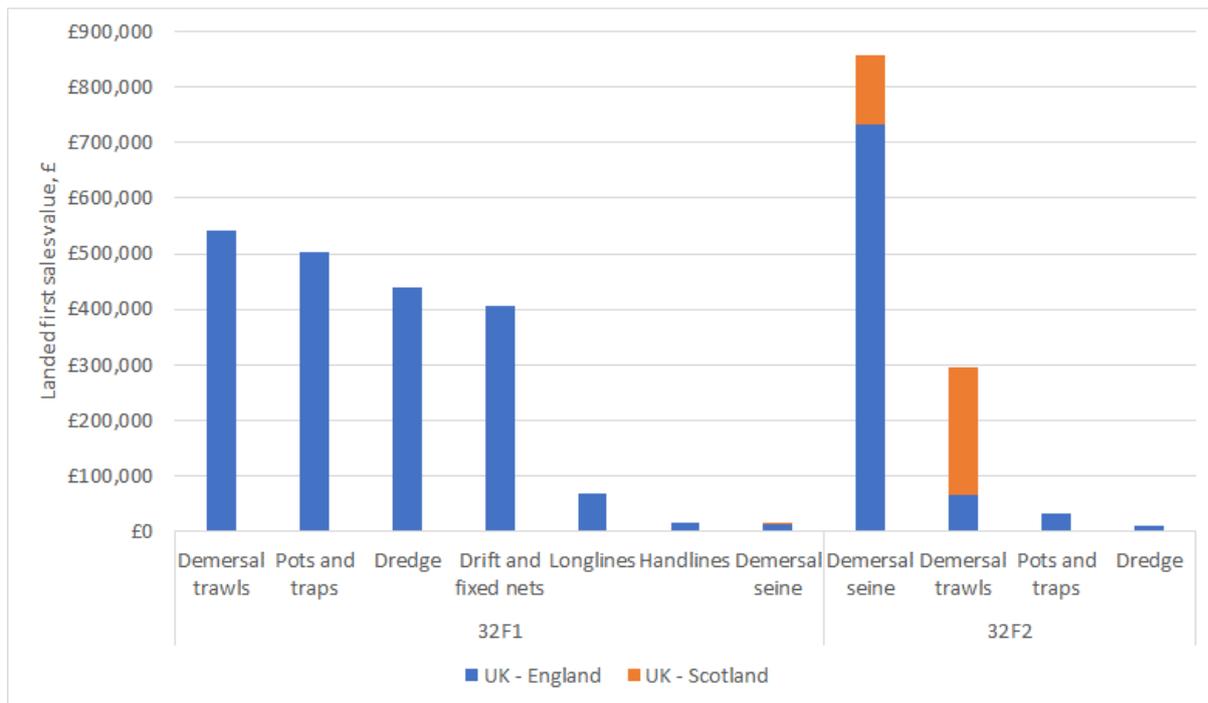
Figure 3.11 Landings value in 2022 by gear type and vessel origin (UK vessels only) for the study area (Data source: MMO, 2023)

3.3.1 Cockle Dredge

The Thames Estuary supports an important cockle fishery, with distinct fishing grounds (see Figure 3.12) located primarily to the south of VE.

Traditionally, the cockle fishery was a year-round fishery which was worked by fishermen sailing and steaming to the main harvesting grounds, allowing their vessels to dry out on the intertidal sands and then hand-raking cockles into small net bags which were then transferred to baskets. Over time, the industry became more mechanised and use of hydraulic suction dredges began in the 1960s.

The fishery is now largely regulated by the KEIFCA (under the Thames Cockle Fishery Order 1994), who restrict the number of licences allowing exploitation of the fishery. Licensed cockle fishing vessels, of length up to 14 m, operate suction dredges for the harvesting of cockles. Grounds 18 (Gunfleet Sand) and 20 (Wallet and North Essex Coast) (Figure 3.12), proximate to the offshore ECC, have not been fished in recent years (Haupt, 2022a).

Figure 3.12 Cockle management areas in the Thames Estuary (Source: Haupt, 2022b)

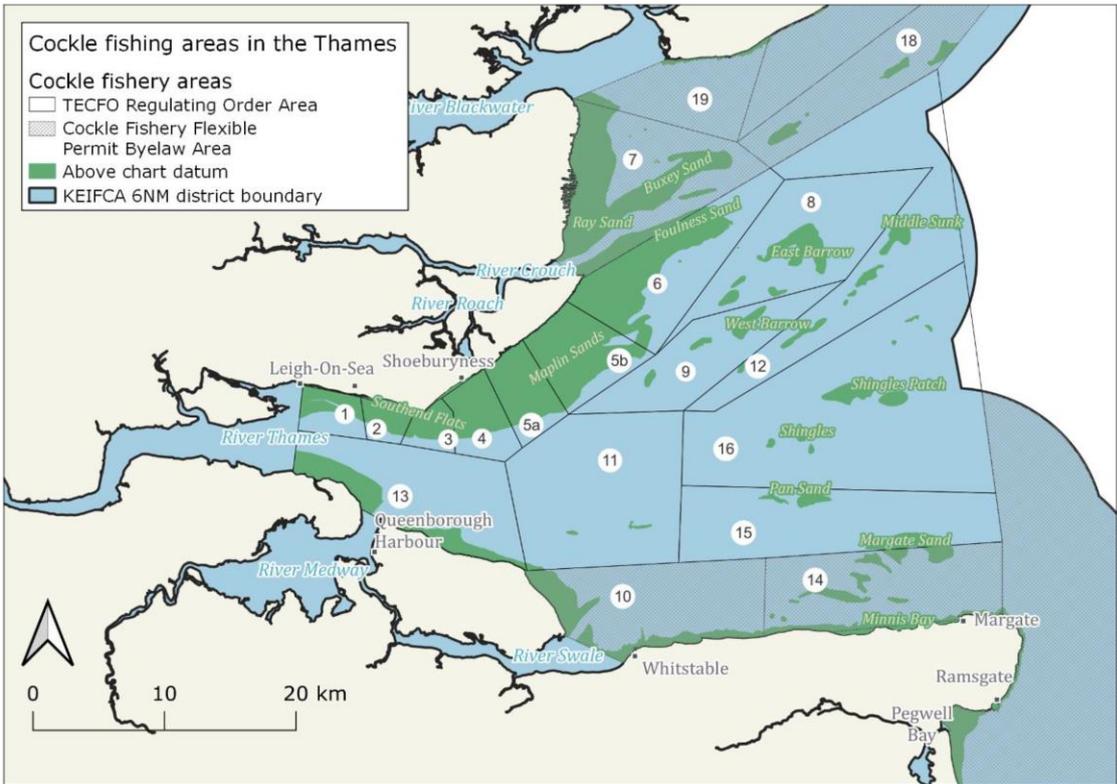**Figure 3.13 Typical Thames Estuary cockle dredgers (Source: KEIFCA)**

3.3.2 Beam Trawl

Figure 3.14 shows a typical beam trawler and associated gear and Table 3.1 describes the profile of beam trawling vessels active across the study area.

Beam trawl gear is used to target flatfish such as sole and plaice, which are often somewhat buried in the seabed. Beam trawl nets are held open by a heavy steel beam which is towed along the seabed on a line approximately three times the depth of the water. Some beam trawls include tickler chains, which drag along the seabed in front of the net, disturbing fish in its path and encouraging them to rise into the net. Beam trawls can range in length from 4 m to 14 m and each trawler tows two beam trawls at a time from derricks on either side of the vessel.

Catches with beam trawl form a significant portion of annual landings from the study area. Fishing effort for the target flatfish species is spread over a wide area and across various grounds throughout the North Sea.

Table 3.1 Profile of typical beam trawl vessel active across the study area

Parameter	Indicative details
Main target species	Sole, plaice, thornback ray, brown shrimp (lightweight trawling in coastal waters)
Nationality	Dutch, Belgian, English
Vessel length	15 m to 45 m
Horsepower	500 hp to 2,000 hp
Typical towing speed	3.5 to 8 knots
Typical duration of tow / dredge	1 to 2 hours
Seasonality of activity	Peak activity in spring months
Typical gear	Twin beam, occasionally single beams; beam length up to 12 m. Each beam weighing <10 tonnes. Chain matting or individual chains attached to underside.

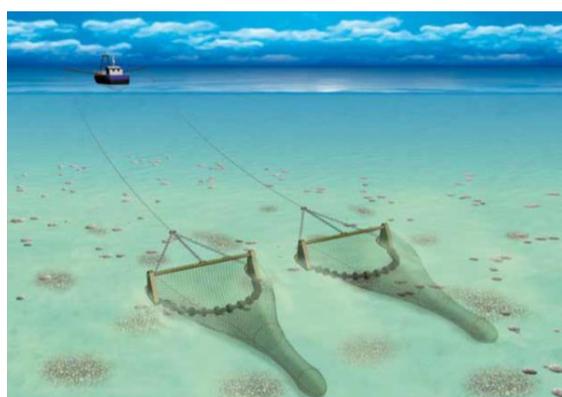**Figure 3.14 Typical beam trawler and gear diagram (Source: Seafish, 2015; Hook and Net Magazine, 2020)**

3.3.3 Demersal Otter Trawl

Otter trawling uses a cone-shaped net which is held open by water pressure on two otter boards. The net is towed either across the seabed or within the water column. Fish are herded between the boards into the mouth of the trawl and then forced along a funnel into the end of

the net. Net mesh sizes can be altered to target different fish species. Light otter trawling can be conducted by smaller boats using small doors.

Within the study area, English trawlers of under 10 m length are active inshore, whilst larger Belgian and French trawlers of up to ~35 m length are active offshore outside of 6 NM.

Figure 3.15 shows a typical demersal trawler and associated gear and Table 3.2Table 3.1 describes the profile of demersal otter trawling vessels active across the study area.

Table 3.2 Profile of typical otter trawl vessel active across the study area

| Parameter	Indicative details
Main target species	Whiting, sole, thornback ray
Nationality	English, French, Belgian
Vessel length	Under 10m (English) and over 10 m (English, French, Belgian)
Horsepower	50 hp to 850 hp
Typical towing speed	2 to 6 knots
Typical duration of tow / dredge	1 to 2 hours
Seasonality of activity	Year-round, summer/autumn peak
Typical gear	Demersal otter trawl Two trawl doors hold the net open horizontally Various forms of ground gear depending on target species
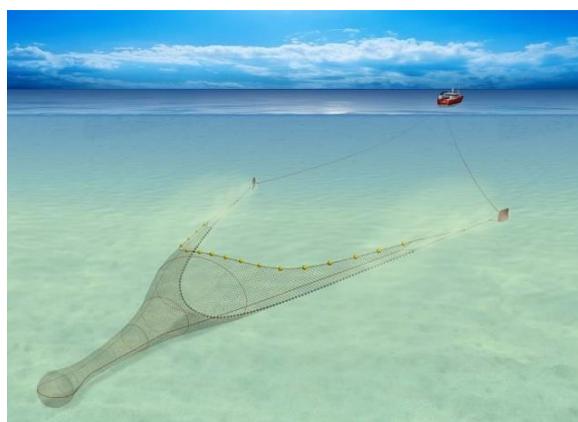
Figure 3.15 Typical otter trawler and gear diagram (Source: Seafish, 2015, MarineTraffic, 2022)

3.3.4 Pots and Traps

Figure 3.17 and Figure 3.16 show typical potting vessels, gear and the configuration of set pots and Table 3.3 describes the profile of potting vessels active across the study area.

For the capture of whelks, modified, weighted 25 litre plastic drum, purpose designed pots are often used. Pots are typically rigged in 'fleets' or 'strings' of between 15 to 60 pots, depending upon vessel size and area fished. Hundreds of pots can be deployed across a fishing location. Lengths of fleets may range from 100 m to over a mile, anchored at each end with anchors or chain clump weights. A variety of surface markers are used, including flagged dhans, buoys and cans. Soak times, the time between emptying and re-baiting the pots, can vary between six and 72 hours, but would typically be 24 hours. All pots are worked on a rotational basis; after hauling and emptying, pots are baited and re-set. Bait for the whelk fishery is often crab or dogfish.

Creels or pots are used for the capture of lobsters and crabs and are set in a similar configuration as described for whelk pots. Creel design is typically D-shaped in section and made from steel rods covered in netting and protected or "bumpered" with rope or rubber strips. The number of pots fished in a location can range from 20 through to hundreds and soak times are typically between 24 and 168 hours. Pots are usually deployed in fleets of 10 to 60 on rocky substrate, though may less frequently be found on other softer substrates.

Larger potters, working further offshore, make fishing trips lasting around two days. Smaller potters, under 10 m in length, operate as day boats, returning to port after hauling, emptying, baiting and re-setting fleets of pots. Potting vessels may target a single or multiple shellfish species.

Table 3.3 Profile of typical potting vessels active across the study area

| Parameter	Indicative details
Main target species	Whelk, brown crab, lobster
Nationality	English
Vessel length	Over 10 m (primarily whelk) and under 10 m
Horsepower	60 hp to 350 hp
Typical speed when shooting and hauling gear	0 to 9 knots
Typical soak time	1 to 2 days
Seasonality of activity	Whelk landings peak through spring and winter. Brown crab landings peak through summer and autumn. Lobster landings peak in summer months.
Typical gear	Fleets of baited pots placed on the seabed. Pots typically hauled daily but may be left a number of days. Generally, day boats that return to port daily.
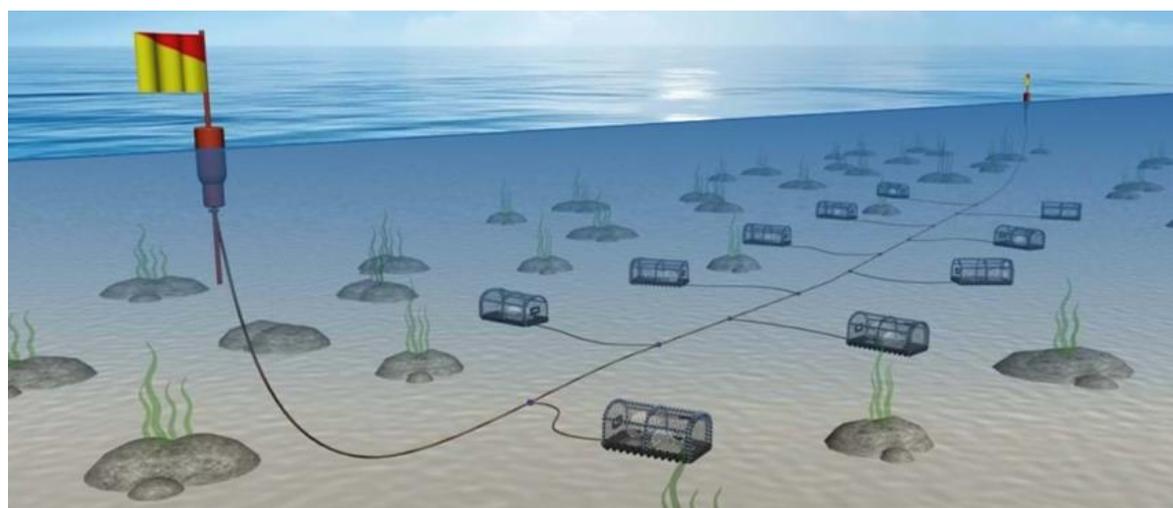
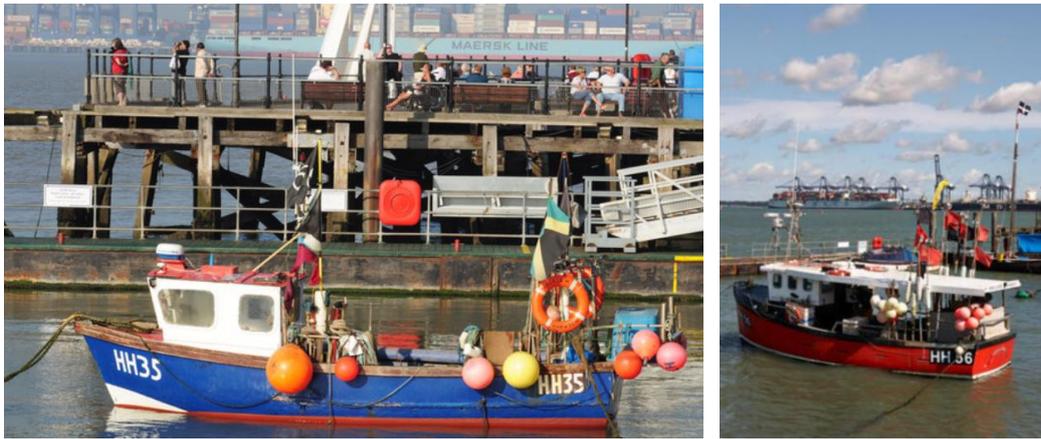**Figure 3.16 Typical potting gear configuration (Source: Seafish, 2015)**

Figure 3.17 Example of potting vessels (Source: Alamy, 2022)

3.3.5   Drift and Fixed Nets

Fixed nets include gill, tangle and trammel nets. They are typically used by small inshore vessels which target bass, flounder and rays.

