Awel y Môr Offshore Wind Farm

Preliminary Environmental Information Report

Volume 4, Annex 8.1: Commercial Fisheries Baseline Report

Date: August 2021

Revision: A

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

REVISION	DATE	STATUS/ REASON FOR ISSUE	AUTHOR:	CHECKED BY:	APPROVED BY:
A	August 2021	PEIR	Poseidon	RWE	RWE

Awel y Môr Offshore Wind Farm

Commercial Fisheries Baseline Report

July 2021

Report Information

Citation: MacNab, S. and Nimmo, F. 2021. Awel y Môr Offshore Wind Farm Commercial Fisheries Baseline Report. Report produced by Poseidon Aquatic Resources Management Ltd.

Client: GoBe Consultants

Version: Final

Report ref: 1600/R/01/A

Date issued: 24 July 2021

CONTENTS

Appendices

Figures and Tables

Figures

Tables

Acronyms

Term	Definition
AIS	Automatic Identification System
AyM	Awel y Môr Offshore Wind Farm
DCF	Data Collection Framework
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EU	European Union
FLO	Fisheries Liaison Officer
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
MCRS	Minimum Conservation Reference Size
MMO	Marine Management Organisation
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
UK	United Kingdom
UKFEN	UK Fisheries Economic Network
VMS	Vessel Monitoring System
WFA	Welsh Fishermen's Association

Units

Term	Definition
€	Euros
°C	Degrees Celsius
cm	Centimetres
hp	Horsepower
kg	Kilograms
km	Kilometres
knots	Nautical mile per hour
kW	Kilowatts

Term	Definition
m	Metres
mm	Millimetres
NM	Nautical Mile
t	Tonne

1. Introduction

1.1 Overview and Purpose of this Report

This document has been prepared by Poseidon Aquatic Resource Management Ltd (Poseidon) to support the Environmental Impact Assessment (EIA) of the Awel y Môr Offshore Wind Farm (hereafter referred to as Awel y Môr or AyM).

The information on commercial fisheries activity presented in this document is intended to inform the Environmental Impact Assessment (EIA) for Awel y Môr by providing a detailed understanding of the commercial fisheries baseline, against which the potential impacts of Awel y Môr can be assessed. An overview of the information presented in this Technical Report is provided in Volume 2, Chapter 8: Commercial Fisheries of the Preliminary Environmental Information Report (PEIR).

This document describes commercial fisheries activity, defined as fishing activity legally undertaken where the catch is sold for taxable profit. A description of charter angling activity, defined as fishing for marine species where the purpose is recreation and not sale or trade, is provided in Volume 2, Chapter 12: Other Marine Users and Activities and Appendix 12.1: Charter Angling Baseline Report. The ecology of the fish and shellfish species targeted by commercial fishing activity is described in Volume 2, Chapter 6: Fish and Shellfish Ecology.

1.2 Report Structure

This report is structured as follows:

- Section 1 introduces the report and outlines its purpose;
- Section 2 presents the methodology and data sources applied to characterise the baseline environment;
- Section 3 presents the characterisation of the existing environment for the commercial fisheries assessment;
- Section 4 presents the characterisation of the future baseline environment; and,
- Section 5 summarises the findings of this Report.

1.3 Experience

1.3.1 Consultancy

Poseidon are fisheries consultants working globally to provide advice in support of sustainable fisheries and aquaculture, marine planning and blue growth. Poseidon provides high quality outputs and solutions across a range of fisheries and marine environmental projects, delivered by a core team of seven staff members.

The Poseidon team working on Awel y Môr include Fiona Nimmo and Sarah MacNab, who together combine expert knowledge in commercial fisheries, environmental impact assessment and the energy consenting process.

Fiona's qualifications include a B.Sc. Marine Biology (First Class Hons), University of Newcastle, UK and a B.Eng. Chemical Engineering (2:1 Hons), Edinburgh University, UK. Sarah's qualifications include a Pg Cert Environmental Management, Chartered Institution of Water and Environmental Management, UK; MSc Tropical Coastal Management (Distinction), Newcastle University, UK; and BA Geography (First Class Honours), University of Nottingham, UK.

Poseidon bring a full understanding of the methodology and best practise for undertaking commercial fisheries impact assessments globally. This includes a keen knowledge of guidance related to undertaking impact assessment for commercial fisheries, including leading

the development of "Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments" for the UK Fisheries Economic Network (UKFEN) and Seafish.

Poseidon have extensive experience in leading every stage for the commercial fisheries elements of consent applications for nationally significant offshore wind farm projects. Since 2010, Poseidon have been engaged on Hornsea Projects on the east coast of England, where our expertise was brought to every stage of the consenting process involving scoping, fisheries liaison plan production, UK and European wide fishing industry consultation, Environmental Statement chapter and technical appendix preparation, development of Statements of Common Ground and acting as expert witness during examination process. We are also engaged in providing equivalent services to a number of other newly identified and extension offshore wind farm projects in UK and Irish waters.

Poseidon also supports developers in meeting post-consent compliance requirements; for example, for Neart na Gaoithe Offshore Wind Farm we prepared a fisheries mitigation and management plan, inputted to commercial negotiations with fishermen, and are undertaking an ongoing programme of commercial fisheries monitoring. Our work requires sound understanding of fish and shellfish ecology, the status of commercial stocks and patterns of fishing activity.

1.3.2 Lead Author(s)

Fiona Nimmo, based in Edinburgh, joined the Poseidon team in 2010 and has 15 years of marine and fisheries consultancy experience. With a BSc (Hons) in Marine Biology (First Class Honours) from Newcastle University and a BEng (Hons) in Chemical Engineering (2:1 Hons) from Edinburgh University, she has a broad and strong scientific background. Her passion lies with commercial fisheries, in particular their strategic planning, industry management, and their interaction with the marine environment both from a biological perspective and in relation to other marine sectors, such as renewable energy.

Fiona has coordinated renewable energy development EIAs for wind and tidal developments and has completed numerous technical commercial fisheries and natural fish resource assessments for offshore wind EIAs in waters off Scotland, England, Wales and Ireland. Fiona has also developed post-consent fisheries liaison and mitigation plans, and commercial fisheries monitoring strategies as required by condition of consent.

Fiona is currently providing consultant support to Project UK Fisheries Improvement Projects (FIP) for UK wide nephrops and scallop fisheries, including the Irish Sea. This work involves a collaborative approach working with industry associations and organisations, including regular quarterly meetings with the Steering Groups of industry, NGOs and fisheries administrators. Throughout her career consultation with stakeholders has been an integral feature of many of her projects, and she has regularly engaged with statutory consultees, fishermen and other fisheries sector stakeholders. She has also organised and facilitated fisheries sector public exhibitions.

2. Methodology

2.1 Approach

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

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

2.2 Study Area

Awel y Môr is located within the southern portion of the International Council for the Exploration of the Sea (ICES) Division 7a (Irish Sea) statistical area; within United Kingdom (UK) Exclusive Economic Zone (EEZ) waters. For the purpose 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 Awel y Môr array area and offshore export cable corridor are entirely located within ICES rectangle 35E6, which represents the study area for EIA. The study area is shown in Figure 2-1; note that Awel y Môr occupies only a portion of the ICES rectangle. In order to understand fishing activity in waters adjacent to Awel y Môr, baseline data has also been gathered and analysed for surrounding regional areas including ICES rectangles 35E5, 35E6, 36E5, 36E6, which are also shown in Figure 2-1.

