Morecambe Offshore Windfarm: Generation Assets

Environmental Statement

Volume 5

Appendix 13.1 Commercial Fisheries Technical Report

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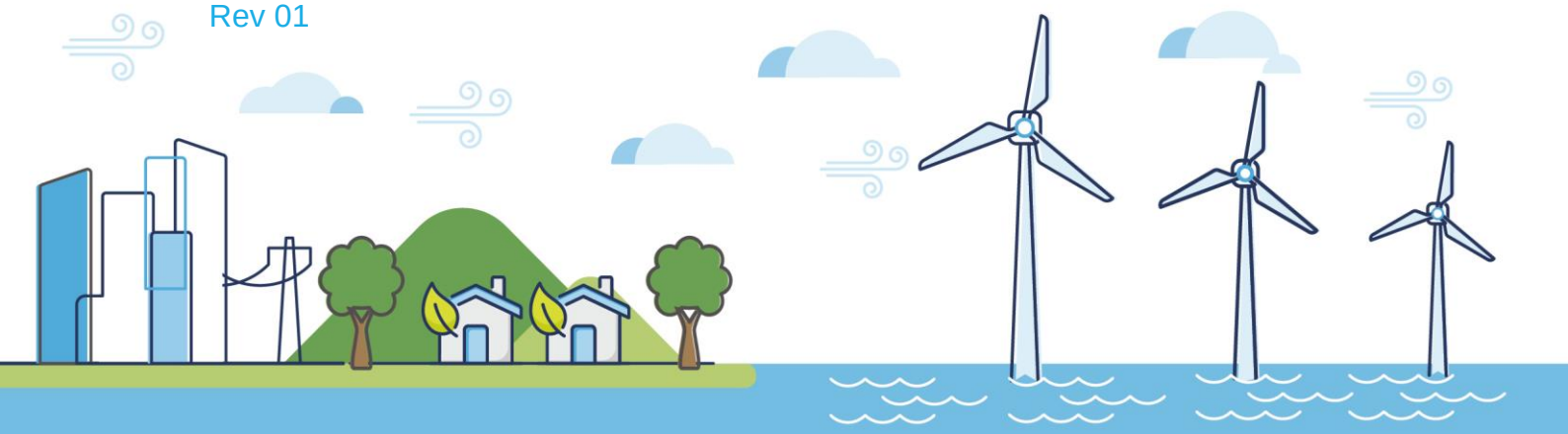

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Morecambe Offshore Windfarm Generation Assets

Appendix 13.1

Commercial Fisheries Technical Report

nimo CONSULTANTS

Report Information

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Acronyms

Term	Definition
AIS	Automatic Identification System
DCF	Data Collection Framework
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FLO	Fisheries Liaison Officer
FIR	Fishing Industry Representative
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
MAP	Multi Annual management Plan
MCRS	Minimum Conservation Reference Size
MMO	Marine Management Organisation
NRA	Navigational Risk Assessment
PEIR	Preliminary Environmental Information Report
PLN	Port Letter and Number
SAR	Swept Area Ratio
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
UK	United Kingdom
UKFEN	UK Fisheries Economic Network
VMS	Vessel Monitoring System

Units

Term	Definition
€	Euros
£	Pound sterling
°C	Degrees Celsius
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 report has been prepared by NiMa Consultants Ltd (NiMa) to support the Environmental Impact Assessment (EIA) of the Morecambe Offshore Windfarm Generation Assets (the Project).

The information on commercial fisheries activity presented in this report is intended to inform the EIA for the Project, by providing a detailed understanding of the commercial fisheries baseline, against which the potential impacts of the Project can be assessed. An overview of the information presented in this Technical Report is provided in **Chapter 13 Commercial Fisheries** of the Environmental Statement (ES) for the Project (Document Reference 5.1.13).

Commercial fisheries activity described in this report, is 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 **Chapter 17 Infrastructure and Other Users** (Document Reference 5.1.17) of the ES. The ecology of the fish and shellfish species targeted by commercial fishing activity is described in, **Chapter 10 Fish and Shellfish Ecology** of the ES (Document Reference 5.1.10).

1.2 Report Structure

This report is structured as follows:

- **Section 1 (Introduction)** introduces the report and outlines its purpose;
- **Section 2 (Methodology)** presents the methodology and data sources applied to characterise the baseline environment;
- **Section 3 (Baseline Environment)** presents the characterisation of the existing environment for the commercial fisheries assessment, specifically focused on landing statistics;
- **Section 4 (Spatial Fishing Activity Assessment)** presents available spatial data to map fishing grounds for specific fleets and fisheries;
- **Section 5 (Fisheries Activity Assessments By Nation)** presents data available specific to UK, Isle of Man and foreign fishing fleets;
- **Section 4 (Future Baseline Environment)** presents the characterisation of the future baseline environment; and
- **Section 5 (Summary)** summarises the findings of this report.

2. Methodology

2.1 Approach

This report has been developed following a detailed and rigorous desk-based assessment of data and literature. Both publicly available data sets; and data results 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 supplemented with qualitative information gained through direct consultation with the fishing industry; and communication and discussion between the onshore Fisheries Liaison Officer (FLO), the Fishing Industry Representative (FIR) and the fishing industry.

2.2 Study Area

The Project windfarm site is located within the eastern portion of the International Council for the Exploration of the Sea (ICES) Division 7a (Irish Sea) statistical area; within the United Kingdom (UK) Exclusive Economic Zone (EEZ). For the purposes of recording fisheries landings, ICES Division 7a is divided into statistical rectangles which are consistent across all Member States operating in the Irish Sea.

The windfarm site is entirely located within ICES rectangle 36E6, which represents the local commercial fisheries study area for the EIA. The local study area is shown in Figure 2.1; note that the windfarm site occupies only a portion of the ICES rectangle. In order to understand fishing activity in waters adjacent to the Project, a regional commercial fisheries study area has been defined to include 36E6 together with surrounding ICES rectangles 37E6, 37E5, 36E5, 35E5 and 35E6, as shown in Figure 2.2. Baseline data has been gathered and analysed for the regional study area.

To summarise, there are two scales of commercial fisheries study areas as follows:

- Local commercial fisheries study area: 36E6 (Figure 2.1); and
- Regional commercial fisheries study area: 37E6, 37E5, 36E6, 36E5, 35E5 and 35E6 (Figure 2.2).

The justification for defining this wider regional study area is that it aligns with the scale of statistical landings data; covers a wider area than the windfarm site; and takes into consideration that most commercial fish and shellfish receptor populations are distributed at a wider spatial scale, ensuring that potential implications of displacement of fishing activity can be adequately understood.

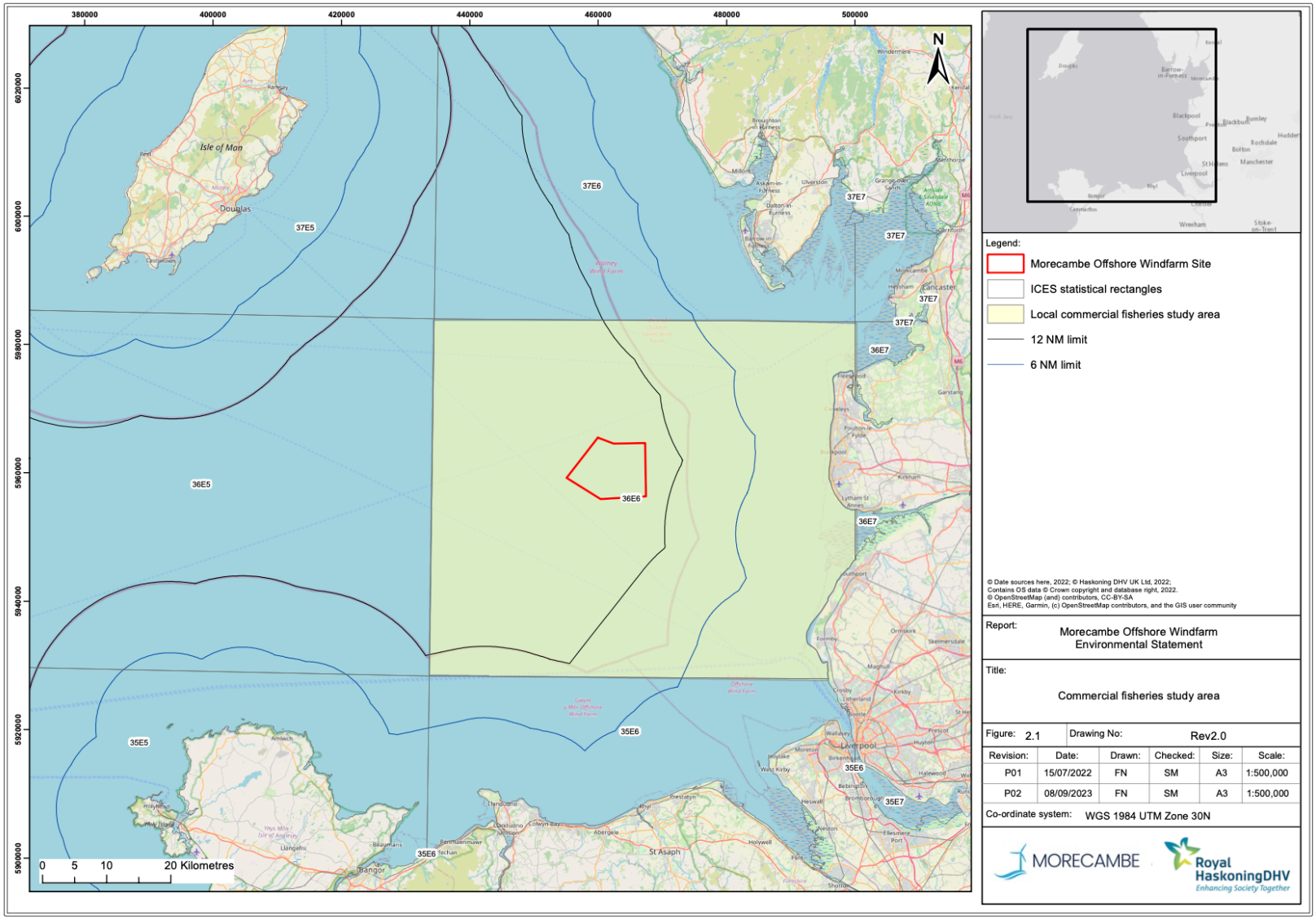

Figure 2.1 Local commercial fisheries study area

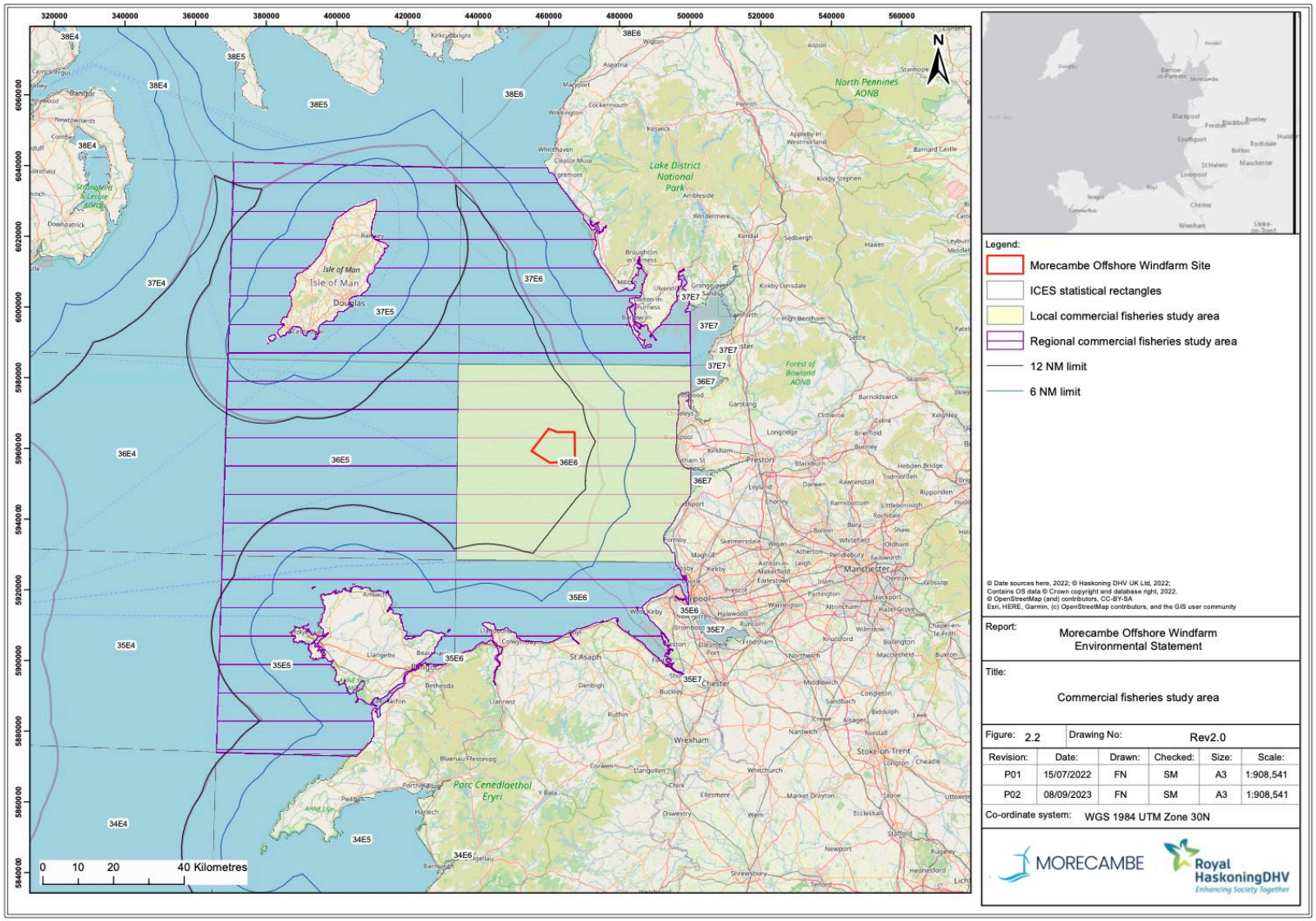

Figure 2.2 Regional commercial fisheries study area

2.3 Data Sources

A range of data sources have been analysed and presented within this report and 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 five to six-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 report. A full list of references is provided at the end of this report and are cited within the text where appropriate. Information on fishing activity across the windfarm site has also been provided by the project Fisheries Liaison Officer (FLO); this includes the findings of scouting surveys undertaken in 2021.

Table 2.1 Data sources used to inform this report

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

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 report. The level of uncertainty and confidence of each data set is defined in Table 2.2 based on expert judgement of the assessment team.

Limitations of landings data include the spatial size of ICES rectangles which can misrepresent actual activity across the windfarm site; 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 of First-Sale Fish Scheme (RBS legislation) (MMO, 2022). 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, 2022). 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, 2022).

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 to 2019) is no longer available by ICES rectangle. Data at a scale of ICES division (i.e. the whole of the Irish Sea) is less useful to understand fishing activity specific to the windfarm site.

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

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 to 2022) data for UK-registered vessels.	The data is recorded from sales notes and landing declarations for all vessel lengths. Due to the UK legislation of Registration of Buyers and Sellers data is considered accurate and verifiable. • Data assessed with low uncertainty and high confidence.
EU DCF	Landings statistics (2012 to 2016) data for EU landings from ICES rectangle 36E6 by country, species and gear type.	The data is submitted by individual member states and therefore limitations vary per country. Vessels 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 is assessed with high uncertainty and low confidence. • For all other EU vessels data is assessed with low uncertainty and high confidence.
Spatial data		
Brown and May Marine	Scouting fisheries surveys to record gear locations.	The data was collated from October to November 2021 and represents a snapshot of activity during these months. All gear locations were recorded for all vessel lengths. Areas not surveys are not represented in the dataset. Dataset has limited coverage. • Data assessed with low uncertainty and high confidence.
MMO	UK VMS data for vessels ≥15 m length.	The data is only available for 15 m and over vessels, so is 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 is only available for 12 m and over vessels, so is 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 is only available for 15 m and over vessels, so is not representative of <15 m vessels. • Data assessed with medium uncertainty and medium confidence.
NASH Maritime	Marine traffic (AIS and radar) survey data (2022).	An assessment undertaken into fishing vessel activity within the Navigational Risk Assessment (NRA) undertaken for the Project windfarm site. Based on a 14 day AIS and radar survey in summer (August 2022) and winter (February 2022) and longer-term AIS data. • Data assessed with low uncertainty and high confidence.

3. Baseline Environment

3.1 Overview of Landings

3.1.1 Local commercial fisheries study area (36E6)

Commercial fisheries statistics presenting data for the annual (2016 to 2022) landed weight and first sales value landed by UK vessels from the local study area (36E6) are shown in Figure 3.1 and Figure 3.2 respectively. This data indicate that landings are dominated by shellfish species, notably queen scallop *Aequipecten opercularis*, whelk *Buccinum undatum*, and king scallop *Pecten maximus*. The majority of landings by UK fishing vessels are made by vessels registered in Scotland and England.

An annual average value of almost £2.22 million was landed by all UK vessels for the years 2016 to 2022 from the local study area (36E6). Queen scallop represents the highest value species commercially landed from the local study area (average £792,000 per annum), although landings are highly variable across the time series, peaking in 2016 with significant drops since. King scallop landings have remained more consistent with an average of £452,000 per annum. The trend seen in queen scallop landings is expected for this species, with higher production at specific grounds on a seven to ten year cycle. The lower level of landings noted from 2018 to 2022 is therefore not signifying a move away from this species, but representing the long term trends seen in catches, which is typical for queen scallop in the Irish Sea region. Notably, landings of queen scallop in 2021 have increased from 2020 levels, although dropped in 2022.

Whelk is also a key species for the local study area, with an average first sales value of £585,000 per annum, peaking in 2019 at £1 million. Relatively small quantities of other species are landed from the local study area, including lobster *Homarus gammarus* (£59,000 annual value), bass *Dicentrarchus labrax* (£54,000) and sole *Solea solea* (£90,000). A significant increase in sole landings are noted in 2022 with a value of £362,000 being landed, compared to the annual average of £90,000.

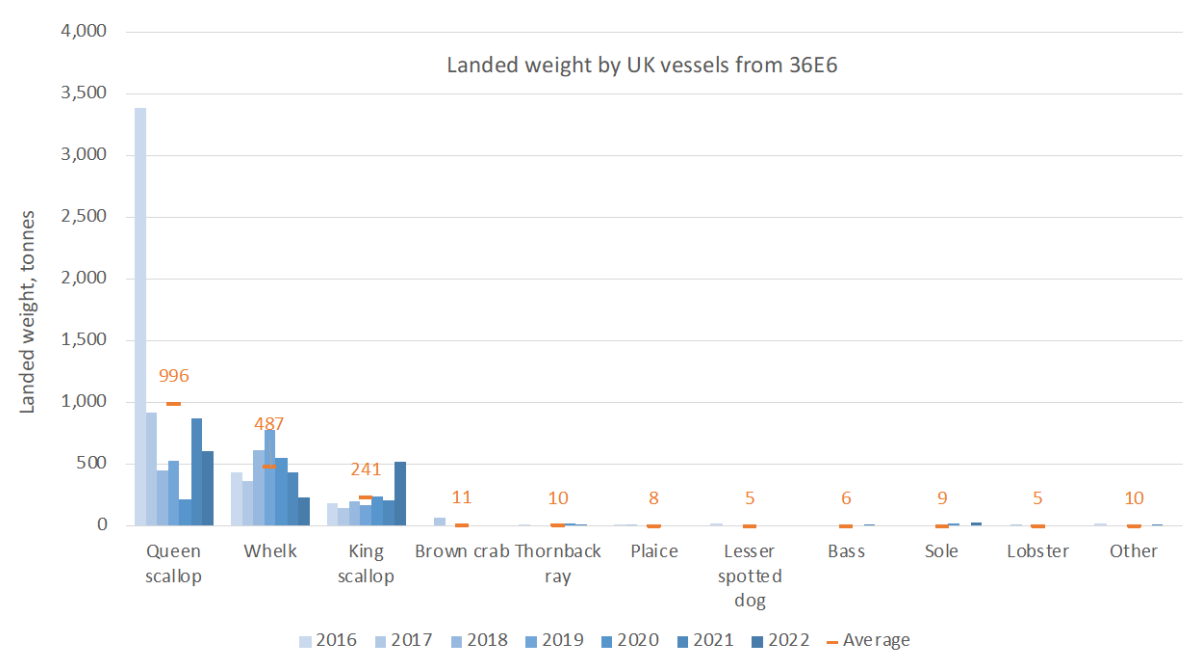

Figure 3.1 Key species by annual landed weight (tonnes) (2016 to 2022) from the local commercial fisheries study area (ICES rectangle 36E6) (MMO, 2022; MMO, 2023)

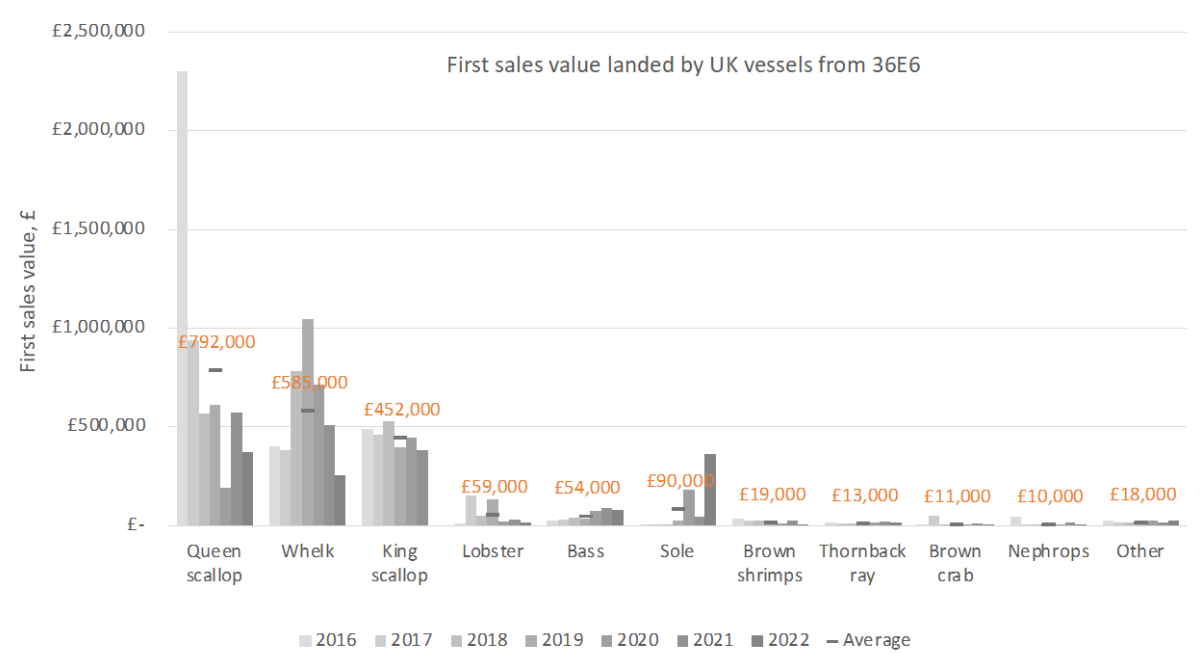

Figure 3.2 Key species by annual landed value (GBP) (2016 to 2022) from the local commercial fisheries study area (ICES rectangle 36E6) (MMO, 2022; MMO, 2023)

3.1.2 Regional commercial fisheries study area

Commercial fisheries statistics presenting data for the annual (2016 to 2022) landed weight and first sales value landed by UK vessels from the regional study area (seven ICES rectangles) are shown in Figure 3.3 and Figure 3.4 respectively.

Landings data indicates that in this wider regional study area, landings remain dominated by shellfish species, namely whelk, king scallop, queen scallop, nephrops *Nephrops norvegicus*, lobster and brown crab *Cancer pagurus*. Landings from the regional study area by UK and Isle of Man fishing vessels are made by vessels registered in England, Scotland, the Isle of Man and Wales.

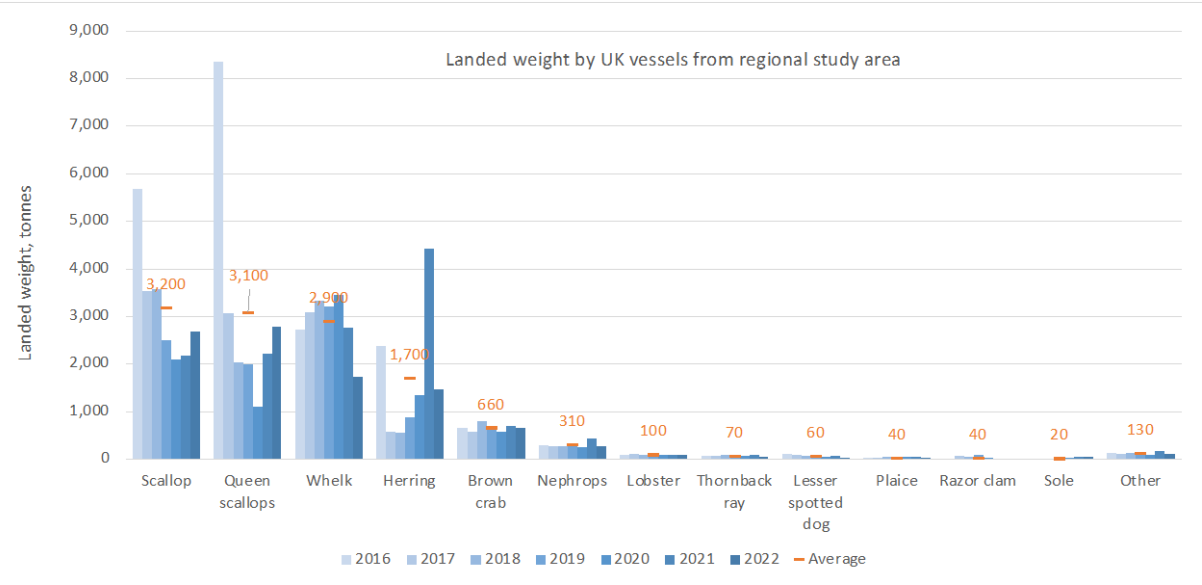

Figure 3.3 Key species by annual landed weight (tonnes) (2016 to 2022) from the regional commercial fisheries study area (MMO, 2022)

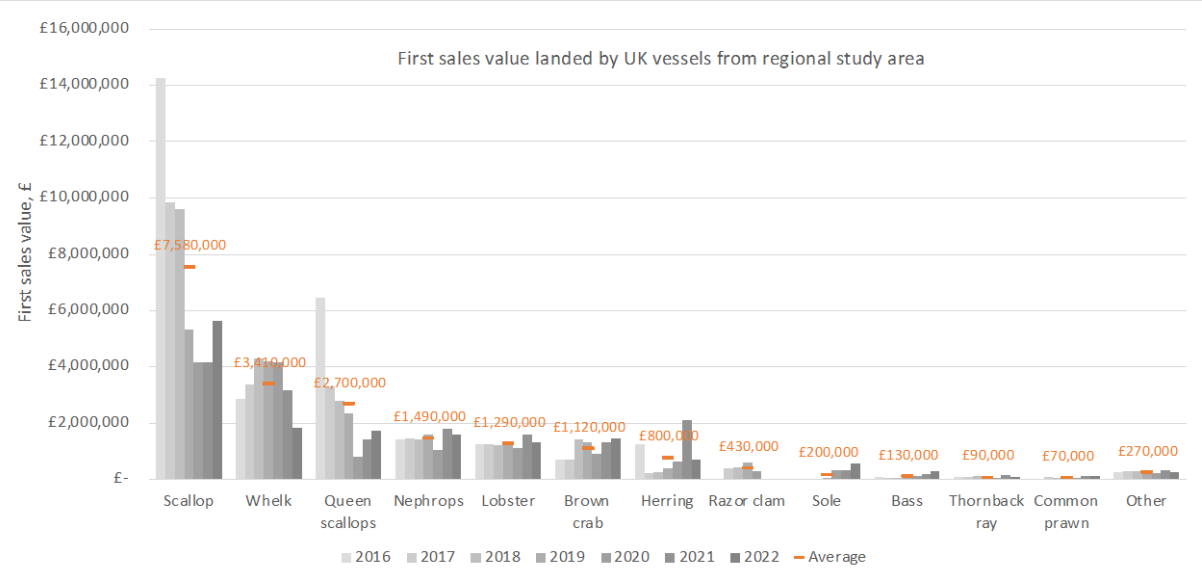

Figure 3.4 Key species by annual landed value (GBP) (2016 to 2022) from the regional commercial fisheries study area (MMO, 2022)

Regional landings data by ICES rectangle (Figure 3.5) illustrate the importance of the wider region to UK and Isle of Man vessel nationalities, specifically Isle of Man landings from 37E5, Scottish landings from 36E5, Welsh landings from 35E5 and Northern Irish landings from 37E5.

Landings data sourced from the EU DCF database indicates that non-UK fishing activity in the regional study area includes Irish dredgers targeting king scallops and Belgian trawlers targeting demersal species, particularly thornback ray *Raja clavata*, plaice *Pleuronectes platessa* and sole. It is understood that Irish and French vessels hold historical access rights in the 6 to 12 NM zone, inshore of the windfarm site.