The nets are usually fished in groups (or fleets) with the end of each fleet attached by bridles to a heavy weight, or anchor, on the seabed. Each weight, or anchor, is attached to a marker buoy or dhan flag, on the surface, by a length of rope equal to about twice the depth of water. Net lengths can vary significantly; individual nets can vary from 50 m to 200 m. The soak times, the time that a fleet is left fishing for, can range from a six-hour tidal soak up to 72 hours. The nets are shot over the stern of the vessel whilst steaming with the tide and are fished along the direction of the tidal stream, rather than across it (there are some exceptions to this).

Smaller vessels under 10 m length are typically engaged in netting and may work both pots and nets, alternating between gears seasonally. Net catches can provide bait for pots.

Table 3.4 Profile of typical netting vessels active across the study area

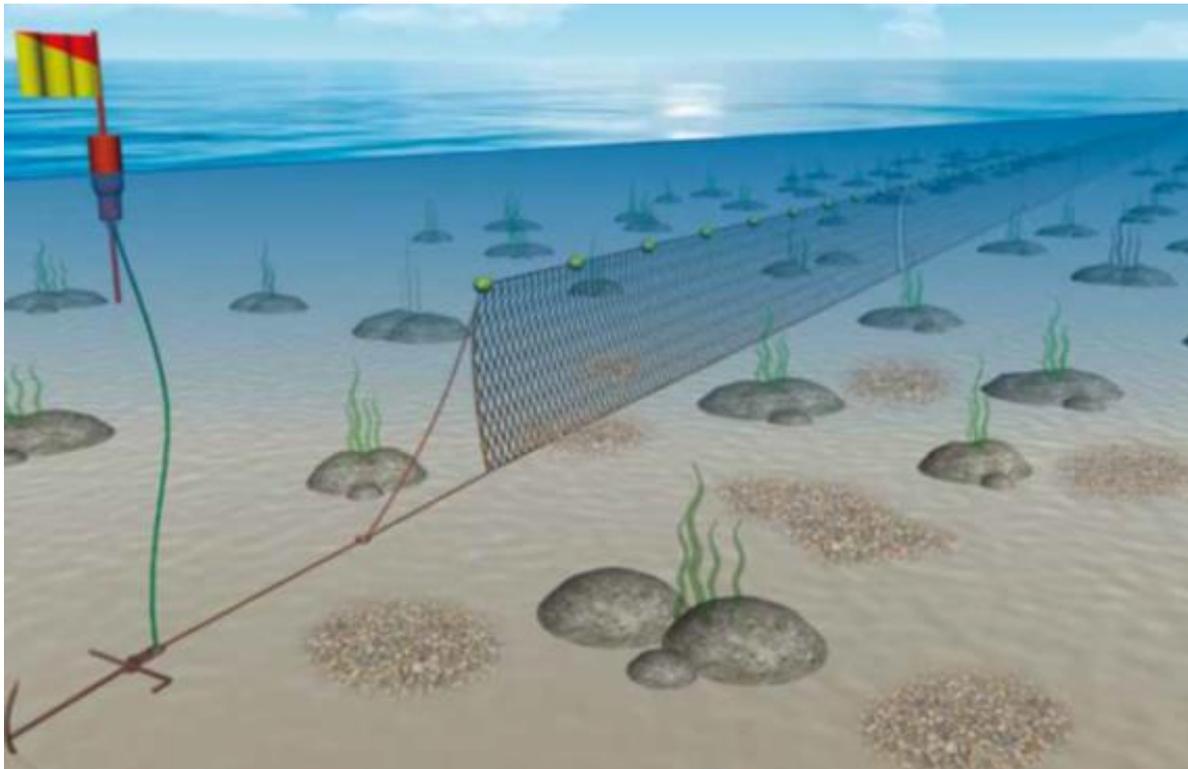| Parameter	Indicative details
Main target species	Flounder, bass, thornback ray, sole and plaice
Nationality	English
Vessel length	Under 10 m
Seasonality of activity	Year-round
Typical gear	Monofilament nylon net Set on seabed with each end anchored and left to fish

Figure 3.18 Typical fixed netting gear configuration (Source: Seafish, 2015)

3.3.6   Gears using Hooks

Small inshore vessels of under 10m length with a specification broadly aligned with that provided immediately above for inshore netting vessels (noting that vessels may switch between gear types seasonally or in response to a number of factors such as market prices and fishing restrictions) use longlines and handlines to target bass, also taking thornback ray and mullet.

A basic longline consists of a long length of line with multiple branch lines with hooks (on snoods) attached at regular intervals. On smaller inshore vessels, where baiting and handling the gear is done by hand, they may use lines that are only a few hundred metres long with a few hundred hooks attached. Rod-and-line fisheries may encompass several different methods of fishing such as jigging and bait fishing, usually done by one or two people on board a small vessel. Fish are landed on a daily basis.

Table 3.5 Profile of typical hooked gear vessels active across the study area

| Parameter	Indicative details
Main target species	Bass, thornback ray, mullet
Nationality	English
Vessel length	Under 10 m
Seasonality of activity	Year-round
Typical gear	Longlines are primary method of hooked gear fishing in study area
	Long length of main line, light rope or heavy nylon monofilament
	To this main line, multiple branch lines with baited hooks on (snoods) are attached at regular intervals
	This rig is set on the seabed with a dhan buoy at either end, and allowed to fish for a set period
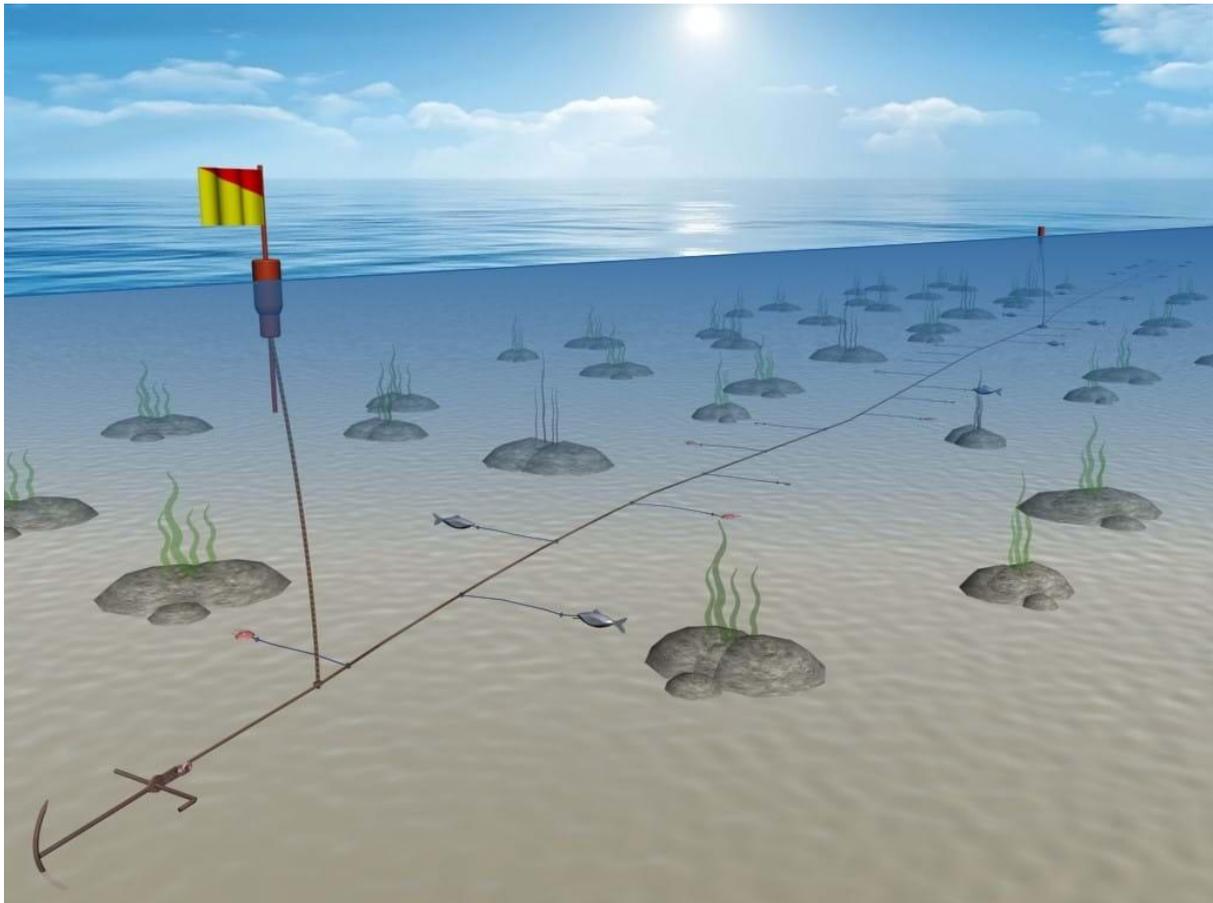
Figure 3.19 Typical longline gear configuration (Source: Seafish, 2015)

3.3.7 Other Gear Types

Demersal seine netting (also referred to as flyseine or flyshooting) is a fishing method involving use of long weighted ropes to herd fish into the mouth of a trawl to target demersal species which live or feed on or near the seabed. The gear is shot on the seabed in a rounded triangle shape with very long weighted ropes attached to each end of the net. The net is gradually hauled in with the vessel maintaining station using its engine power. Vessels may also work in pairs, towing the gear between them and coming together when hauling the gear. In the study area, seine netting targets demersal non-quota species such as red mullet and gurnards. 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 (Defra, 2022). UK vessel landings data indicates a sudden spike in demersal seine activity in the study area from 2020 onwards.

Pelagic or mid-water trawls are towed at the appropriate level in the water column to intercept shoaling fish such as herring, sprat and mackerel. The location of the shoals is determined by sonar or vertical sounder echoes. Catches with pelagic trawl from the study area are limited and sporadic, with UK vessel landings being recorded only in 2021 (across the entire 2016 to 2021 study period) associated with horse mackerel

3.4 Fishing Restrictions

3.4.1 Total allowable catch and quota

As per EU Council Regulations, TACs and quotas are in place for many commercial fish species based on their stock distribution across ICES Divisions. The TACs set for a species across ICES Division 4 (North Sea) for example, allow countries that have been allocated a quota from this TAC to fish within ICES Divisions 4a, 4b, 4c. TACs and quotas per country are

presented in Table 3.6 for key species landed from the commercial fisheries study area including sole, plaice, herring and whiting.

Table 3.6 Total allowable catch (TAC) and quotas in tonnes by country for the key species landed in the regional fisheries study area in 2022 (EU, 2022)

Species	ICES Division	TAC (tonnes)	Netherlands	Belgium	France	Denmark	UK	Germany	Sweden	Norway
Herring	4c, 7d	427,628	20,055	8,736	11,326	909	5,419	594	-	-
Plaice	2a, 4	125,692	30,258	4,841	908	15,734	33,268	4,539	-	8,798
Sole	2a, 4	5,270	3,587	398	80	182	705	318	-	10
Whiting	2a, 4	26,636	1,244	498	3,234	2,152	16,131	560	4	2,664

3.4.2 Byelaws, technical measures and spatial closures

In addition to limits on catch volumes, a number of restrictions are in place based primarily on fisheries byelaws, intended to protect fish stocks and their habitats. These restrictions include limits on minimum landings sizes, technical measures relating to fishing gear design and use, limits on fishing effort, and temporary and permanent fishery closures.

Within the study area several spatial restrictions are in place that are relevant to the offshore ECC. These include (Figure 3.20):

- Kent and Essex IFCA Byelaws for 'Area A' – These byelaws set a number of restrictions on fishing activity in Area A, as shown in the figure below. These include limits on vessel size (vessel to be under 14 m length) and power (engine no more than 221 kilowatts), limits on duration of net setting (30 hours) and net size, limits on pot design (requirement for at least one unobstructed escape gap per parlour) and minimum landings sizes for several species.

- Kent and Essex IFCA Byelaw - Whelk Fishery Flexible Permit Byelaw - A person must not use a whelk pot within the District other than in accordance with granted permits, which can restrict pot numbers that may be set.

- MMO Byelaw Margate and Long Sands European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw 2017 - - a person must not use bottom towed fishing gear (dredges, trawls, seines) in a specified area of sandbank (Area A).
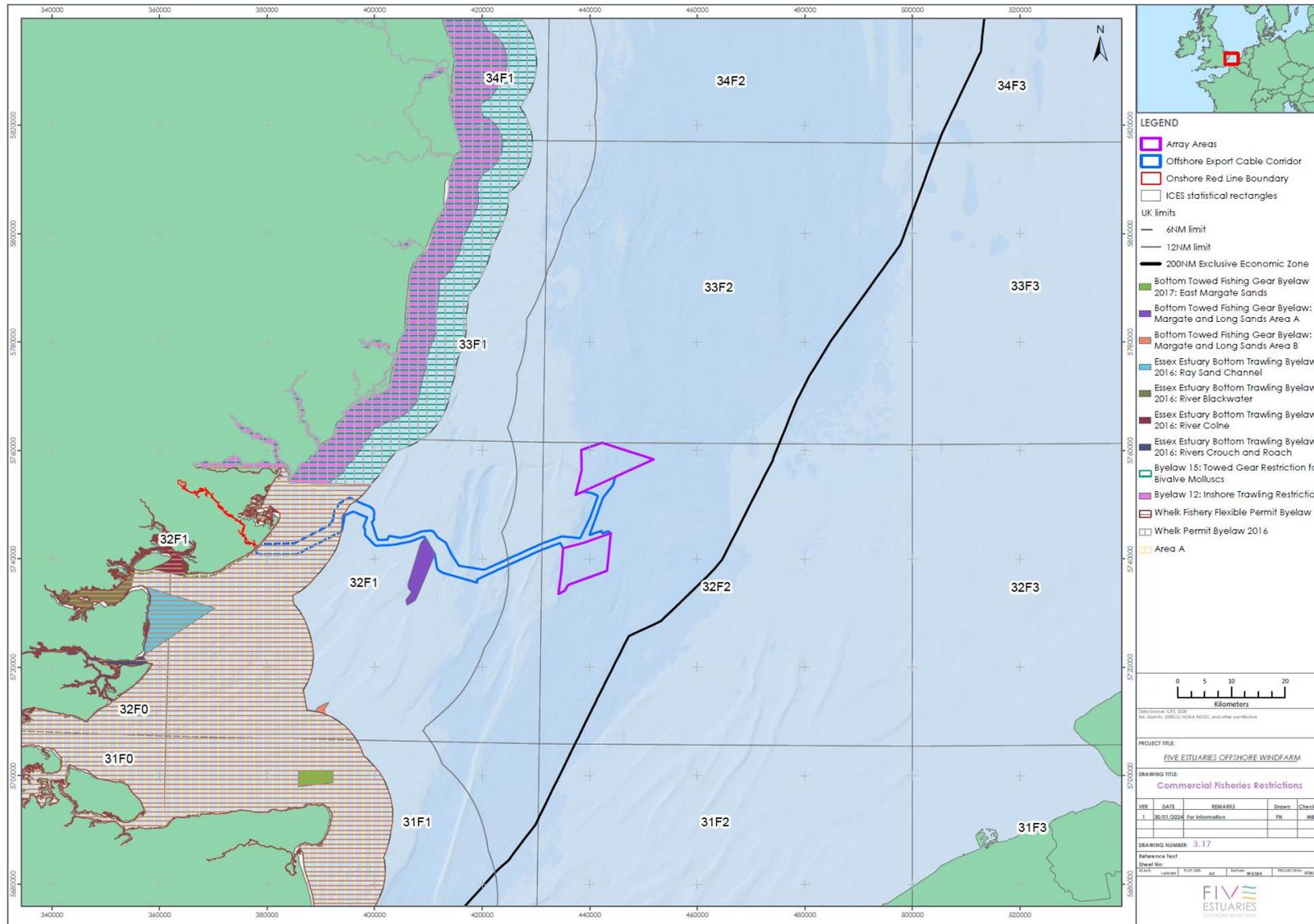
Figure 3.20 Spatial fishery restrictions in the study area (Kingfisher Information Service, 2023)

3.5 Activity Assessment

3.5.1 Fishing Intensity based on VMS Data

VMS data sourced from ICES[2] displays the surface Swept Area Ratio (SAR) of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. VMS data sourced from the MMO displays the value of catches for UK registered vessels 15 m and over in length.