The justification for defining this wider regional study area is that it aligns with the scale of statistical landings data and covers a wider area than Awel y Môr, ensuring that potential implications of displacement of fishing activity can be adequately understood.

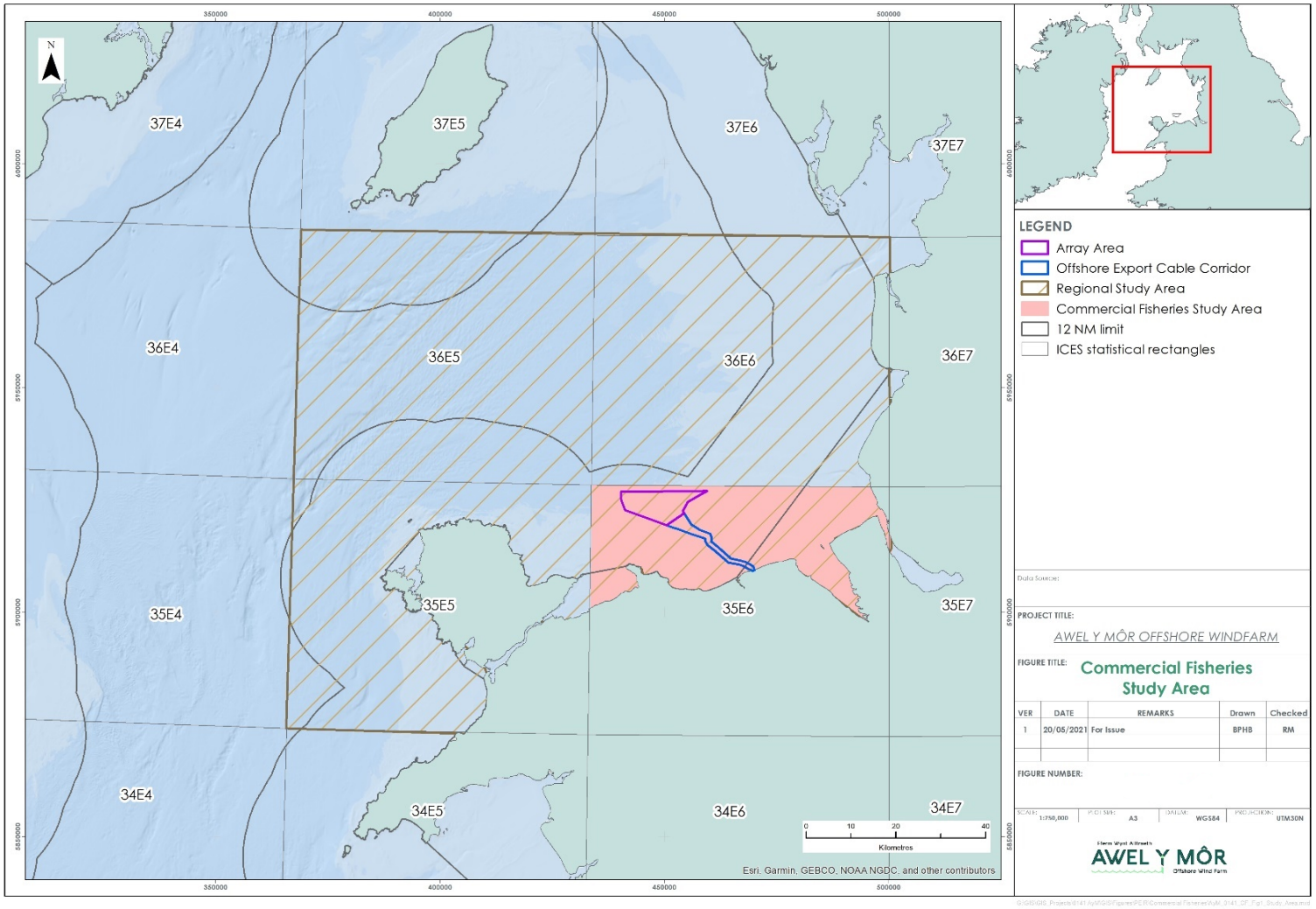

Figure 2-1 Commercial Fisheries Study Area

2.3 Data Sources

A range of data sources have been analysed and presented within this Technical Report; these are listed in Table 2-1.

Data has been sourced from ICES, the EU Data Collection Framework (DCF), the UK Marine Management Organisation (MMO) and directly from the fishing industry.

Where data sources allow, a five-year trend analysis has been undertaken, using the most recent annual datasets available at the time of writing. The temporal extent of this five-year period is dependent on each data source analysed, e.g. 2012 to 2016 or 2015 to 2019, as annotated in Table 2-1.

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

Table 2-1 Data sources used to inform this Technical 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	2015 - 2019	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 - 2016	European Union (EU) Data Collection Framework (DCF) database
All Europe	VMS data for EU registered vessels with data query attributes for time fishing at a resolution of 1/200th of an ICES rectangle amalgamated for all mobile vessels	2017	International Council for the Exploration of the Sea (ICES)
Wales	Generalised fishing intensity maps for nine different fishing gear types operating in Welsh waters	2013	FishMap Môn acessed via WISERD Data Portal
Wales	Generalised fishing activity maps for mobile and static gear operating in Welsh waters	2019	Welsh National Marine Plan

2.3.1 Data Limitations and Uncertainties

A range of different data limitations and uncertainty exist for all of the commercial fisheries datasets assessed within this technical report. The level of uncertainty and confidence of each data set is defined in Table 2-2 based on judgement of the assessment team.

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.

Limitations of landings data include the spatial size of ICES rectangles which can misrepresent actual activity across Awel y Môr and care is therefore required when interpreting these data.

Lack of recent landings statistics for EU (non-UK) fleets is also recognised as a data limitation; based on the most recent European Commission data call, more recent landings data (2017-2019) is no longer available by ICES rectangle. Data at a scale of ICES division (i.e. the whole of the Irish Sea) is less useful to understand fishing activity specific to the area overlapping the Awel y Môr.

Limitations of VMS data are primarily focused on the coverage being limited to larger vessels 12 m and over. 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 <12 m in length). To assist in mitigating the risk of under-representing smaller inshore vessels, site-specific marine traffic survey data comprising information on vessel movements gathered by Automatic Identification System (AIS) and radar has been analysed alongside VMS data.