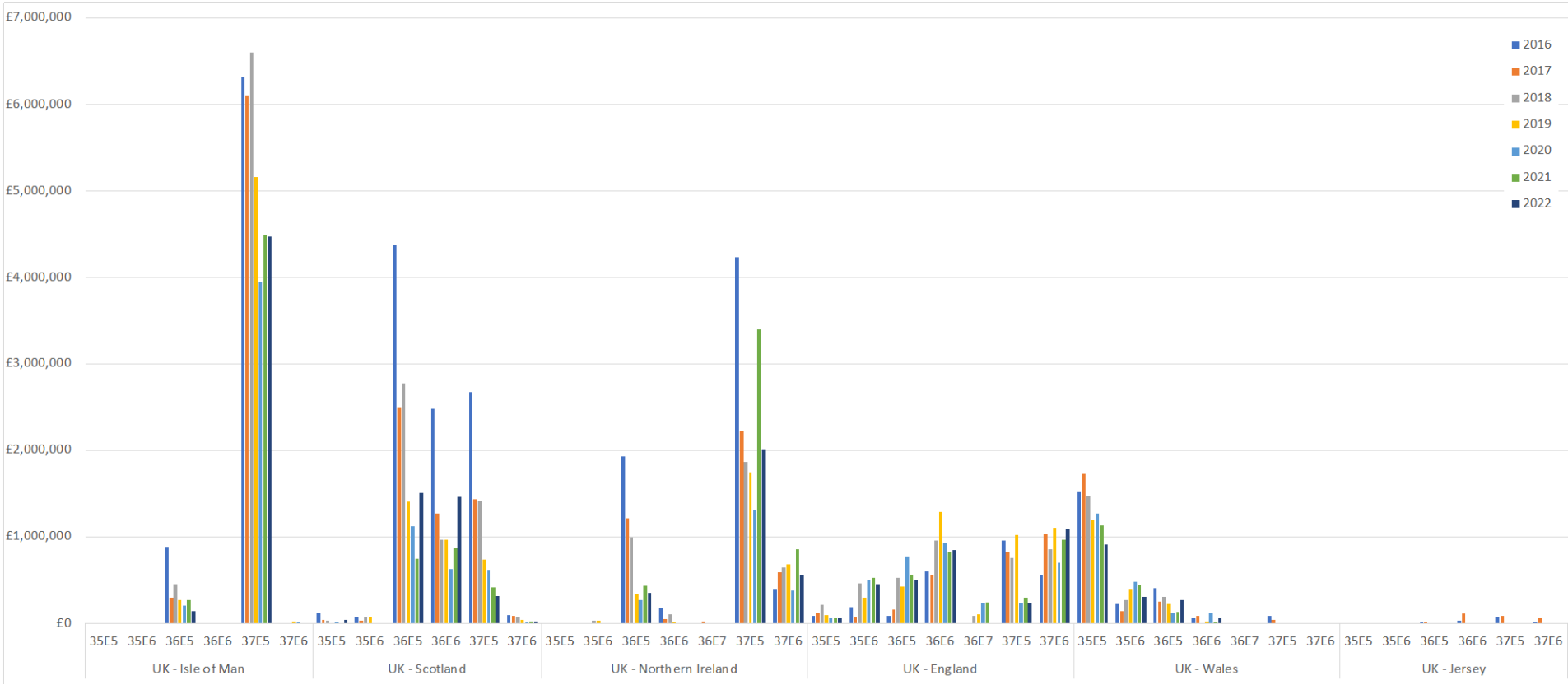

Figure 3.5 Annual landed value (GBP) (2016 to 2022) from the regional commercial fisheries study area by vessel nationality and ICES rectangle for UK and Crown Dependencies (MMO, 2022; MMO, 2023)

3.2 Key Fishing Fleets and Target Species

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 local study area, as indicated by landings statistics for registered vessel nationality and gear type (Figure 3.6). Across the local study area, the highest proportion of landings by weight are caught by dredges and pots and traps. Vessel and gear types within the key fleets and fisheries that operate across the local and regional study areas are described within this section.

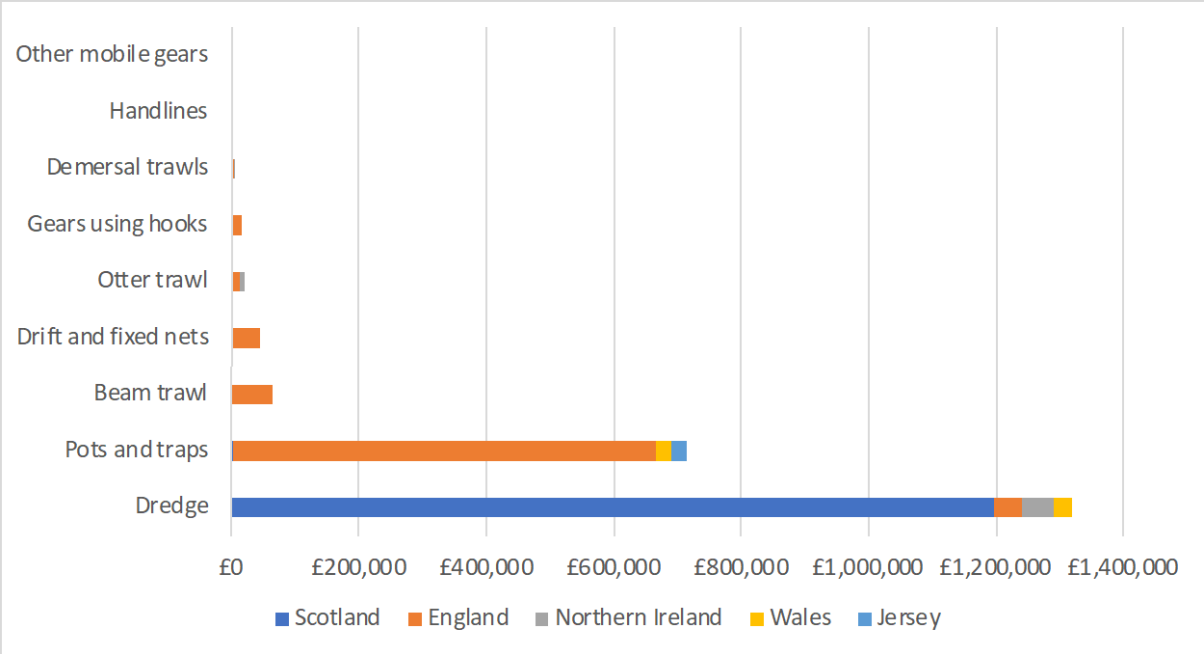

Figure 3.6 Annual average landings value 2016 to 2022 by gear type and vessel origin for the local study area, 36E6 (Data source: MMO, 2022)

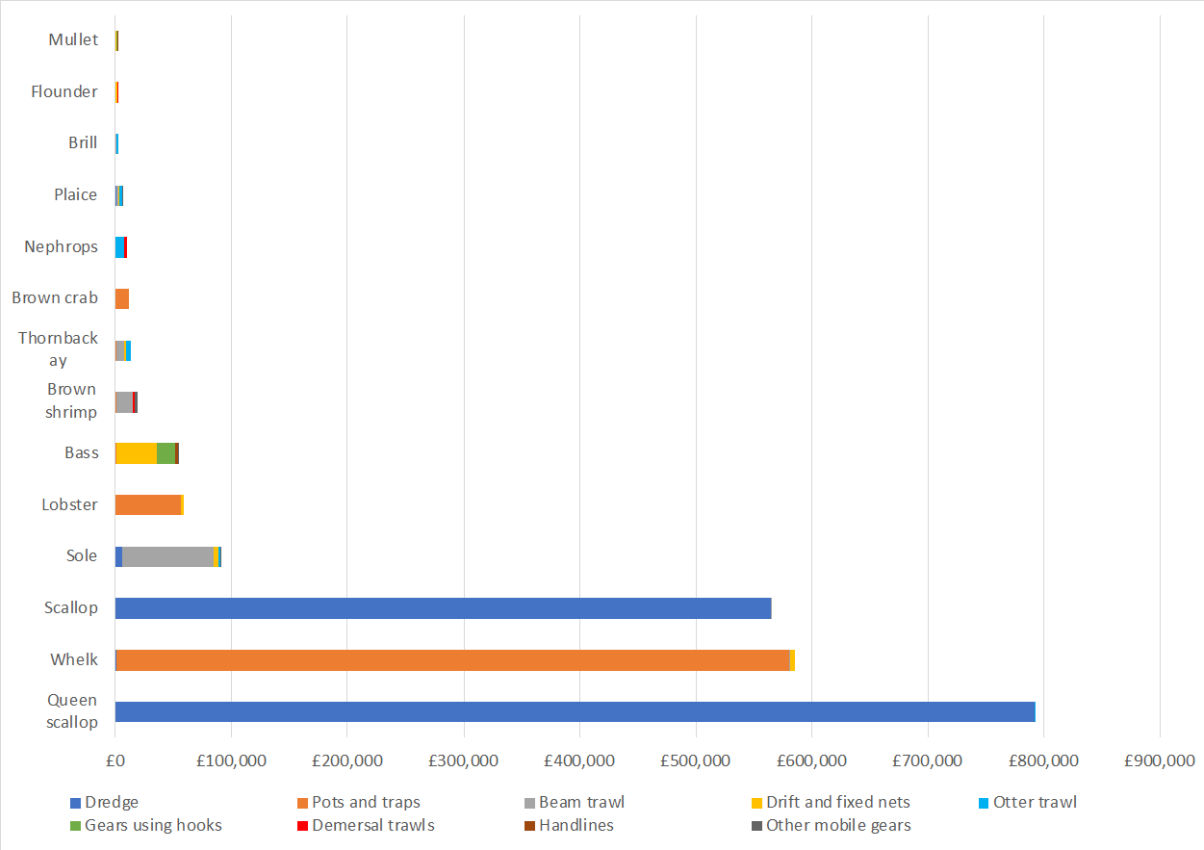

Figure 3.7 Annual average landings value 2016 to 2022 by gear type and key species for the local study area, 36E6 (Data source: MMO, 2022)

3.2.1 Scallop Dredge

Dredges are rigid structures that are towed along the seabed to target various species of shellfish. A typical scallop dredging vessel is shown in **Figure 3.83-8** and **Table 3.13.1** describes the profile of scallop dredging vessels active across the regional study area.

Scallop dredgers fish as the tooth bar of each dredge rakes through the sediment lifting out scallops and the spring-loaded tooth bar swings back, allowing the dredge to clear obstacles on the seabed. The dredges are held in a series on two beams, which are fished on each side of the vessel. Generally, queen scallop are targeted using skid dredges. Skid dredges operate in much the same way as toothed dredges which target king scallop, but the tooth bar is replaced with a "tickler chain" which disturb queen scallops resting on the seafloor, causing them to swim upwards into the water column where they can be caught by the dredge.

From the regional study area, king scallops are caught by vessels operating dredge gear; Queen scallops are caught by both dredge gear and demersal otter trawl. In the local study area queen scallop are caught by dredge gear operated by UK vessels; in the regional study area queen scallop are caught by UK scallop dredgers and Isle of Man demersal otter trawlers.

UK and Isle of Man scallop dredgers operate around the entire coastline of the British Isles. Scallop dredging takes place year-round. The UK and Isle of Man scallop fleet has two main components: a fleet of larger boats (> 20 m in length) which range in a nomadic fashion exploiting both inshore and offshore scallop stocks around the British Isles; and, smaller inshore boats (< 15 m in length) that are restricted in range to inshore waters. Larger nomadic vessels tend to fish intensely in an area until harvesting scallops becomes unprofitable. They will then move on to new areas but will return a number of years later when the scallop stocks have returned to a level where dredging for them has once again become viable. Due to this fishing pattern a large scallop dredger may operate in four or five, or even more, areas and rotate around them over a period of several years. In this way, most of the suitable grounds

around the UK are fished. At the other end of the spectrum are the smaller, inshore vessels, including some who will only fish for scallops on a part time basis, and others who rely on scallops for the majority of their income. These vessels are restricted, primarily by their size, in the areas and weather that they can fish meaning that they are likely to dredge for scallops only in their local area. The catching capacity of these vessels is significantly lower than the large vessels due to the lower number of dredges they can tow. Visiting vessels from Scotland, England and Northern Ireland periodically fish scallop grounds in the Irish Sea, and in addition there are a small number of Welsh dredgers based out of Holyhead.

Scallop dredging is an activity which is generally engaged by larger (>10 m vessel length) vessels due to the engine capacity required to tow this heavy fishing gear.

Not all scallops in the path of the dredge are retained by the dredges and efficiency of the Newhaven dredge (commonly used in the UK commercial scallop fishery) can vary between <10 % on soft ground to 51 % on hard ground. Dredge efficiency is affected by ground type (e.g. soft sand, gravel or cobble), towing speed, warp length, tide strength and direction and the experience of the skipper.

Table 3.1 Profile of typical dredging vessels active across the regional study area

Parameter	Indicative details
Main target species	King scallop and queen scallop
Nationality	Scottish, English and Northern Irish, some Welsh, Irish
Vessel length	10 m to 25 m
Horsepower	200 hp to 400 hp
Typical speed when shooting and hauling gear	2 to 6 knots
Typical duration of tow / dredge	1 to 2 hours
Seasonality of activity	King scallop targeted primarily in winter months (November to February) Queen scallop targeted year-round with spring/summer peak, noting current seasonal Irish Sea closure April to June
Typical gear	Up to 16 dredges per side of vessel. Each dredge consists of a triangular frame leading to an opening, a tooth bar with spring-loaded teeth, and a bag of steel rings and netting back.

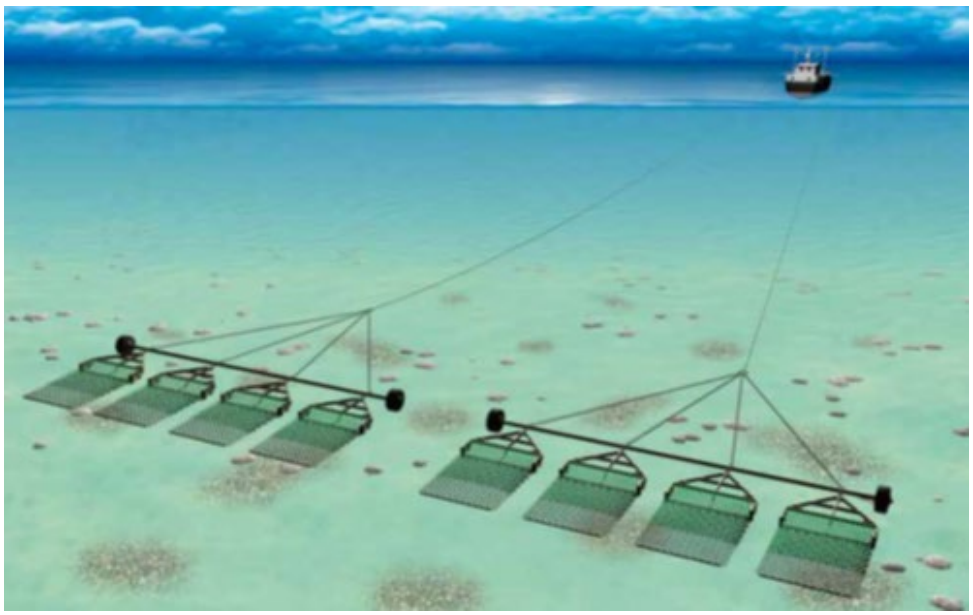

Figure 3.8 Typical dredge gear configuration (Source: Seafish, 2015)

Figure 3.9 Example of dredge vessel (Source: Fishing News)

Key species caught by vessels operating scallop dredge

Queen scallop

In the regional study area queen scallop are caught by scallop dredgers and demersal otter trawlers; in the local study area queen scallop are principally targeted by scallop dredgers.

The regional demersal otter trawl fleet targeting queen scallop is principally vessels registered in the Isle of Man. Further details of this fleet is provided in Section 5.5.

Queen scallop is found down to depths of 100 m, on sand or gravel habitats. It is fished commercially around the UK, with particularly important commercial grounds around the Isle of Man. It can grow up to 90 mm in diameter.

Queen scallop differ from king scallop in that they are smaller, and both shells (valves) are curved (convex), whereas for the king scallop the lower valve on which it lies is deeply convex and the upper valve is almost flat (Carter, 2008).

Most information available about the stock status of queen scallops in the Irish Sea is from research and stock assessments from Isle of Man territorial waters. The Isle of Man queen scallop stock could be an indicator of scallop stock status in the rest of the Irish Sea. Isle of Man queen scallop stock peaked at around 25,000 tonnes in 2010, and subsequently declined to around 1,200 tonnes in 2019, the lowest on record. Estimated biomass in 2021 is 2,004 tonnes: an improvement but still below the long term average. Therefore, there remains concern for the status of the stock. There are few management measures in place for Irish Sea queen scallop fisheries outside of territorial waters; a minimum landing size (MLS) of 45 mm is in place for queen scallop; however, it is generally uneconomic to process queen scallops less than 55 mm. The queen scallop fishery in the Irish Sea is currently subject to closure between April and June each year (MMO, 2018).

In general, landings of queen scallop are more variable and less valuable than king scallops. Landings of queen scallops from the local study area occur year-round, though typically peak in the summer months. Landings from the local study area have declined substantially in recent years from over 3,000 tonnes in 2016 to approximately 200 tonnes in 2020, increasing to 880 tonnes in 2021 and 600 tonnes in 2022.

Stakeholder consultation indicated the cyclical nature of queen scallop landings, which peak and trough on a 7 to 9 year cycle. A long term trend in landings has therefore been analysed for queen scallop, for the period 2011 to 2022 (i.e.,12 years). The data presented in Figure 3.10, Figure 3.11 and Figure 3.12 illustrate this long term trend relative to landed weight, value by ICES rectangle and value by ICES rectangle and vessel nationality for all UK vessels including Isle of Man.

The long term data trend in queen scallop landings indicates a clear pattern of higher landings from 2011 to 2016 compared to 2017 to 2022, and this trend is reflected in landings from all key ICES rectangles i.e., 36E5, 36E6 (within which the Project is sited) and 37E5 (where the majority of Isle of Man effort is focused).

The average annual value from the periods 2011 to 2016, 2017 to 2022 and 2011 to 2022 is shown in Table 3.2 for the regional study area and local study area. The landed value from the local study area dropped by 58% between the period 2011-2016 and 2017-2022; the regional landings dropped by 68% across the same periods.

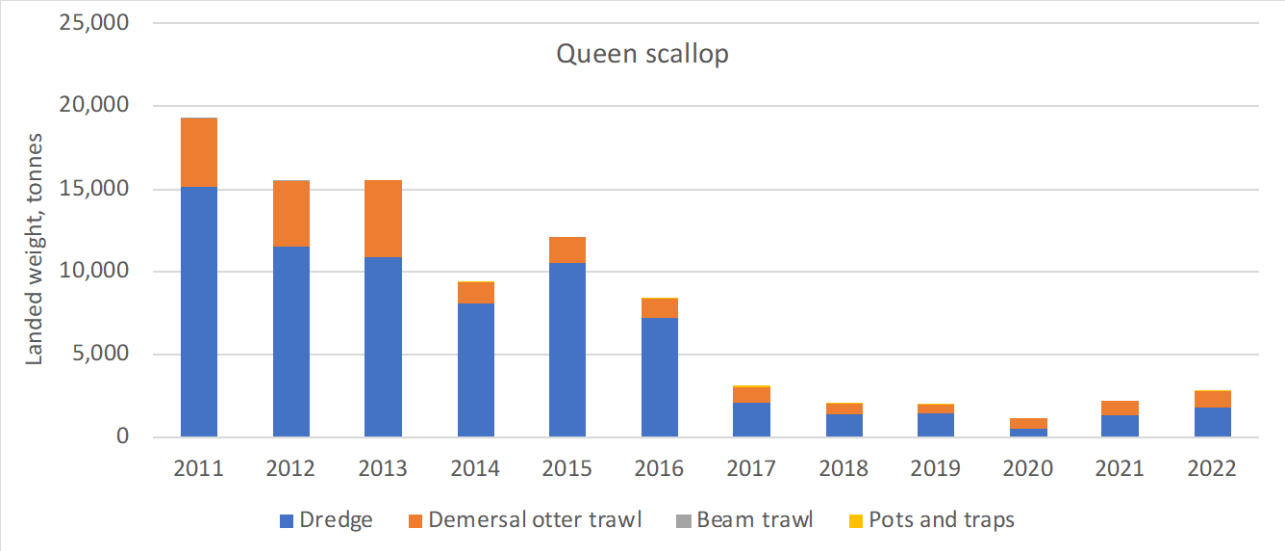

Figure 3.10 Long term trend in queen scallop landed weight, tonnes (2011 to 2022) by UK and Isle of Man vessels from the regional study area (MMO, 2016, 2022)

Table 3.2 Average annual first sales value of queen scallop landed by UK vessels (MMO, 2016, 2022; 2023)

	2011 to 2016 average	2017 to 2022 average	2011 to 2022 average
Regional study area	£6,381,174	£2,071,126	£4,226,150
Local study area (36E6)	£1,274,194	£541,317	£907,756

Most information available about the stock status of queen scallops in the Irish Sea is from research and stock assessments from Isle of Man territorial waters. The Isle of Man queen scallop stock could be an indicator of scallop stock status in the rest of the Irish Sea. Isle of Man queen scallop stock peaked at around 25,000 tonnes in 2010, and subsequently declined to around 1,200 tonnes in 2019, the lowest on record.

The Isle of Man Queen Scallop 2022 Stock Survey Report conducted by Bangor University's Sustainable Fisheries and Aquaculture Group (Bloor et al., 2022a) presents a comprehensive overview of the stock status, fishing effort, and management measures for the queen scallop fishery in and around the Isle of Man's territorial waters. Within Manx waters, queen scallop is managed via a TAC, however this TAC does not extend into English waters.

The variation in landings confirms the importance of considering long term trends in specific circumstances. The cyclical nature of the queen scallop fishery is noted, but not clearly evidenced in landings statistics for the regional study area. There is slight growth in landings in 2022 and while potential remains for queen scallop landings to increase in the near future, the recent stock assessments show a low biomass for this species.

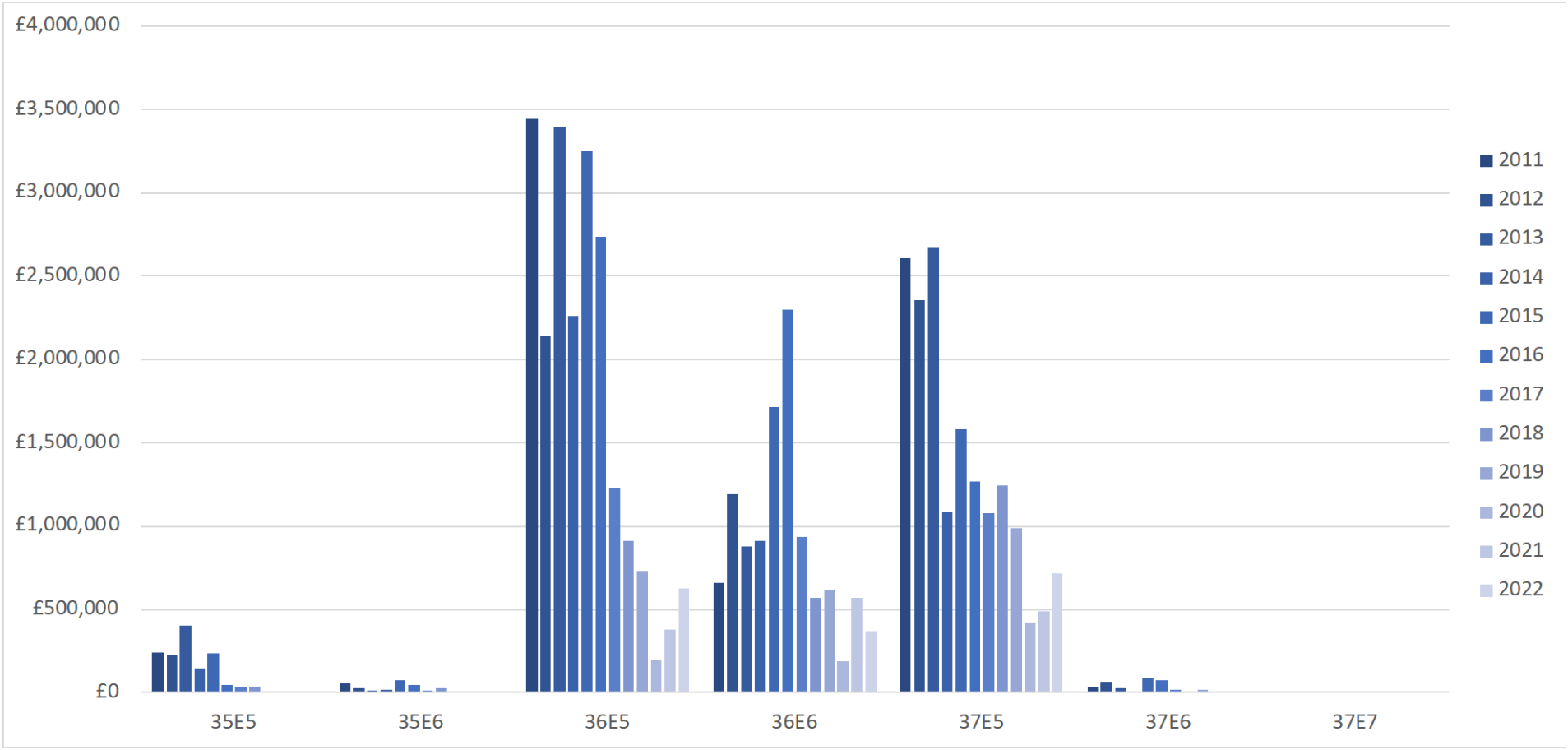

Figure 3.11 Long term trend in queen scallop landed value (2011 to 2022) by UK vessels from the regional study area (MMO, 2016, 2022)

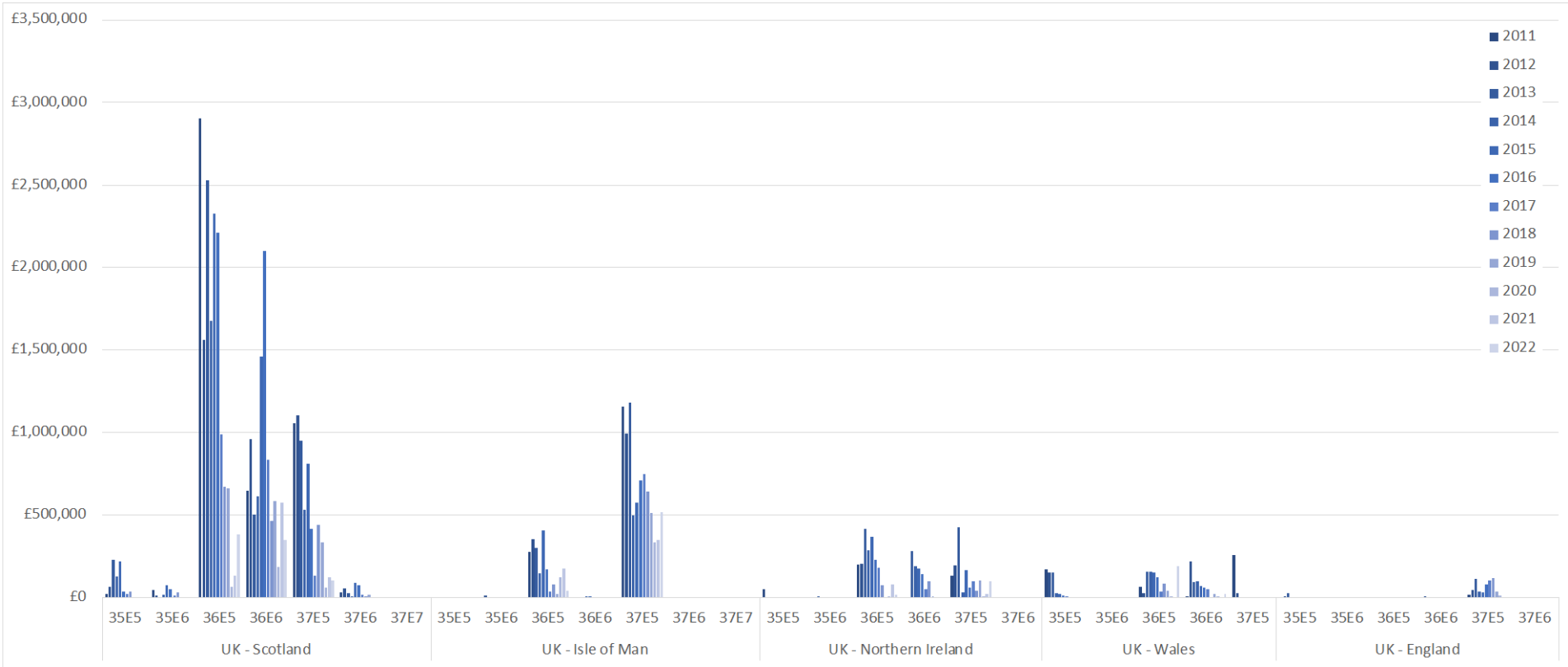

Figure 3.12 Long term trend in queen scallop landed value (2011 to 2022) by UK vessels from the regional study area (MMO, 2016, 2022)

King scallop

King scallop are most common in water depths of 20 to 70 m, in areas of clean firm sand and fine gravel exposed to water currents, which provide good feeding conditions for this bivalve mollusc. Adults are largely sedentary and usually found recessed in sediment. King scallop live to 10 to 15 years and reach reproductive maturity between 3 to 5 years, at a size of 60 mm; the average maximum size is 160 mm. Recruitment is usually unpredictable as it depends not only on successful spawning and larval production but also on if larvae are retained or transported to areas suitable for larval settlement. Larvae are pelagic, making settlement in a particular area somewhat unpredictable, which leads to an unstable age structure within stocks. As a consequence of this, king scallop beds frequently show a regional separation of year classes and spatial variability in age structure.

Whilst annual assessments of king scallop stock status in UK English waters are undertaken by Cefas, there is no analytical assessment of stock status in this area. However, several administrations have responsibilities for this area and dredge surveys within the Irish Sea have been undertaken by the Isle of Man, Ireland and Wales.

There are no total allowable catches (TACs) (i.e. catch limits) or quotas in place for this species; instead, UK king scallop fisheries are controlled predominantly through the use of minimum legal landing sizes, gear restrictions, seasonal closures and some effort controls on the largest boats. An EU Minimum Conservation Reference Size (MCRS) exists of 110 mm in the south Irish Sea and there is a cap on the level of effort (kWdays) that vessels ≥15 m can utilise in ICES area 7 by the Western Waters agreement (EC 1415/2004).

Landings of king scallop from the local study area typically peak from winter through to late spring **Figure 3.13**, and have fluctuated slightly around 200 tonnes per annum in recent years.