Surface SAR provides a proxy for fishing intensity and has been analysed to determine an average annual SAR based on data from 2016 to 2020 for the following gear types:

- Figure 3.21: dredge;
- Figure 3.22: beam trawl; and
- Figure 3.23: otter trawl.

VMS data sourced from MMO displays the first sales value (£) of catches and covers UK registered vessels 15 m and over in length from 2016 to 2019 for the following gear types:

- Figure 3.24 and Figure 3.25: pots and traps;
- Figure 3.26 and Figure 3.27: dredge;
- Figure 3.28 and Figure 3.29: beam trawl;
- Figure 3.30 and Figure 3.31Figure 3.30: otter trawl; and
- Figure 3.32 and Figure 3.33: pelagic trawl.

VMS data sourced from ICES displays the first sales value (€) of catches and covers EU and UK registered vessels 12 m and over in length in 2017 for the following gear types:

- Figure 3.35: beam trawl.

The data presented in these figures indicates that beam trawl activity 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, as corroborated by the landings data presented in earlier sections of this report.

The data indicates some demersal otter trawl activity within 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 ascribed to non-UK vessels.

Potting activity takes place within the study area. The VMS data are not representative of all potting activity because a portion of potting vessels are under 15 m in length and not captured in the data, but the data does indicate the presence of larger vessels in the array areas and offshore portion of the offshore ECC, expected to be targeting whelk, with a notable peak in activity in the array areas indicated in the 2020 VMS data.

Data indicates that there is limited dredge activity by UK vessels in the study area, with dredge fisheries located to the south of VE, associated with the Thames Estuary cockle fishery. Data shown in Figure 3.21 indicates dredge activity across the middle portion of the offshore ECC; however, landings data does not indicate any significant dredge activity in the study area other than that associated with the cockle fishery.

3.5.2 Fishing Intensity based on AIS Data

Fishing vessel route density, based on vessel AIS positional data is shown in Figure 3.34. AIS is required to be fitted on fishing vessels ≥15 m length. The data is specific to fishing vessels and indicates the route density per square km per year. This data does not distinguish between

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[2] Note that UK VMS data presents information on fishery value, whereas ICES VMS data presents 'swept-area ratio', which is the cumulative area contacted by a fishing gear within a grid cell over an annual period.

transiting vessels and active fishing but does provide a useful source to corroborate fishing grounds. Data indicates sustained fishing vessel presence in the nearshore area of the offshore ECC and in the array areas.

3.5.3 Fishing intensity based on marine traffic survey data

Project-specific marine traffic surveys were undertaken in winter and summer 2022 (See Volume 6, Part 2, Chapter 9: Shipping and Navigation, using AIS and radar tracking and visual observations to record vessel activity across the project area.

During the winter survey, approximately eight fishing vessels per day were recorded in the wider study area. There was limited fishing activity in the array areas, with most activity located to the northeast of the VE array areas and some within the southeast portion of the southern array area, with Dutch (78% of data records), UK (15%) and Belgian (5%) vessels observed. The majority of observed vessels were beam trawlers.

During the summer survey approximately two fishing vessels per day were recorded in the study area. The majority of activity was located to the east of VE, with active fishing by beam trawlers recorded in the northern array area. Dutch, French, Belgian and UK vessels were observed; the majority of activity was associated with Dutch beam trawlers.

3.5.4 Fishing Activity based on Fisheries Scouting Surveys

Fisheries scouting surveys were undertaken ahead of VE site investigation surveys in summer 2021. The aim of these surveys was to identify potting areas and gear within the offshore ECC and array areas, enabling liaison with relevant operators ahead of site survey.

The surveys recorded static potting gear in the northern array area and in the nearshore area of the offshore ECC, with few gear observations along the main portion of the offshore ECC.

3.5.5 Fishing Activity based on IFCA Surveillance Records

KEIFCA fisheries patrol vessel sightings between 2015 and 2020 are presented in Figure 3.36. Whilst the distribution of sightings is expected to reflect patrol vessel activity rather than patterns of fishing activity, the data provides a useful insight into the presence of smaller inshore vessels, which is not captured by the VMS data described above.

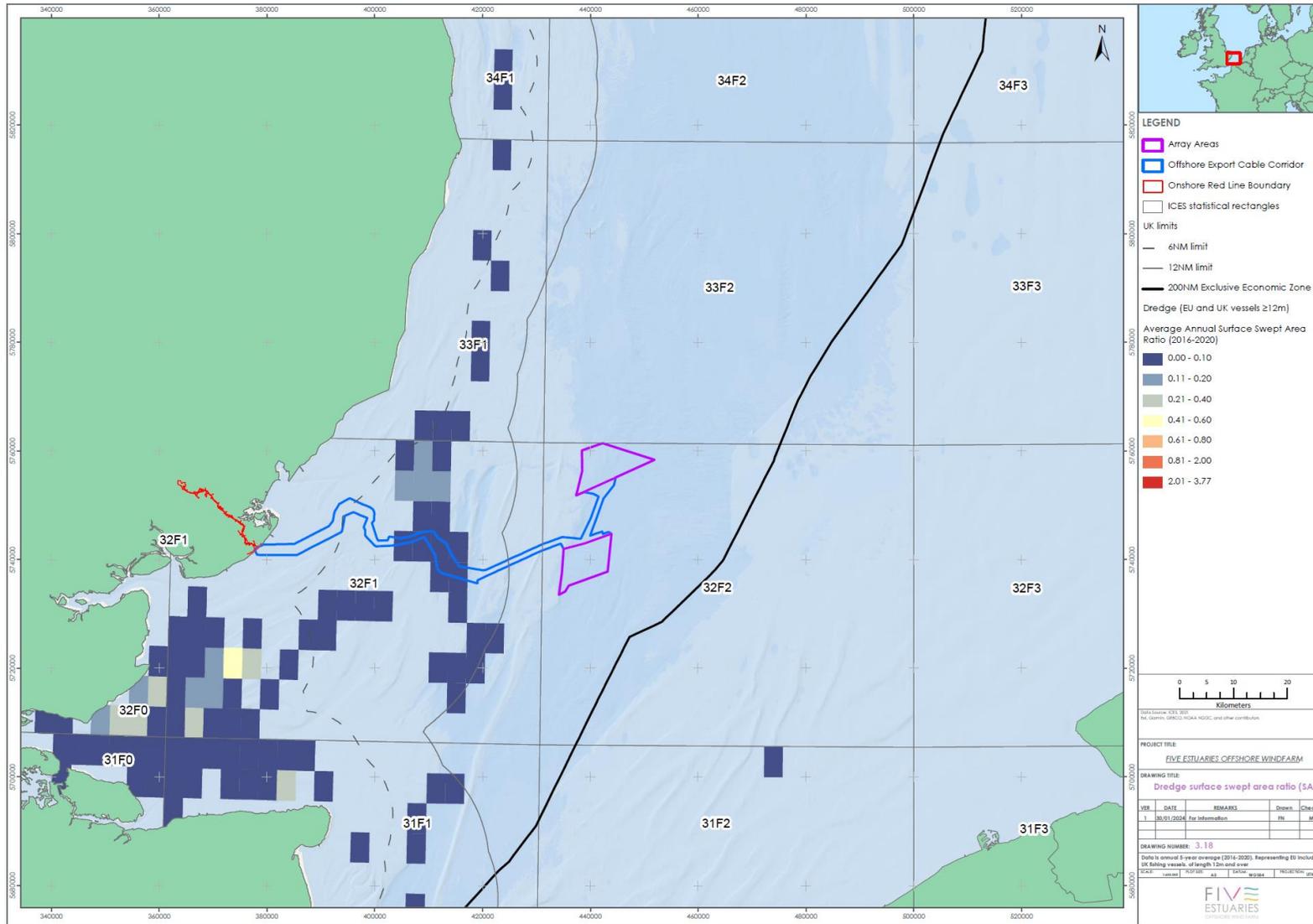The data indicates the presence of trawlers, netting and potting vessels within the offshore ECC within IFCA limits.

Figure 3.21 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using dredge gear (Source: ICES, 2021)
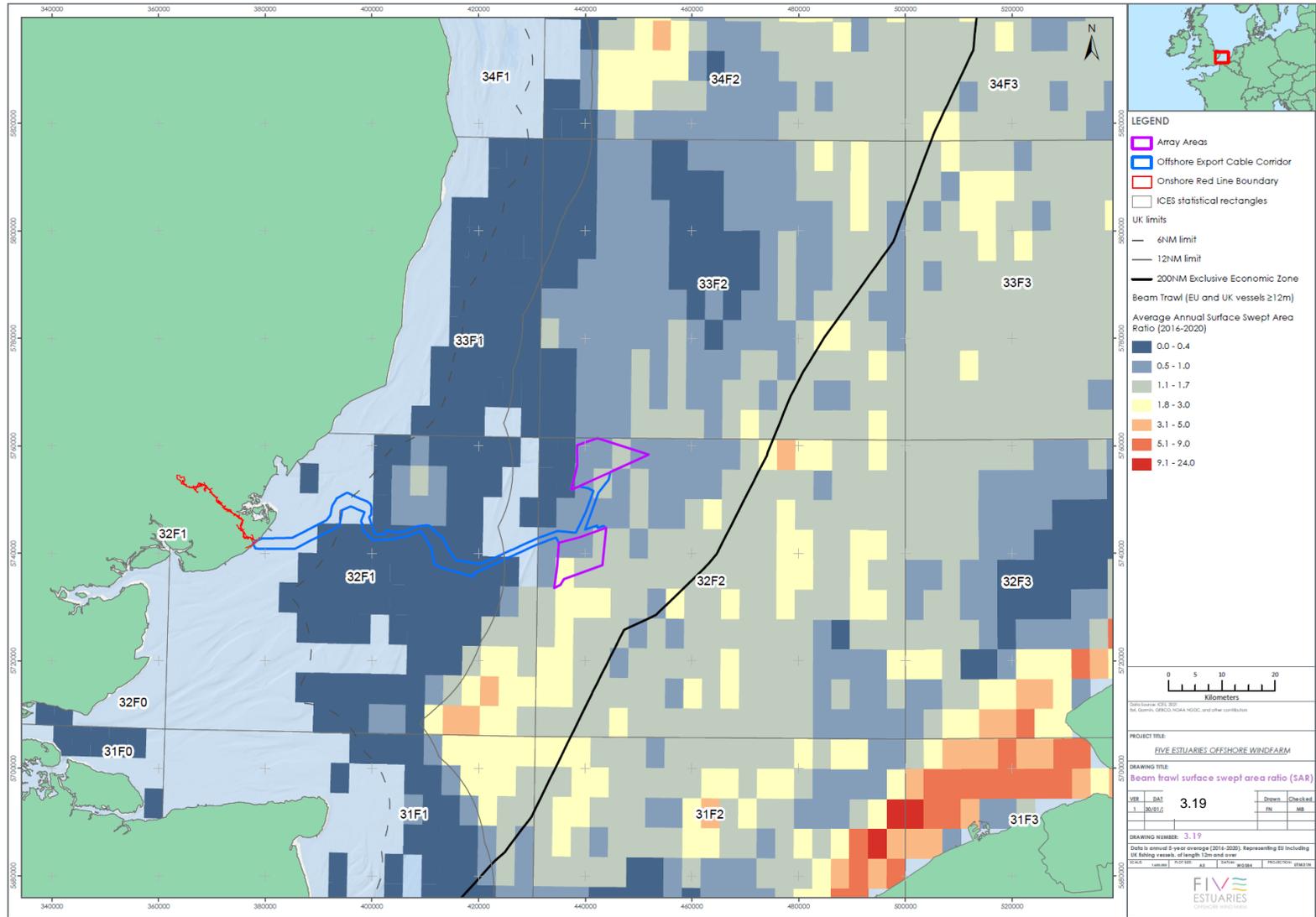
Figure 3.22 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using beam trawl gear (Source: ICES, 2021)
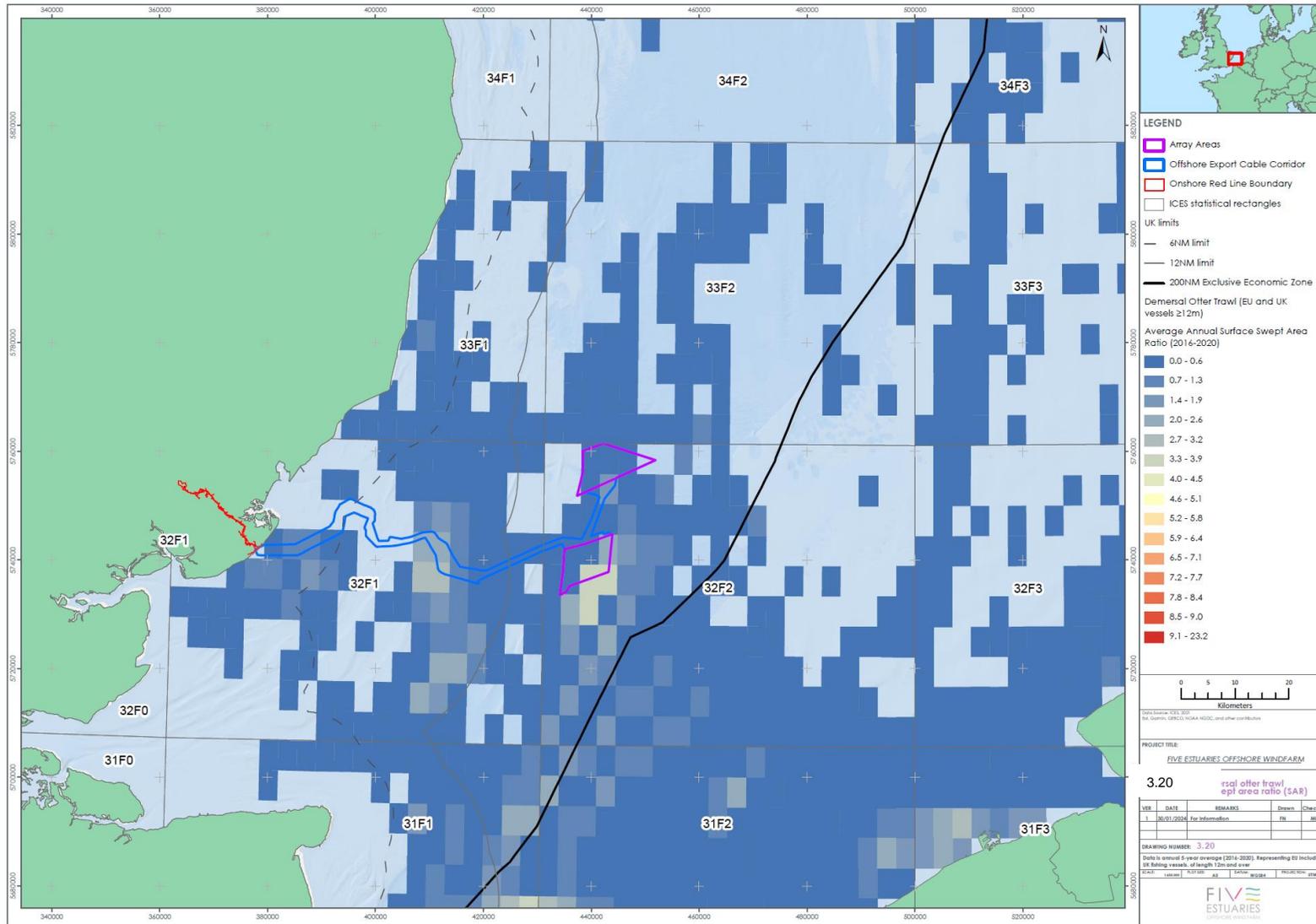
Figure 3.23 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using otter trawl gear (Source: ICES, 2021)