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 (2015-2019) 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 (2012-2016) data for EU landings from ICES rectangles 35E6 by country, species and gear type.	The data is submitted by individual member states and therefore limitations vary per country. Vessels under 10m may be omitted or mis-represented by the data. Accuracy is likely to be greater for landings rom larger vessels. ▪ For UK vessels under 10m 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 and Vessel Monitoring System (VMS) data		
MMO	UK VMS data for vessels 15m and over.	The data is only available for 15m and over vessels, so is not representative of <15m vessels. • Data assessed with: medium uncertainty and medium confidence.
ICES	EU VMS data (2017) for vessels 12m and over.	The data is only available for 12m and over vessels, so is not representative of <12m vessels. • Data assessed with: medium uncertainty and medium confidence.
FishMap Môn	Fishing intensity for nine gear types in a defined project area off the north Wales coastline (2013).	Understood to be derived from interviews with fishermen. Data is relatively old. Unable to access metadata or project report and therefore not clear how representative data is. • Data assessed with: medium uncertainty and low confidence.

Welsh Government Fishing Activity	Fishing activity for mobile and static gear in Welsh waters (2019).	The data sources that have been compiled to prepare fishing activity maps are partial, have been drawn from various unverified sources and some of the information is dated, originating from as early as 2004. These datasets represent samples of fishing activity only and thus do not give an absolute measure of fishing activity in Welsh waters. • Data assessed with: medium uncertainty and medium confidence.
Anatec	Marine traffic (AIS and radar) survey data (2019-20).	An assessment undertaken into fishing vessel activity within the Navigation Risk Assessment (NRA) undertaken for AyM. Based on a 14 day AIS and radar survey in winter 2020 and longer-term AIS data for 2019. A summer AIS and radar survey is yet to be undertaken. • Data assessed with: low uncertainty and high confidence.

2.4 Informal Consultation

Poseidon has engaged with commercial fishermen known to be active in and around the Study Area to inform this Technical Report. Fishermen have been identified by the Awel y Môr Fisheries Liaison Officer (FLO) and following an initial group commercial fisheries stakeholder meeting held via Zoom on 28 September 2020, the purpose of which was to describe the planned Awel y Môr project to the local fishing industry and to present to them and discuss Poseidon's understanding of existing commercial fisheries activity across the Study Area.

Following the initial group meeting, Poseidon have engaged with individual fishermen via questionnaires and associated follow-up interviews via telephone. A copy of the questionnaire issued to fishermen is shown in Annex A. In total, five fishermen joined the initial group meeting, and four fishermen then participated in questionnaire completion and individual interviews with Poseidon.

Outcomes of consultation relevant to baseline characterisation are captured throughout this document where relevant, with key themes emerging from consultation summarised immediately below.

2.4.1 Issues Raised during Informal Consultation

During consultation undertaken to inform this report, the issues presented in Table 2-3 were raised in relation to AyM.

Table 2-3 Issues raised during consultation and where addressed within PEIR

Issue Raised	Where addressed in PEIR
Concerns of reduced access: Potting and netting grounds are located in the AyM area. Concern was expressed about how much fishing ground will be lost to AyM, and the impact on the whelk stock in the AyM array area. In particular, it was consistently noted that the presence of existing offshore wind farms (including Gwynt y Môr, Rhyl Flats, North Hoyle, Burbo Bank and Burbo Bank extension) have driven greater effort and reliance onto the AyM area.	Potential impacts of AyM on reduced access are assessed in **Sections 8.10.1 & 2** (construction phase), **8.11.1 & 2** (operational phase) and **8.12.1 & 2** (decommissioning phase) of **Volume 2, Chapter 8: Commercial Fisheries.**
Concerns about displacement: Concern was expressed about potential displacement of fishing activity from the AyM area leading to gear conflict. The example was cited of increased potential for conflict between potting vessels and scallop	Potential impacts of AyM on displacement are assessed in **Sections 8.10.3 & 4** (construction phase), **8.11.3** (operational phase) and **8.12.3 & 4**

Issue Raised	Where addressed in PEIR
dredgers, especially given the activity of scallop dredgers to the west and north of AyM. Concern was also expressed at the presence of AyM necessitating fishing to move further offshore, and fishing vessels – particularly smaller vessels – being more exposed to weather downtime and/or less economically viable fishing trips as a result; this effect has been experienced as a result of Gwynt y Môr.	(decommissioning phase) of **Volume 2, Chapter 8: Commercial Fisheries.**
Concerns about effects on commercially fished species: Concern was expressed in particular about potential effects on the whelk stock within AyM, with it observed that whelk catches in Gwynt y Môr declined following construction of the wind farm and whelk are just starting to return now. Concerns were cited about the effect of vibration associated with wind farm development on whelk and other shellfish species. Concern was also expressed about the potential barrier effect of AyM, preventing the movement of mobile species into the area south of AyM and it was observed that there had been a fall in finfish catches during and after the construction of Gwynt y Môr.	Potential impacts of AyM on commercially important fish and shellfish resources are assessed in **Sections 8.10.5** (construction phase), **8.11.4** (operational phase) and **8.12.5** (decommissioning phase) of **Volume 2, Chapter 8: Commercial Fisheries.** Trends in whelk landings are depicted in Figure 3.25 within this document.
Cumulative impact: Concern was expressed about the potential cumulative impact on commercial fisheries resulting from offshore wind farm development (future Round 4 development was cited, as were offshore wind farm projects proposed off the coast of Ireland) and closures associated with marine protected areas. A continued incremental loss of fishing grounds may result in a significant effect, and lead to displacement into other areas or ultimately make business unviable.	Potential cumulative effects of reduced access and displacement are assessed in **Section 8.13** of **Volume 2, Chapter 8: Commercial Fisheries.**
Effects on steaming time: Concern was expressed about increased steaming times to fishing grounds, with associated increases in fuel costs and time at sea, which can limit the value of fishing trips.	Potential impacts of AyM on steaming time are assessed in **Sections 8.10.7** (construction phase), **8.11.6** (operational phase) and **8.12.7** (decommissioning phase) of **Volume 2, Chapter 8: Commercial Fisheries.**
Mitigation and monitoring: Stakeholders noted that there were positive opportunities associated with AyM, and support was expressed for a monitoring programme to consider the effects of the project on landings and/or key species such as whelk. Habitat (reef) creation was also cited as a potential opportunity, including related to rock armour protection requirements. Stakeholders want to keep fishing and are seeking solutions to allow sustainable fishing to continue.	Commitments to mitigation are presented in Section 8.9 of **Volume 2, Chapter 8: Commercial Fisheries.** A Fisheries Liaison Plan, which will set out in detail the planned approach to fisheries liaison and means of delivering any other relevant mitigation measures, is being developed and has been shared with stakeholders during informal consultation.
Fishing within wind farms: Mixed views were expressed around fishing in wind farms. It was noted that potting can continue if the skipper is comfortable, and that in some cases gear is modified to allow this (e.g. by using shorter strings of pots). Other stakeholders stated that they would not fish within wind farms due to risk of gear entanglement. It was generally perceived that fishing across export cables is possible, but noted that they have typically been avoided in the case of Gwynt y Môr, Rhyl Flats and North Hoyle.	In assessing the potential impact of AyM on reduced access once the wind farm is operational, it is considered fishing will be possible within AyM with the exception of any Safety Zones and noted that individual decisions made by the skippers of fishing vessels with their own perception of risk will determine the likelihood of whether their fishing will resume; see Section 8.11.1 of **Volume 2, Chapter 8: Commercial Fisheries.**

3. Baseline Environment

3.1 Overview of Landings

An annual average value of almost £500,000 was landed by all UK vessels for the years 2015 to 2019 from the Study Area ICES rectangle (based on data from MMO, 2020). Data are presented for the annual (2015-2019) landed weight and value by UK vessels in Figure 3-1 and Figure 3-2 respectively, indicating that landings are dominated by shellfish species.