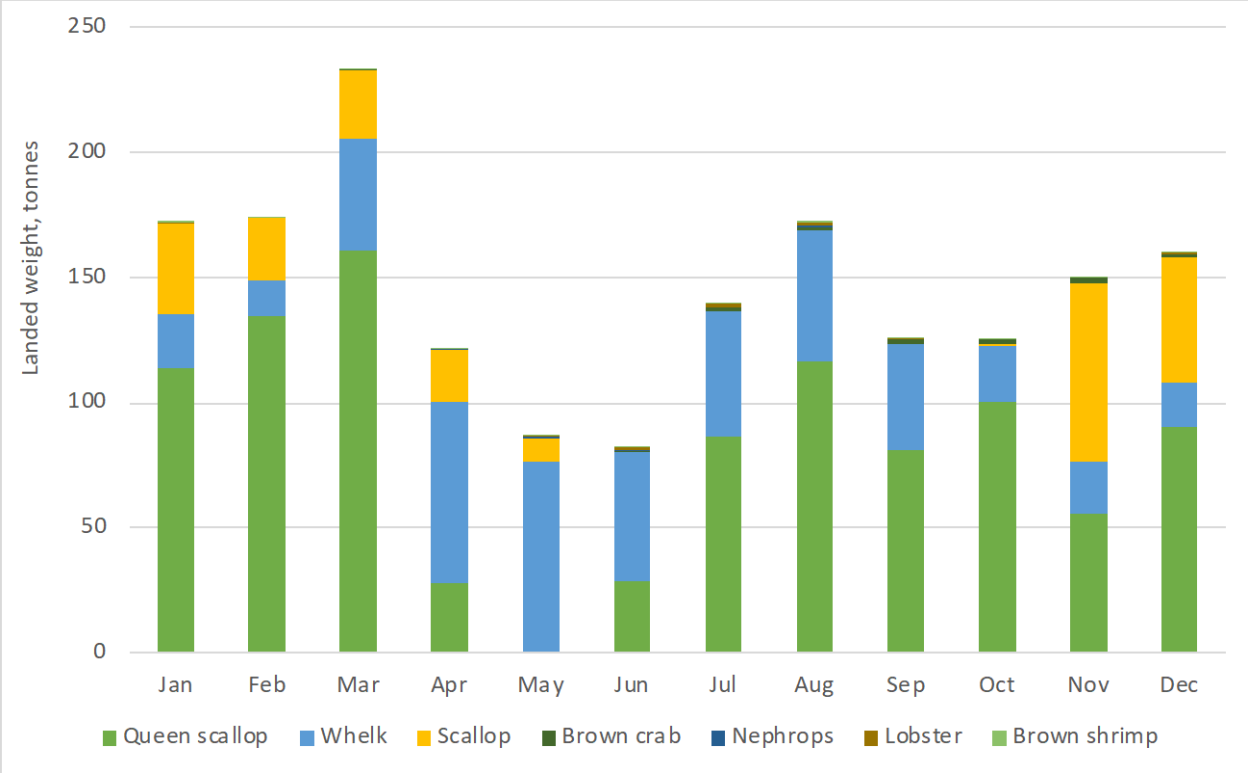

Figure 3.13 Seasonality of average monthly landings of shellfish species based on landed weight (tonnes) based on data from 2016 to 2022 from the local study area (MMO, 2022; 2023)

3.2.2 Pots and Traps

Figure 3.14 and Figure 3.15 show typical potting vessels, gear and the configuration of set pots and Table 3.3 describes the profile of potting vessels active across the regional 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 1 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. Large vessels, 'super whelkers', fish year-round offshore.

Creels or pots used for the capture of lobsters and crabs, 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 regional study area

Parameter	Indicative details
Main target species	Whelk, brown crab, lobster
Nationality	Majority English, some Welsh
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 summer and spring. Brown crab landings peak through late autumn and winter. Lobster landings peak in summer months and in December.
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.

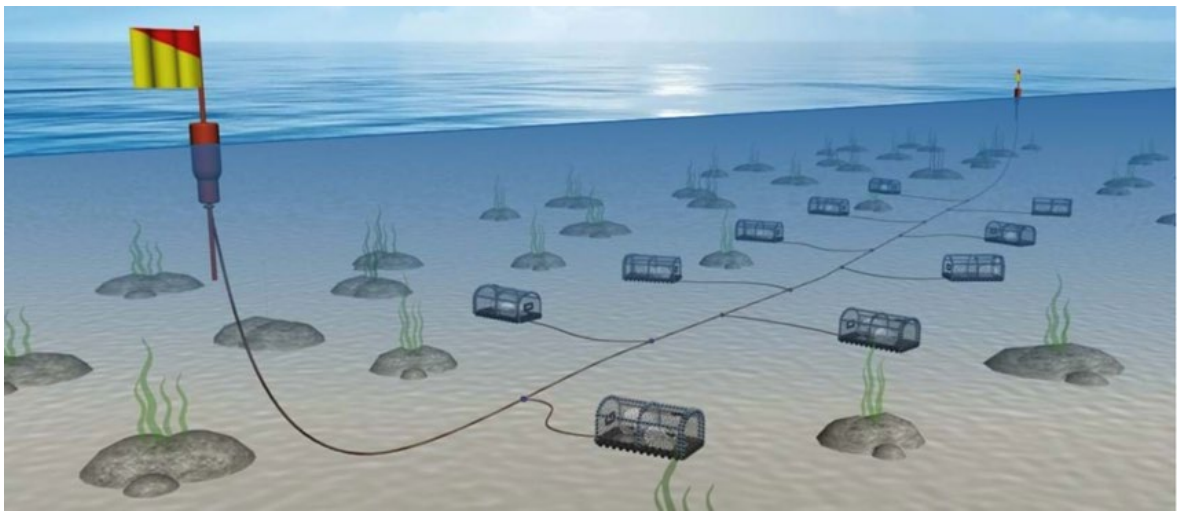

Figure 3.14 Typical potting gear configuration (Source: Seafish, 2015)

Figure 3.15 Example of potting vessels (Source: The Bosun's Watch; Poseidon)

Key species caught by vessels operating potting gear

Whelk

Common whelk are a gastropod mollusc that inhabits mixed sediment from the low water mark down to 1,200 m, being most common in 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 2 to 3 years. 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 3 to 5 months. The life cycle therefore has no pelagic phase, leading to limited dispersal between populations.

Whelk fisheries have typically been expanding around the UK in recent years as prices have increased and export to non-EU countries has grown. No TAC or quotas are in place for whelk. The current EU-wide MLS for whelks is 45 mm, noting that around the UK, whelks typically reach maturity between 45 mm and 78 mm.

Whelk landings from the local study area indicate a seasonal peak across spring and summer months, though they are landed year-round. In recent years, approximately 550 tonnes whelk has been landed from the local study area annually.

Lobster

Lobster is a long-lived decapod crustacean. Lobster 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 (Seitz *et al*., 2014).

There are no TACs or quotas in place for lobster. Primary management is by the technical measure of an MLS of 87 mm (Council Regulation 850/98).

Lobster is one of the highest value per kilogram, commercially exploited shellfish species found in UK waters. Fishing activity typically peaks across summer months in the local study area, with a second peak in December associated with supplying the Christmas-time market. Landings from the local study area fluctuated across 2016 to 2021, peaking at ~16 tonnes in 2017 and being as low as ~1 tonne in 2020, remaining low in 2021 at 2 tonnes.

Brown crab

Brown crab is a long-lived, large decapod crustacean. Brown crabs are very productive animals, and each female can hatch between 1 and 4 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 crab is found across a wide range of habitat types, ranging from rocky reefs to soft mud and sand.

As with lobster, brown crab 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).

Fishing activity typically increases through late summer months, peaking in autumn and winter in the local study area. Landings from the local study area fluctuated across 2016 to 2021, peaking at ~63 tonnes in 2017 and being ~4 tonnes in 2020 and ~6 tonnes in 2021.

3.2.3 Beam Trawl

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.

Shrimp trawls used in inshore waters are a very lightweight version of a lightweight beam trawl but have a smaller cod end mesh and a sorting grid/veil attached.

Table 3.4 Profile of typical beam trawl vessel active across the regional study area

Parameter	Indicative details
Main target species	Sole, plaice, thornback ray, brown shrimp (lightweight trawling in coastal waters)
Nationality	English, Belgian
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 or single beams; beam length up to 12 m Each beam weighing <10 tonnes. Chain matting or individual chains attached to underside.

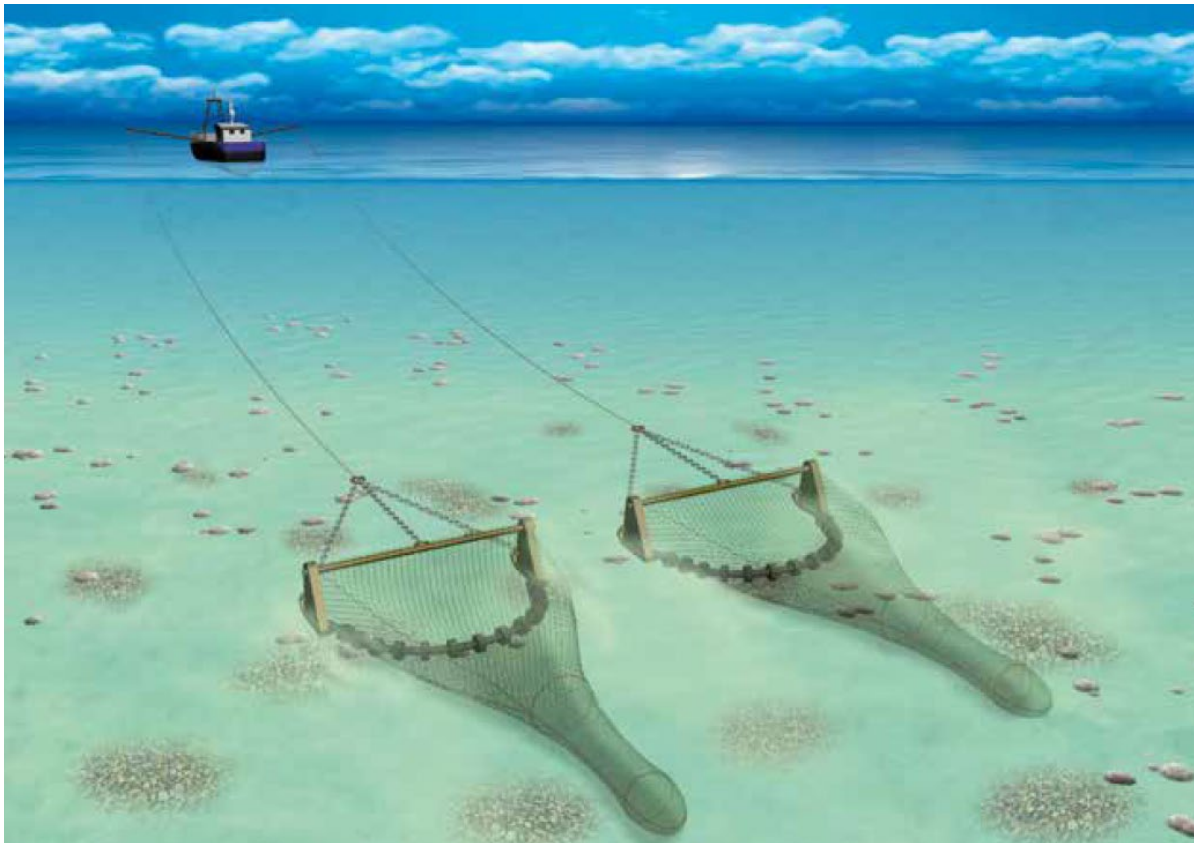

Figure 3.16 Typical beam trawl gear configuration (Source: Seafish, 2015)

Key species caught by vessels operating beam trawl

Plaice

Plaice is a bottom-dwelling flatfish. It spawns in the early months of the year (January to March) and sometimes makes 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 water depth, but are mostly between 10 and 50 m.

The Irish Sea plaice stock is in a very healthy state and fishing pressure is low (ICES, 2022), although the amount of fish discarded at sea is high. This stock is covered by the EU's Western Waters Multi Annual management Plan (MAP), in which it is considered bycatch. The TAC in recent years have been set in line with advice, and catches are usually below TACs (ICES, 2023), owing to limited market demand.

In the regional study area, plaice are taken year-round with landings peaking in summer months. Across the period 2016 to 2021, landings of plaice from the local study area averaged ~ 8 tonnes annually.

Sole

Sole is a flatfish and belongs to the family of flatfishes known as Soleidae. It spawns 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 2 to 3 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. After a record low spawning stock biomass in 2014, the latest ICES stock assessment observes that spawning stock biomass is estimated to be above the maximum sustainable yield trigger point (ICES, 2022b). Sole are subject to a TAC (set at 40 tonnes annually in the Irish Sea from 2016 to 2018, increasing more recently to 768 tonnes in 2021) 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 MCRS of 24 cm is in place.

Sole is caught in a mixed fishery with other flatfish as well as gadoids. In the regional study area, they are targeted using nets and demersal otter trawls, with landings peaking in summer months. Across the period between 2016 and 2021, landings of sole were less than 1 tonne per year between 2016 and 2018 reflecting the low TAC, increasing to 22 tonnes in 2020 and dropping to 6 tonnes in 2021.

Flounder

Flounder *Platichthys flesus* is a widespread coastal European fish species that divides its life cycle between brackish and freshwater habitats. It moves offshore into deeper water of higher salinity in winter where it spawns 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 attains a length of 50 to 60 cm and can live up to 15 years.

Flounder is 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. ICES have noted that so long as the species in the targeted fisheries for which flounder is a bycatch species are exploited sustainably, there should be a low risk of flounder becoming overexploited. There is currently no TAC for this species and there is no minimum conservation reference size, though in inshore waters within 6 NM of the coast, an MLS of 25 cm is applicable between the Welsh border in the Dee Estuary to Haverigg Point in Cumbria (i.e. the former North Western Sea Fisheries Committee District). Across the period 2016 to 2021 landings of flounder from the local study area averaged ~ 3 tonnes per annum.

Brown shrimp

Crangon crangon, the common or brown shrimp, is found in mainly shallow water. It grows to about 8 cm, with length at maturity between 35 and 50 mm. Lifespan is 4-5 years, with females living longer.

Brown shrimp populations exhibit rapid growth, and also high natural mortality. There has been no stock assessment undertaken for brown shrimp in this region, and assessing such species is difficult as populations can widely fluctuate depending on environmental conditions and predation.

Fisheries occur mainly over sandy/muddy habitats within bays and estuaries including the Solway Firth, Morecambe Bay, the Ribble Estuary and the Dee Estuary. They are seasonal fisheries, historically the season starting in spring as the water temperature increases, with a lull in summer and ending in late autumn as the temperature decreases again. Across the period 2016 to 2021, landings of brown shrimp from the local study area peaked in 2017 at ~ 2 tonnes.

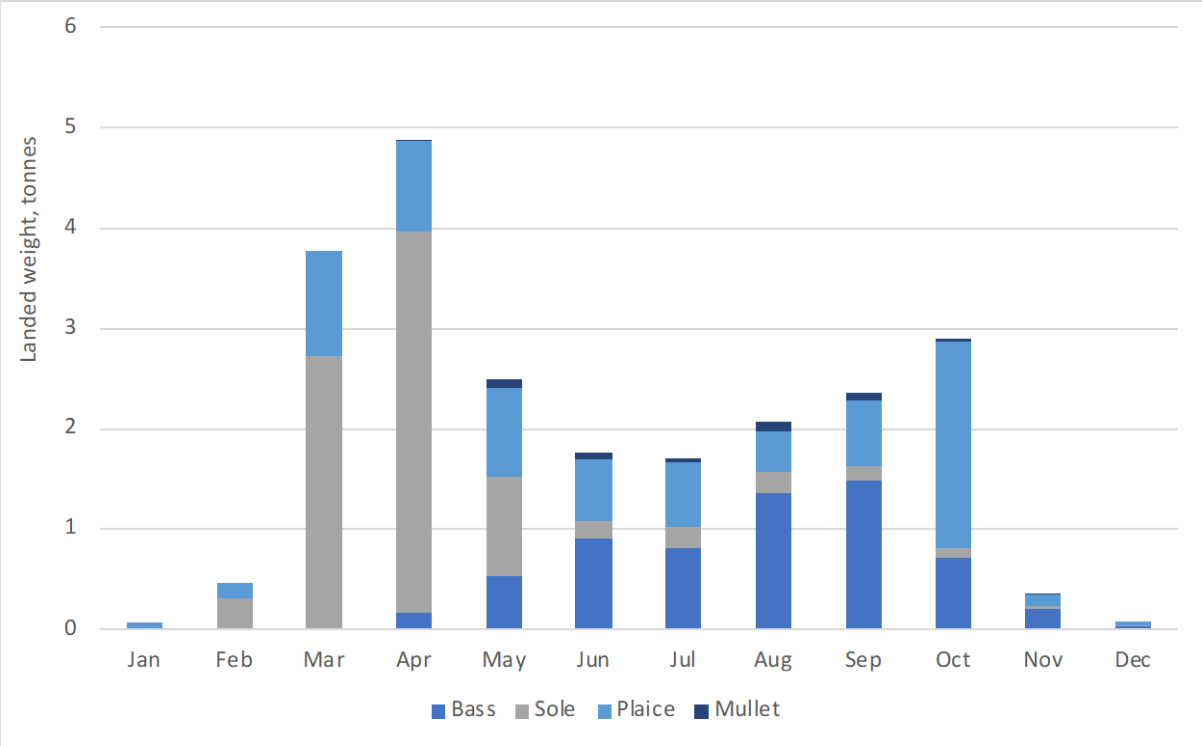

Figure 3.17: Seasonality of average monthly landings of demersal species based on landed weight (tonnes) based on data from 2016 to 2022 from the local study area (MMO, 2022; 2023)

3.2.4 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, depending on the locations targeted, ground conditions and seabed obstacles, such as wrecks, as well as the gear and equipment configuration of individual vessels).

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 3.5 Profile of typical netting vessels active across the regional study area

Parameter	Indicative details
Main target species	Flounder, bass, thornback ray, lesser spotted dogfish, 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

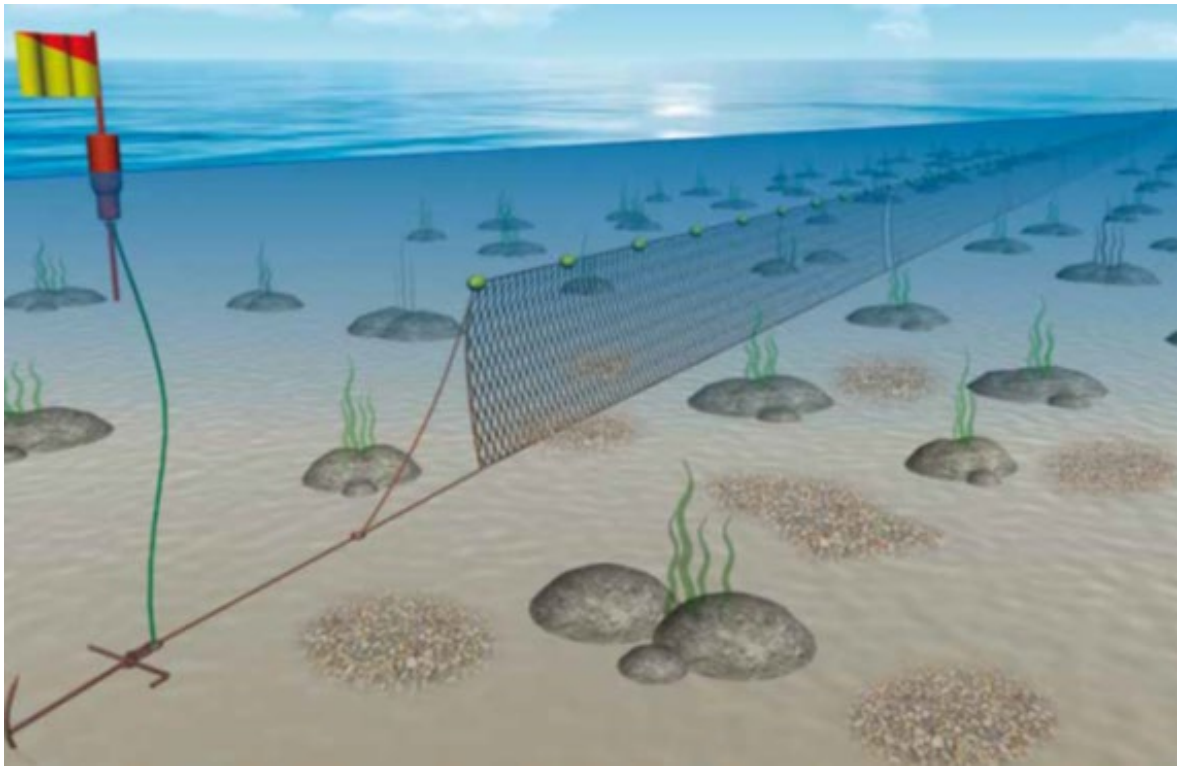

Figure 3.18 Typical fixed netting gear configuration (Source: Seafish, 2015)

Key species caught by vessels operating drift and fixed nets

Bass

Bass breed from February to May in the English Channel and eastern Celtic Sea. Juveniles use inshore sheltered areas as nursery grounds, particularly for their first few years. Once mature, bass may migrate within UK coastal waters and occasionally further offshore. It is a long-lived and slow growing species - up to 30 years of age - and can achieve a length of up to 1 m with a weight of 12 kg.

Bass spawning stock biomass has historically declined since 2005, showing signs of slow increase in recent years (ICES, 2021a), 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 commercial fishermen are prohibited from catching, retaining, transhipping or landing bass caught in a number of areas in UK waters, including in the Irish or Celtic Seas outside of the 12 NM limit (i.e. within the Project windfarm site). Bass are not subject to EU TACs or quotas.

Inshore of the local study area, an area around Heysham Nuclear Power Station has been designated as a bass nursery area. All fishing activity for any species has been prohibited within this site to protect juvenile bass.

Bass fisheries often have two distinctive components; an offshore fishery on pre-spawning and spawning seabass during winter months, and small-scale inshore fisheries catching mature fish returning to coastal areas following spawning and in some cases immature seabass. The inshore fisheries include small (10 m and under) vessels using a variety of fishing methods (e.g. trawl, handline, nets, rod and line). The fishery may either target seabass

or take them as a bycatch with other species. Across the period 2016 to 2021, landings of bass from the local study area averaged ~ 4.5 tonnes annually.

3.2.5 Gears using Hooks

Small inshore vessels of under 10 m length (with a specification broadly aligned with that provided immediately above for inshore netting vessels) use hook and line methods to primarily target bass and flounder, though a variety of other species may be taken.

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 3.6 Profile of typical hook and line fishing vessel active across the regional study area

Parameter	Indicative details
Main target species	Bass, flounder
Nationality	English
Vessel length	Majority under 10 m
Seasonality of activity	Summer/autumn peak
Typical gear	Baited monofilament nylon lines Set and left to fish or attached to rod

Figure 3.19 Typical line-fishing gear depicting rod & line (left) and set long lines (right) (Source: Seafish, 2015)

3.2.6 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. Otter trawlers active in the regional study area target plaice, also taking thornback ray, lesser spotted dogfish and other demersal species.

Demersal otter trawlers from the Isle of Man target queen scallop primarily within Manx territorial waters, but also within UK waters. This is described further in Section 5.5.

Nephrops trawlers from Northern Ireland are also active in the regional study area. The prawn net used by these trawlers is a long winged low net with lightweight ground gear for towing over the soft muddy areas where nephrops are found. Generally a traditional prawn net will have a headline height (the height of the trawl) in the region of 1 to 1.2 metres. The net is designed to be very low to target the nephrops on the seabed with minimal round fish bycatch that usually swim higher off the seabed. In some areas over time the traditional prawn net design has evolved to have longer wings to make the net more efficient for targeting bottom fish / a mixed fishery.

Table 3.7 Profile of typical otter trawl vessel active across the regional study area

Parameter	Indicative details
Main target species	Queen scallop, plaice, thornback ray, lesser spotted dogfish, Nephrops
Nationality	English, Northern Irish (Nephrops)
Vessel length	Under and over 10 m, majority of Nephrops trawlers over 10 m
Horsepower	50 hp to 300 hp
Typical towing speed	2 to 6 knots
Typical duration of tow / dredge	1 to 2 hours, 2 to 4 hours for Nephrops
Seasonality of activity	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

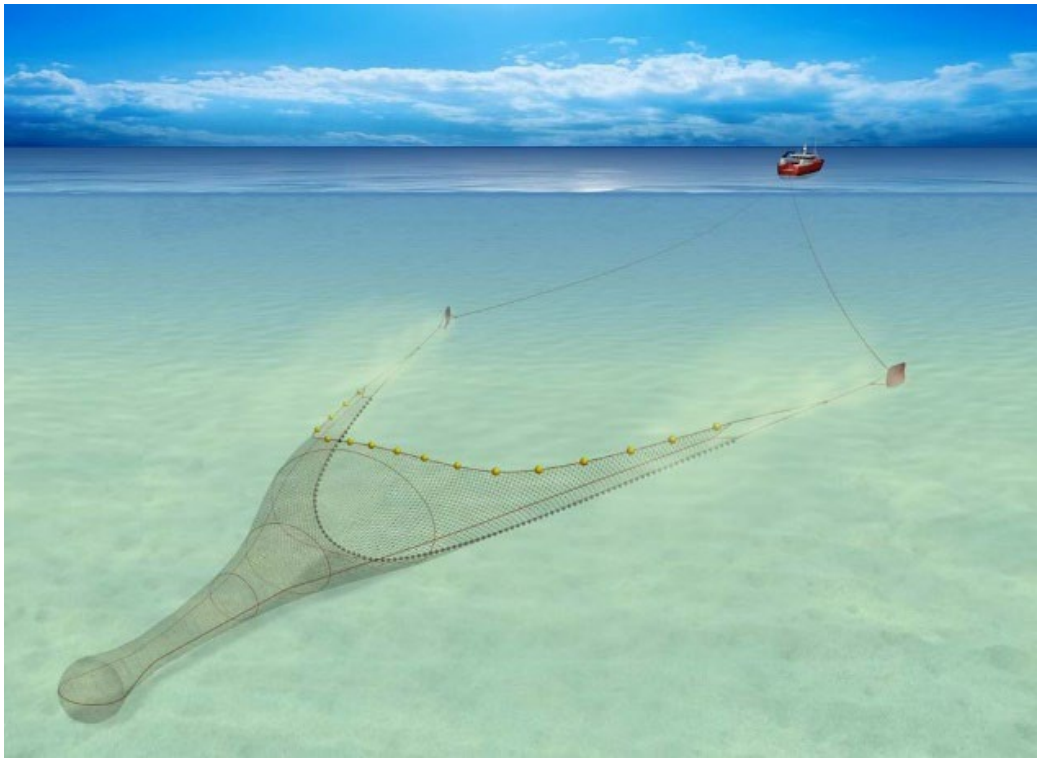

Figure 3.20 Typical otter trawl gear configuration (Source: Seafish, 2015)

Key species caught by vessels operating demersal otter trawl

Nephrops

Nephrops norvegicus is a small lobster, pale orange in colour. It grows to a maximum total length of 25 cm (including the tail and clawed legs), although individuals are normally between 18 to 20 cm. Nephrops do not reach sexual maturity until 2 to 3 years. Life span in the Irish Sea is understood to be 8 to 9 years.

They are found in soft sediment, commonly at depths of between 200 and 800 m, although considerable populations exist at depths <200 m. They live in shallow burrows and are common on grounds with fine cohesive mud which is stable enough to support their unlined burrows.

Nephrops stock assessments are conducted by ICES. Stock assessments are produced for 33 areas across the Northeast Atlantic, called Functional Units (FUs). However, management is applied to 18 areas, called management units. The local study area is located within FU14 (Irish Sea East). The density of Norway lobster in FU 14 is considered medium (~0.46 burrow m^2, average 2012–2021) compared with other FUs (ICES, 2021). Stock abundance in FU14 was estimated to be 393 million individuals in 2021, lower than that estimated for the previous year (496 million). However, the stock remains above target levels and not considered to be overfished.

TACs are in place, but these are not specific to the stock in FU14. One TAC covers the whole of the Celtic Seas surrounding Ireland and southwest England (ICES Subarea 7), encompassing eight different stocks. However, catches in Subarea 7 overall have been less than the TAC in recent years, as there has been a general decline in trawling fishing effort for Nephrops. Total catches for Irish Sea East have been somewhat below the advised limits, averaging just 27% of the advised limits between 2016 and 2020 (ICES, 2021).

There is a MCRS of 20 mm for UK and Irish trawlers in the Irish Sea. The Landing Obligation requires target species to be landed, and therefore prohibits the discarding of quota species. In UK waters the landing obligation is implemented via the Fisheries Act 2020 UK Statutory Instrument 2020 No.1542. For the nephrops trawl fishery in the Irish Sea, there is a de minimis exemption from the landing obligation consisting of a 6% discard rate by weight.

Two Fishery Improvement Projects are operating relevant to the eastern Irish Sea: Project UK (running until 2024), and the Irish Prawn FIP (running until 2025). Both are looking to reduce bycatch and implement better management in their respective fleets.

Fishing activity typically increases through late spring and summer months. Landings from the local study area decreased substantially across 2016 to 2021, peaking at ~10 tonnes in 2016, reducing to 0.04 tonnes in 2020 and climbing to 3 tonnes in 2021.

Thornback ray

Thornback rays *Raja clavata* 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 and 15 kg. Thornback ray 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.

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, though in inshore waters within 6 NM of the coast, an MLS of 45 cm is applicable from Haverigg Point in Cumbria to the Scottish border in the Solway Firth (i.e. the former Cumbria Sea Fisheries Committee District).

Thornback rays are targeted seasonally or as bycatch in trawl and gillnet fisheries. Across the period 2016 to 2021, landings of thornback ray from the local study area averaged 10.5 tonnes per annum, reaching 19 tonnes in 2020, dropping to 10 tonnes in 2021.

Lesser spotted dogfish

Scyliorhinus canicular is a small shark has a slender shark-shaped body with a blunt head, rounded snout and small dorsal fin. The species is known by several names including small spotted catshark, rough hound, rock salmon, small spotted dog fish and sandy dog. Lesser spotted dogfish are bottom-living sharks that occur in depths of 3 to 400 m but are usually found no deeper than 100 m on sandy, gravelly or muddy seabeds. Lesser spotted dogfish grow to a maximum length of 85 cm in the British Isles and North Sea. Maximum age has been estimated at 20 years.

Information on the status of the stock is limited but there is currently no concern over fishing pressure.

Lesser spotted dogfish are typically not part of a targeted fishery, but taken as bycatch in trawl and gillnet fisheries. They are often returned to the sea because of their low market value but those that are landed are utilised as bait for pot fisheries. Across the period 2016 to 2021, landings of lesser spotted dogfish from the local study area have declined substantially, from 24 tonnes in 2016 to <1 tonnes in 2021.