Figure 3.24 UK vessels ≥ 15 m length actively fishing using pots and traps 2016 to 2019 (Source: MMO, 2021)
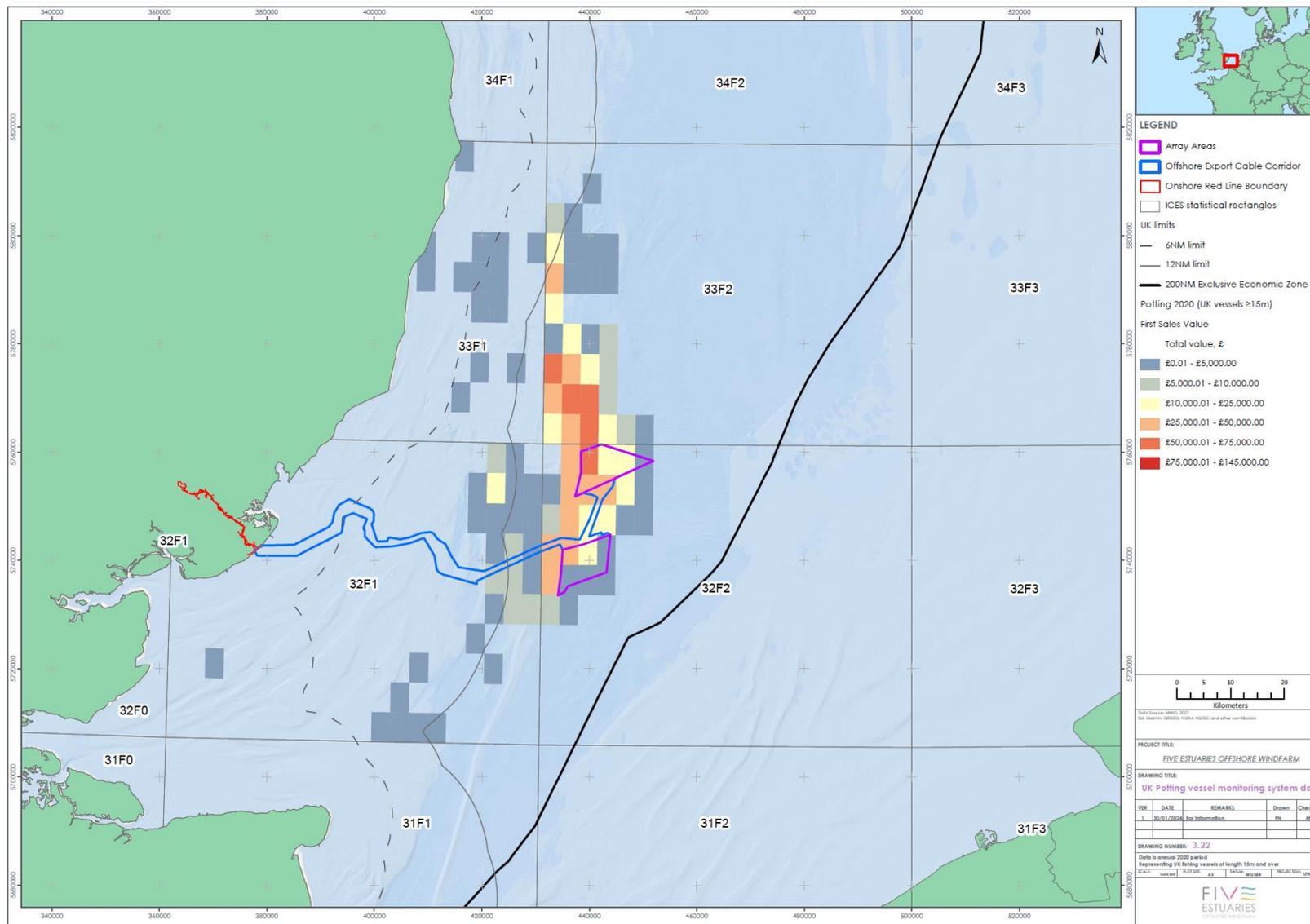
Figure 3.25 UK vessels ≥ 15 m length actively fishing using pots and traps 2020 (Source: MMO, 2022)
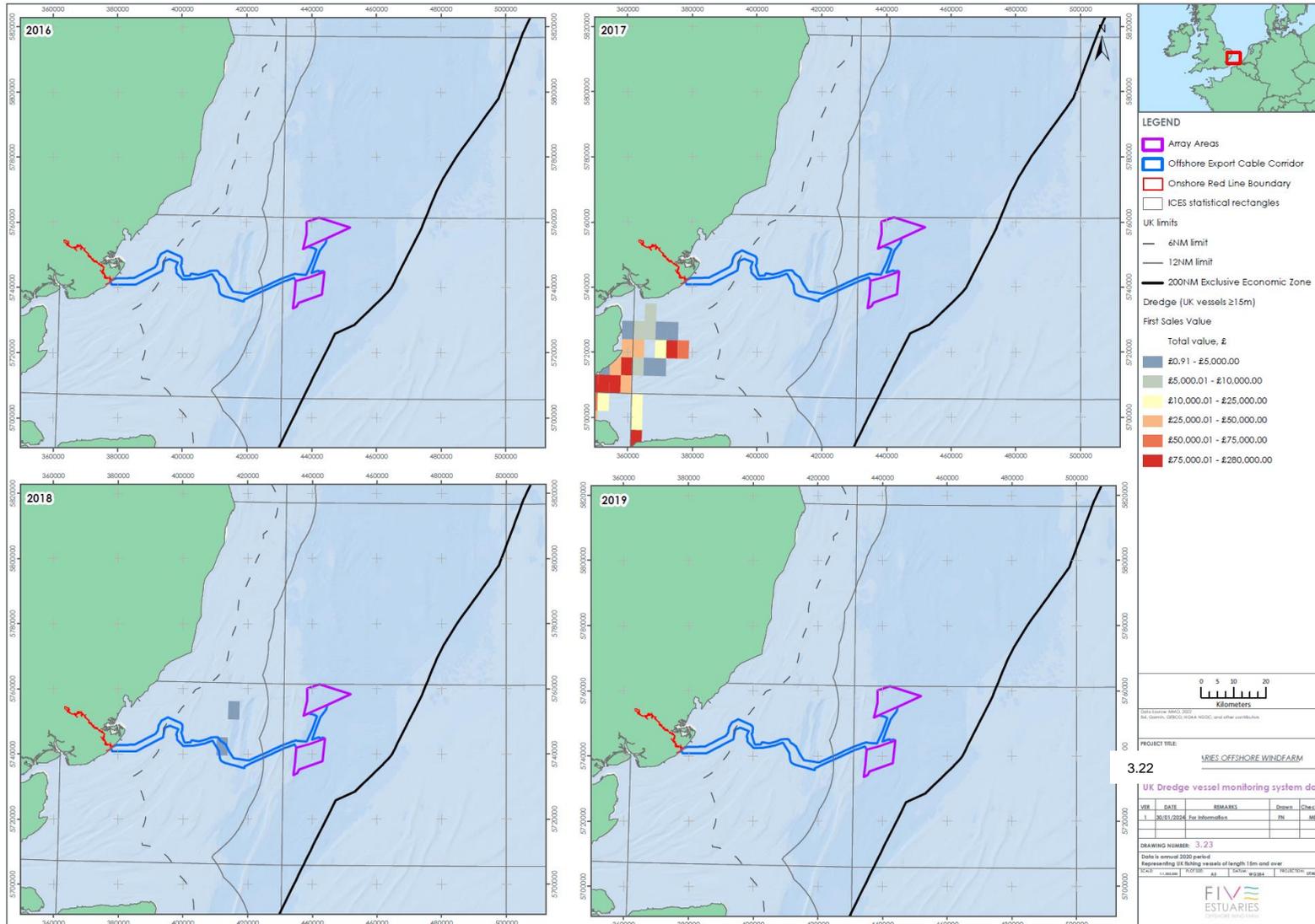
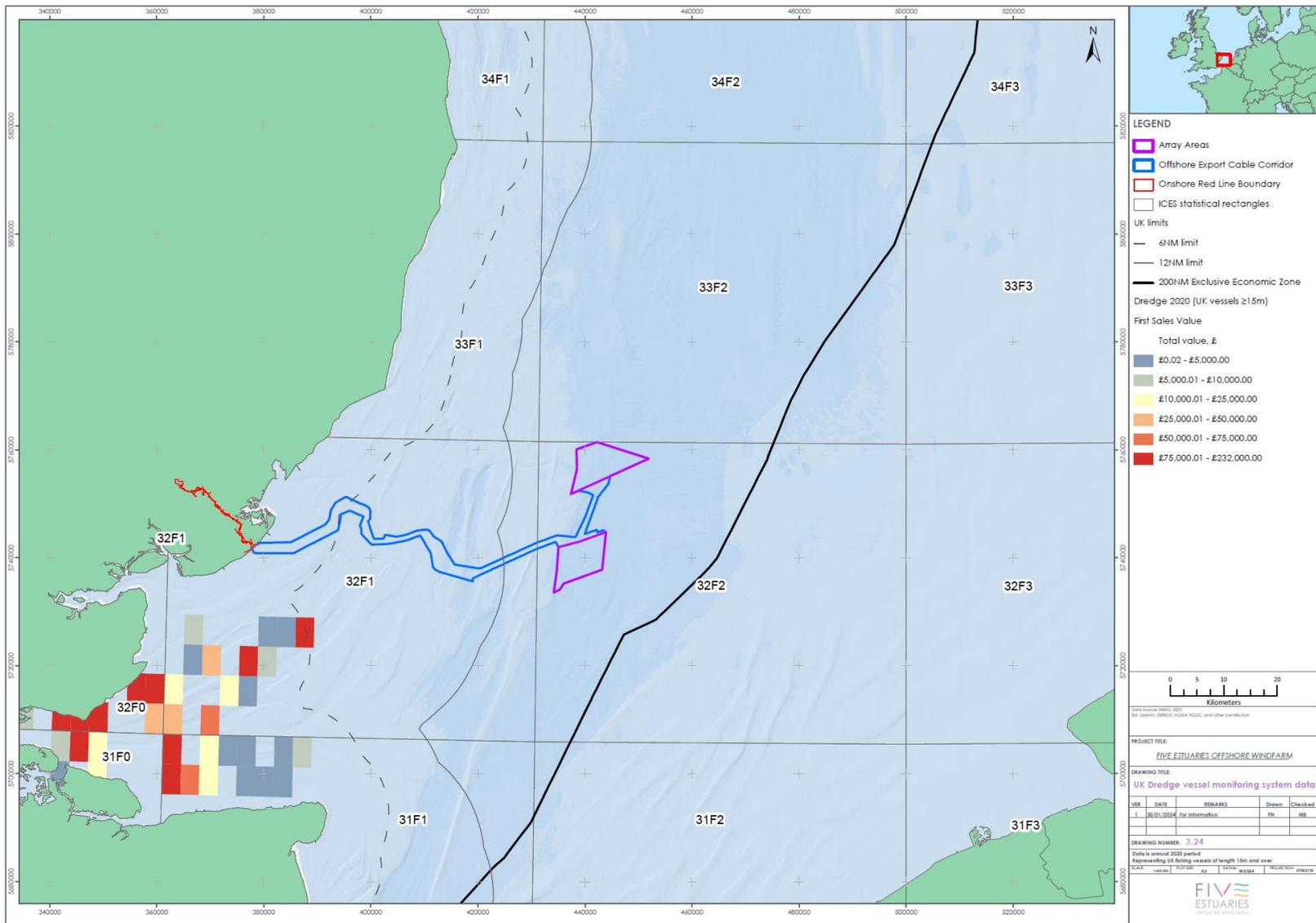**Figure 3.26 UK vessels ≥ 15 m length actively fishing using dredges 2016 to 2019 (Source: MMO, 2021)**