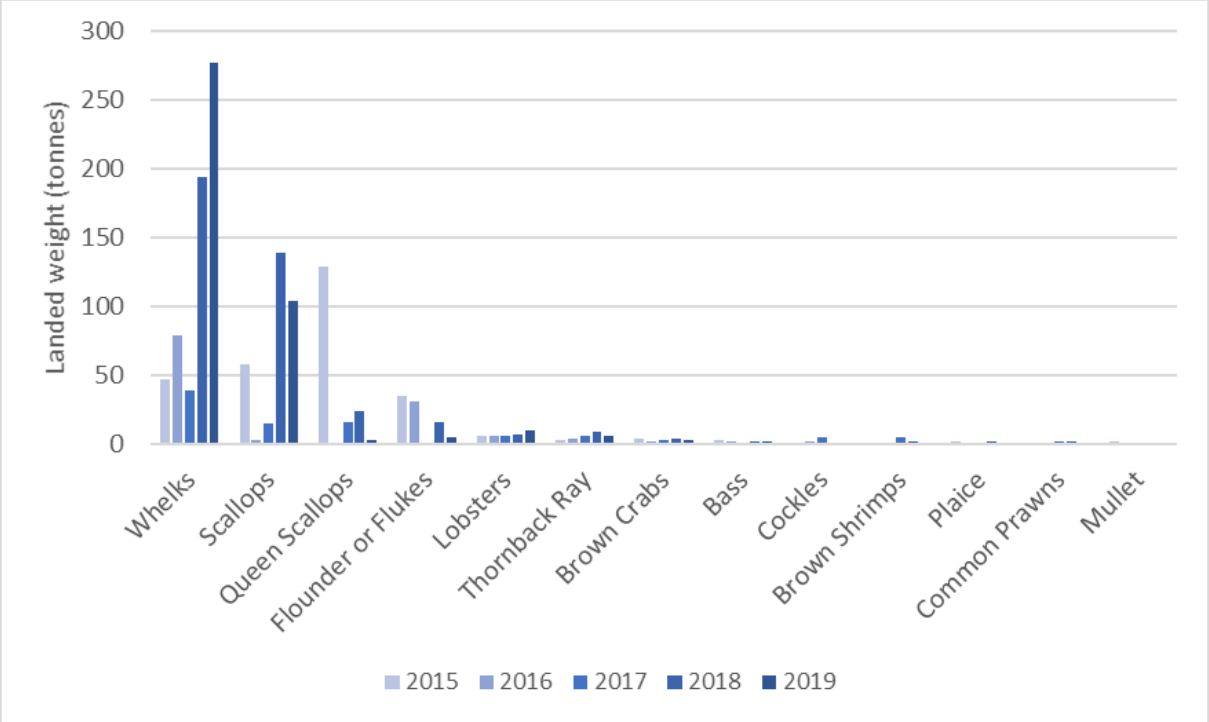

Figure 3-1 Key species by annual landed weight (tonnes) (2015 to 2019) from the Study Area (MMO, 2020)

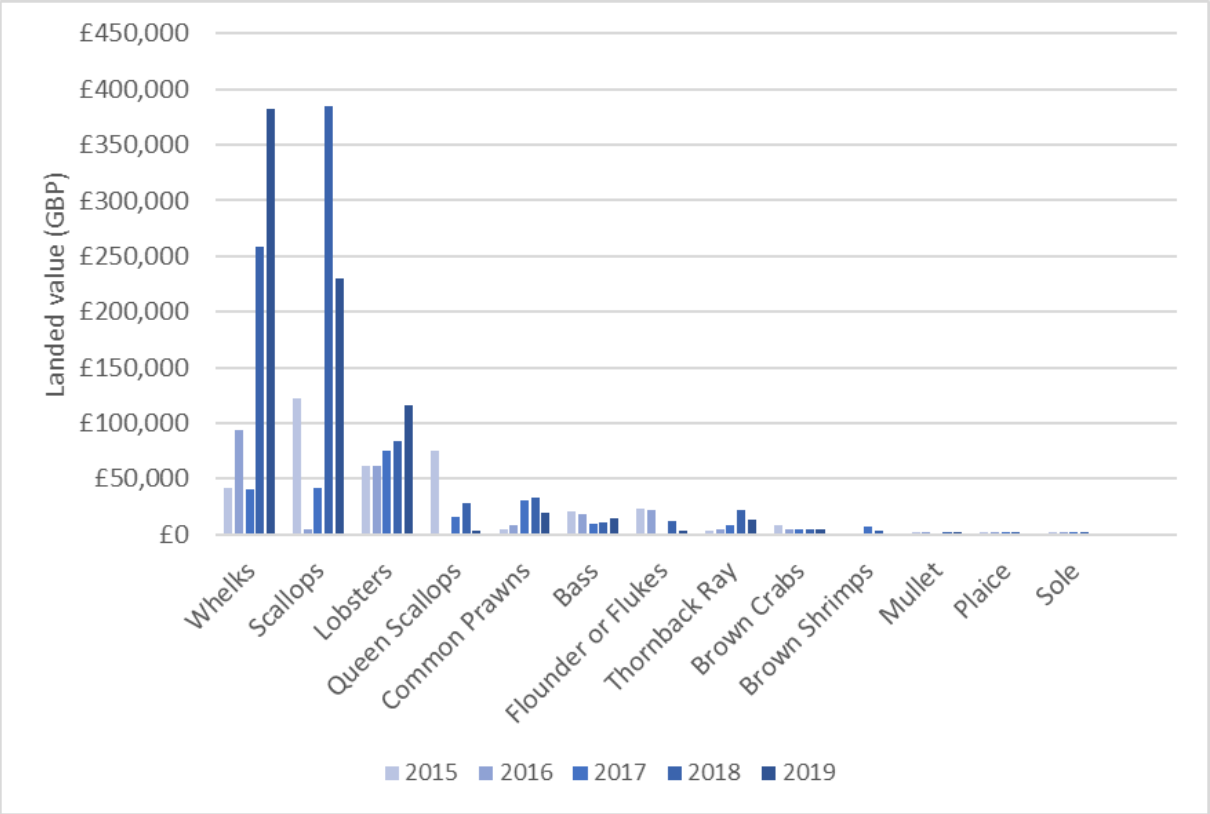

Figure 3-2 Key species by annual landed value (GBP) (2015 to 2019) from the Study Area (MMO, 2020)

Landings data sourced from the EU DCF database indicates that the only non-UK fishery present in the Study Area is Irish vessels targeting Dublin Bay prawn *Nephrops norvegicus*. The data suggests that landings by Irish vessels from the Study Area are small (e.g. 1.5 tonnes of *Nephrops* were landed from the Study Area by Irish vessels across 2015 and 2016).