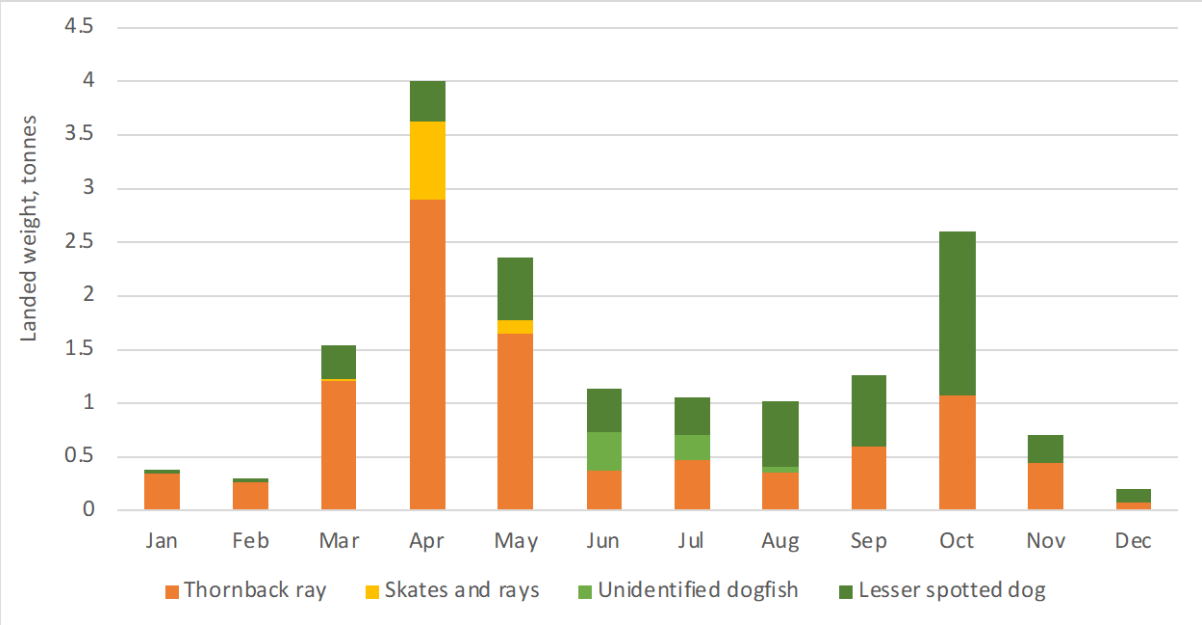

Figure 3.21: Seasonality of average monthly landings of elasmobranch species based on landed weight (tonnes) based on data from 2016 to 2022 from the local study area (MMO, 2022; 2023)

4. Spatial Fishing Activity Assessment

4.1 Fishing intensity based on VMS data

VMS data sourced from ICES[1] 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 4.1: dredge;
- Figure 4.2: beam trawl;
- Figure 4.3: otter trawl.

VMS data sourced from the MMO displays the first sales value (£) of catches and covers UK registered vessels 15 m and over in length from 2016 to 2020 for the following gear types:

- Figure 4.4 and Figure 4.5: pots and traps;
- Figure 4.6and Figure 4.7: dredge;
- Figure 4.8 and Figure 4.9: beam trawl;
- Figure 4.10and Figure 4.11: otter trawl;
- Figure 4.12and Figure 4.13**:** pelagic trawl.

The data presented in these figures indicates that potting activity takes place across the Project windfarm site and throughout the local study area. The VMS data is not representative of all potting activity because a portion of potting vessels are under 15 m in length and are not captured in the data, but the data does indicate the presence of larger vessels in the windfarm site, expected to be targeting whelk.

Dredge activity is widespread across the Irish Sea. The data indicates that important king scallop grounds are located to the west and south of the windfarm site, and that some dredge activity takes place within the southern portion of the windfarm site, which data suggests is located on the fringes of a king scallop ground. King scallop grounds targeted by UK, Northern Irish and Irish vessels is presented in Figure 4.14, based on mapping undertaken by the ICES Scallop Working Group (ICES, 2021).

Beam trawl activity undertaken by UK vessels is limited across the local study area, and data does not indicate any activity within the windfarm site. SAR data capturing wider EU-vessel activity indicates that non-UK, understood to be primarily Belgian, beam trawlers are active within the local study area, outside and to the north of the windfarm site. Similarly, data indicates some otter trawl activity within the local study area, focused to the north of the windfarm site, with activity dominated by non-UK vessels, understood to be Irish vessels targeting Nephrops on the eastern Irish mud belt.

VMS data indicates potting activity throughout the windfarm site. This is corroborated by gear scouting surveys undertaken in 2022, which show gear marker locations within the middle southern portion of the windfarm site (Figure 4.15), together with stakeholder consultation; pots are understood to be deployed across the windfarm site.

4.1.1 Fishing intensity based on AIS data

Fishing vessel route density, based on vessel AIS positional data is shown in Figure 4.17. AIS is required to be fitted on fishing vessels ≥15 m length. The data is filtered to show only fishing

[1] 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.

vessels (with no other commercial or recreational vessels included) and indicates the route density per square km per year. This data does not distinguish between transiting fishing vessels and active fishing, but does provide a useful source to corroborate fishing grounds.

Activity by fishing vessels within the centre of the windfarm site is present in all years analysed. This is anticipated to be associated with potting vessels which has been further corroborated through stakeholder consultation.

4.2 Fishing activity based on marine traffic survey data

Project-specific marine traffic surveys were undertaken in February 2022 and August 2022 (a 14 day period each), using AIS and radar tracking and visual observations to record vessel activity across the windfarm site. During the winter survey, no fishing vessel tracks were recorded in the windfarm site. Within the wider survey area, outside the windfarm site, seven individual fishing vessels were observed, noted to be scallop dredgers operating to the south of the windfarm site. During the summer survey, fishing vessel tracks were largely attributed to a single vessel, targeting whelk. Some fishing vessel tracks were recorded in the windfarm site, though most activity occurred to the north and east of the windfarm site (NASH Maritime, 2022).

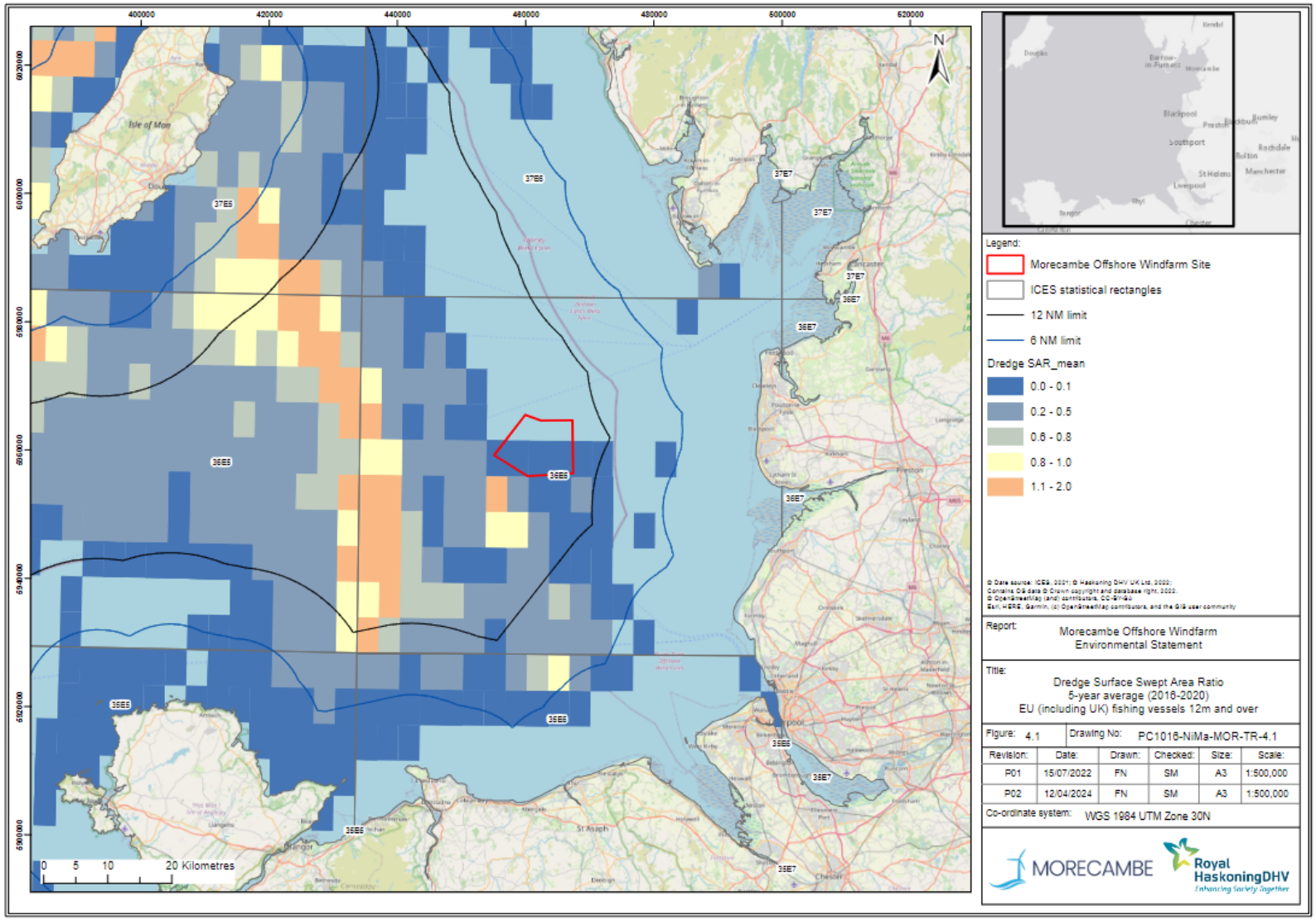

Figure 4.1 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using dredge gear (Source: ICES, 2021)

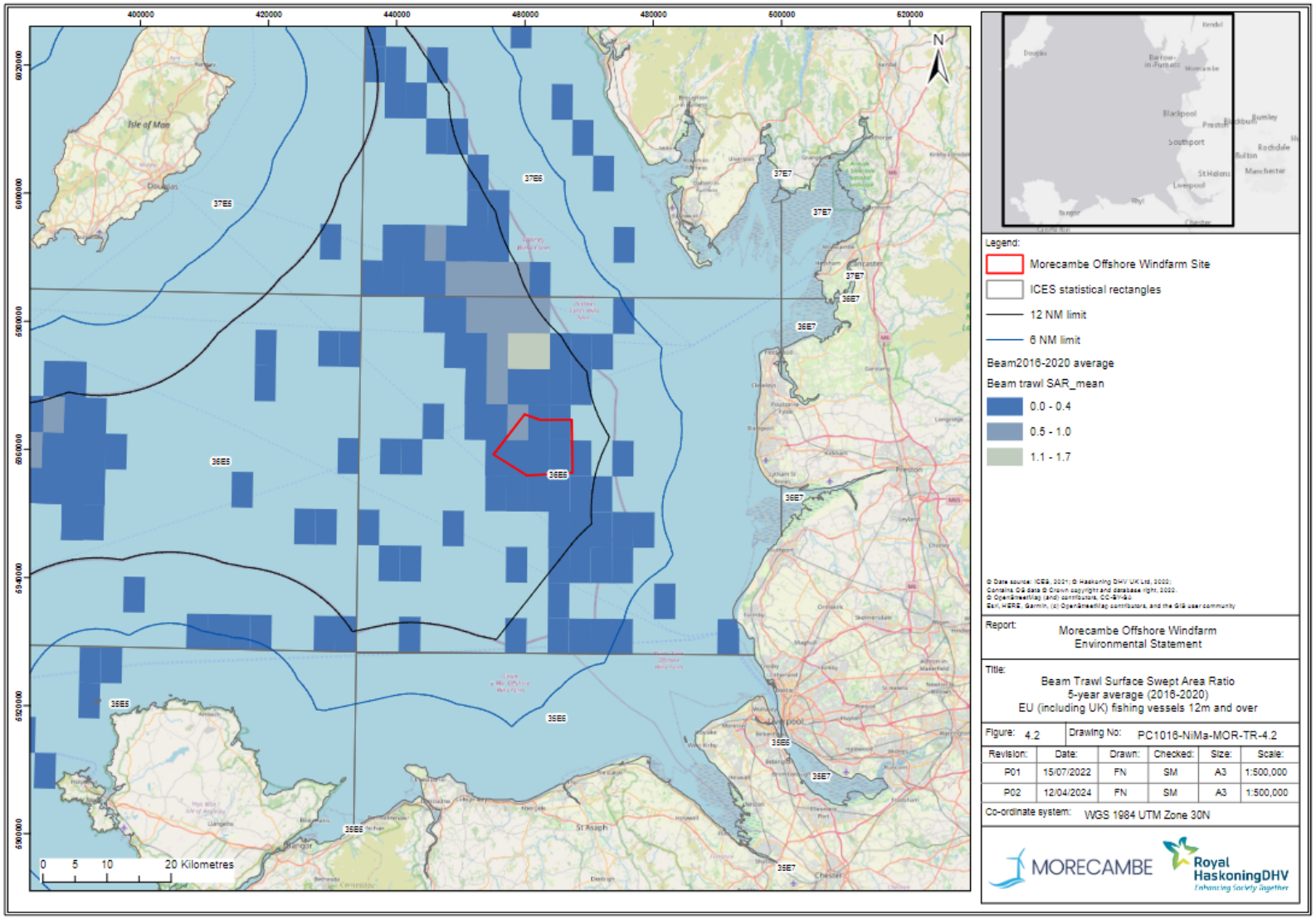

Figure 4.2 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using beam trawl gear (Source: ICES, 2021)

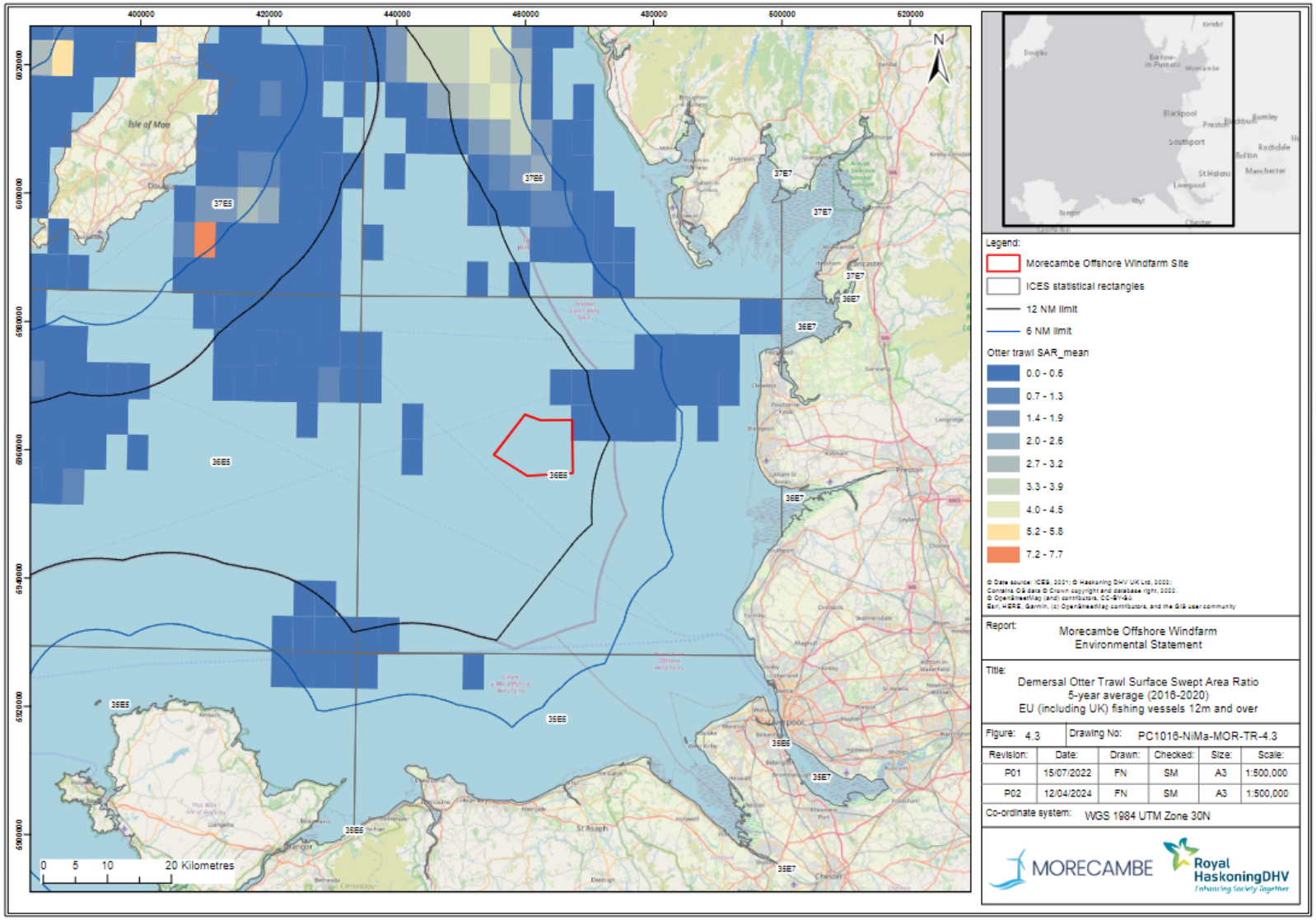

Figure 4.3 Surface Swept Area Ratio 2016 to 2020 for EU (including UK) vessels ≥ 12 m length using otter trawl gear (Source: ICES, 2021)

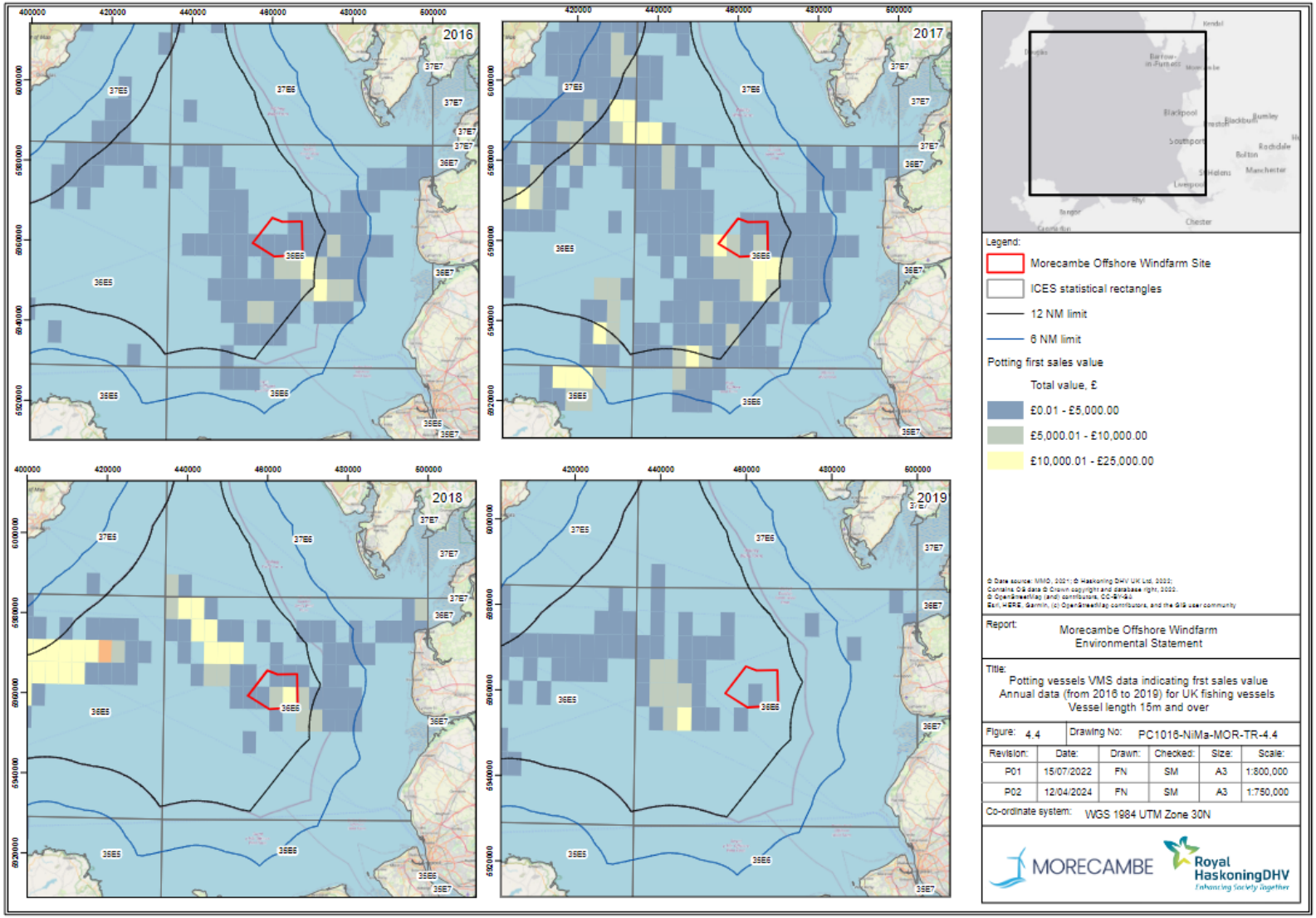

Figure 4.4 UK vessels ≥ 15 m length actively fishing using pots and traps 2016 to 2019 (Source: MMO, 2021)

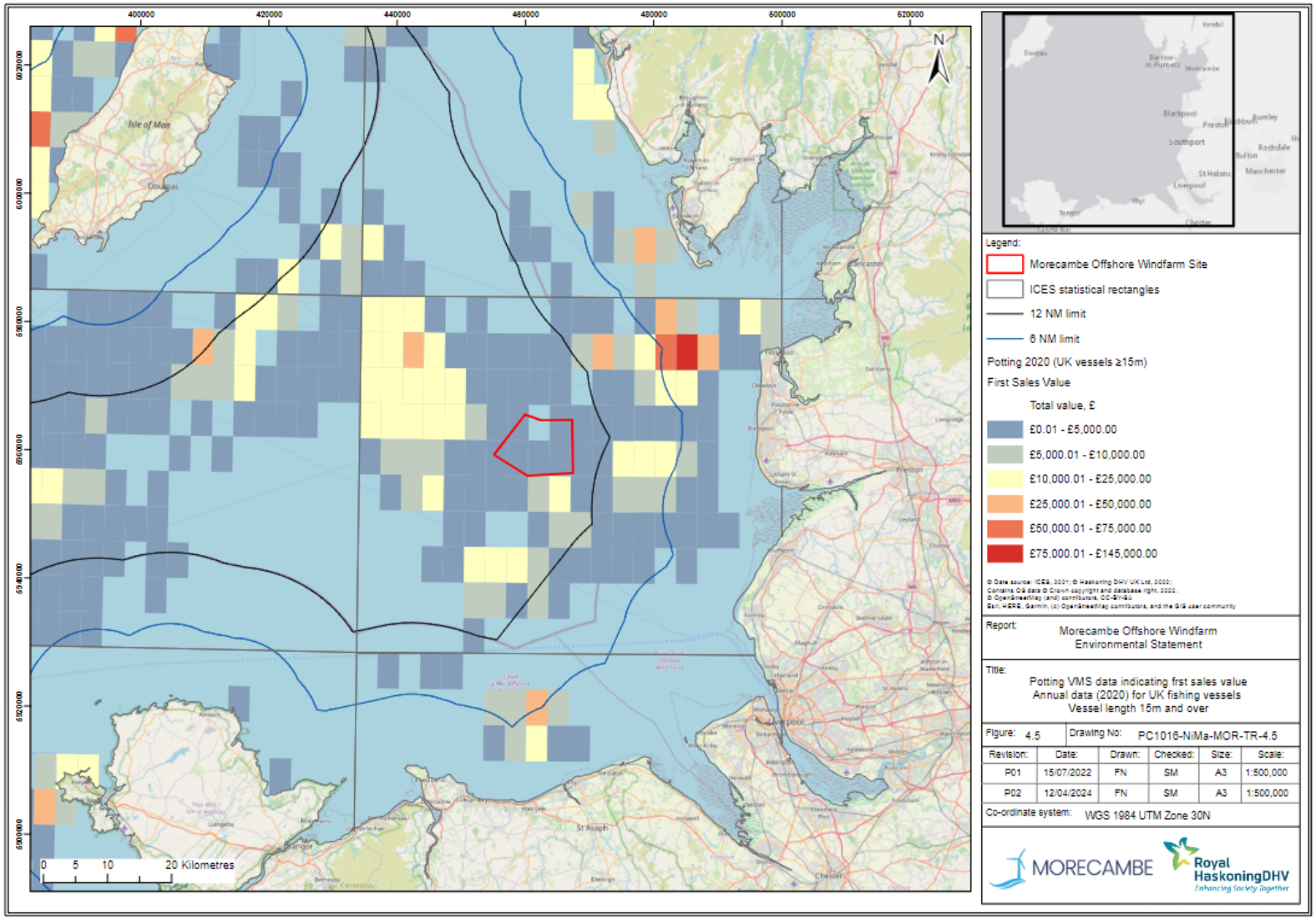

Figure 4.5 UK vessels ≥ 15 m length actively fishing using pots and traps 2020 (Source: MMO, 2020)

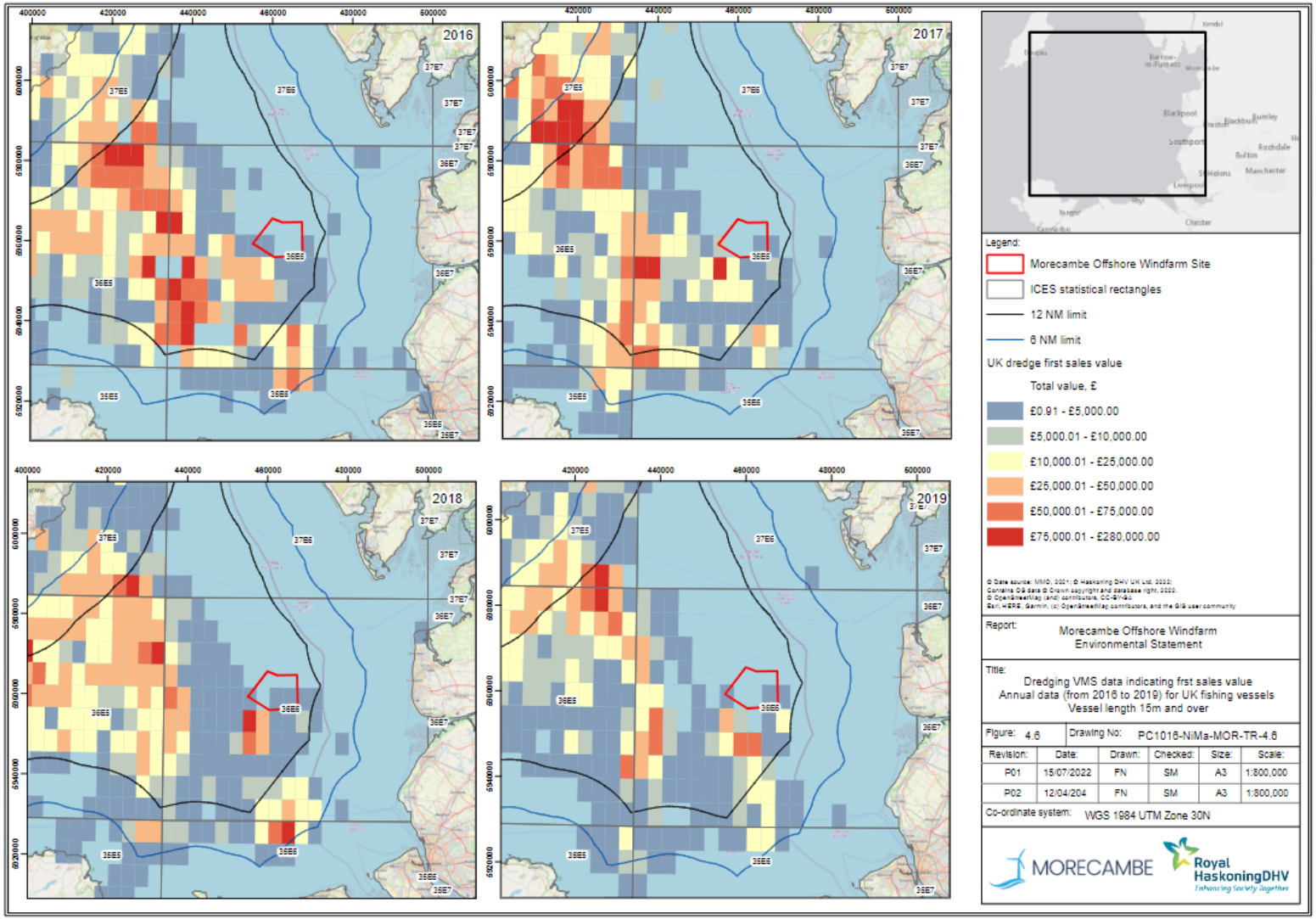

Figure 4.6 UK vessels ≥ 15 m length actively fishing using dredges 2016 to 2019 (Source: MMO, 2021)