Figure 3.27 UK vessels ≥ 15 m length actively fishing using dredges 2020 (Source: MMO, 2022)
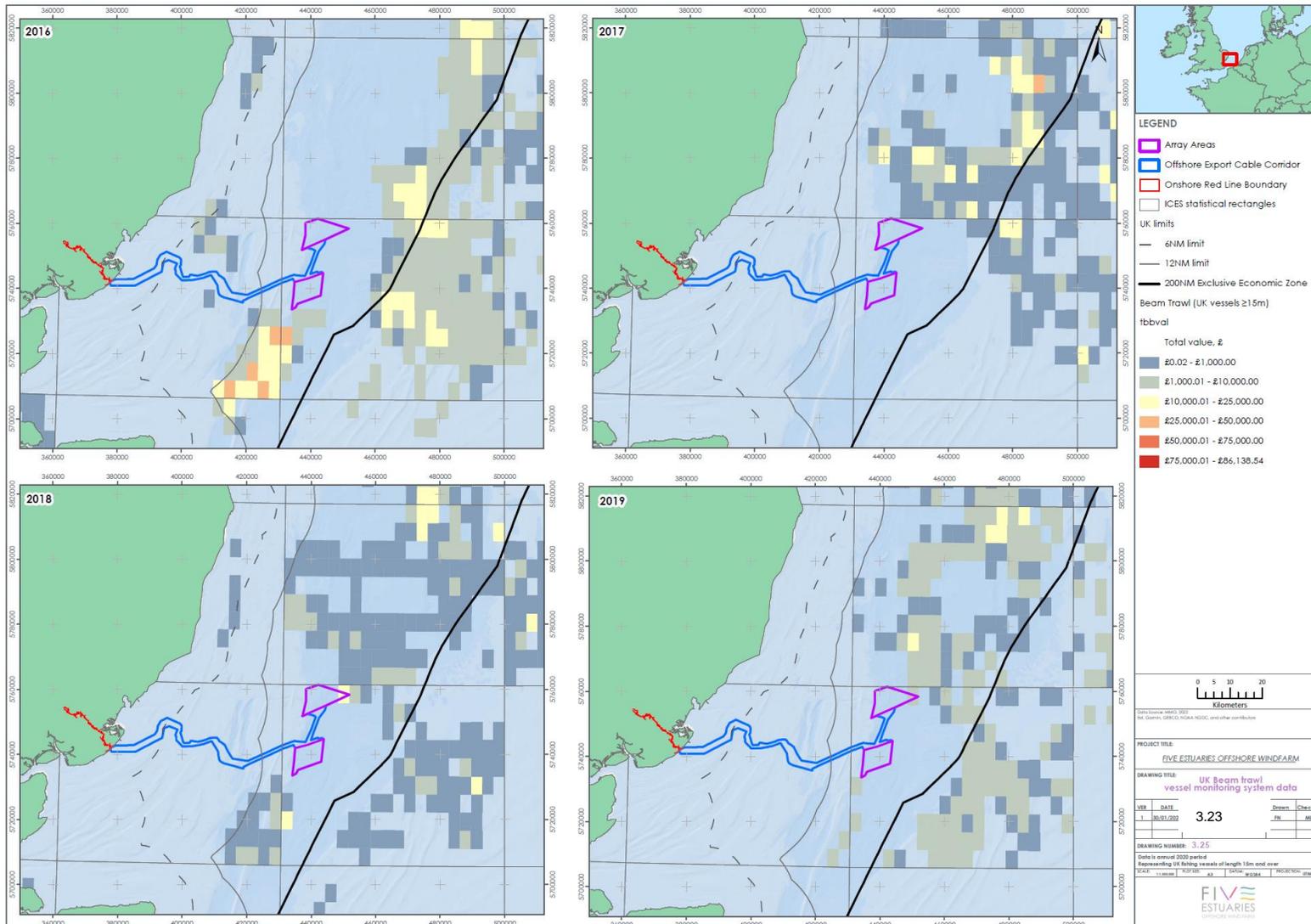
Figure 3.28 UK vessels ≥ 15 m length actively fishing using beam trawls 2016 to 2019 (Source: MMO, 2021)
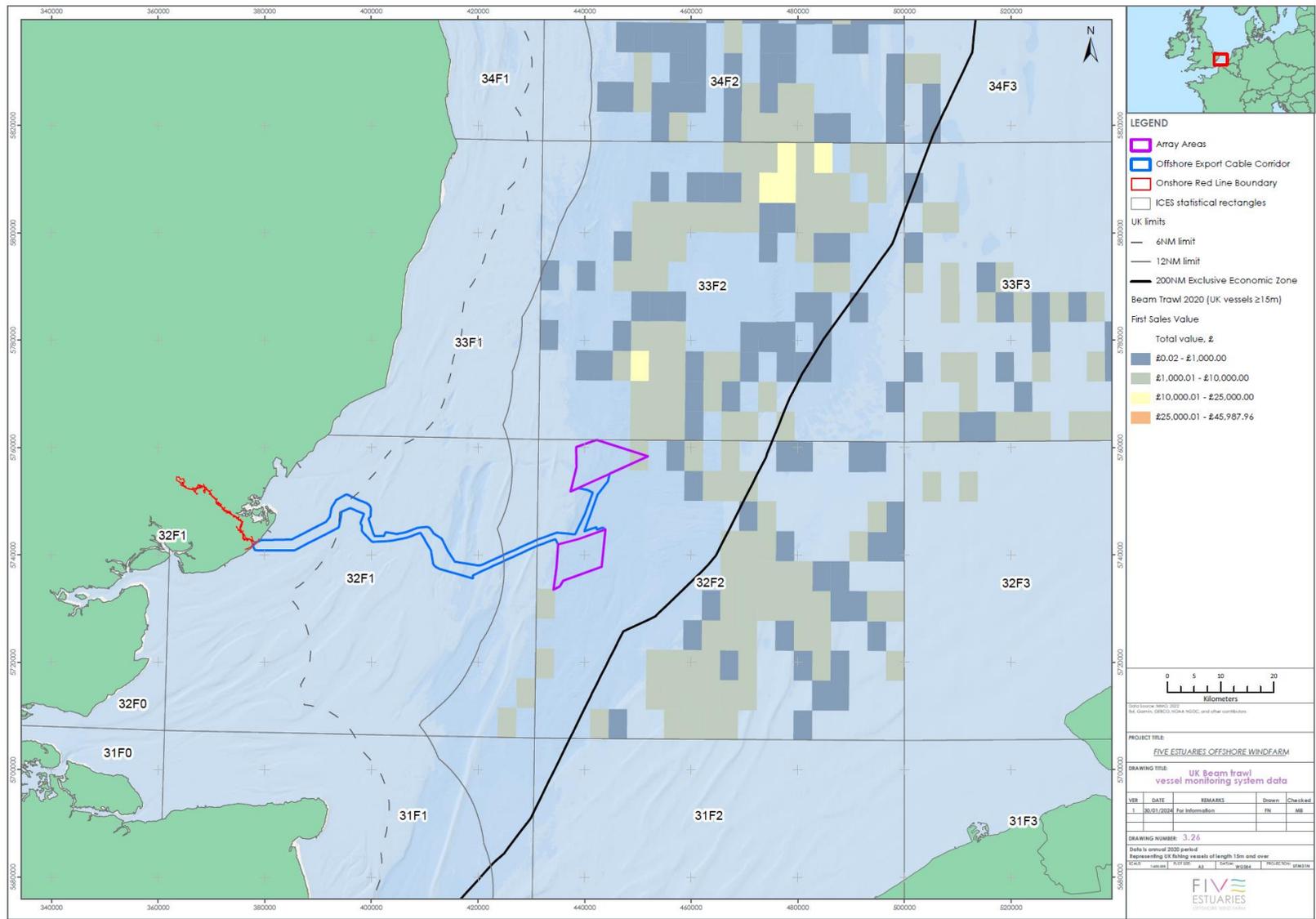
Figure 3.29 UK vessels ≥ 15 m length actively fishing using beam trawls 2020 (Source: MMO, 2022)
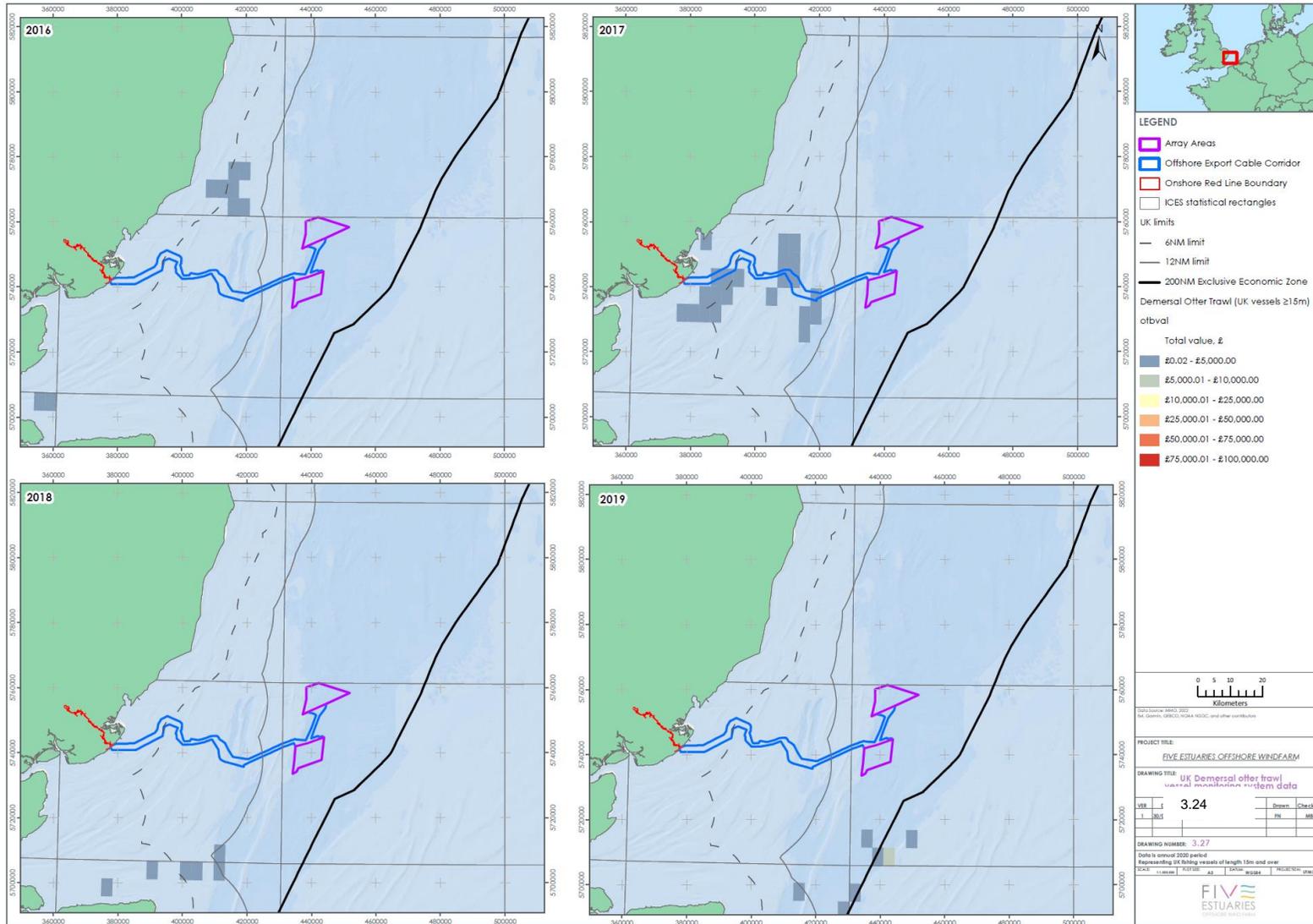
Figure 3.30 UK vessels ≥ 15 m length actively fishing using otter trawls 2016 to 2019 (Source: MMO, 2021)

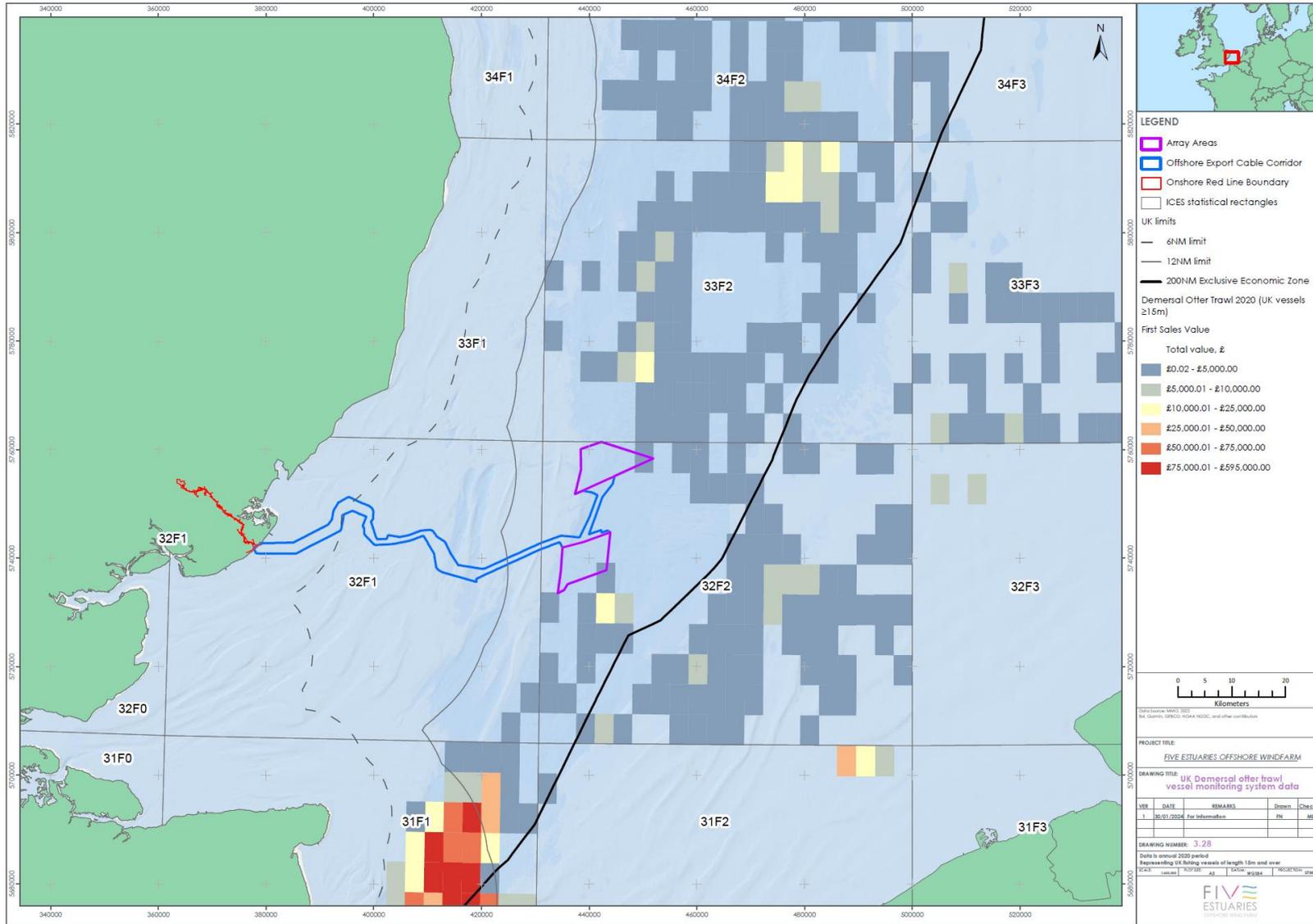**Figure 3.31 UK vessels ≥ 15 m length actively fishing using otter trawls 2020 (Source: MMO, 2022)**
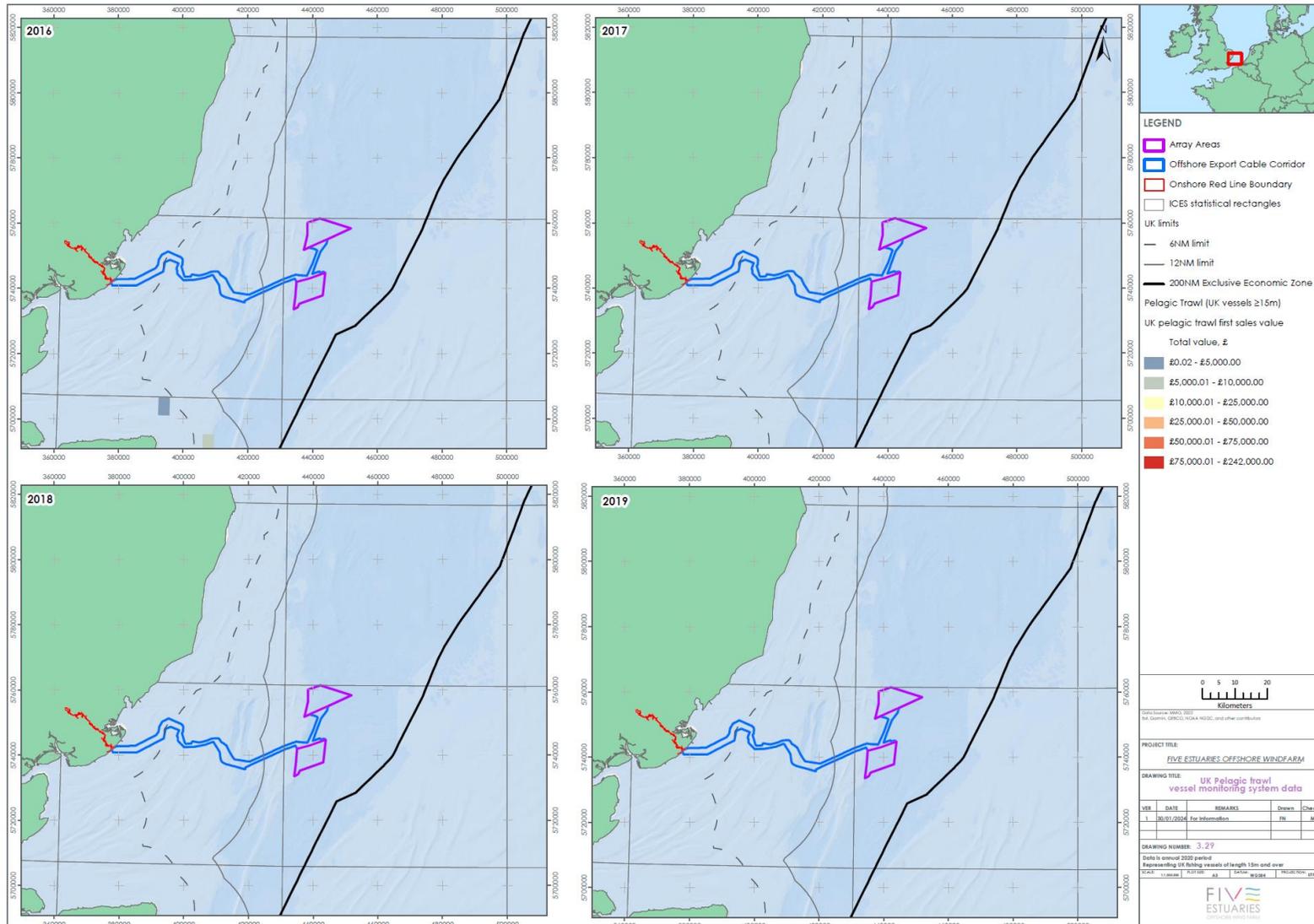
Figure 3.32 UK vessels ≥ 15 m length actively fishing using pelagic trawls 2016 to 2019 (Source: MMO, 2021)