MMO landings data for surrounding ICES rectangles 36E6, 36E5 and 35E5 indicates that in this wider regional study area, landings remain dominated by shellfish species, namely whelk *Buccinum undatum*, king scallop *Pecten maximus*, queen scallop *Aequipecten opercularis* and lobster *Homarus gammarus*.

3.2 Key Species

The data presented in Section 3.1 profile the species commercially caught across the Study Area and wider Irish Sea. These key species are discussed in this section in terms of biological characteristics, seasonal trends and relevant fisheries management.

3.2.1 Shellfish

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 0-50 m water depths. 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 2-3 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 3-5 months. The life cycle therefore has no pelagic phase, leading to limited dispersal between populations.

Whelk are caught using plastic pots, which may be deployed by the same potting vessels that target crab and lobster. Whelk are cleaned and exported to the far east and Europe in a variety

of product types, including cooked whole in-shell or meat only, in fresh or frozen forms. The fishery is very dependent on market conditions and prices.

Whelk fisheries are one of the largest fisheries in Wales and fishing effort has increased notably in recent years. Fishing for whelk occurs year-round but peaks in spring and winter months, decreasing in summer when some vessels switch from targeting whelk to other species (Rossiter, 2016).

No TAC or quotas are in place for whelk. The Welsh Whelk Statutory Instrument which was phased in from 2019 introduced an increase in the size at which whelks can be retained and landed, from 45mm to 65 mm, a cap on the allowable total monthly landings of 20 tonnes per vessel, per month from January to September each year, and a cap on the monthly landings of 5 tonnes per vessel, per month during the biologically sensitive period from October to December each year.

Queen Scallop

Queen scallop is found down to depths of 100 m, on sand or gravel habitats and occur in high densities. 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).

Whilst the Welsh king scallop fishery is more strictly regulated than anywhere else in the UK, the queen scallop fishery has very few specific management measures. An EU set MCRS of 40 mm is in place for queen scallop; however, it is generally uneconomic to process queen scallops less than 55 mm.

In general, landings of queen scallops are more variable and much less valuable than king scallops. Landings of queen scallops from the Study Area typically peak in summer months, though have declined in recent years.

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 10-15 years and reach reproductive maturity between 3-5 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 retention of larvae or transport of larvae into areas suitable for settlement. Larvae are pelagic with settlement in a particular area somewhat unpredictable leading to an unstable age structure within stocks. As a consequence of this, scallop beds frequently show a regional separation of year classes and spatial variability in age structure.

Bangor University has conducted eight scallop research surveys in Welsh waters since 2012. The aim of the surveys was to gather information on the distribution, abundance and population dynamics of king scallop populations in Welsh waters, with the additional aim of conducting stock assessments to assess stock sizes and provide advice to management on the status of Welsh scallop stocks. Latest reporting notes that king scallop populations in Liverpool Bay and the Llyn remain at low densities, but are dominated by larger, older individuals with little or highly sporadic recruitment occurring. The report concludes that a longer data time series is required to better quantify all this information in stock assessment models.

There are no TACs or quotas in place for this species; instead, UK 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 MCRS exists of either 100 mm, 110 mm (in the south Irish Sea) or 120 mm (used locally by agreement), and a cap on the level of effort (kWdays) that vessels ≥15m can utilise in ICES area 7 by the Western Waters agreement (EC 1415/2004). King scallop fisheries in Wales are more strictly regulated than anywhere else in the UK. In addition to the above restrictions, and specific closed areas (e.g. Cardigan Bay), no scallop fishing is allowed within 1 mile of the shore and dredging between 1 and 3 miles is only permitted by boats less than 10m in length and towing no more than 6 dredges in total. Within 3-6 miles and 6-12 miles respectively, totals of 8 and 14 dredges are allowed. Furthermore, all scallop dredgers in Wales must carry and use working satellite Vessel Monitoring Systems.

Landings typically peak from late autumn through to late spring.

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).

Lobsters are caught by pots and there are no TACs or quotas in place. Primary management is by the technical measure of a Minimum Landing Size (MLS) of 87mm (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 between July and September in the Study Area.

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 Minimum Landing Size (MLS) of 140mm carapace width inside 6NM and 130mm outside 6NM (Council Regulation 850/98).

Fishing activity typically peaks across summer months in the Study Area.

Brown Shrimp

Crangon crangon, the common or brown shrimp, is found in mainly shallow water. It grows to about 8cm, with length at maturity between 35-50mm. 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.

The local shrimp fishery is pursued mainly between the Dee and Duddon Estuaries, inclusive, from April through to December, when brown shrimps are taken in beam trawls (towed by boats and vehicles) and push nets (hand nets).

Common Prawn

Unlike the brown shrimp which lives in sandy and muddy ground, the common prawn *Palaemon serratus* prefers rocky ground. The common prawn can be found in the inter-tidal zone, and will also live in depths down to around fifty metres.

Breeding can take place from November through to June. Thousands of eggs are fertilised externally and then carried by the female. After three to four months the eggs will hatch and swim as pelagic larvae before turning into the adult prawns and living for the rest of their life on the seabed. It is thought that the common prawn can live for a maximum of five or six years reaching up to 11cm in length.

Prawns are targeted using pots and occasionally single trawls, and are fished through autumn and winter. Catches are typically exported to markets in southern Europe. The stock status of the fishery is unknown.