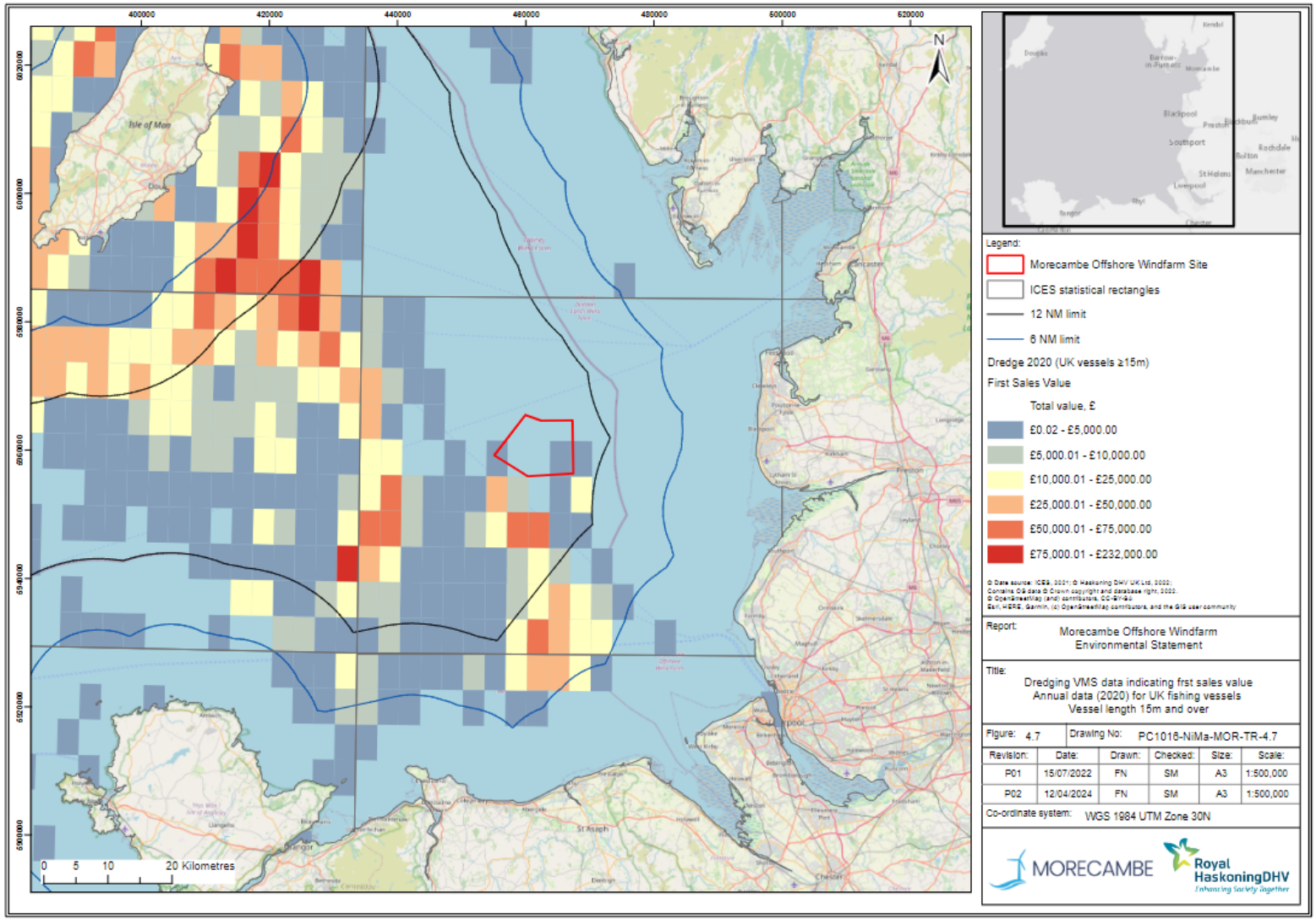

Figure 4.7 UK vessels ≥ 15 m length actively fishing using dredges 2020 (Source: MMO, 2023)

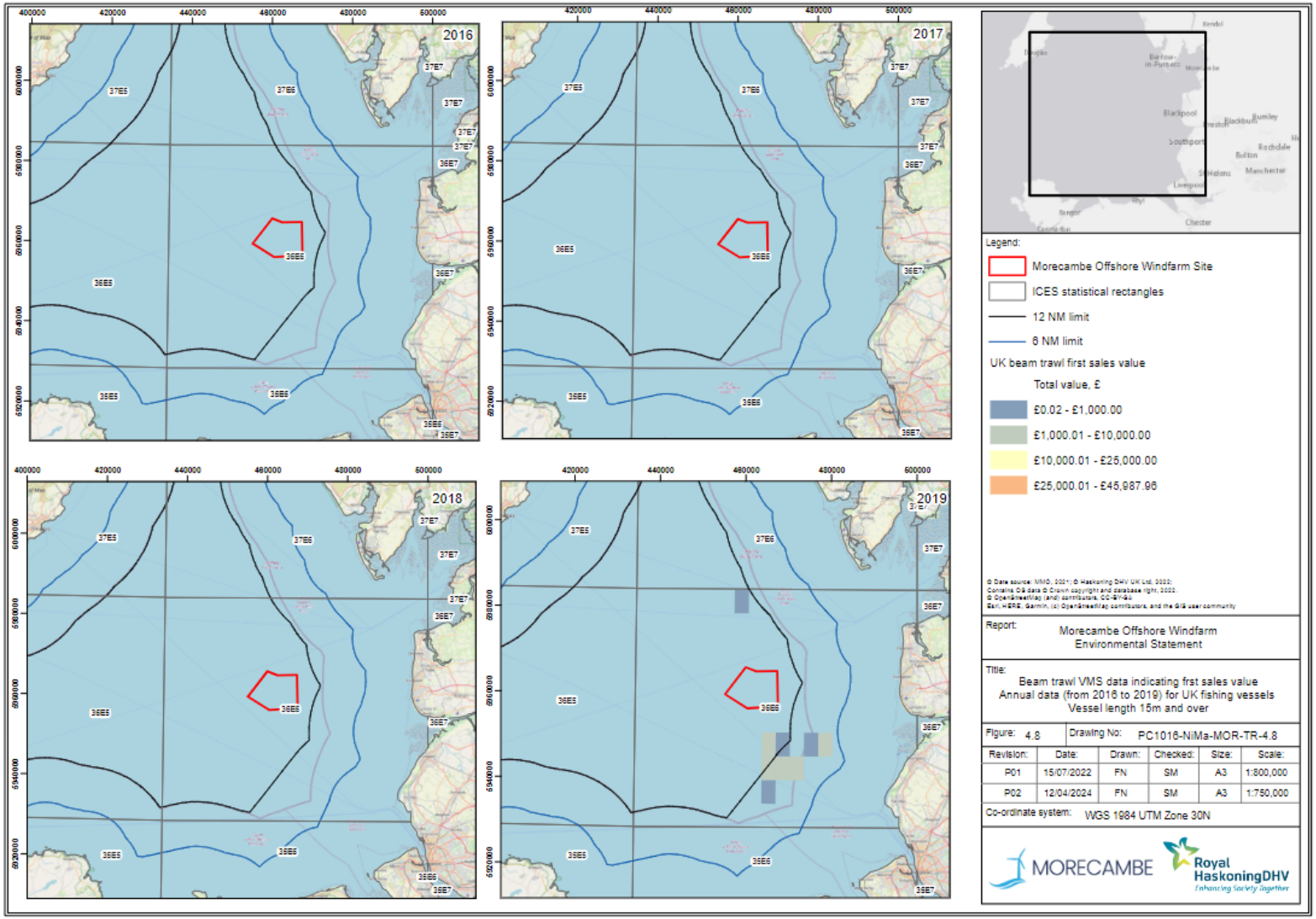

Figure 4.8 UK vessels ≥ 15 m length actively fishing using beam trawls 2016 to 2019 (Source: MMO, 2021)

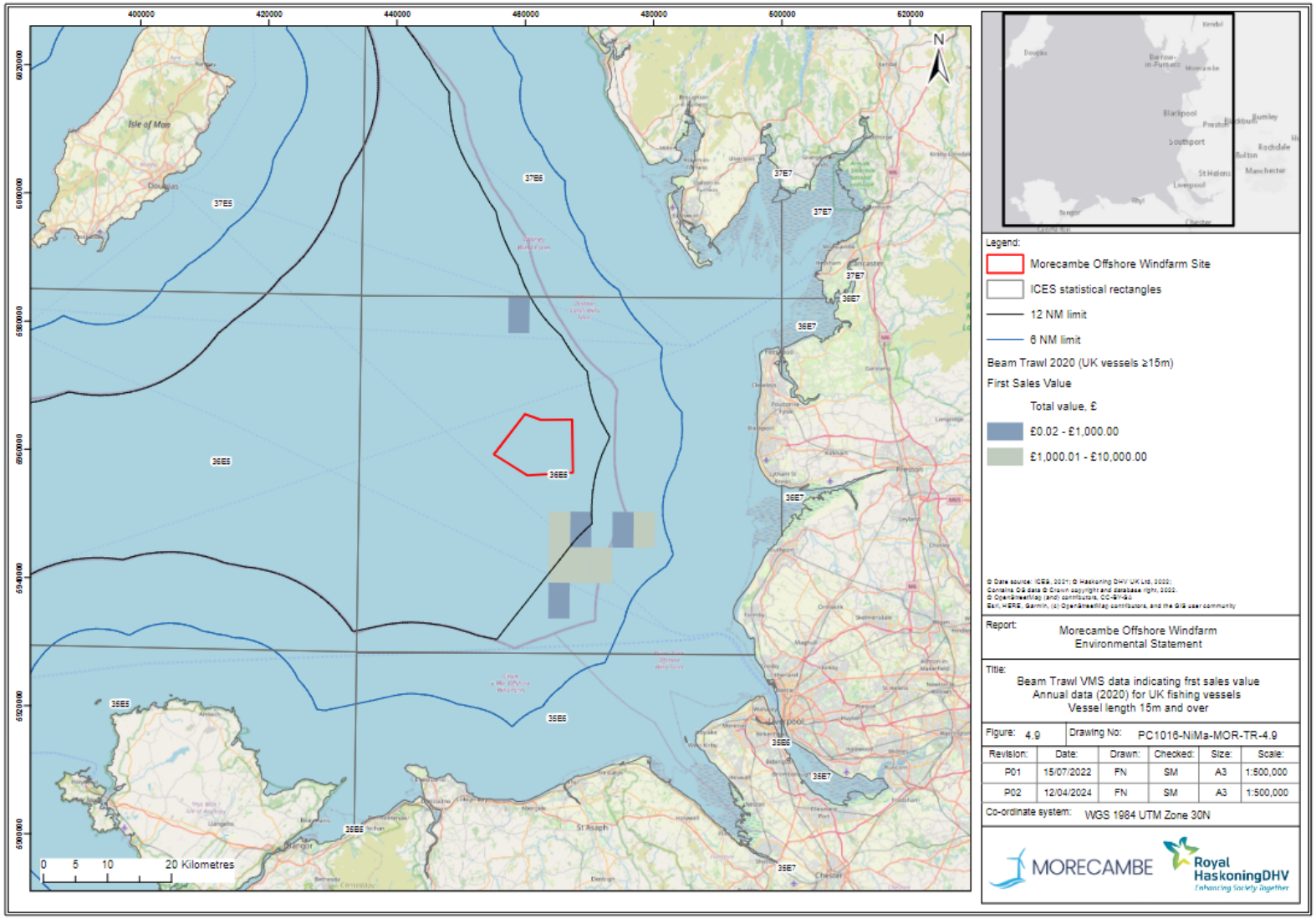

Figure 4.9 UK vessels ≥ 15 m length actively fishing using beam trawls 2020 (Source: MMO, 2023)

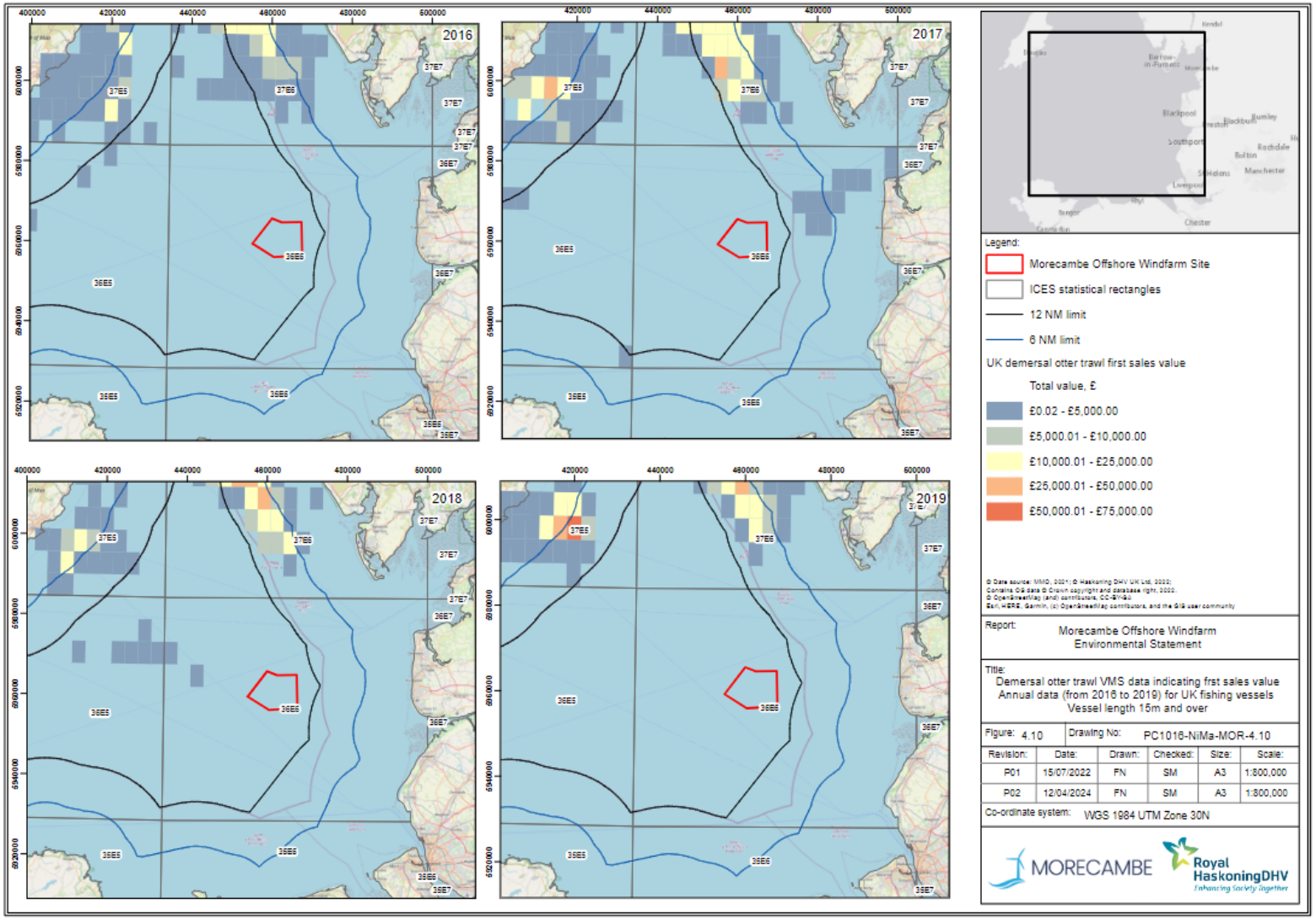

Figure 4.10 UK vessels ≥ 15 m length actively fishing using demersal otter trawls 2016 to 2019 (Source: MMO, 2021)

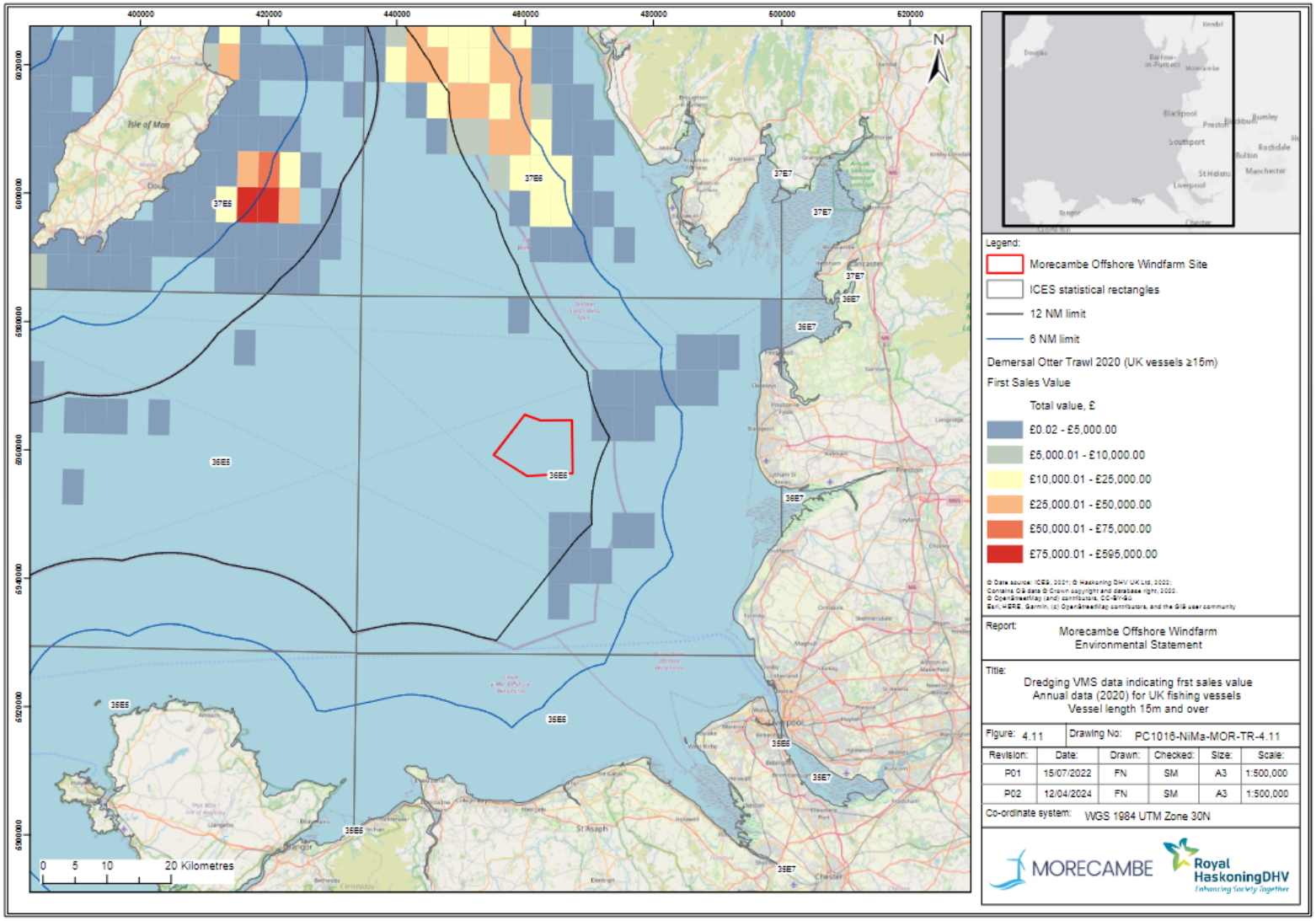

Figure 4.11 UK vessels ≥ 15 m length actively fishing using demersal otter trawls 2020 (Source: MMO, 2023)

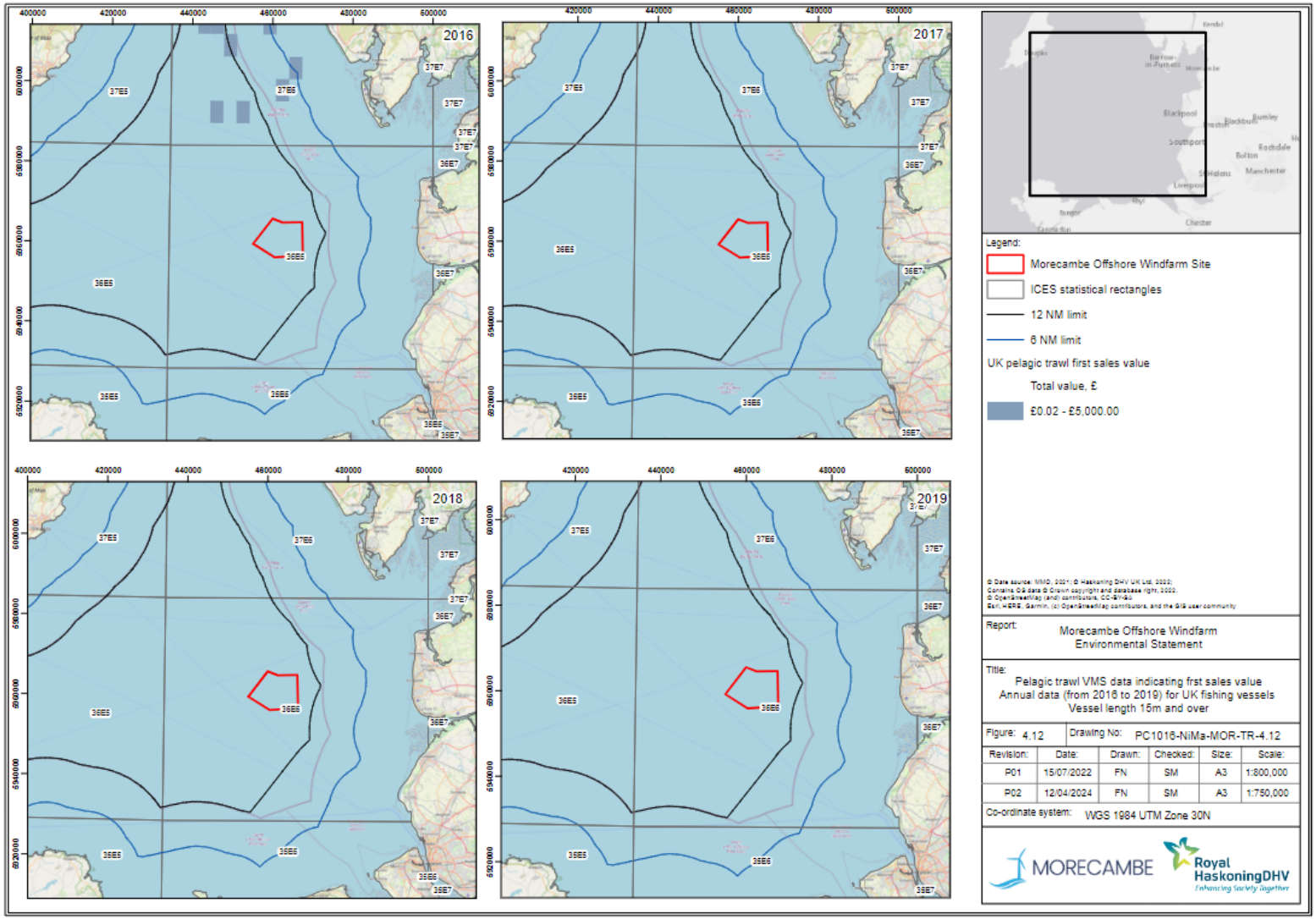

Figure 4.12 UK vessels ≥ 15 m length actively fishing using pelagic trawls 2016 to 2019 (Source: MMO, 2021)

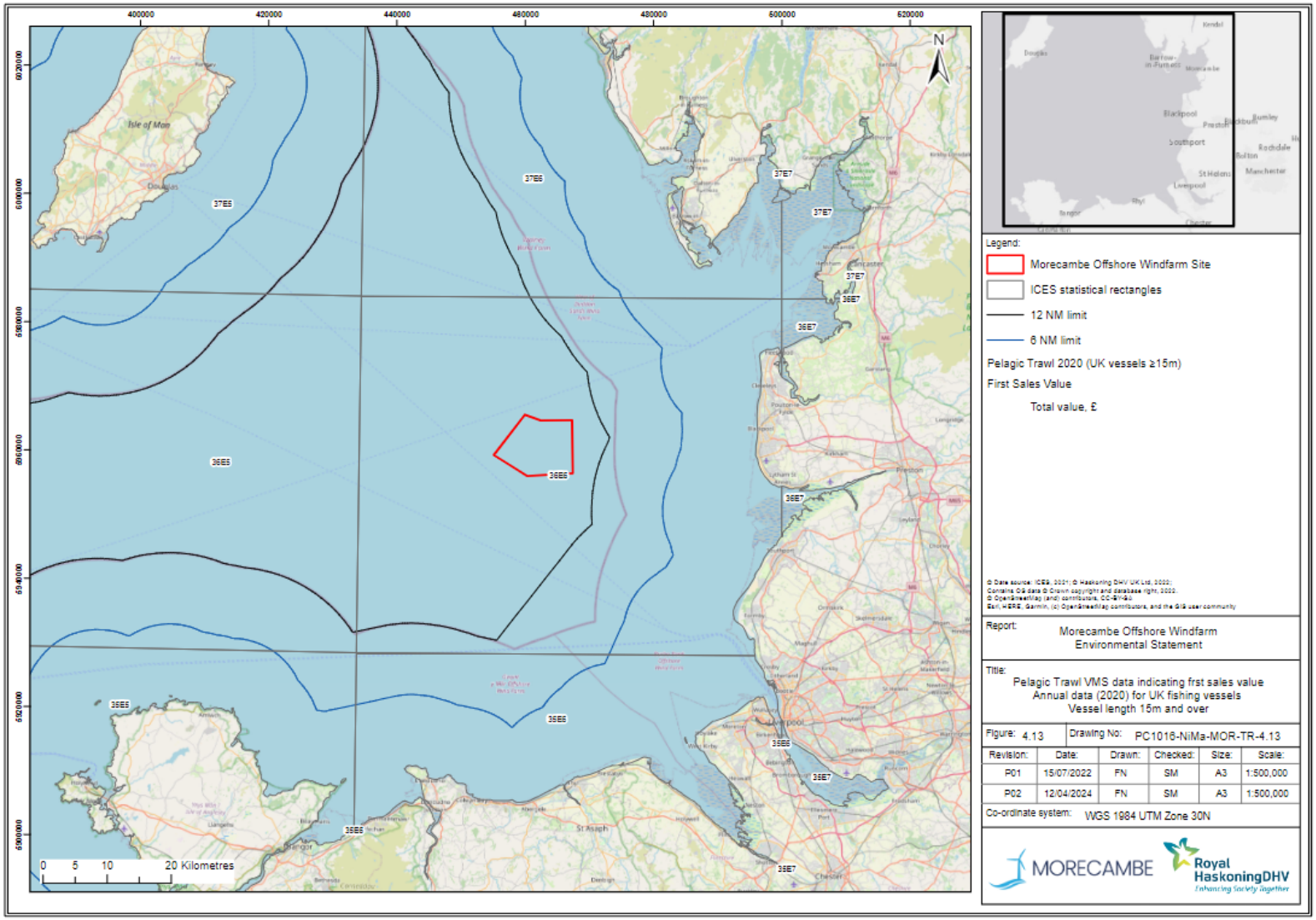

Figure 4.13 UK vessels ≥ 15 m length actively fishing using pelagic trawls 2020 (Source: MMO, 2023)

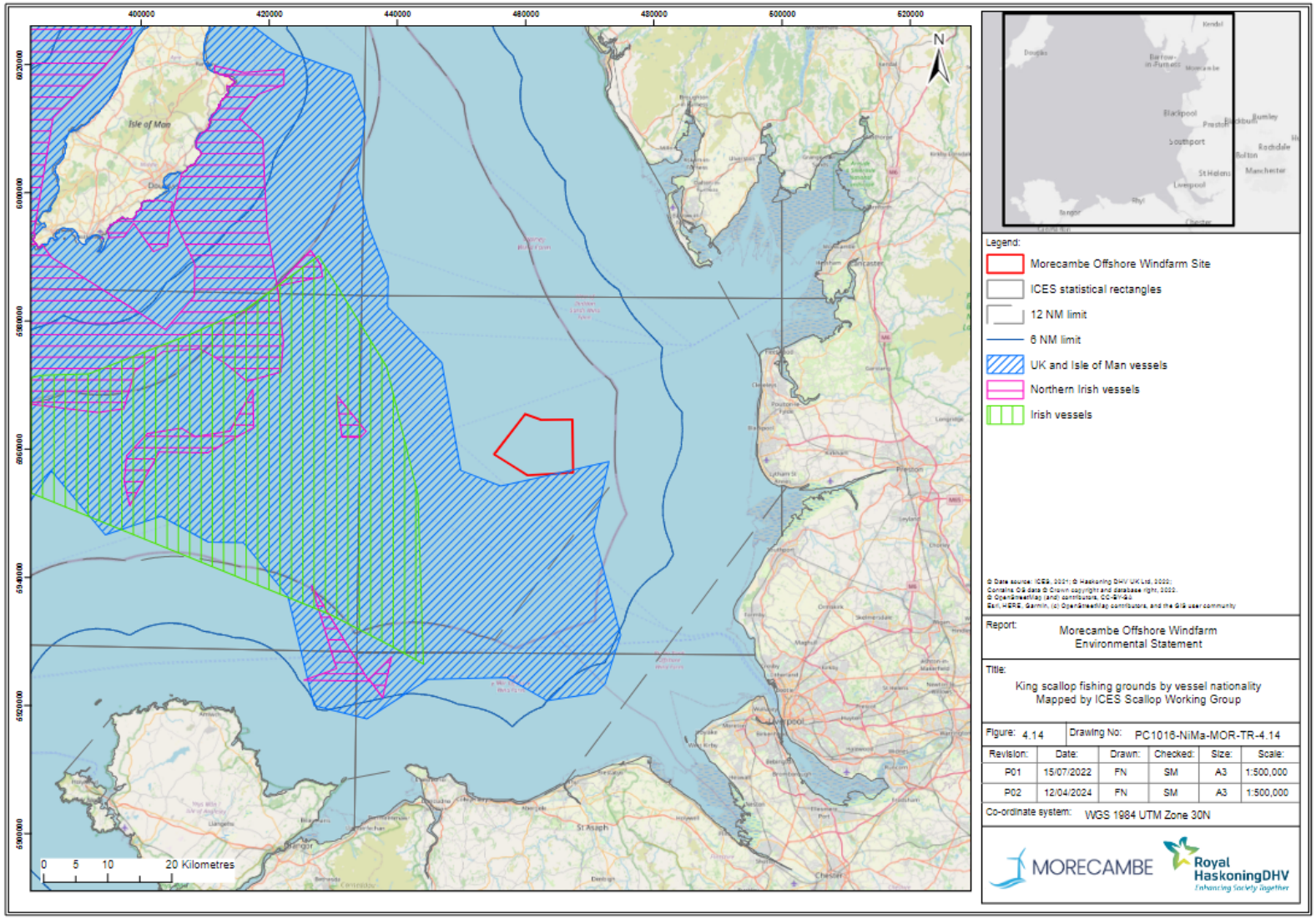

Figure 4.14 Irish Sea king scallop fishing grounds targeted by UK, Northern Irish and Irish vessels (Source: ICES, 2021)