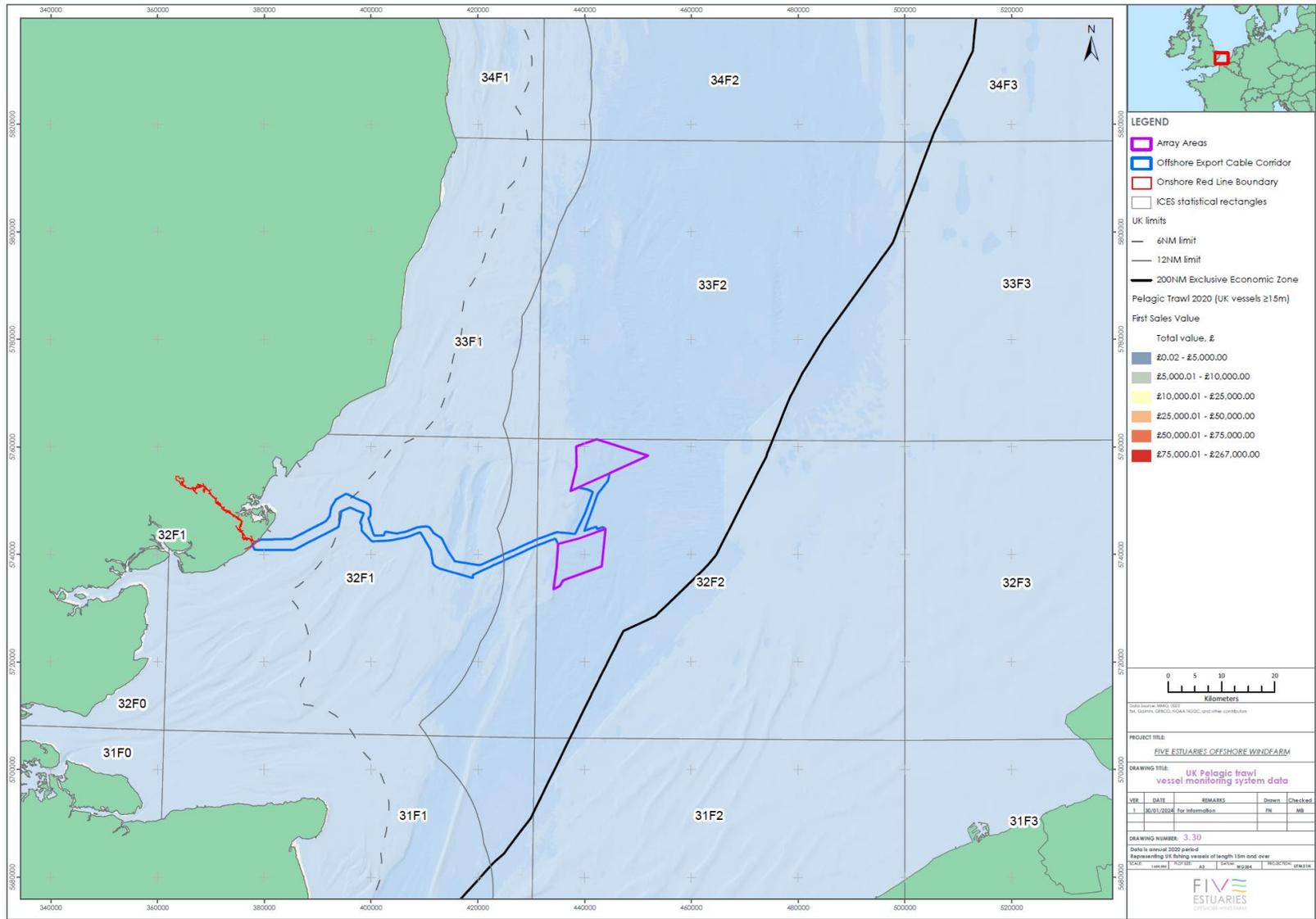**Figure 3.33 UK vessels ≥ 15 m length actively fishing using pelagic trawls 2020 (Source: MMO, 2022)**
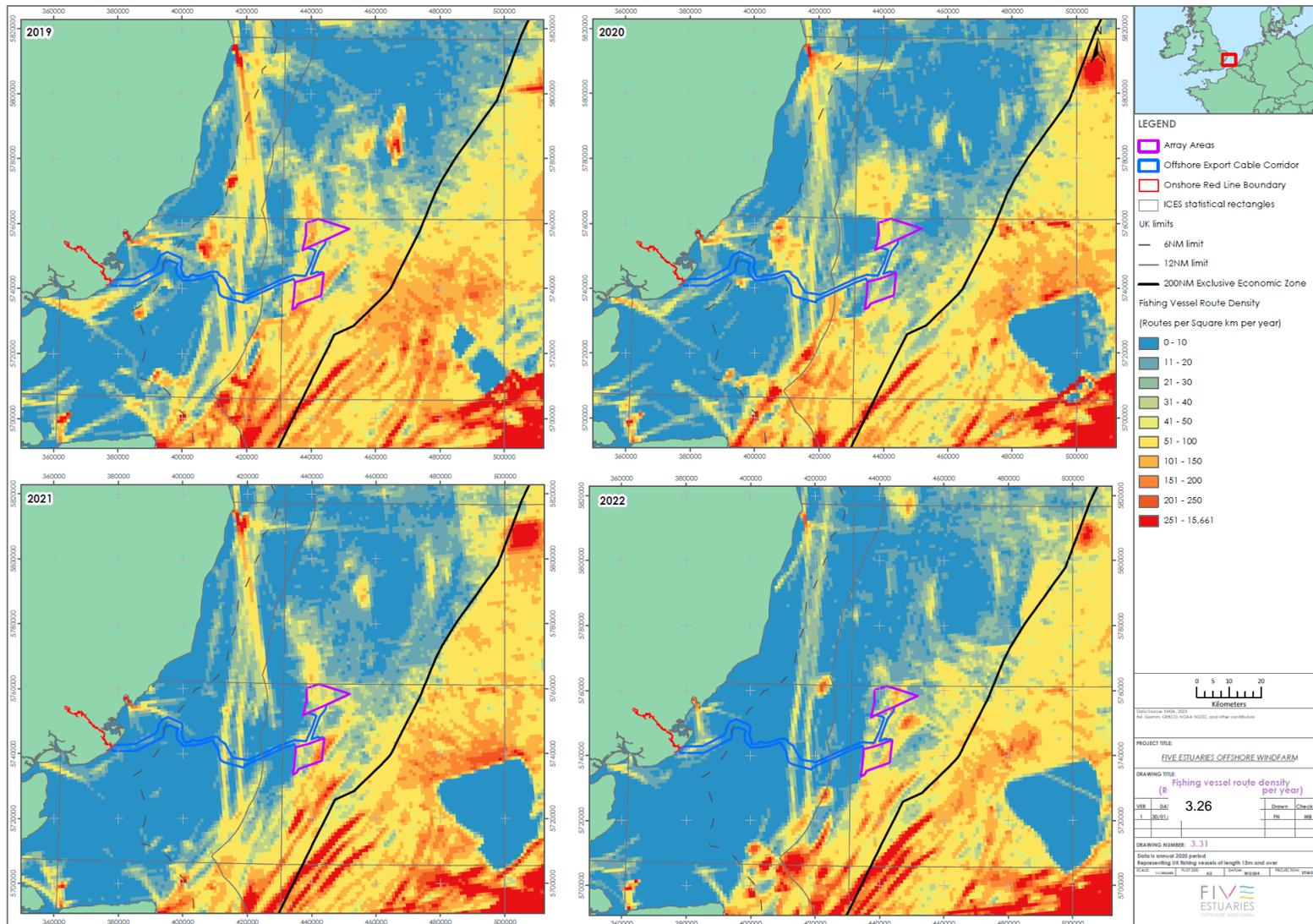
Figure 3.34 AIS fishing vessel route density 2019 to 2022 (Source: EMSA, 2023)
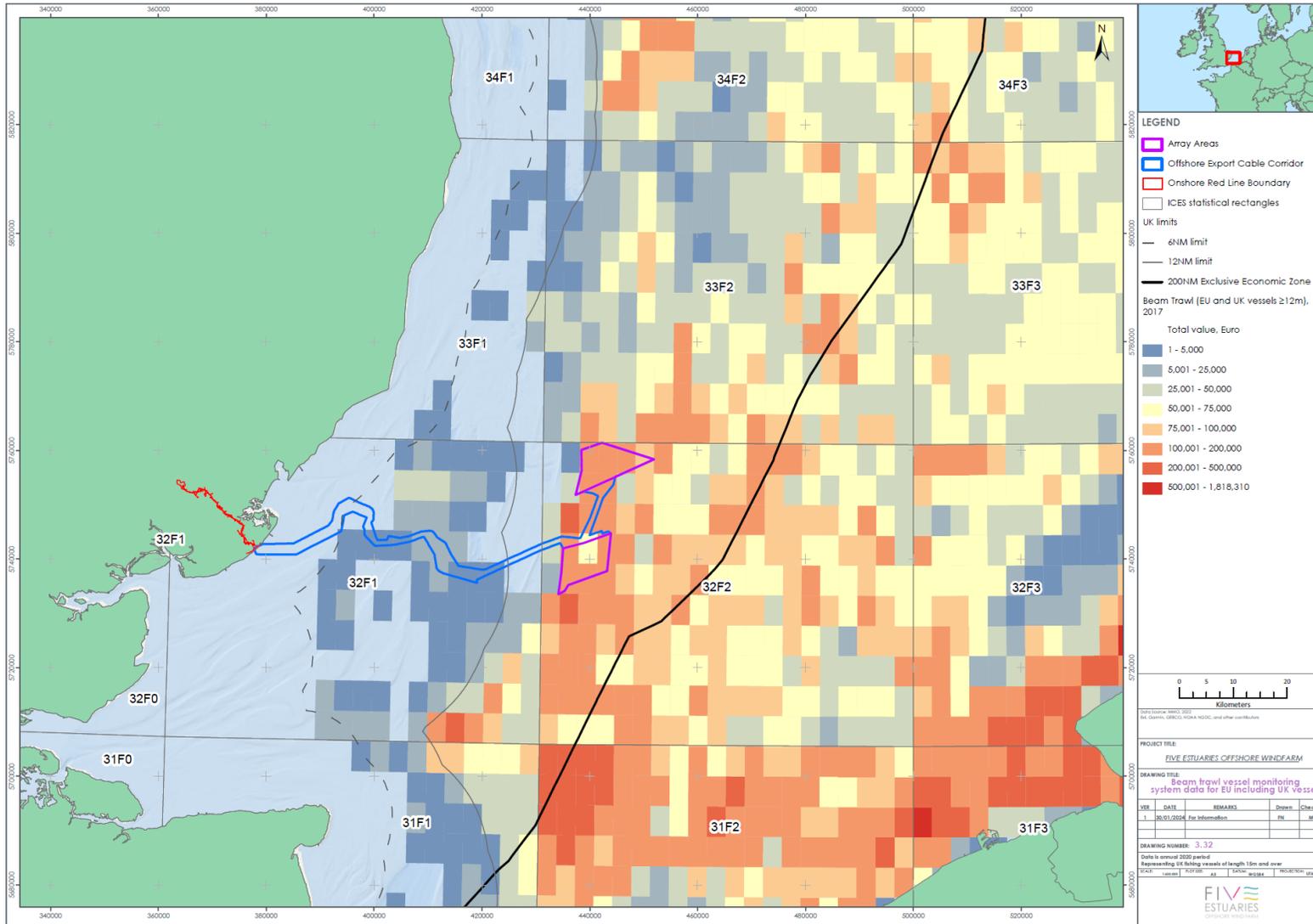
Figure 3.35 EU and UK vessels ≥ 12 m length actively fishing using beam trawls in 2017 (Source: ICES, 2021)
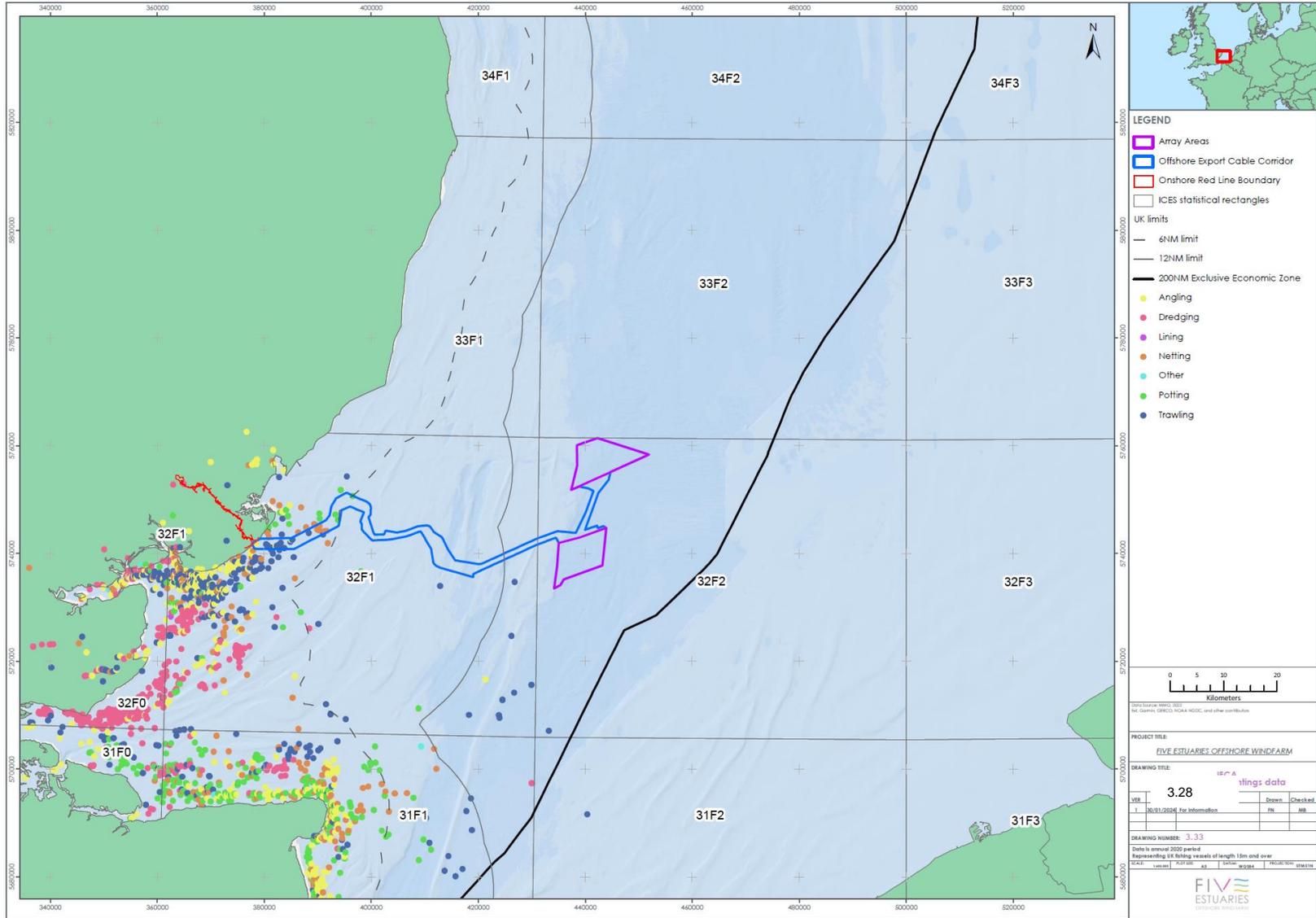
Figure 3.36 Kent and Essex IFCA patrol vessel sightings 2015 to 2020

3.5.6   UK Fisheries Activity Assessment

Landings Trends, Fishing Grounds and Key Species

The trends in landed value by English-registered vessels from ICES rectangles 32F1 and 32F2 are presented in Figure 3.37 for gear type and Figure 3.38 for species.

English landings are dominated by vessels targeting cockles with suction dredges, noting that this activity takes place outwith VE. English potting vessels target whelk and to a lesser extent lobster and crab. Netting vessels (bass, roker) and trawlers (sole, plaice) target a variety of demersal species. In recent years there has also been an emergence of demersal seine vessels targeting non-quota species such as red mullet and gurnard. Stakeholder engagement has highlighted that vessels – particularly smaller inshore vessels - will switch between gears (e.g., between nets and pots or nets and hooked gear) seasonally or in response to other factors such as market prices and fishing restrictions.

The average annual first sales value of English landings from the two ICES rectangles between 2016 and 2022 was approximately £3 million, with over 85% of this value being associated with landings from inshore ICES rectangle 32F1. This includes landings of cockles with an average annual value of £1.1 million, sole with a value of £520,000, whelk at £510,000 and bass at £180,000.

Based on the landings data presented here and spatial data presented above, English-registered vessels active in the offshore ECC are primarily targeting whelk, lobster and crab with pots, netting for bass, roker and other demersal species, and trawling for demersal species. Figure 3.40 shows four inshore whelk fishing areas in the KEIFCA district and the percentage distribution of whelks landed between 2013 and 2021 from the four areas. Area 1, within which the VE offshore ECC is located, accounts for a small percentage (less than 7%) of total whelk landings in the district. Across the VE array areas, English vessels are primarily potting for whelk.

Outside of these two rectangles, and in surrounding ICES rectangles, fishing activity by English-registered vessels is similar to that described immediately above.