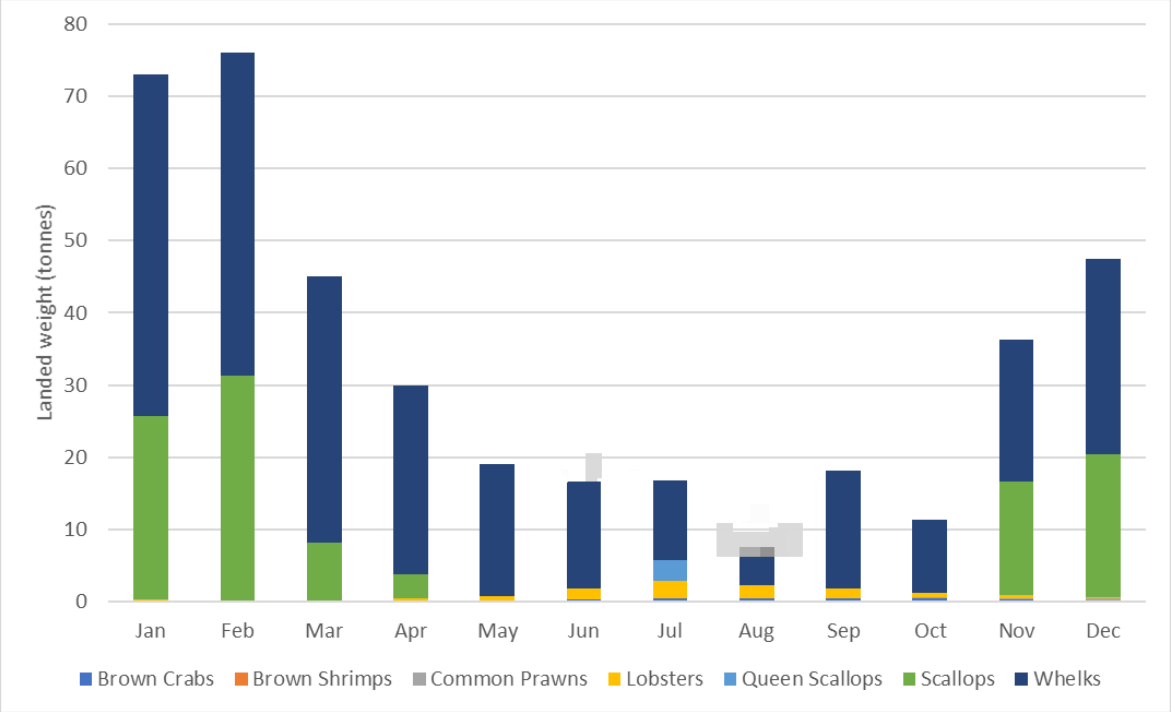

Figure 3-3 Seasonality of landings of shellfish species based on landed weight (tonnes) in 2019 from the Study Area (MMO, 2020)

3.2.2 Demersal Finfish

Bass

Bass breed from February to May in the English Channel and eastern Celtic Sea. It is a long-lived and slow growing species. 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 1m with a weight of 12kg.

Bass spawning stock biomass has been declining since 2005 (ICES, 2020a), though fishing pressure has been reduced by a series of management measures; the EU multiannual plan for stocks in the Western Waters and adjacent waters applies to bass and management measures include prohibiting targeting bass except using longlines and rod-and-line to a limit of 10 tonnes/year. Bass are not subject to EU TACs or quotas. In Welsh waters, commercial fishing for bass is subject to seasonal restrictions (e.g. it was prohibited in February and March in 2020) and limits on catches by hook and line and gillnets. In summary, the stock is at a very low size but fishing pressure is currently within sustainable limits.

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.

Flounder

A widespread European fish found in both fresh and marine water. Flounder *Platichthys flesus* is a coastal 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 20-50 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 50-60 cm and can live up to 15 years.

Flounder is mainly taken as a bycatch species in fisheries for plaice and sole. Stock is data 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 total allowable catch for this species and there is no minimum conservation reference size.

Mullets

Grey mullet belong to a large family, which comprises some 80 species of marine fish, known as Muglidae, and is a common inhabitant of marine coastal waters in Europe. The thick-lipped grey mullet *Chelon labrosus* is the most common of three species which occur in northern European waters. They are slow-growing, long-lived and late-maturing fish, which makes them susceptible to overfishing. They live to around 25 years old and mature around 9 years old (42 cm) for males and 11 years (47 cm) for females. Thicklipped mullet are thought to spawn on alternate years. Grey Mullet spawn in the English Channel and Irish Sea and potentially in estuaries in Eastern England. They spawn in open water and after around two to six weeks, the then juvenile fish move into inshore waters, especially estuaries.

There is no formal stock assessment of grey mullet and the status of the stock is unknown. There is little information available on mullet abundance in UK waters as there is a lack of data collection on the species. Grey mullet tend not to be a major commercial species but when fished commercially, they are a target or bycatch species which are mostly caught with gill nets.

Sole

Sole *Solea solea* 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-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 2-3 years old. The juveniles can undertake extensive migrations, although once they reach maturity, will only carry out seasonal migrations from deeper water to shallower spawning habitat.

Catches of sole have declined since the mid-1990s. The latest ICES stock assessment observes that spawning stock biomass has increased since 2007 and is estimated to have been above the maximum sustainable yield trigger point since 2010 (ICES, 2020b). Sole are subject to a TAC and technical measures are applicable to the mixed demersal beam-trawl fishery (relevant to both sole and plaice), namely a minimum mesh size of 80mm.

Sole is caught in a mixed fishery with other flatfish as well as gadoids. In the Study Area, they are targeted using nets and demersal trawls, with landings peaking in summer months.

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.

The Irish Sea plaice stock is in a very healthy state and fishing pressure is low, 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 total allowable catch (TAC) in recent years have been set in line with advice, and catches are usually below TACs, owing to limited market demand.

In the Study Area, plaice are taken as bycatch in demersal trawl and net fisheries, with landings peaking in summer months.

3.2.3 Elasmobranchs

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 118cm in length and 18kg in weight, while males can reach 98cm in length. Thornback ray frequents 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 – 60 m. Although mainly a non-migratory species, the fish often moves close inshore during the spring.

Common around the north Wales coastline, it is the most abundant ray in inshore waters. Information on the status of the stock is limited but there is currently no concern over fishing pressure. Thornback rays are targeted seasonally or as bycatch in trawl and gillnet fisheries.

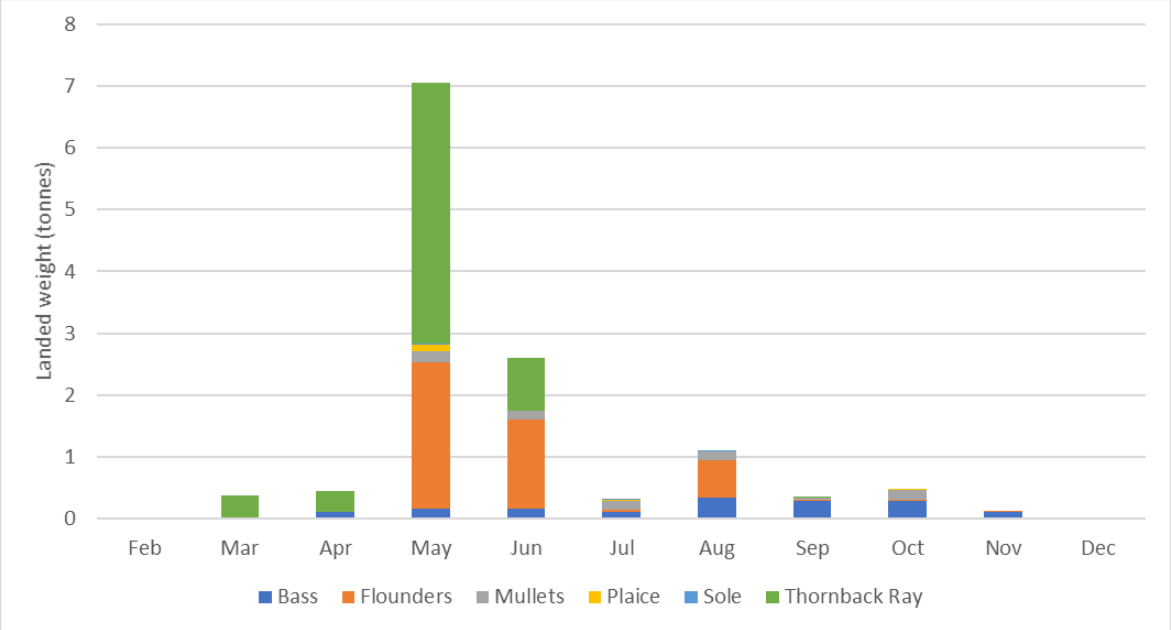

Figure 3-4 Seasonality of landings of demersal species based on landed weight (tonnes) in 2019 from the Study Area (MMO, 2020)

3.3 Key Fishing Gears

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

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

A range of fleets target different fisheries across the Study Area, as indicated by landings statistics for registered vessel nationality and gear type (Figure 3-5). Across the study area,

the highest proportion of landings by weight are caught by pots and traps, dredges and drift and fixed nets. Vessel and gear types within the key fleets and fisheries that operate across the Study Area are described within this section.