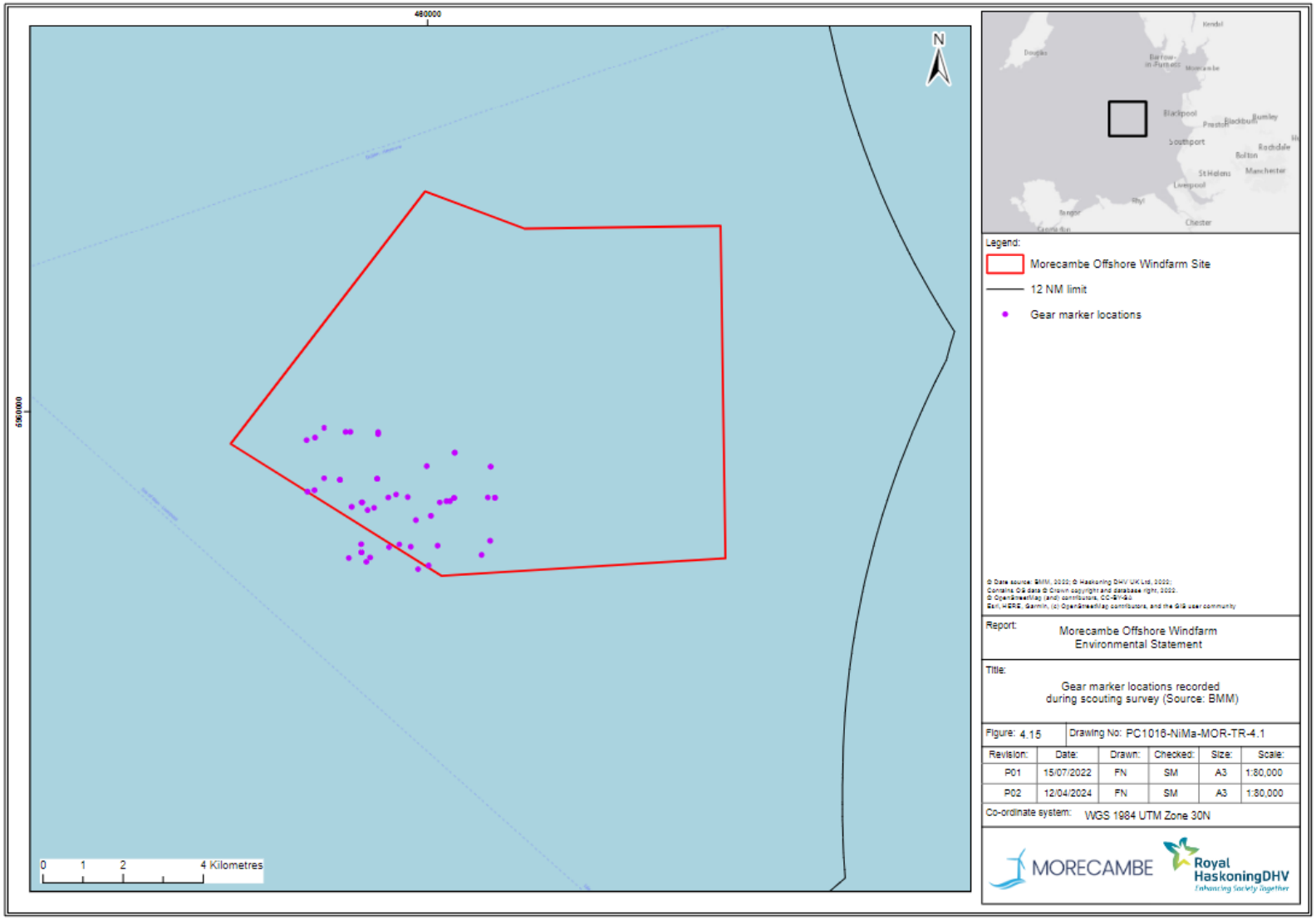

Figure 4.15 Gear marker locations recorded during scouting surveys (Source: BMM, 2022)

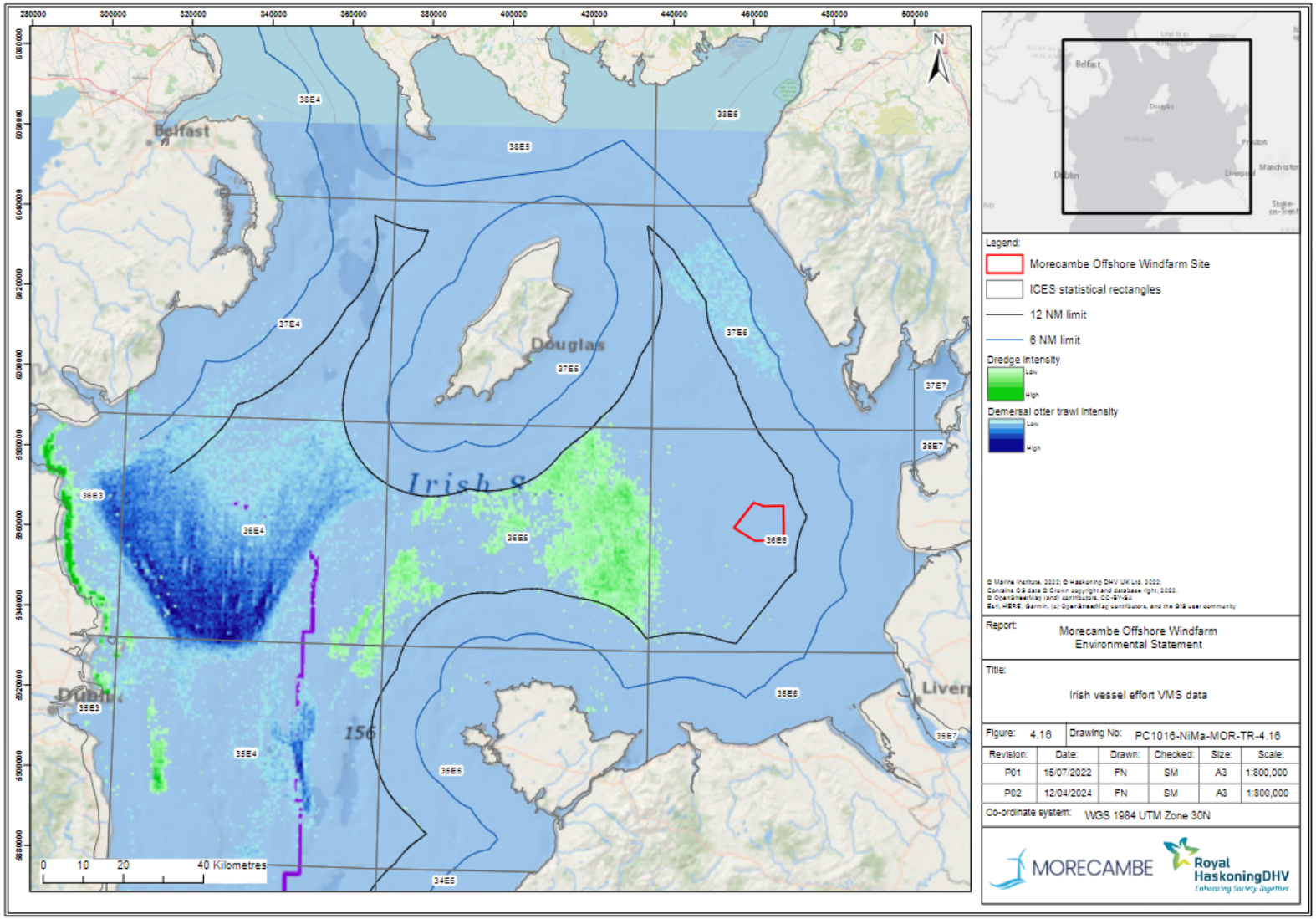

Figure 4.16 Effort VMS data from Irish registered vessels operating demersal otter trawl and dredge gear (Source: Marine Institute, 2022)

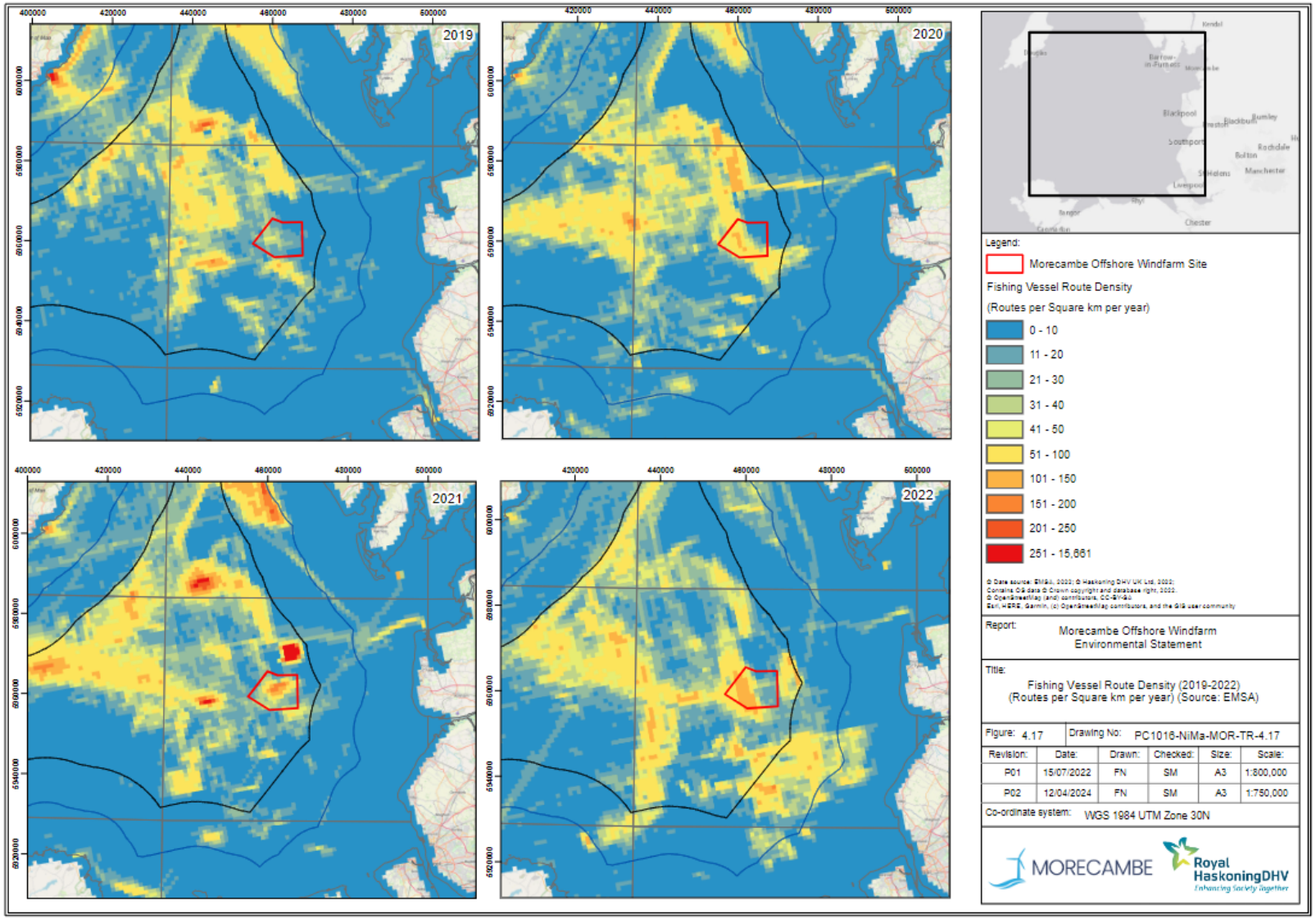

Figure 4.17 AIS fishing vessel route density 2019 to 2022.

5. Fisheries Activity Assessments by nation

5.1 English Fisheries Activity Assessment

5.1.1 Landings trends, fishing grounds and key species

The trends in landed value by English-registered vessels from the local study area are presented in Figure 5.1 for gear type and Figure 5.2 for species.

English landings from the local study area are dominated by vessels targeting whelk with pots. To a lesser extent, English vessels target other shellfish species with static gear and dredges, and a variety of demersal species primarily using trawls, nets and hooks.

Landings of whelk peaked in 2019. Landings of lobster, brown crab and shrimp have fluctuated, showing a general downward trend. Landings of sole showed a sharp spike in 2020 and 2022 and landings of bass have remained relatively consistent, also with a peak in 2021.

The average annual first sales value of English landings from the local study area between 2016 and 2022 was approximately £860,000, including whelk at £539,000 and lobster at £59,000. The value of landings from the local study area has increased by over £246,000 between 2016 and 2022.

Based on the landings data presented here and spatial data presented in the **Section 4**, English-registered vessels active in the windfarm site are primarily targeting whelk with pots on grounds that extend across the local and regional study areas. 2020 and 2022 saw significant peaks in landings of sole by English beam trawlers and it is possible that some of this fishing activity occurred within the windfarm site. The English beam trawl fleet are understood to travel from southwest ports to target this area. English-registered scallop dredgers may also be active within the southern portion of the windfarm site.

In waters inshore of the windfarm site, fishing activity includes potting for shellfish, netting for demersal species, and some demersal trawling.

Outside of the local study area, and in surrounding ICES rectangles, fishing activity by English-registered vessels is similar to that described immediately above, with shellfish species – notably whelk – dominating landings in terms of both landed weight and value.

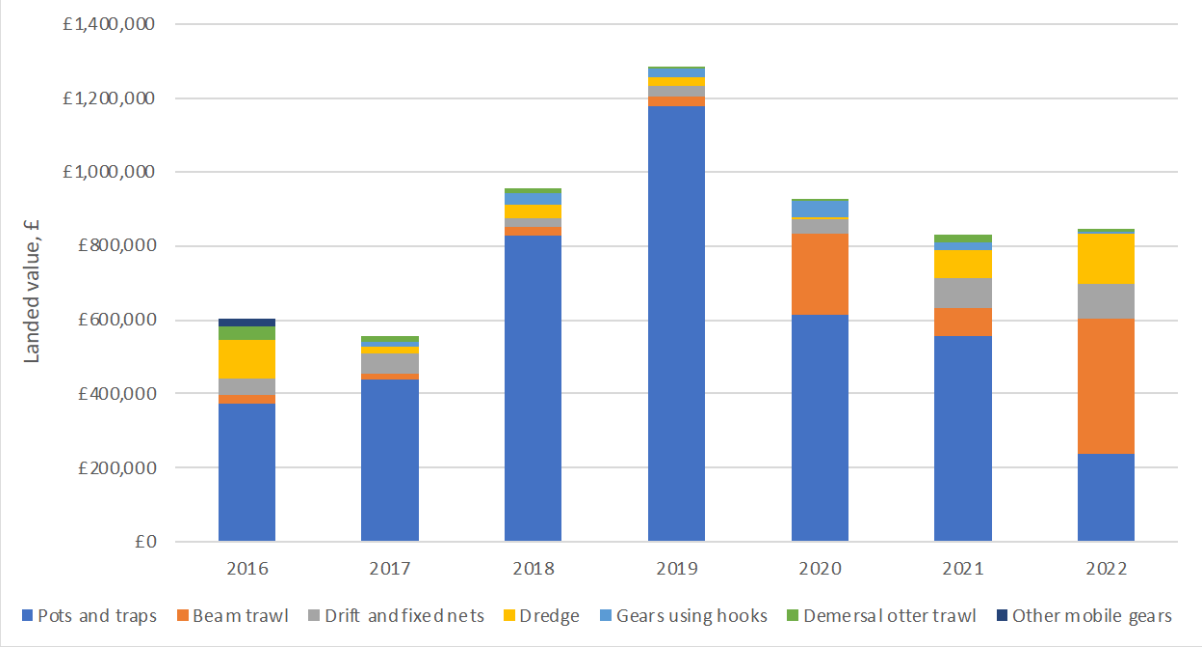

Figure 5.1 Landed value of all landings by English registered vessels from ICES rectangle 36E6 (local study area) indicating gear type (MMO, 2022, 2023)

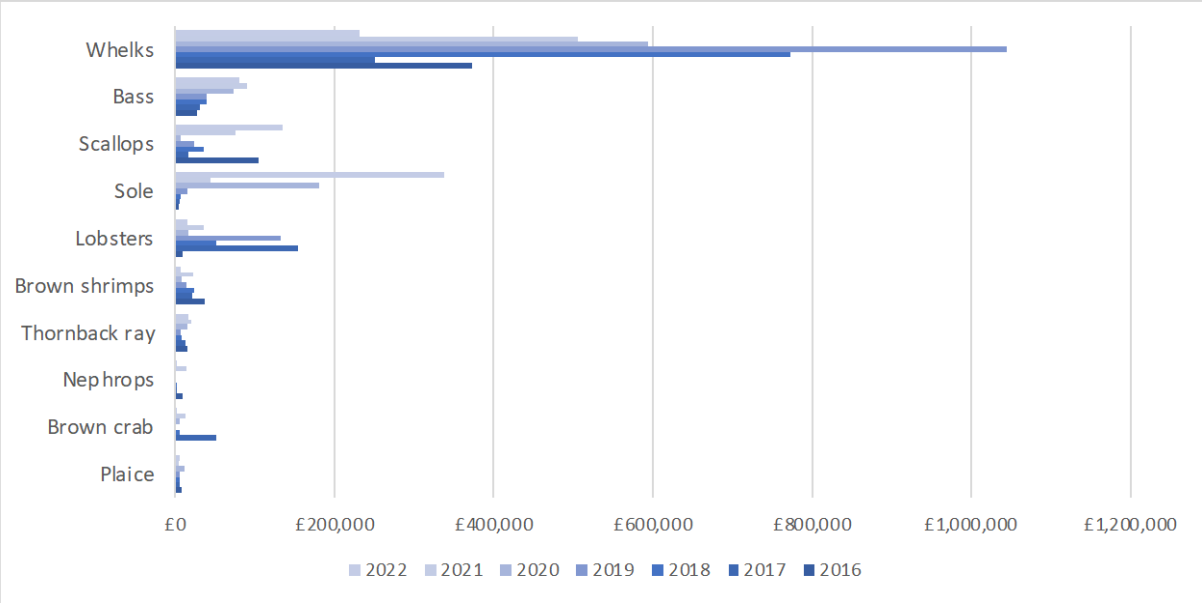

Figure 5.2 Landed value of all landings by English registered vessels from ICES rectangle 36E6 (local study area) indicating species (MMO, 2022, 2023)

5.1.2 Ports and vessel fleets

Vessels of 10 m or more in length accounted for approximately 78% of landings by English vessels from the local study area by value across 2016 to 2022. These larger vessels target shellfish species, namely whelk and king scallop in offshore waters in the vicinity of the windfarm site. Data also indicates some limited beam trawl activity by English vessels targeting sole.

Smaller 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 and are active in the localised brown shrimp fishery.

The MMO provides 2021 landings statistics by port of landing attributed to specific ICES rectangles, allowing linkage of the location of fishing to the specific port the catch is landed into, as shown in Figure 5.3. Key ports and fleets targeting fisheries within the local study area (36E6) include:

- Whelk landed into Fleetwood and Whitehaven;
- Bass landed into Fleetwood, Barrow, Lytham St Annes and Liverpool;
- Scallop landed into Bangor; and
- Sole landed into Holyhead.

Comparable data for 2022 is shown in Figure 5.4, which indicates a significant growth in the sole landings from 36E6 into Holyhead and a drop in whelk landings into Fleetwood. The whelk landings into Whitehaven remain relatively consistent across 2021 to 2022.

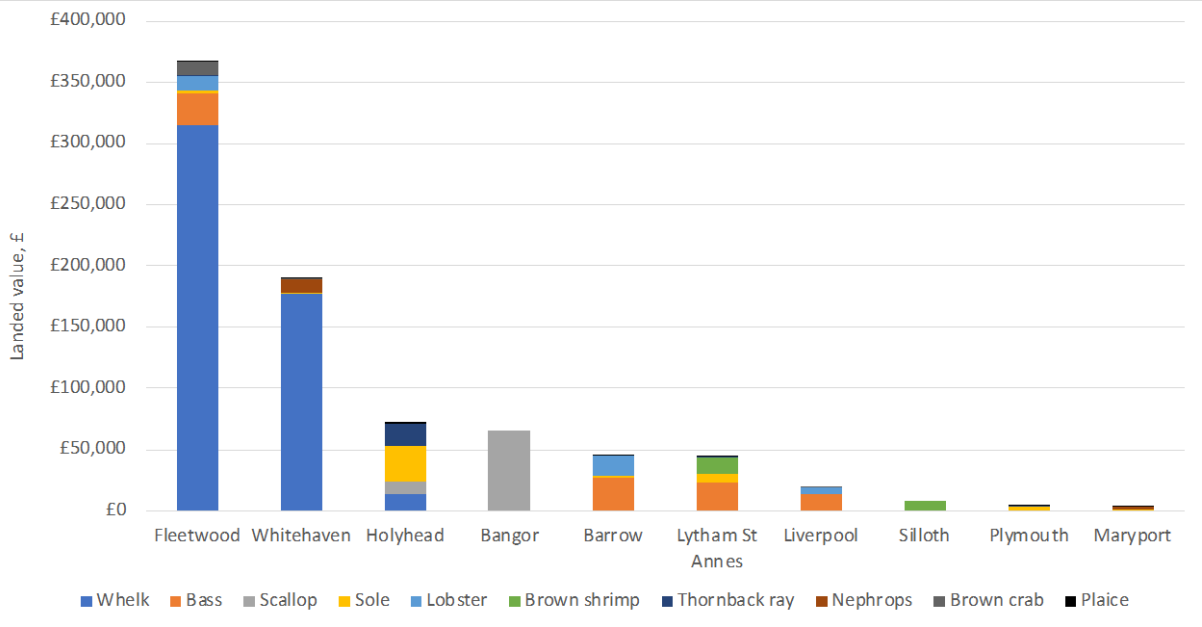

Figure 5.3 Value of landings from 36E6 by English registered vessels by port of landing in 2021 (MMO, 2022)

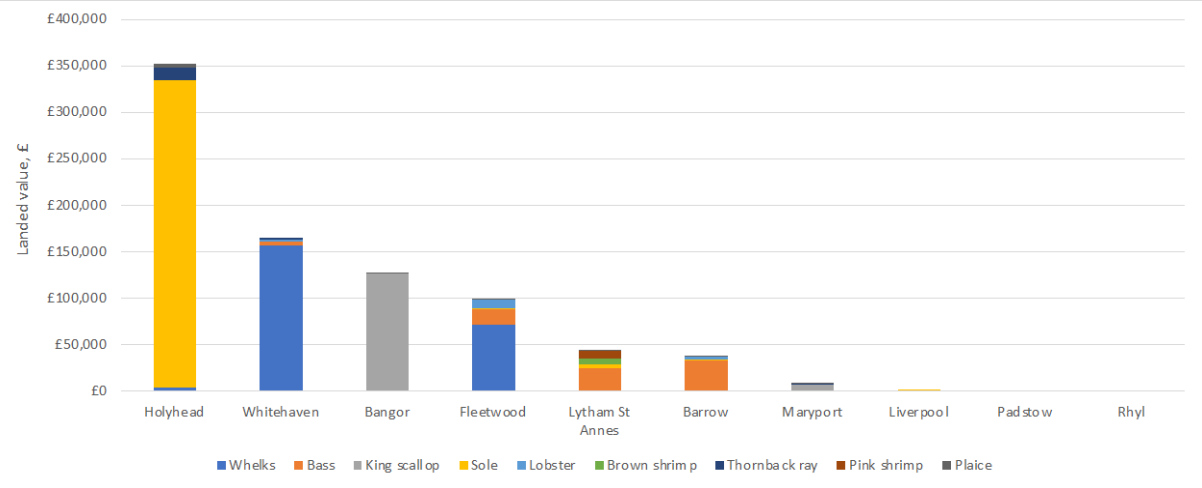

Figure 5.4 Value of landings from 36E6 by English registered vessels by port of landing in 2022 (MMO, 2023)

5.2 Scottish Fisheries Activity Assessment

5.2.1 Landings trends, fishing grounds and key species

The trends in landed value by Scottish-registered vessels from the local study area are presented in Figure 5.5 for gear type and Figure 5.6 for key species.

Scottish landings are dominated by vessels targeting king and queen scallops with dredges. Across the 2016 to 2022 period, landings have declined; this decline is associated with a reduction in landings of queen scallops (from an annual value of £2 million in 2016 to £180,000 in 2020, increasing to £570,000 in 2021, and dropping slightly in 2022). Overall an average of £727,000 of queen scallop are landed annually by the Scottish fleet from the local study area. Landings of king scallops have remained relatively consistent across the same period (with an average annual value of £503,000 across 2016 to 2022). The decline in queen scallop landings is consistent with the broad cyclical pattern seen in queen scallop landings over a

seven to ten year period, as informed by industry consultation. The introduction of a closed fishing season in the Irish Sea for dredge fisheries running between 1st April and 30th June from 2018 is also noted.

Based on the landings data presented here and spatial data presented in **Section 4.1**, Scottish-registered vessels are active in the local and regional study areas. Key targeted dredge grounds are located outside of the windfarm site, but spatial data indicates some dredge activity in the southern portion of the windfarm site.

In the regional study area fishing activity by Scottish-registered vessels is similar to that described immediately above, with shellfish species – notably scallop – dominating landings in terms of both landed weight and value.

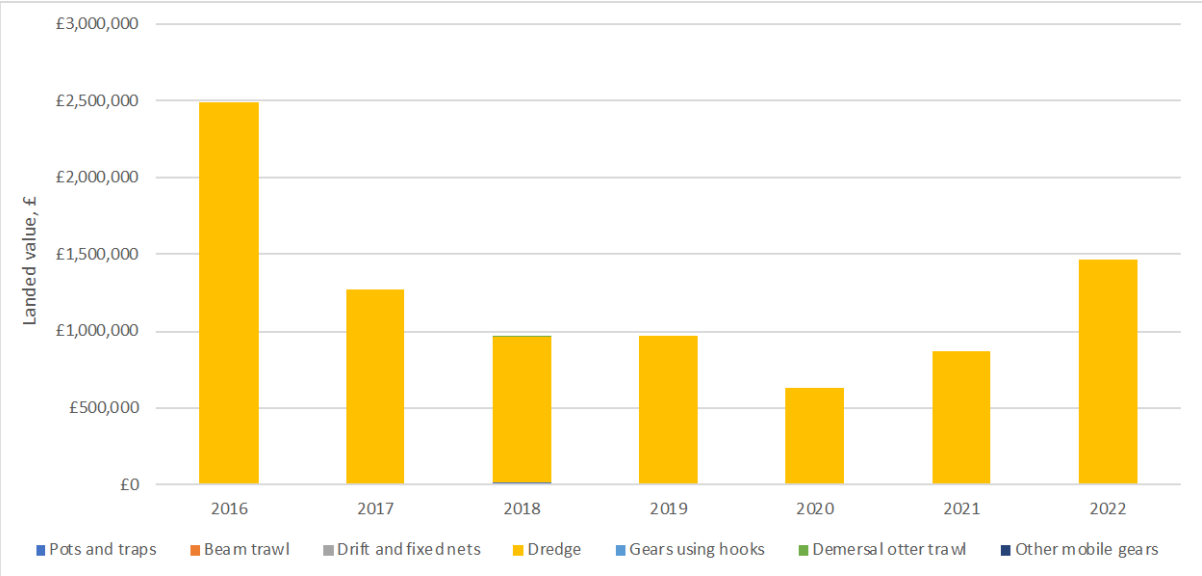

Figure 5.5 Landed value of all landings by Scottish registered vessels from ICES rectangle 36E6 (local study area) indicating gear type (MMO, 2022; MMO, 2023))

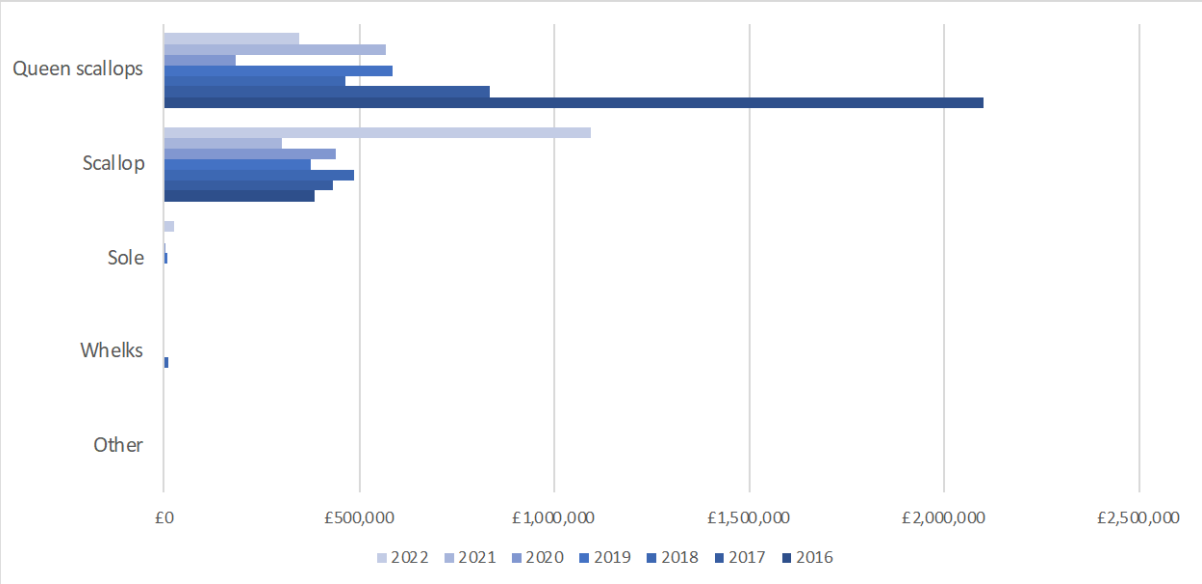

Figure 5.6 Landed value of all landings by Scottish registered vessels from ICES rectangle 36E6 (local study area) indicating species (MMO, 2022; MMO, 2023))

5.2.2 Ports and vessel fleets

Scottish dredge vessels, all over 10 m in length, land the majority of their catch into Kirkcudbright, in the Solway Firth, from which approximately 20 dredge vessels operate and where a shellfish processing plant is located. Reflecting declines in queen scallop landings across the Irish Sea, the value of scallop landings into Kirkcudbright has declined between 2016 and 2020.

It is noted that whilst a portion of landings into Kirkcudbright are expected to be associated with catches from the regional study area, some landings may be attributed to catches from further afield.