In terms of wider UK vessel activity, it is noted that a small proportion of landings from the study area, and specifically in ICES rectangle 32F2, are attributable to Scottish-registered vessels. These Scottish-registered vessels include demersal trawl and seine vessels with key target species being squid and mullets. The activity of these vessels within the study area has notably increased during 2021 and 2022 (reflecting the increase in fly-shooting activity in the southern North Sea in recent years), with limited Scottish vessel activity prior to that.
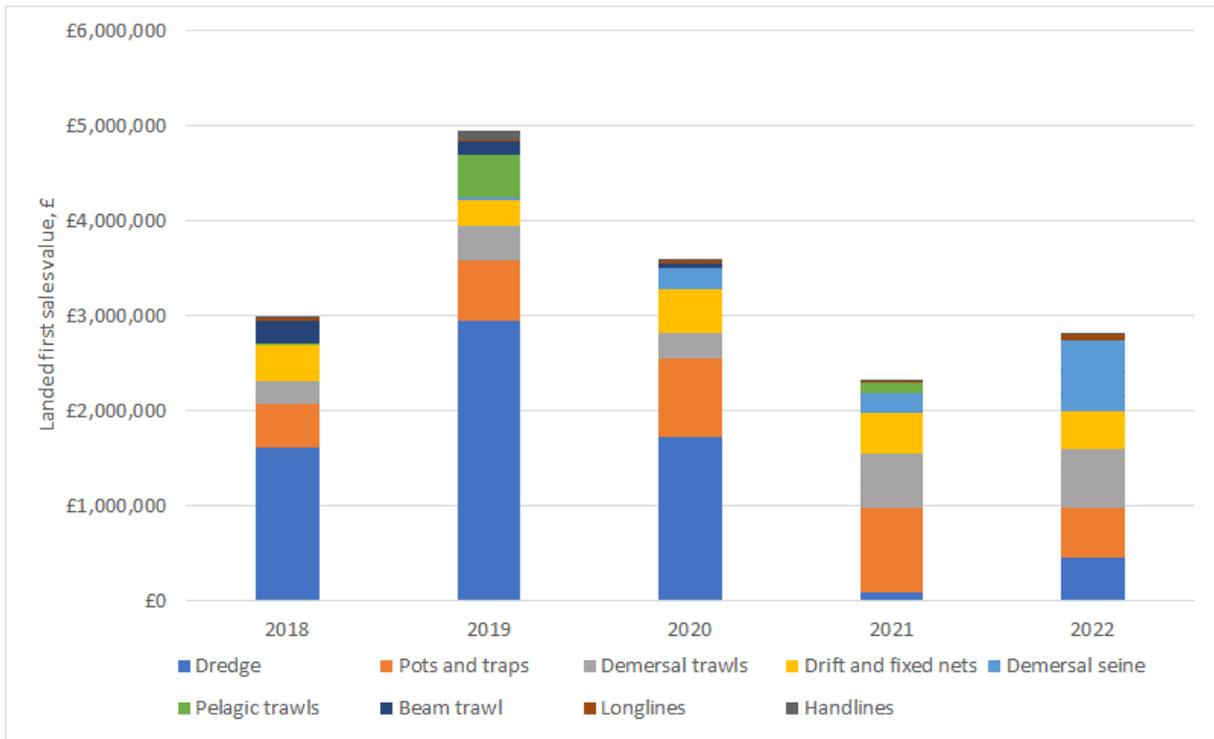
Figure 3.37 Landed value of all landings by English registered vessels from ICES rectangles 32F1 and 32F2 indicating gear type (MMO, 2023)
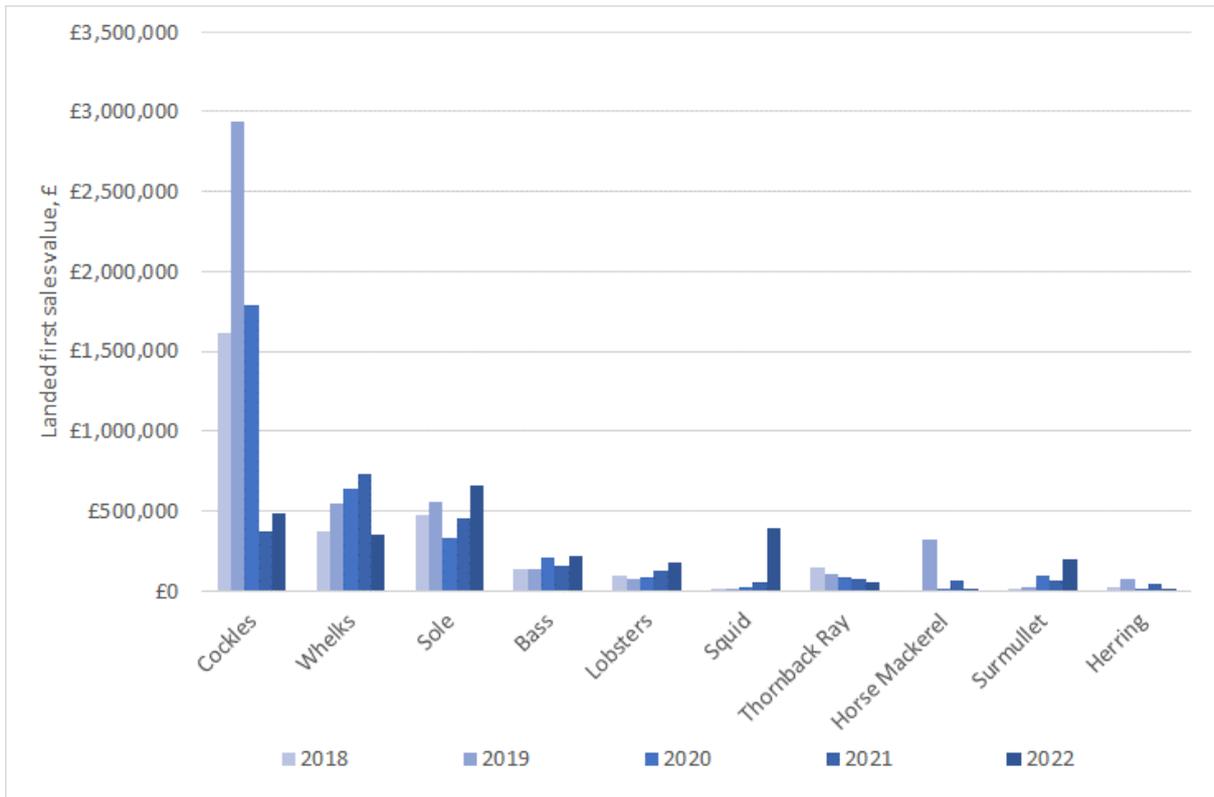
Figure 3.38 Landed value of landings by English registered vessels from ICES rectangles 32F1 and 32F2 indicating key species (MMO, 2023)
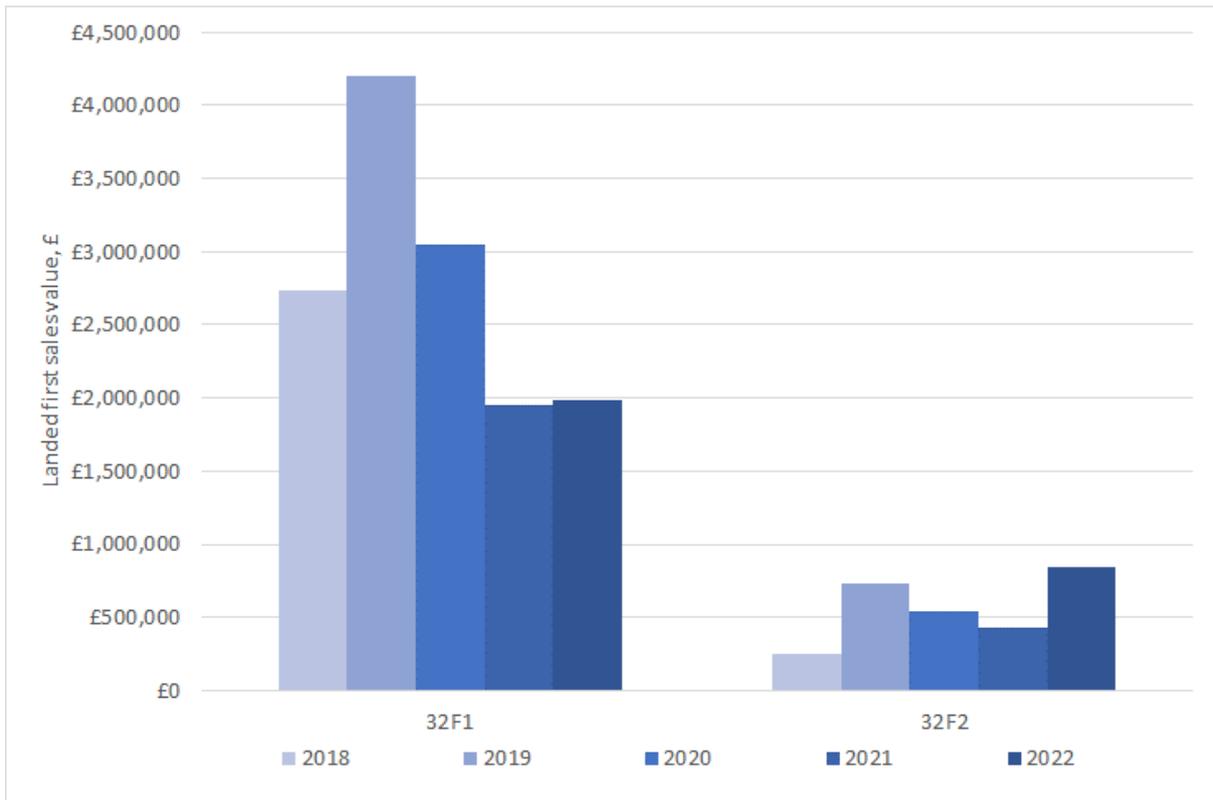
Figure 3.39 Landed value of all landings by English registered vessels indicating ICES rectangle (MMO, 2023)
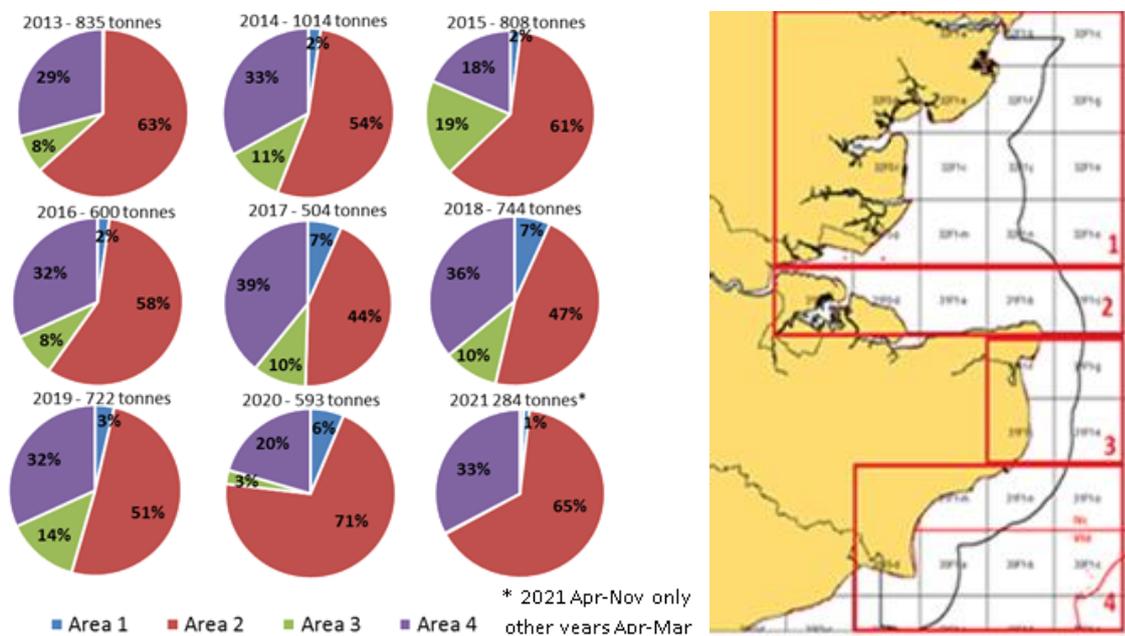
Figure 3.40 Percentage distribution of whelks landed in the four KEIFCA whelk fishing areas 2013-2021 (the VE offshore ECC is located in Area 1) (Source: KEIFCA, 2022)

Ports and Vessel Fleets

Vessels of 10 m or more length accounted for approximately 70% of landings by English vessels from ICES rectangles 32F1 and 32F2 across 2016 to 2022. These larger vessels include cockle dredgers, whelk potting vessels and beam and otter trawlers. Smaller under 10 m length vessels operating further inshore deploy pots to target whelk, lobster and brown crab and nets and hooked gear to target a variety of species, including bass, flounder and

thornback ray. Relatively lightweight trawlers of less than 10 m length target mixed demersal species in small volumes.

The MMO provides landings statistics by port of landing, which can be attributed to ICES rectangles as shown in Figure 3.41. Data shows that UK vessels active in the study area land at several local UK ports including Leigh-on-Sea, Harwich and West Mersea. UK vessels also land into non-UK ports, including several Dutch ports.

Fisheries scouting surveys within VE have confirmed that vessels actively deploying static gear within VE originate from a number of local ports including Orford, Harwich, Felixstowe, West Mersea and Southwold.

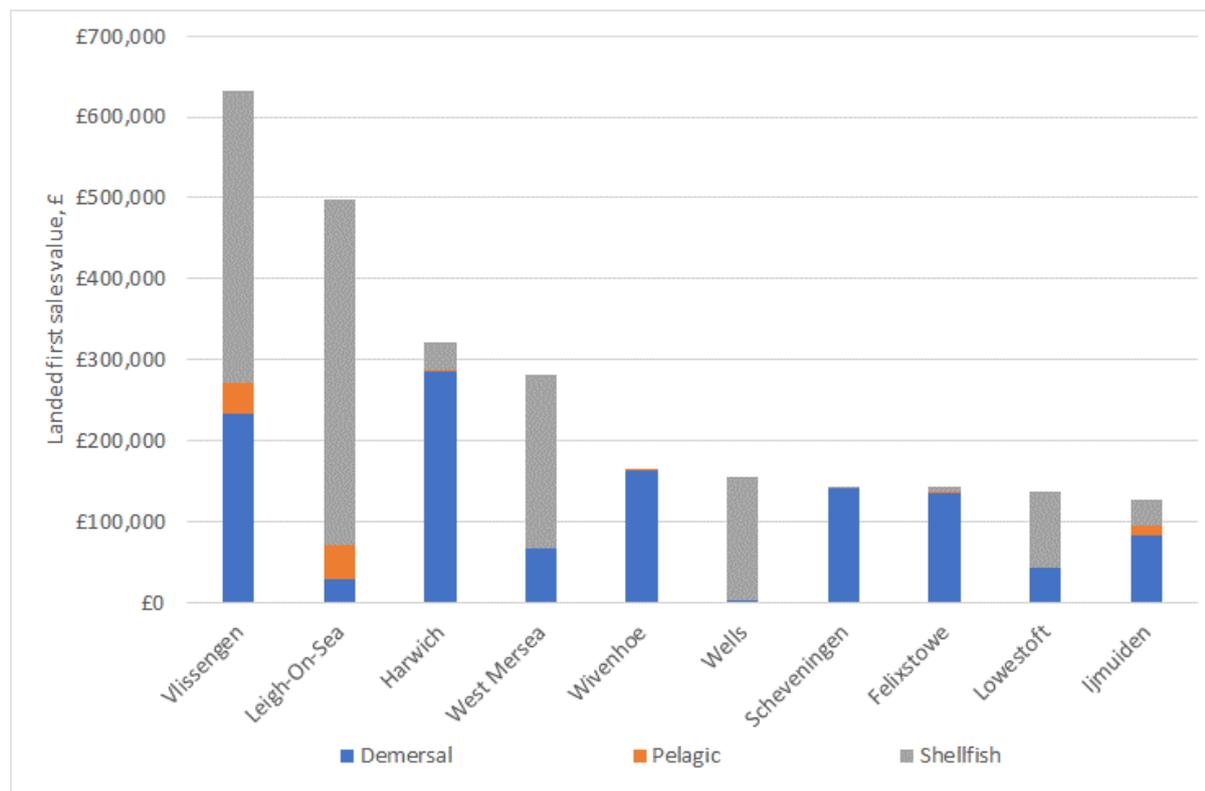**Figure 3.41 Value of landings to ports from ICES rectangles 32F1 and 32F2 in 2022 (MMO, 2023)**

3.5.7   Dutch Fisheries Activity Assessment

Landings Trends, Fishing Grounds and Key Species

Dutch registered vessels operate within the study area. Landings are predominately by large trawlers targeting plaice and sole (Figure 3.42). Whilst not specific to the study area, data capturing landings from 2016 onwards by the Dutch beam trawl fleet indicates a decline in plaice and sole landings between 2016 and 2020 (Wageningen website, 2022; Figure 3.43). This is reflected in more recent Dutch landings data, which indicates that the value of landings of sole from the study area by Dutch vessels has approximately halved between 2019 and 2022, decline from €10.6 million in 2019 to €5.1 million in 2022 (Wageningen University & Research, 2023). Landings of plaice from the study area have also declined over time, though less rapidly, and were valued at approximately €770,000 in 2022.