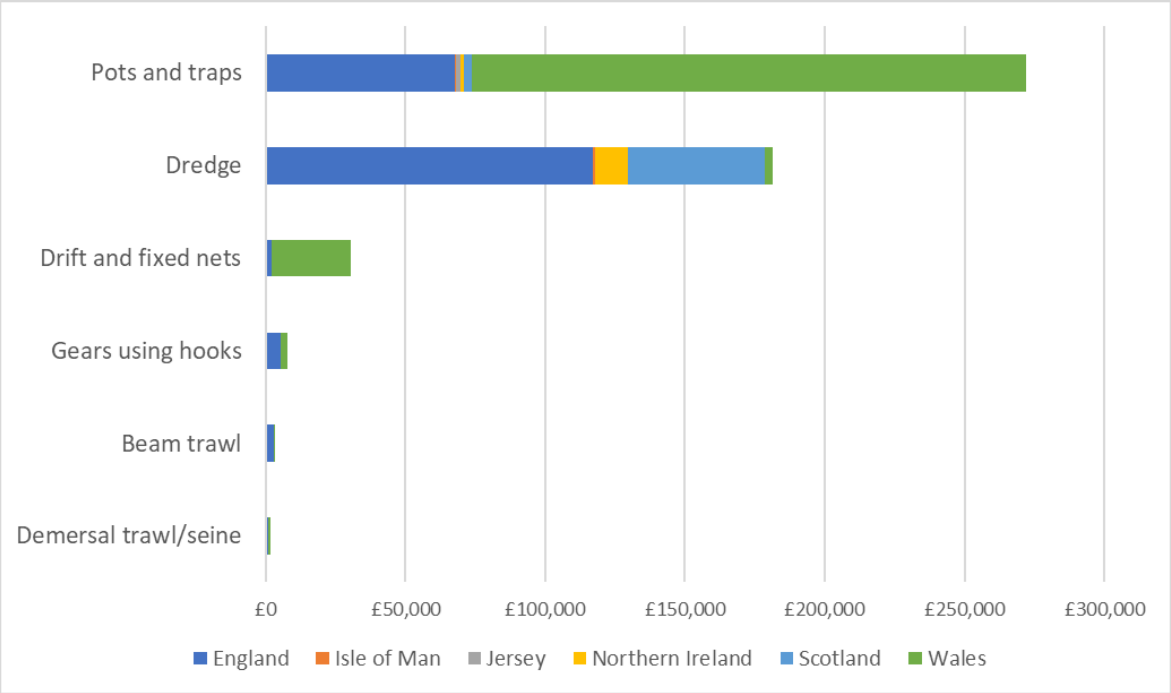

Figure 3-5 Annual average landings value by gear type and vessel origin for the commercial fisheries Study Area (Data source: MMO, 2020)

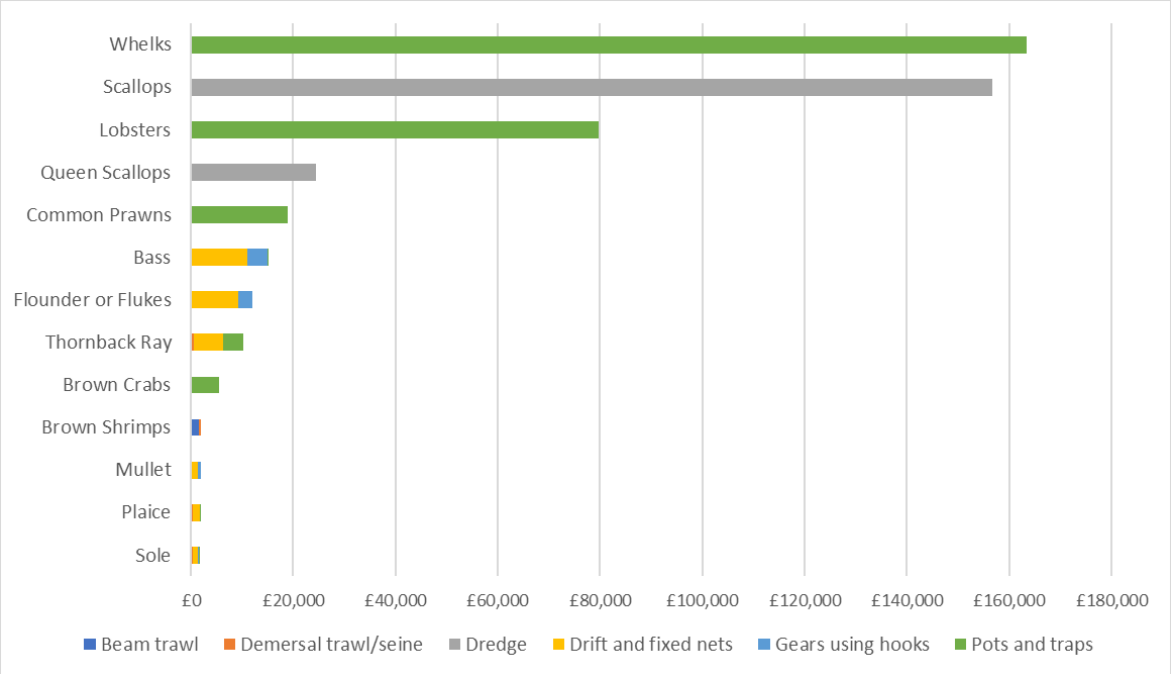

Figure 3-6 Annual average landings value by gear type and key species for the commercial fisheries Study Area (Data source: MMO, 2020)

3.3.1 Pots and Traps

Figure 3-7 and Figure 3-8 show typical potting vessels, gear and the configuration of set pots and Table 3-1 describes the profile of potting vessels active across the Study Area.

For the capture of whelks, modified, weighted 25 litre plastic drum purpose designed pots are often used. Pots are typically rigged in 'fleets' or 'strings' of between 15 to 60 pots, depending upon vessel size and area fished. Hundreds of pots can be deployed across a fishing location. Lengths of fleets may range from 100 m to over 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 crab or dogfish (Pantin et.al., 2015). Large vessels, 'super whelkers', fish year round offshore.

Creels or pots used for the capture of lobsters and crabs, and 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 (Pantin et.al., 2015).

Fishers harvest prawns with both round pots and D shaped pots with a variety of mesh sizes for the body and ends of the pots. Fleet sizes and soak times are comparable to those for crab and lobster, though pots are more typically deployed on muddy substrates (Pantin et.al., 2015).

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. These smaller vessels may also alternate to deploy netting gear (see Section 3.3.3). Potting vessels may target a single or multiple shellfish species.