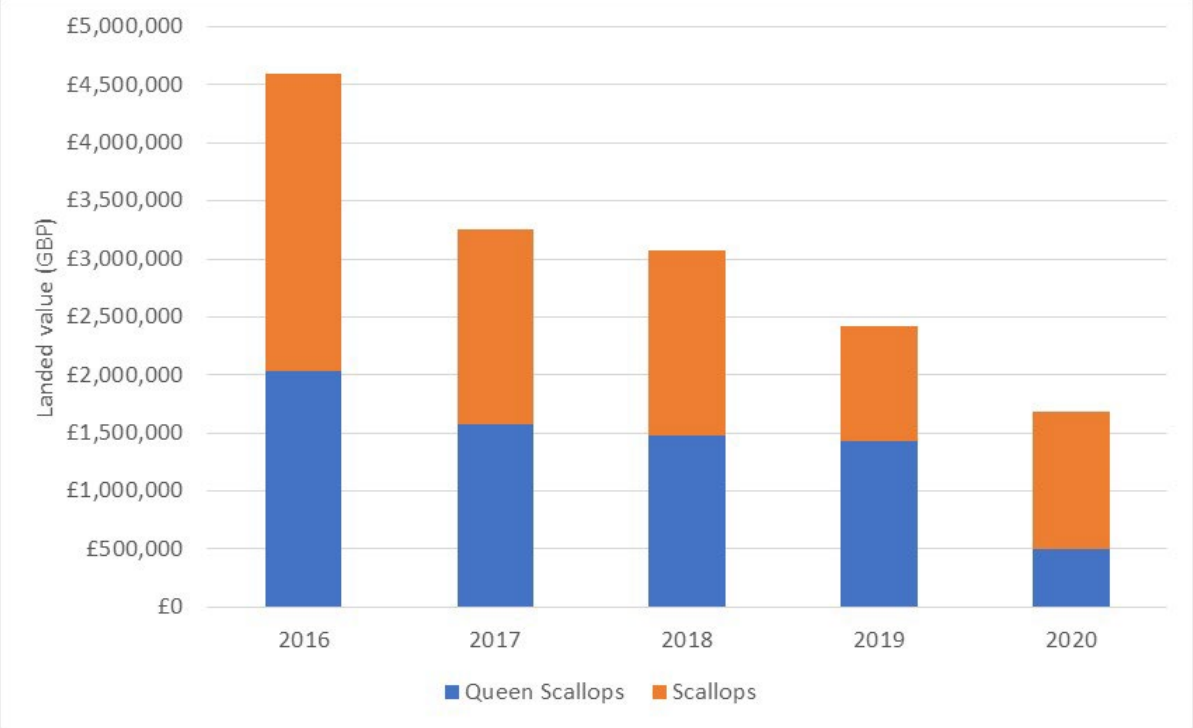

Figure 5.7 Value of scallop landings to Kirkcudbright 2016 to 2020 (MMO, 2021)

The MMO provides 2021 landings statistics by port of landing attributed to specific ICES rectangles, allowing linkage of the location of fishing to the specific port the catch is landed into, as shown in Figure 5.8. Key ports and fleets targeting fisheries within the local study area (36E6) include:

- Queen scallop landed into Kirkcudbright and Whitehaven; and
- King scallop landed into Silloth, Whitehaven and Holyhead.

Comparable data for 2022 is shown in Figure 5.9, which indicates a significant growth in the king scallop landings from 36E6 being landed into Kirkcudbright.

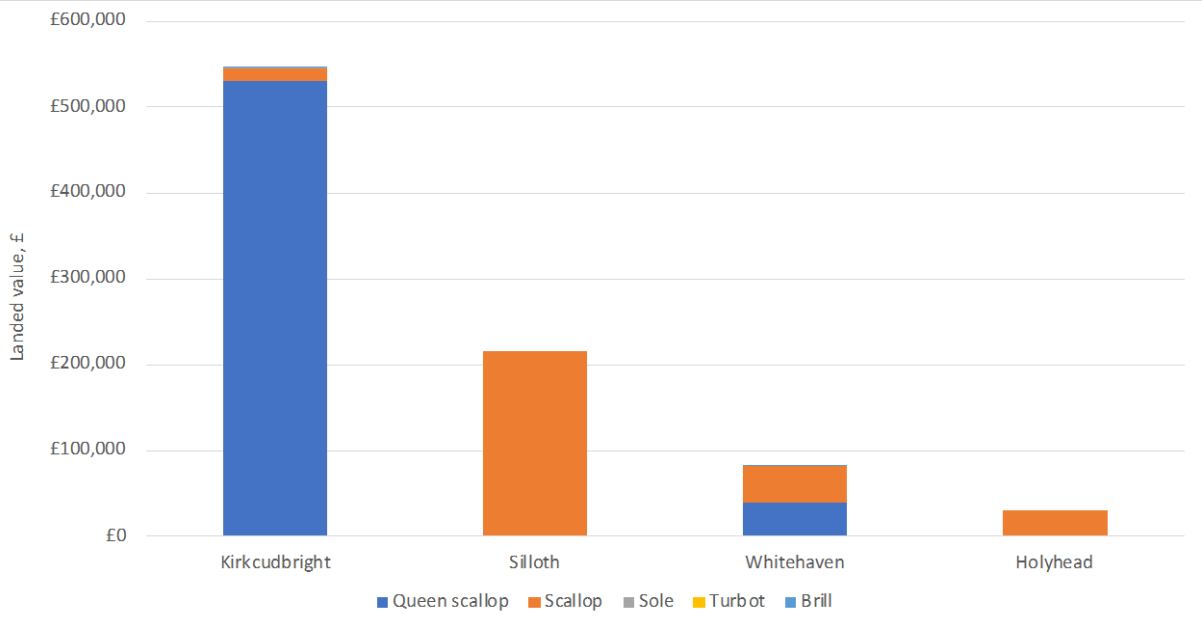

Figure 5.8 Value of landings from 36E6 by Scottish registered vessels by port of landing in 2021 (MMO, 2022)

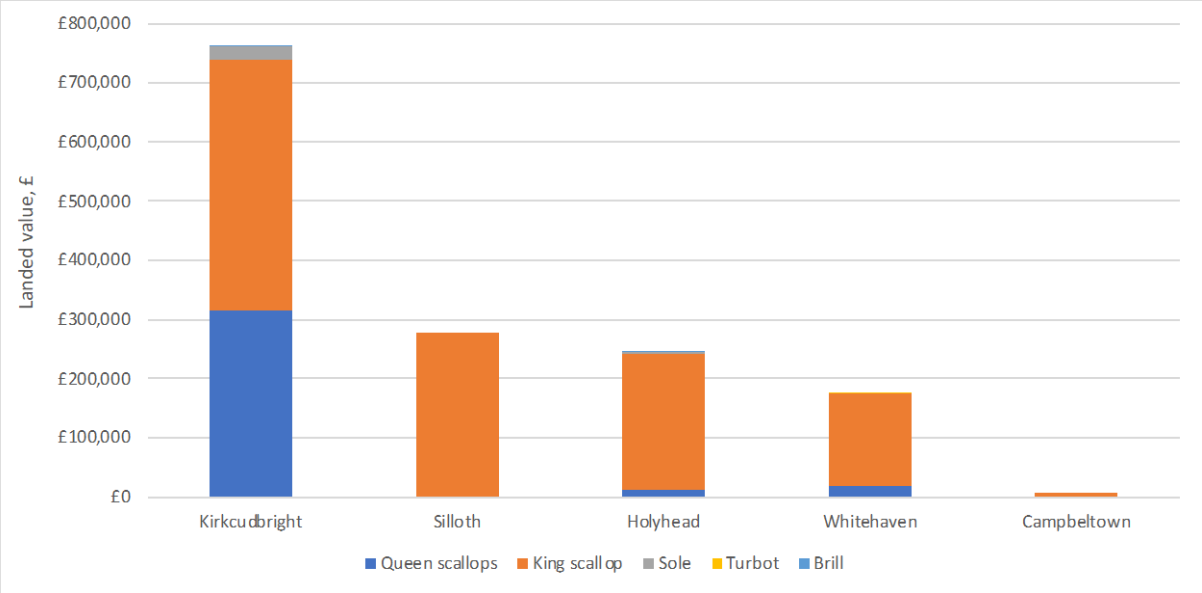

Figure 5.9 Value of landings from 36E6 by Scottish registered vessels by port of landing in 2022 (MMO, 2023)

5.3 Northern Irish Fisheries Activity Assessment

The trends in landed value by Northern Irish-registered vessels from the local study area are presented in Figure 5.10 for gear type and Figure 5.11 for key species.

Northern Irish landings are dominated by vessels targeting queen scallops with dredges and nephrops with demersal otter trawl. Landings by Northern Irish vessels from the local study area have averaged £69,000 annually over the 2016 to 2020 period, though peaked in 2016 and have declined substantially since, with negligible landings in 2021 and 2022. Vessels are understood to operate primarily out of Kilkeel, Ardglass and Portavogie.

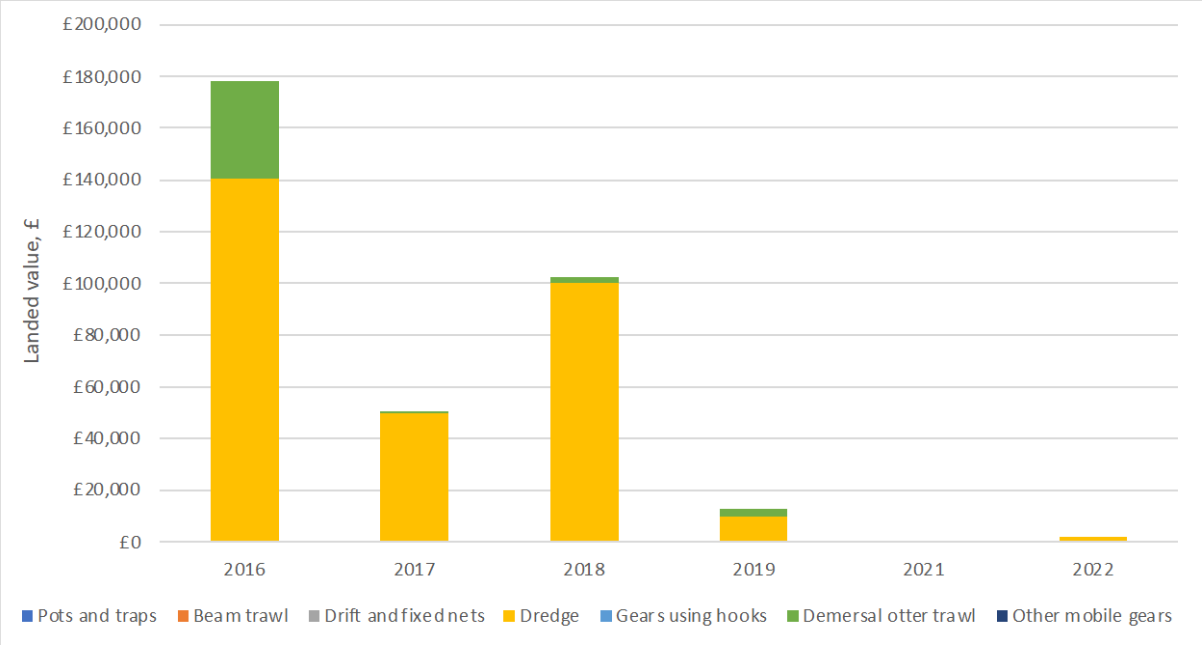

Figure 5.10 Landed value of all landings by Northern Irish registered vessels from ICES rectangle 36E6 (local study area) 2016 to 2022 (MMO, 2022; MMO, 2023))

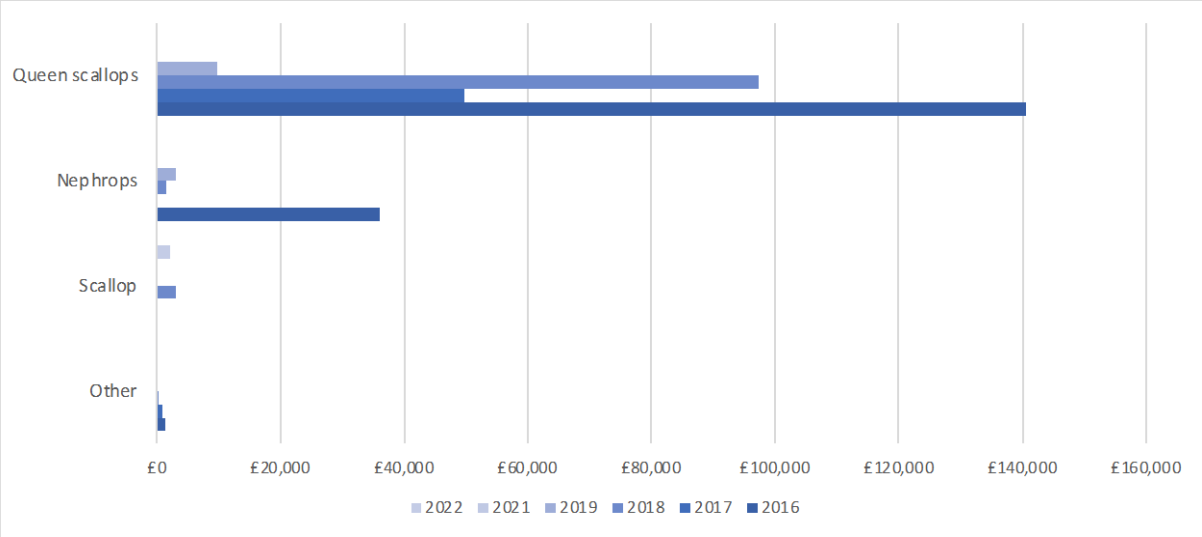

Figure 5.11 Landed value of all landings by Northern Irish registered vessels from ICES rectangle 36E6 (local study area) indicating species (MMO, 2022; MMO, 2023))

5.4 Welsh Fisheries Activity Assessment

The trends in landed value by Welsh-registered vessels from the local study area are presented in Figure 5.12 for gear type and Figure 5.13 for key species.

Welsh landings are dominated by vessels targeting queen scallops with dredges and potting for whelks. Landings by Welsh vessels from the local study area have averaged £52,000 annually over the 2016 to 2022 period, peaking in 2020 at over £120,000, related to landings of whelk. Vessels are understood to operate out of Bangor, Fleetwood, Holyhead and other ports in north Wales.

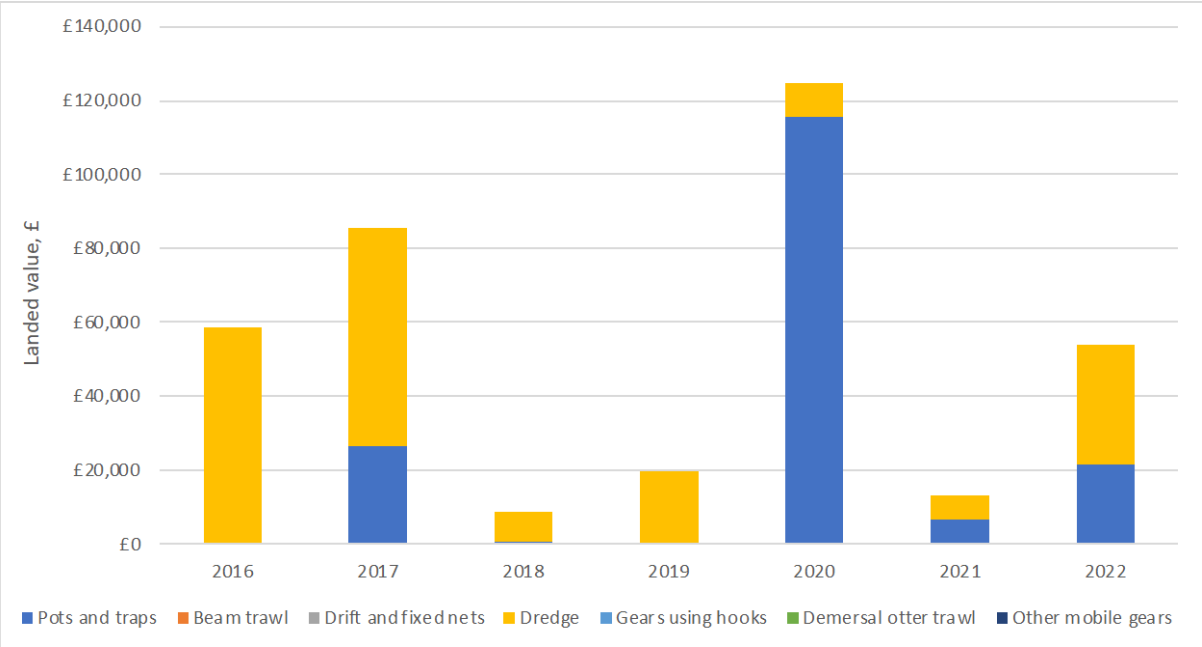

Figure 5.12 Landed value of all landings by Welsh registered vessels from ICES rectangle 36E6 (local study area) 2016 to 2022 (MMO, 2022; MMO, 2023)

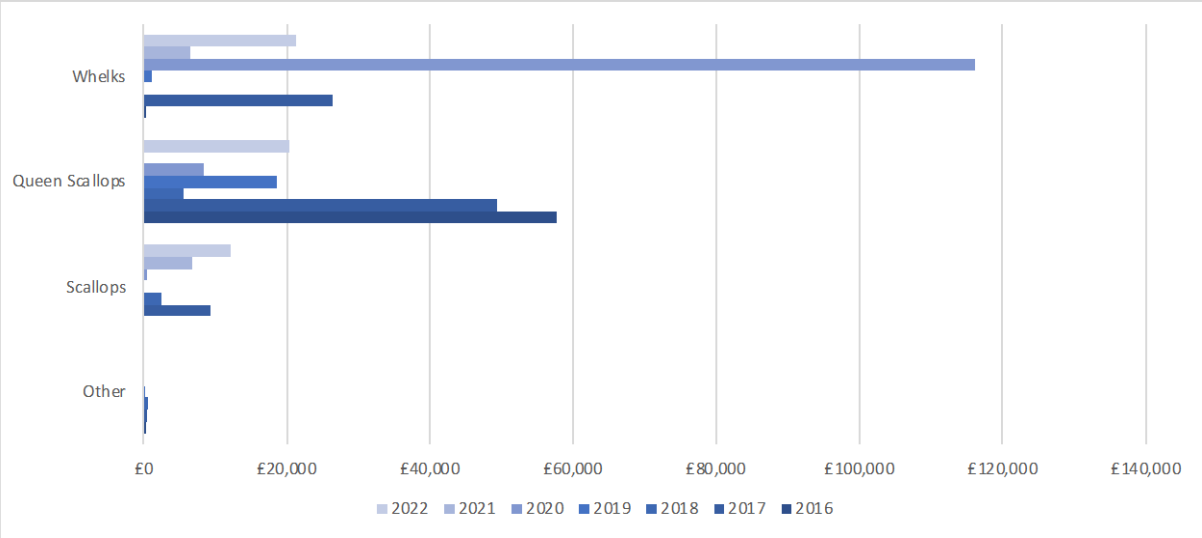

Figure 5.13 Landed value of all landings by Welsh registered vessels from ICES rectangle 36E6 (local study area) indicating species (MMO, 2022; MMO, 2023)

5.5 Isle of Man Fisheries Activity Assessment

No landings by vessels registered to the Isle of Man have been recorded from ICES rectangle 36E6 (local study area) from 2016 to 2021 and low levels were recorded in 2022. Specifically, 2 tonnes of queen scallop were landed in August 2022 by Isle of Man registered vessel(s) of length 15-18m deploying demersal otter trawl, with a first sales value of £1,400.

Across the wider regional study area, it is notable that activity by Isle of Man vessels targeting scallop is substantial in ICES rectangle 37E5, and also present to a lesser extent in ICES rectangle 36E5. These vessels target the important scallop grounds around the Isle of Man and land scallop into Ramsey, Peel, Douglas and Port St Mary.

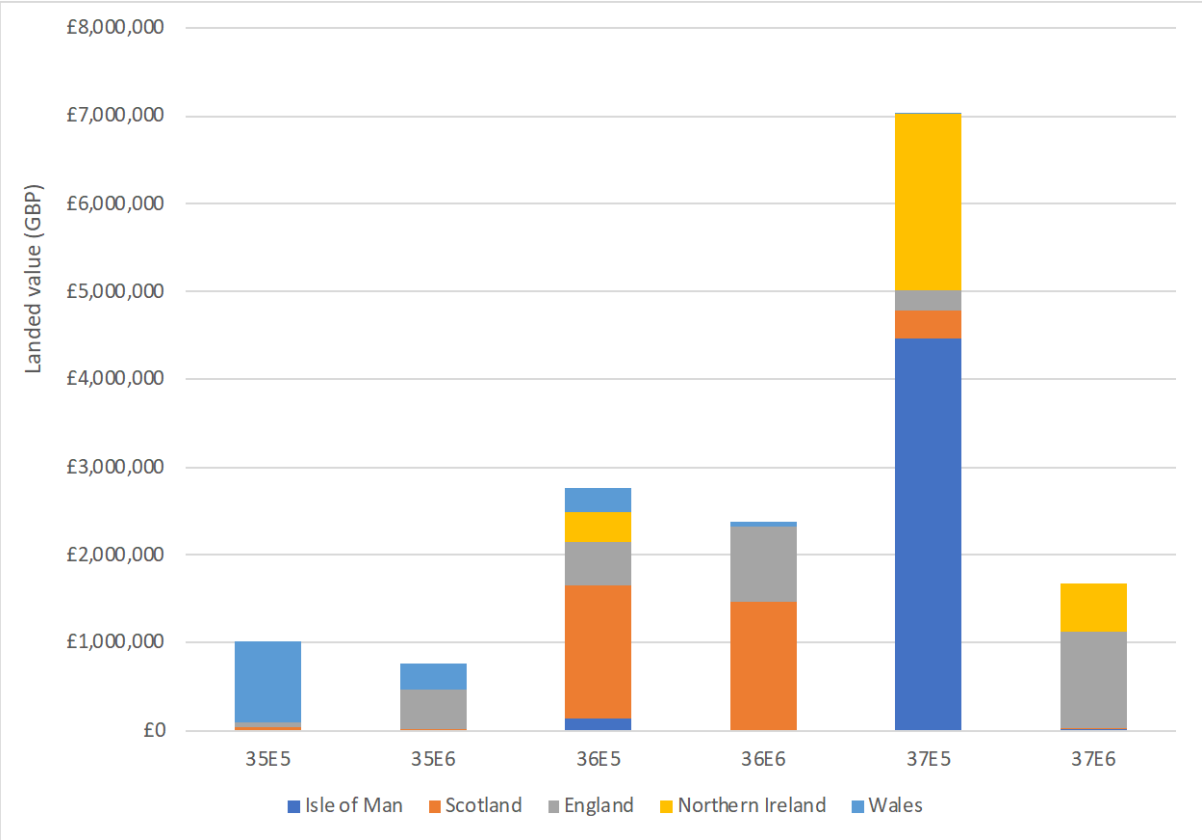

Figure 5.14 Landed value of all landings by UK registered vessels from the regional study area in 2022, indicating vessel nationality and ICES rectangle (MMO, 2023)

5.5.1 Isle of Man fisheries

The Department of Environment, Food and Agriculture (DEFA) is responsible for granting the sea fishing license and ensuring coherent and sustainable fisheries management within Manx Territorial Waters.

Key aspects of the legal, environmental, and economic considerations involved in the sea fishing licensing and regulatory framework within the Isle of Man territorial sea include:

- Legal Framework: The Fisheries Act 2012 and the Wildlife Act 1990 provide the legal powers for DEFA to regulate sea fishing activities through statutory documents, policy documents, and guidance notes.
- Public Asset and Shared Responsibility: Fish stocks within the Isle of Man territorial sea are considered a public asset and a shared natural resource, requiring cooperation, collaboration, and fairness in their utilization and sustainable management.
- Jurisdiction and International Cooperation: The Isle of Man's territorial sea jurisdiction, extended under the Territorial Sea Act, necessitates cross-jurisdictional cooperation and adherence to UK's international obligations through the Fisheries Management Agreement.
- Sustainable Resource Management: The document emphasizes the economic value of fish stocks to the Isle of Man's economy and the need for effective regulation to ensure sustainable harvesting and protection of marine ecosystems.
- Co-management and Strategic Approach: DEFA aims to work in partnership with stakeholders, adopting a co-management approach to fisheries management and implementing a strategic Future Fisheries Strategy.

Vessels registered in the Isle of Man and in the UK require both a UK and Isle of Man fishing licence to fish in Isle of Man territorial waters. In addition, an authorisation is required to catch king scallop, queen scallop, whelk and crab/lobster. The number of vessel licence owners and their administrative vessel nationality is presented in Table 5.1. For example, two English registered vessels have a licence to catch whelk within 3-12 NM area of Isle of Man territorial waters.

Table 5.1: Fishing licences within Manx Territorial Waters (source: DEFA, IoM Government)

Isle of Man Territorial Waters Access		Vessel nationality				
		Isle of Man	Northern Ireland	Scotland	Wales	England
General Access	IoM Licence	58	66	7	1	8
	0-3 Permit	56	20	4	1	7
King Scallop Authorisation	3-12 Area	29	16	4	1	5
	0-3 Area	25	2	0	0	4
Queen Scallop Authorisation	3-12 Area	26	6	1	1	3
	0-3 Area	24	5	1	1	3
Whelk Authorisation	3-12 Area	14	0	0	0	2
	0-3 Area	13	0	0	0	0
Crab/Lobster Authorisation	3-12 Area	28	6	0	0	0
	0-3 Area	28	6	0	0	0

Manx Marine Environmental Assessment

A Manx Marine Environmental Assessment (MMEA) was produced in 2018 with the commercial fisheries chapter of the MMEA documenting the changes in commercial landings from 2005 to 2016 and associated trends in fishery production (Duncan and Emmerson, 2018).

The main species of commercial value in Manx waters include king scallops, queen scallops, whelk, brown crab, lobster, langoustine, squid, European flat oyster, and various finfish species such as cod, haddock, plaice, turbot, brill, and dab. These species are important for the local fishing industry and contribute significantly to the commercial fisheries in the Isle of Man. Additionally, there are ongoing efforts to manage and sustainably develop these fisheries, as evidenced by the implementation of various management measures and stock assessments for species such as queen scallops.

The trends documented form 2005 to 2016 in the king and queen scallop fisheries in Manx waters indicate a dynamic and evolving situation. The queen scallop fishery experienced a peak in landings in 2011, followed by steep declines due to stock depletion and the subsequent introduction of management restrictions. The fishery has undergone a significant decline since 2014 and has undergone a stock-rebuilding process under highly-constrained fishing conditions. The king scallop fishery has also shown indications of excessive fishing effort, leading to the introduction of new, restrictive management measures since 2016. These measures include effort reduction and the development of a stock assessment and Total Allowable Catch (TAC) application in 2017.

Annual fisheries science report

The Annual Fisheries Science Report of 2022 by the Sustainable Fisheries and Aquaculture Group at Bangor University details the research and findings related to the Isle of Man's scallop fisheries (Bangor University and isle of Man Government, 2022).

Progress has been made in the research and assessment of scallop stocks. This includes the use of innovative techniques such as video surveys and the development of assessment models. The research also emphasizes the interconnected nature of scallop stocks across the

Irish Sea, involving collaborations with multiple jurisdictions to facilitate sustainable fishing practices.

These recommendations aim to ensure the sustainable management of the king scallop fishery for the 2022/2023 season, emphasizing the importance of real-time data collection, spatial monitoring, and the protection of high-density areas to maintain the health of the scallop stocks.

5.5.2 Isle of Man queen and king scallop fisheries

Queen scallop

The Isle of Man Queen Scallop 2022 Stock Survey Report conducted by Bangor University's Sustainable Fisheries and Aquaculture Group (Bloor *et al*., 2022a) presents a comprehensive overview of the stock status, fishing effort, and management measures for the queen scallop fishery in and around the Isle of Man's territorial waters.

The stock assessment is undertaken using a Catch-Survey Analysis (CSA) method, showing a slight increase in biomass over the last four years but remaining below sustainable levels.

The key findings from the 2022 annual stock survey of queen scallops include:

- Spatially discrete high-density areas within several fishing grounds have been created due to the closure of areas with high-density juvenile scallops for on-growing. The stock assessment method down-weights these high-density isolated patches when calculating the overall stock biomass, indicating that assessing the stock at the territorial sea level may be less applicable for the current fine-scale spatial management in place for queen scallops.
- The annual landings of queen scallops from ICES Rectangles 36E5, 37E5, and 38E5, which cover the main extent of the Isle of Man’s territorial waters, show a similar pattern of landings to those from the wider Irish Sea (Area VIIa) over the period 2000 – 2020.
- The 2022 survey indicates a well-defined peak in recruiting queen scallops (15-45 mm) that was absent in 2021, suggesting the need to consider sustainable management over a period of more than one year and potential closures for areas containing high densities and proportions of queen scallop recruits.
- Both scientific and industry surveys show similar spatial trends for high-density areas, with a high-density hotspot identified at the Targets (TAR) fishing ground on the west of the island. The industry survey also indicates significant declines in the post-recruit survey index within the current restricted area at the Chickens (CHI) fishing ground in the south of the island following relatively high fishing pressure and landings.

King scallop

The Isle of Man king scallop 2022 stock survey report provides details on two annual surveys: a long-term, medium-resolution, fixed site survey on the R.V. Prince Madog, and a short-term, fine-resolution, random stratified survey on two industry fishing vessels (Bloor *et al*., 2022b). The survey data from both approaches is analysed to assess the stock development over time.

The annual king scallop landings in the ICES Rectangles 36E5, 37E5, and 38E5 show a similar pattern to those from the wider Irish Sea (Area 7a) over the period 1992 – 2019. There was a rapid increase in landings from 2006 to 2009, almost doubling during that period from 2111t to 3971t. Annual landings continued to increase since 2009, with an annual average of 4020t from 2010 – 2015 and a peak in 2016 of 5714t. However, there were decreases in landings in 2017, 2018, 2019, and 2020, with a slight increase again in 2021. These reductions in landings followed the introduction of TACs within Isle of Man territorial waters. It's important to note that TACs are not the only factor that may have influenced the reduction in landings, as stock decline, Brexit, and Coronavirus may have also had an impact.

The stock advice for the 2022/2023 season recommends a precautionary management approach and suggests a TAC based on the ICES Category 3 approach, with a potential increase of 20%. The report emphasizes the need for in-season reviews, spatial monitoring and management, as well as closed area management to protect high-density areas of post-recruits and recruits.

The king scallop fishery in Manx territorial waters has been subject to a Capacity Reduction Programme (Policy) as implemented through a long term management plan which became effective from 16 May 2022 (DEFA, 2022). The Capacity Reduction Programme sets a track-record requirement for eligibility in the fishery. Authorisations failing to meet this requirement become ineligible and revert to the Department. It is implemented under the authority of the Fisheries Act 2012.

Spatial distribution of the king scallop and queen scallop

The spatial distribution of the queen scallop fishery in the Isle of Man territorial sea is primarily concentrated within specific grounds; these grounds are named locally as: Targets, Chickens, Point of Ayre, Bradda and East of Douglas. These locations are shown in Figure 5.15 and have been the focus of fishing activity by Manx fishing vessels, as evidenced by VMS data between 2007-2013 (Duncan and Emmerson, 2018) and swept area ratio data from 2018-2022 (DEFA, 2023). The fishing activity tends to occur within the territorial sea, with occasional fishing further afield in UK waters, although this is restricted to relatively few boats. The distribution of fishing activity varies annually, but these areas represent the long-term locations of the king and queen scallop fishing activity. Additionally, the fishery is regulated with measures such as fishing curfews, closed areas, and individual and TAC quotas, as well as restrictions on fishing gear and vessel size. These regulations are aimed at managing and sustaining the queen and king scallop fisheries within the Isle of Man's territorial sea.