Dutch fishing vessels have no historic fishing rights within the 6 and 12 NM limit and so their activity is focused across the outermost extent of the offshore ECC and the array areas. VMS data indicate that Dutch beam trawling occurs at moderate to high levels across very wide sections of the Southern North Sea with relatively low levels of activity in the study area. VMS data indicates that fishing by Dutch vessels using other fishing gears does not take place within the study area, with activity by demersal otter trawlers, seiners and pelagic trawlers focused elsewhere in the North Sea.

Dutch vessels active in the study area are understood to land their catch in a number of ports including Ijmuiden, Harlingen, Urk and Scheveningen.

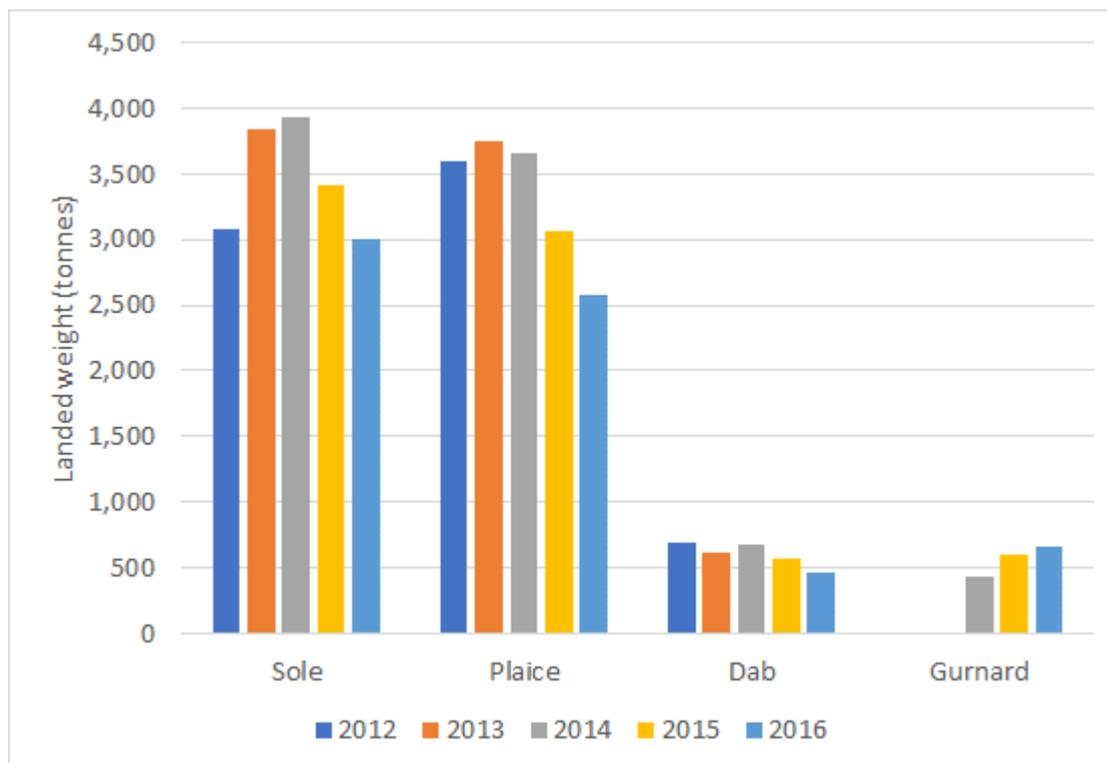**Figure 3.42 Landed weight of key species by Dutch registered vessels from ICES rectangles 32F1 and 32F2 (EU DCF, 2022)**
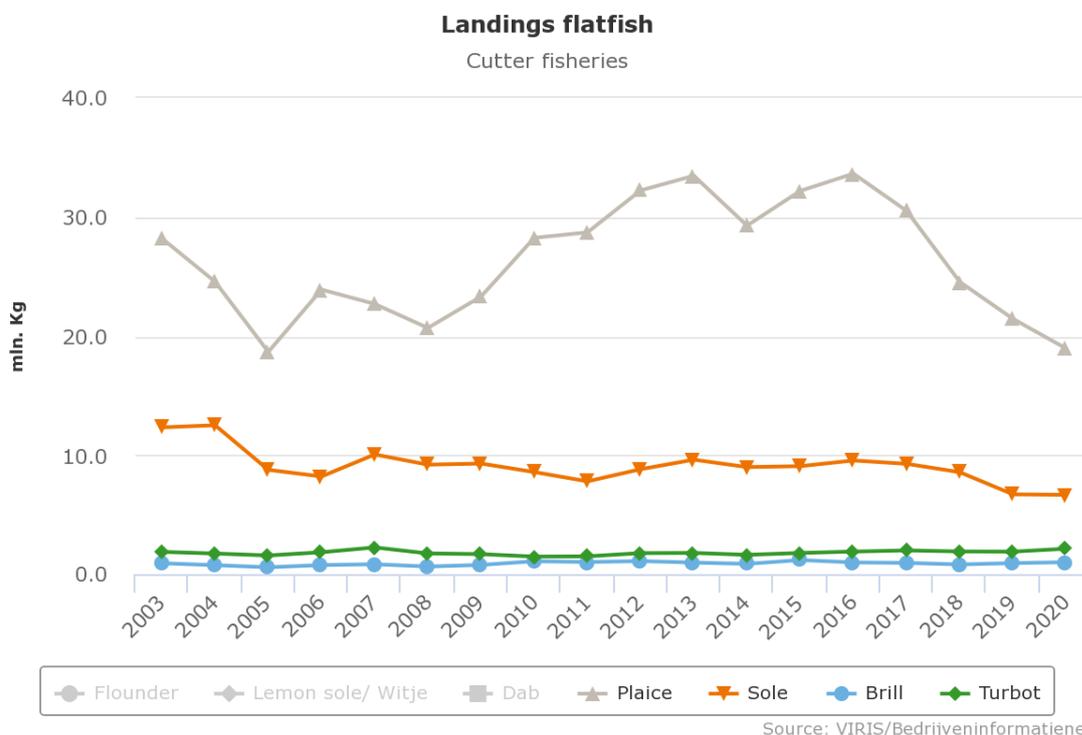
Figure 3.43 Landed live weight (in millions of kilograms) of key species by the Dutch beam trawl fleet (Wageningen, 2022)

3.5.8 Belgian Fisheries Activity Assessment

Landings trends, fishing grounds and key species

The principal methods used by the Belgian fleet in the study area are beam trawling and to a lesser extent demersal otter trawling. It is understood that some vessels are able to operate both gears. Belgian vessels in this area target a range of species, but primarily sole and plaice (Figure 3.44).

Belgian vessels have historic fishing rights in the study area between the UK's 6 and12 NM limits. VMS data indicates that Belgian beam and otter trawlers have wide operational ranges, targeting grounds in the Southern North Sea, the English Channel, the Celtic Sea and the Irish Sea.

Belgian vessels active in the study area are understood to land their catch in a number of ports including Zeebrugge, Oostende and Nieuwport.

Figure 3.44 Landed weight of key species by Belgian registered vessels from ICES rectangles 32F1 and 32F2 (EU DCF, 2022)

3.5.9 French Fisheries Activity Assessment

Landings Trends, Fishing Grounds and Key Species

In the study area, French vessels have fishing rights to fish between the UK's 6 and 12 NM limit. French vessels active in the area are understood to be predominantly demersal otter trawlers, with some pelagic trawl activity. Vessels primarily target whiting and mackerel, with occasional catches of large volumes of herring.

French fishing vessels active in the area are understood to be based out of Boulogne and Etaples predominantly and mostly active in spring and summer months.
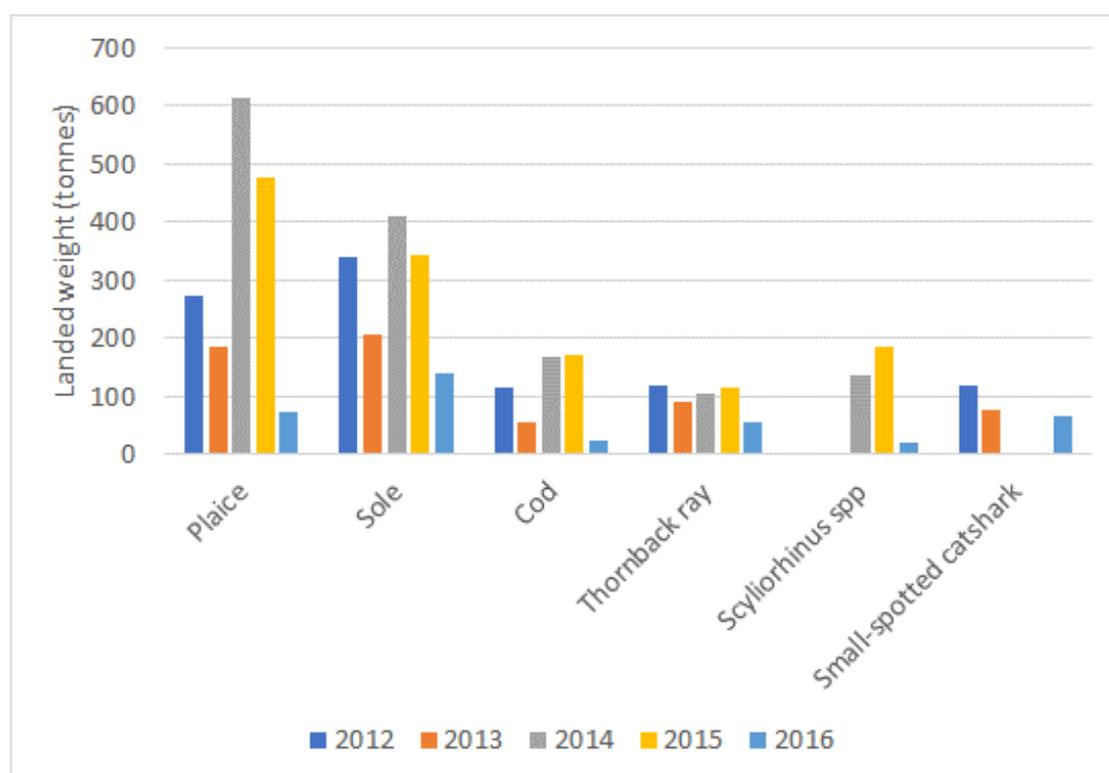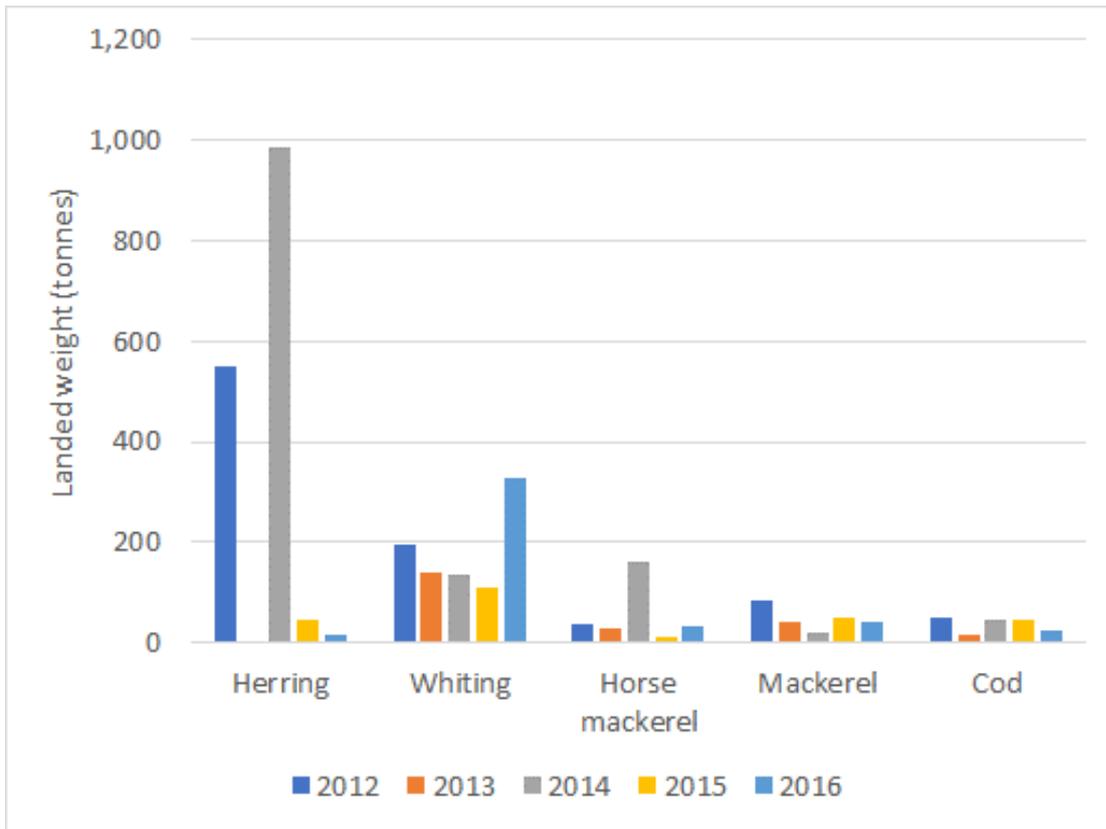
Figure 3.45 Landed weight of key species by French registered vessels from ICES rectangles 32F1 and 32F2 (EU DCF, 2022)

4. Future Baseline Environment

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

- Market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, including the 2020 to 2021 COVID pandemic;

- Market prices: commercial fishing fleets respond to market prices by focusing effort on higher value target species when prices are high, and markets are in demand;

- Stock abundance: fluctuation in the biomass of individual species stocks in response to the 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 TACs 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.

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

Following withdrawal, 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 Excusive Economic Zones (EEZs, 12 to 200 NM) to fish. In this period, EU vessels will also be able to fish in specified parts of UK waters between 6 to 12 NM.

Twenty five percent of the EU's fisheries quota in UK waters will be transferred to the UK over the five-year transition period; most of this quota has already been transferred and distributed across the four nations of the UK. After the five-year transition there will be annual discussions on fisheries opportunities. Across the study area, where UK fisheries primarily target non-quota shellfish species, it is expected that fleets are unlikely to be impacted by quota transfers. It is possible that UK vessels will seek to exploit additional quota-species opportunities, but vessels would need to access quota holdings. There has been limited change in the overall UK share for plaice and sole, the key fisheries targeted by non-UK vessels, notably Dutch and Belgian beam trawlers.

Market changes have the potential to impact fishing activity in the study area; some of the catch landed by UK vessels is exported to EU markets (e.g., brown crab) and potential tariff/non-tariff barriers could affect which species are targeted and to what extent. The key species landed by potters in the area, is whelk, which is primarily exported to non-EU countries, including Korea, Taiwan and Singapore. The trade in UK landed whelk has therefore not been as affected by the Brexit process and associated implications on shellfish exports in comparison to other species. In terms of future baseline scenarios, it is therefore possible, for

example, that the UK fleet will more heavily target whelk given that prices have increased in recent years, and they are exported to non-EU countries.

In relation to EU access to UK territorial waters, provision has been made for EU vessels with a track record of fishing between 6 NM 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.

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).

5. Summary

The key fleets operating across the study area are identified in Table 5.1 below.

Table 5.1 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 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.	

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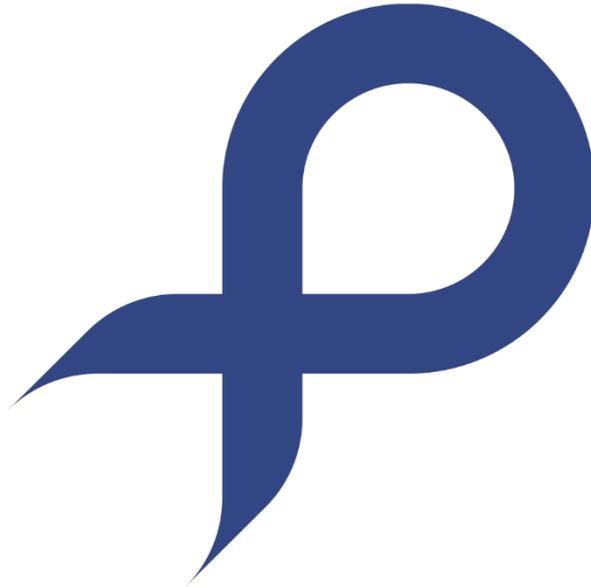
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