The distribution maps for queen scallop targeted by demersal otter trawl is shown in Figure 5.16. This includes Isle of Man and UK vessels of all lengths fishing within Isle of Man territorial waters. The distribution map for king scallop activity by dredge vessels operating in Manx territorial waters is shown in Figure 5.17.

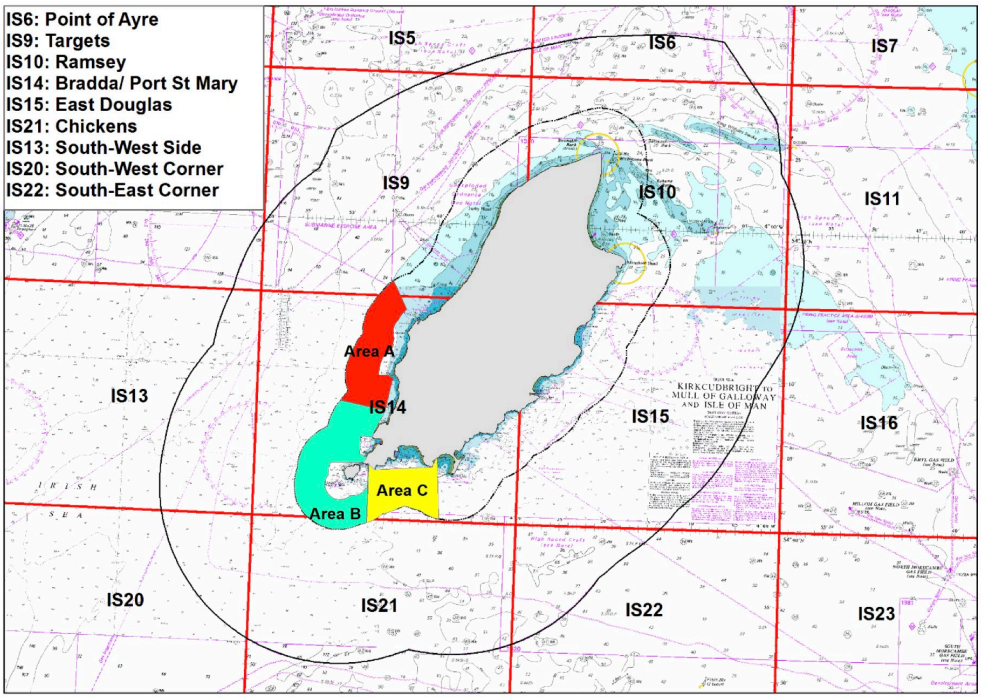

Figure 5.15: Map showing location of Irish Sea Boxes which are used to define fishing areas in the Nest Forms Landings Data. The fishing grounds delineated within each IS box are listed on the map. In addition, Subzones for reporting fishing within 3 subzones within the 0-3 nm limit are also shown (Bloor et al., 2022a)

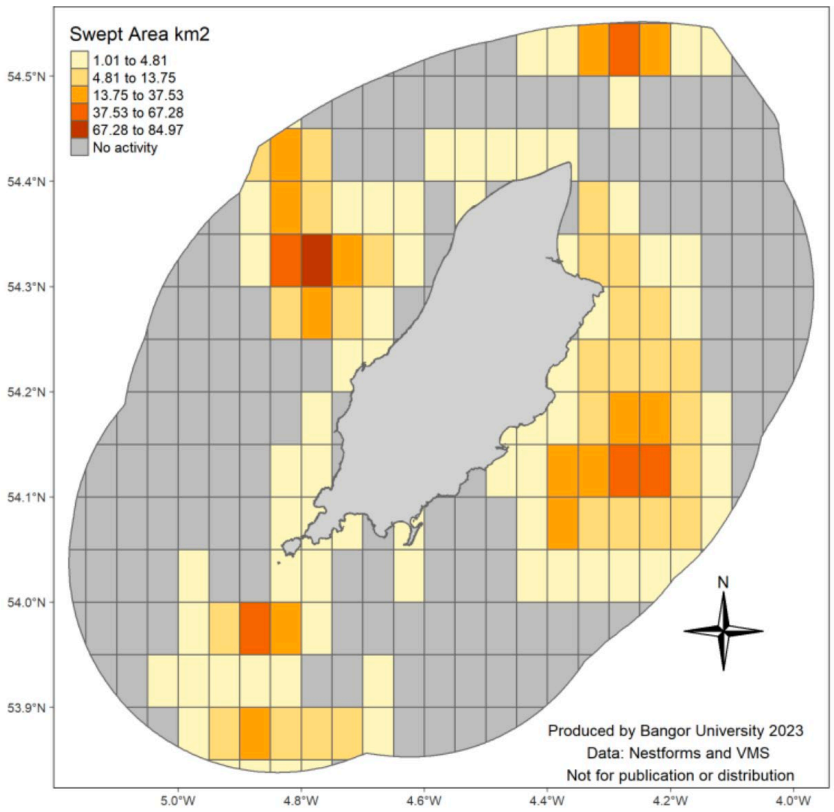

Figure 5.16: Queen scallop: fishing activity map (otter trawl) based on EU VMS data (2018-2022) from Citrix (available from MMO) merged with NestForms data (held by DEFA, IoM Government) (Bangor University, 2023a)

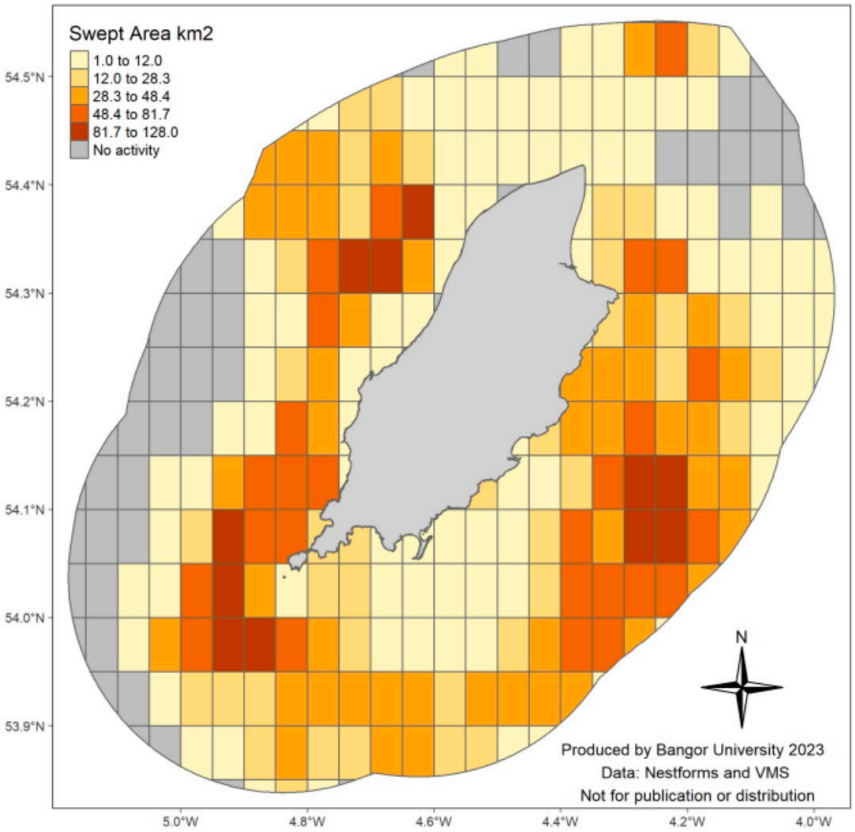

Figure 5.17: King scallop: fishing activity map (dredge) based on EU VMS data (2017/18-2021/22) from Citrix merged with NestForms data (held by DEFA, IoM Government) (Bangor University, 2023b).

5.5.3 Isle of Man potting fishery

Manx registered potting vessel target whelk using plastic pots and crab and lobster using creels.

Landings data provided by the DEFA, IoM Government (Table 5.2) for whelk, brown crab and lobster landings by Manx vessels into Manx ports closely matches with the MMO iFish database analysed for comparable parameters (i.e., Manx vessel landings from the regional study area) (Table 5.3). This provides confidence that Isle of Man vessels are accurately included in the MMO datasets analysed through this report.

Table 5.2: Landings of whelks, brown crab and lobster caught in all areas by Manx vessels into Manx ports from 2018 to 2021 (data source: DEFA, IoM Government)

Manx vessels into Manx ports (all landings)	Whelks		Brown crab		Lobsters	
	Landed Weight (tonnes)	Value (£)	Landed Weight (tonnes)	Value (£)	Landed Weight (tonnes)	Value (£)
2018	993	£1,166,231	629	£1,176,197	43	Not provided
2019	940	£1,087,085	437	£893,862	45	
2020	667	£773,199	465	£708,136	47	
2021	534	£603,165	531	£956,529	47	
Average annual	784	£907,420	516	£933,681	46	

Table 5.3: Landings of whelks, brown crab and lobster caught in the regional study area by Manx vessels into Manx and UK ports from 2018 to 2021 (data source: DEFA, IoM Government)

Manx vessels into Manx and UK ports (landings from from regional study area)	Whelks		Brown crab		Lobsters	
	Landed Weight (tonnes)	Value (£)	Landed Weight (tonnes)	Value (£)	Landed Weight (tonnes)	Value (£)
2018	993	£1,142,589	610	£1,127,929	43	£631,894
2019	940	£1,087,085	435	£889,901	45	£614,058
2020	675	£782,345	462	£708,147	46	£571,763
2021	534	£603,165	531	£957,376	47	£698,361
Average annual	785	£903,796	510	£920,838	45	£629,019

Whelk fishery distribution

The distribution of the whelk fishery in Isle of Man territorial waters is presented in Figure 5.18 for activity by vessels with an Isle of Man whelk license for the period 2010 to 2021, indicating the number of pot hauls. Activity is highest on the east side of the Isle of Man, specifically from 0 to approximately 6 NM.

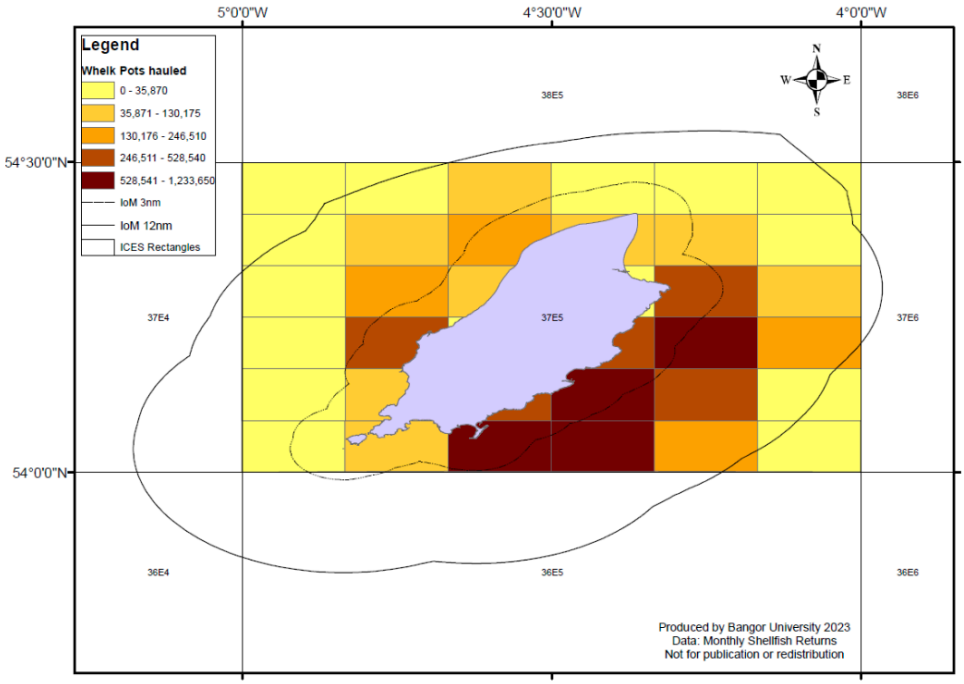

Figure 5.18: Whelk commercial fishery activity map (2010 to 2021)(static gear) based on pot hauls (as a proxy for fishing effort/activity). (Bangor University, 2023c).

Crab and lobster fishery distribution

The spatial distribution of crab and lobster fishing in the Isle of Man territorial sea is dynamic and occurs all around the island, principally within 3 NM (Figure 5.19). Activity is highest to along the northwest region. The distribution is influenced by factors such as the mating season, reproductive migrations, and the natural reduction of suitable habitat types. The industry primarily uses traditional creels and parlour pots, with bait typically consisting of oily fish such as mackerel or herring.

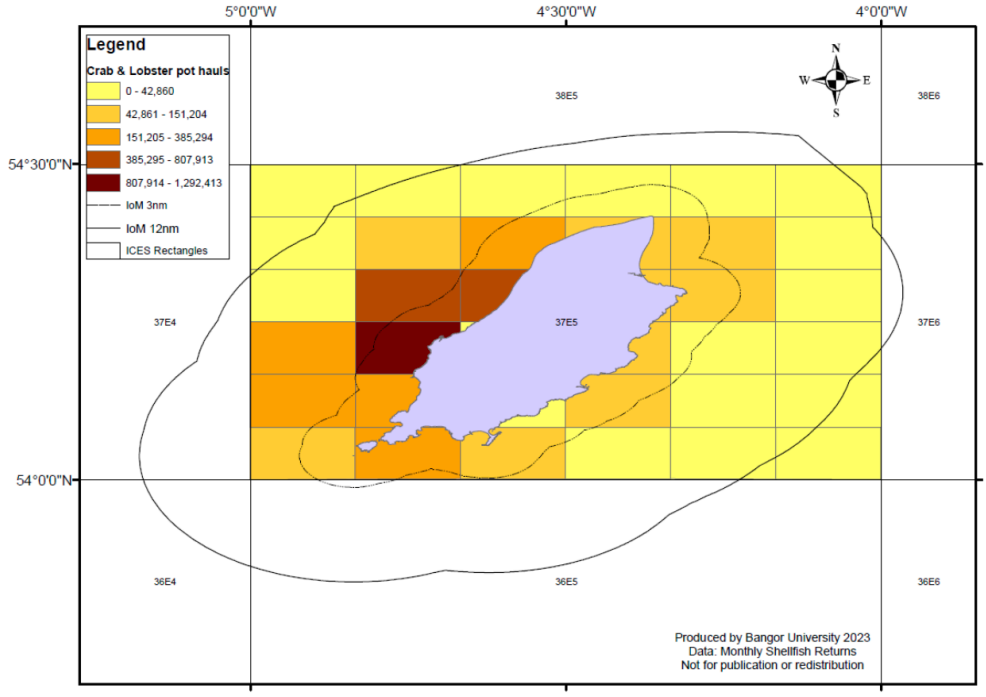

Figure 5.19: Crab and lobster commercial fishery activity data (2010 to 2021) (static gear) based on pot hauls (as a proxy for fishing effort/activity)) (Bangor University, 2023d).

5.5.4 Marine nature reserves

The marine nature reserves (MNRs) in Manx waters are designated areas aimed at biodiversity conservation and sustainable fisheries management. These reserves were established to protect specific habitats and species, and they serve as important areas for research, fisheries management, and conservation purposes. The MNRs were initially developed for research and fisheries management, primarily focusing on king and queen scallop fisheries between 1989 and 2009. Over time, the objectives of the MNRs have evolved to align more closely with fisheries management and conservation goals. The reserves are governed by specific legislation, such as the Sea Fisheries Byelaws and the Manx Marine Nature Reserves (Designation) Order 2018.

The location of MNRs within 0-3 NM of Isle of Man territorial waters is shown in Figure 5.20, with management measure summarised in Figure 5.21 and Table 5.4.

The MNRs are managed through a combination of input and output controls, including fishing curfews, closed areas, and individual and total TAC quotas. The reserves are also supported by scientific data and ongoing efforts to establish an ecologically coherent network of MPAs, ensuring sustainable commercial fisheries in the future. The MNRs are an integral part of the Isle of Man's marine conservation initiatives and contribute to the sustainable management of marine resources.

Figure 5.20: Isle of Man Marine Nature Reserves (as of 2018) (Duncan and Emmerson, 2018)

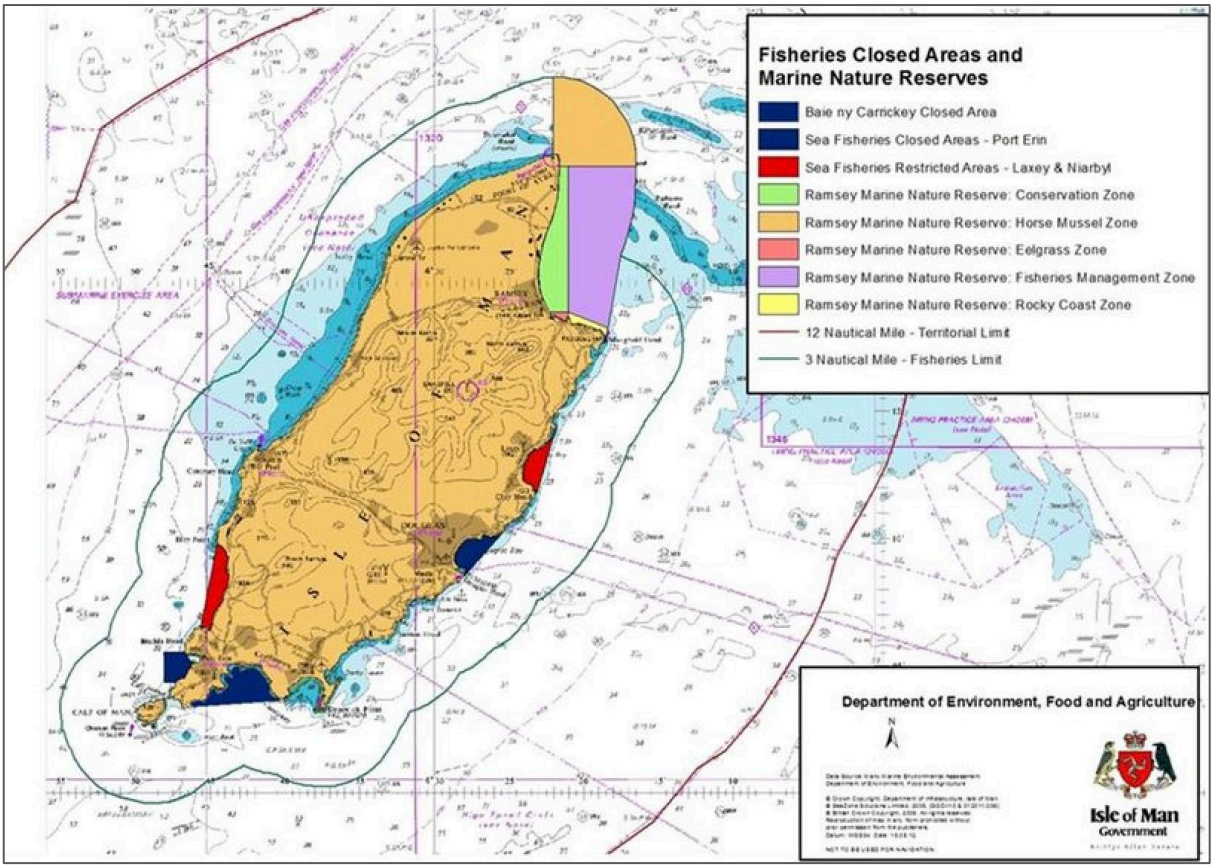

Figure 5.21: Fisheries closed areas and marine nature reserves around the Isle of Man, as of November 2012 (Leigh and Bryce, 2014)

Table 5.4: Characteristics of Marine Nature Reserves in Manx Waters (Duncan and Emmerson, 2018)

Closed Area	Legislation (selected)	Year Implemented	Restrictions
Baie ny Carrickey MNR	Sea Fisheries (Baie Ny Carrickey Closed Area) Byelaws 2012, Manx Marine Nature Reserves (Designation) Order 2018.	(2012, extended 2013 as Closed Area) MNR in 2018	Fishing with towed gear not permitted. See: Manx Marine Nature Reserves Byelaws 2018
Calf of Man and Wart Bank MNR	Manx Marine Nature Reserves (Designation) Order 2018.	2018	See: Manx Marine Nature Reserves Byelaws 2018
Douglas Bay MNR	Sea Fisheries (Douglas Bay Closed Area) Byelaws 2008, Manx Marine Nature Reserves (Designation) Order 2018.	(2008 as Closed Area) MNR in 2018	Fishing with towed gear not permitted. See: Manx Marine Nature Reserves Byelaws 2018
Langness MNR	Manx Marine Nature Reserves (Designation) Order 2018.	2018	See: Manx Marine Nature Reserves Byelaws 2018
Laxey MNR	Sea Fisheries (Scallop Ranching) (Restricted Area) Byelaws 2009, Manx Marine Nature Reserves (Designation) Order 2018.	(2009 as Restricted Area) MNR in 2018	No fishing for queen or king scallops without authority. See: Manx Marine Nature Reserves Byelaws 2018
Little Ness MNR	Manx Marine Nature Reserves (Designation) Order 2018.	2018	See: Manx Marine Nature Reserves Byelaws 2018
Niarbyl MNR	Sea Fisheries (Scallop Ranching) (Restricted Area) Byelaws 2009, Manx Marine Nature Reserves (Designation) Order 2018.	2009 as Restricted Area) MNR in 2018	No fishing for queen or king scallops without authority. See: Manx Marine Nature Reserves Byelaws 2018
Port Erin Bay MNR	Sea Fisheries (Experimental Area) Byelaws 2006 (I) & Amendments in 2007 (II), 2009 (III), Manx Marine Nature Reserves (Designation) Order 2018.	(1989, extended 2003, 2006 as Experimental Area) MNR in 2018	Fishing with towed gear not permitted. See: Manx Marine Nature Reserves Byelaws 2018
Ramsey Bay MNR	Ramsey Bay (Marine Nature Reserve) (Designation) Order 2011, Ramsey Bay (Marine Nature Reserve) (no. 2) byelaws 2011, Ramsey Bay (Marine Nature Reserve) (no.2) byelaws 2011 (amendment) byelaws 2016, Manx Marine Nature Reserves (Designation) Order 2018.	2011, re-designated 2018	Various, but towed gear only within Fisheries Management Zone and static gear excluded from Horse Mussel Zone and Eel Grass Zone, See: Manx Marine Nature Reserves Byelaws 2018
West Coast MNR	Manx Marine Nature Reserves (Designation) Order 2018.	2018	See: Manx Marine Nature Reserves Byelaws 2018

5.6 Non-UK Fisheries Activity Assessment

EU landings data and ICES spatial data (see Section 4.1), indicate the likely presence of other European-registered vessels in the local and regional study areas. These vessels are understood to include Irish vessels dredging for scallop and Belgian beam trawlers targeting sole and plaice.

The landings data presented in Figure 5.22 is available only up to 2016 and indicates that over the 2012 to 2016 period, landings by Belgian vessels substantially declined whilst landings by Irish vessel showed smaller fluctuation, averaging 40 tonnes per year.

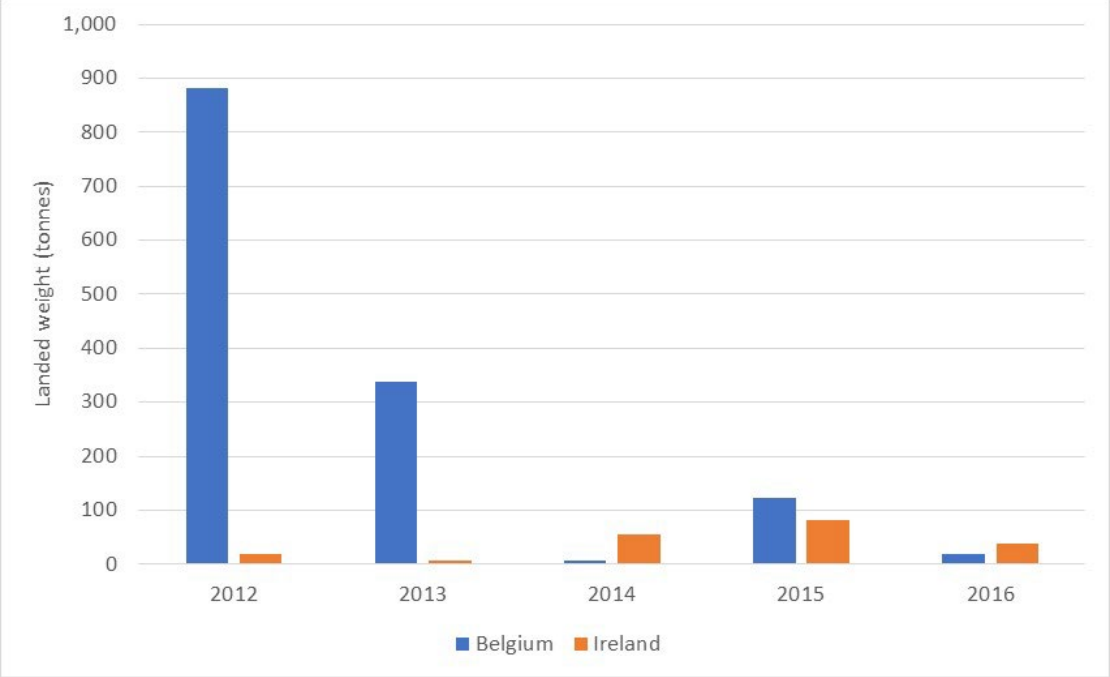

Figure 5.22 Landings from the local study area by non-UK vessels 2012 to 2016 (EU DCF, 2022)

Landings data for all vessel nationalities from 2012 to 2016 is presented in Figure 5.23 for the regional study area. This indicates that ICES rectangle 36E5 is more important to Irish vessels, which is corroborated by VMS data presented in Section 4. Belgian vessels have relatively low levels of activity across the region.

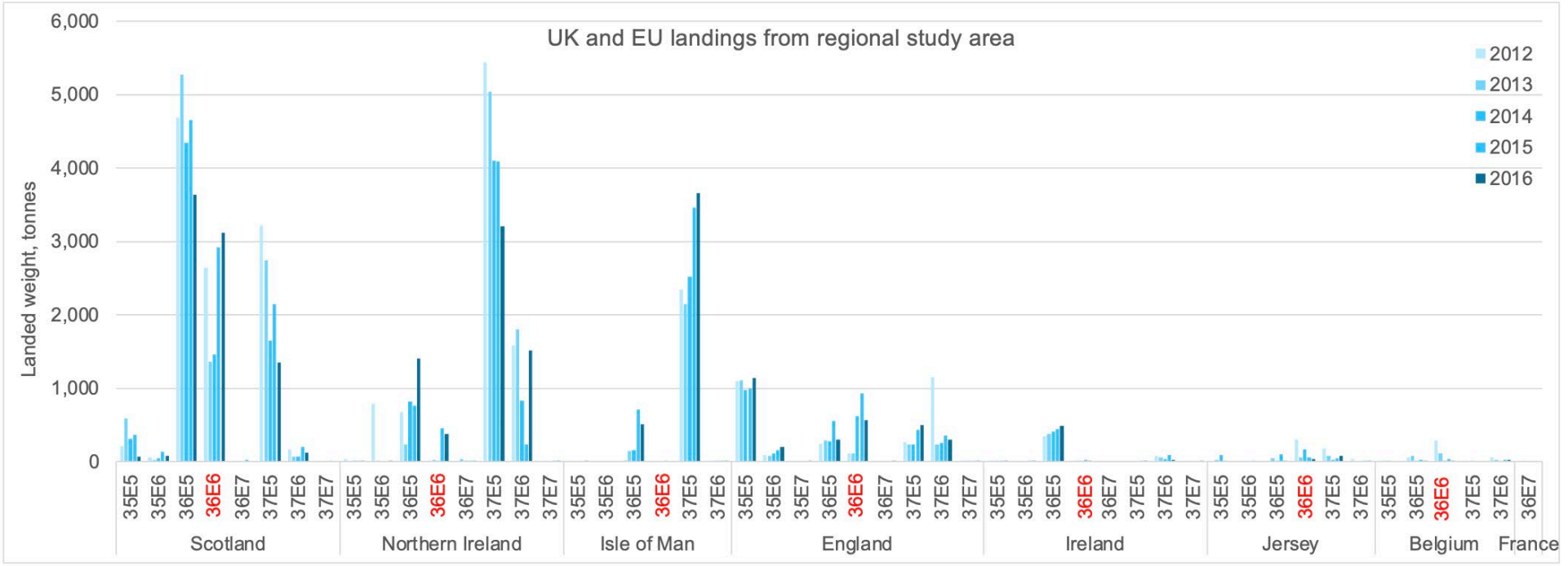

Figure 5.23 Landings from the regional study area by all vessel nationalities 2012 to 2016 (EU DCF, 2022).

6. Future Baseline Environment

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

- Market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, 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 in demand;
- Stock abundance: fluctuation in the biomass of individual species stocks in response to status of the stock, recruitment, natural disturbances (e.g. due to storms, sea temperature etc.), changes in fishing pressure etc.;
- Fisheries management: including new management for specific species where overexploitation has been identified, or changes in 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.

25% 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 regional study area, where UK fisheries primarily target non-quota shellfish species, it is expected that fleets are unlikely to be impacted by quota transfers. It is possible that UK vessels will seek to exploit additional quota-species opportunities, but vessels would need to access quota holdings.

Market changes have the potential to impact fishing activity in the regional 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.

7. Summary

The key fleet métiers operating across the regional study area include (in no particular order):

- UK (primarily Scottish, but also some Northern Irish, English and Welsh) and Irish dredgers targeting king and queen scallops;
- Isle of Man dredgers targeting king scallops;
- Isle of Man demersal otter trawlers targeting queen scallops;
- UK (primarily English) potters targeting shellfish, primarily whelk offshore, but also lobster and brown crab;
- Isle of Man potters targeting shellfish, primarily whelk offshore, but also lobster and brown crab;
- UK (primarily English) and Belgian beam trawlers targeting sole, plaice and other demersal species, with localised inshore trawling targeting brown shrimp;
- UK inshore vessels (English) under 10 m length targeting a variety of demersal species (e.g. bass) using nets and hooked gear;

Based on analysis of landings and spatial data, and the location of windfarm site beyond the 12 NM limit, fishing activity across the windfarm site is expected to be dominated by vessels over 12m in length operating potting gear targeting whelk and dredge targeting king scallop, with potential for occasional beam trawl activity.

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