Table 3-1 Profile of typical potting vessels active across the Study Area

Parameter	Indicative details
Main target species	Whelk, brown crab, lobster, common prawn
Nationality	Majority Welsh, some English
Vessel length	Over 10 m and under 10 m
Horsepower	60 hp to 350 hp
Typical speed when shooting and hauling gear	0 to 9 knots
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.

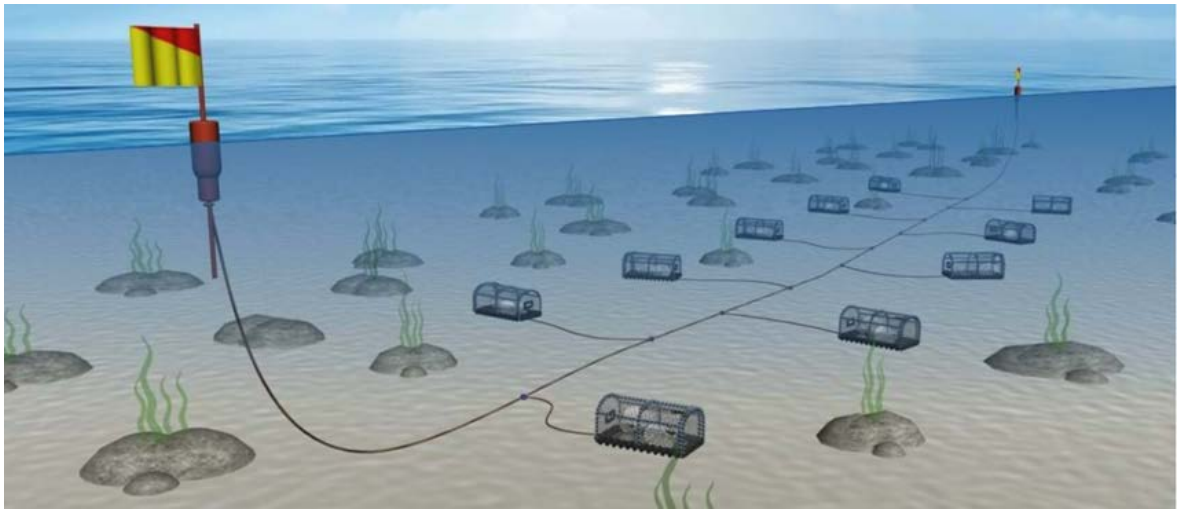

Figure 3-7 Typical potting gear configuration (Source: Seafish, 2015)

Figure 3-8 Example of larger and smaller potting vessels (Source: Fishing News, 2019 and 2018)

3.3.2 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 3-10 and Table 3-2 describes the profile of scallop dredging vessels active across the 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.

UK scallop dredgers operate around the entire coastline of the UK. A number of scallop vessels are nomadic, fishing one location before moving to another and returning to grounds when they have recovered. In this way, most of the suitable grounds around the UK are fished. 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 locally based vessels operating out of Holyhead.

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

Table 3-2 Profile of typical dredging vessels active across the Study Area

Parameter	Indicative details
Main target species	King scallop and queen scallop
Nationality	English, Scottish and Northern Irish, some Welsh
Vessel length	10 m to 25m
Horsepower	200 hp to 400 hp
Typical speed when shooting and hauling gear	2 to 6 knots
Typical gear	Up to 8 dredged 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.

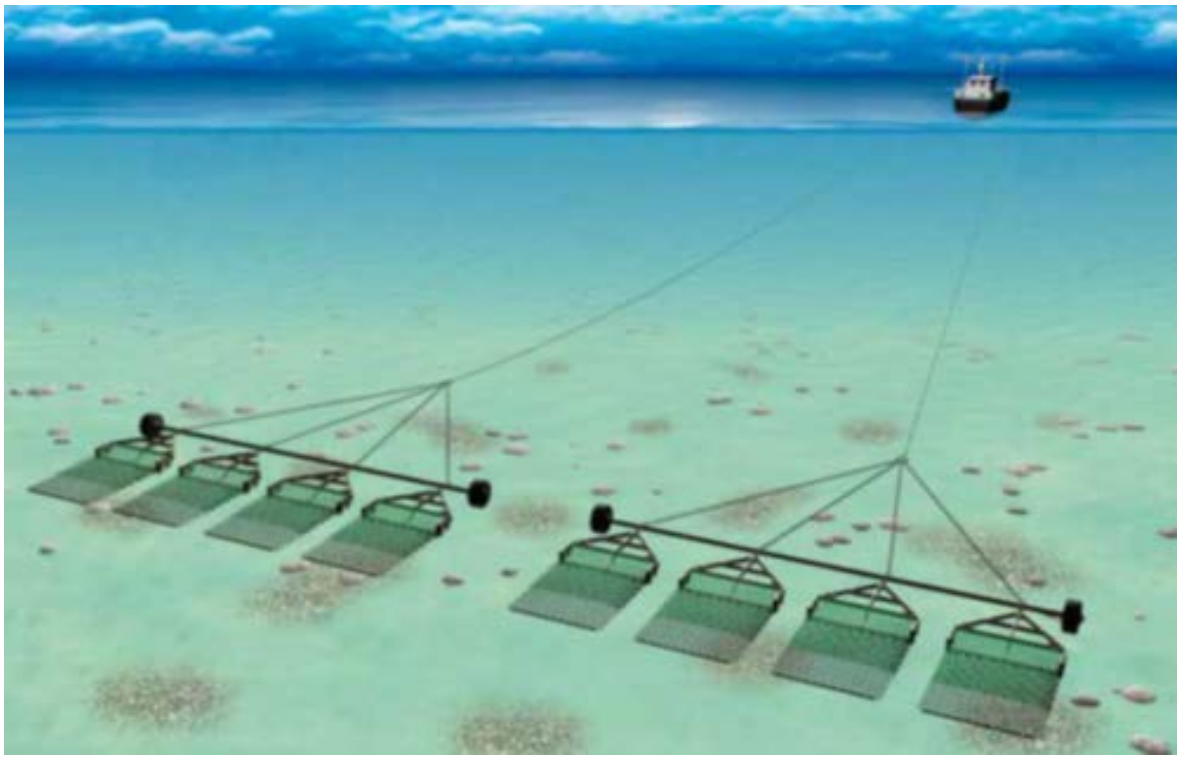

Figure 3-9 Typical dredge gear configuration (Source: Seafish, 2015)

Figure 3-10 Example scallop dredge vessel (Source: MarineTraffic.com, 2021)

3.3.3 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 to 200m. The soak times, the time that a fleet is left fishing for, can range from a six-hour tidal soak up to 72 hours. The nets are shot over the stern of the vessel whilst steaming with the tide and are fished along the direction of the tidal stream, rather than across it (there are some exceptions to this).

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

Table 3-3 Profile of typical netting vessels active across the Study Area

Parameter	Indicative details
Main target species	Bass, flounder, thornback ray, mullet, sole and plaice, brill, turbot
Nationality	Welsh, English
Vessel length	Under 10 m
Typical gear	Monofilament nylon net Set on seabed with each end anchored and left to fish

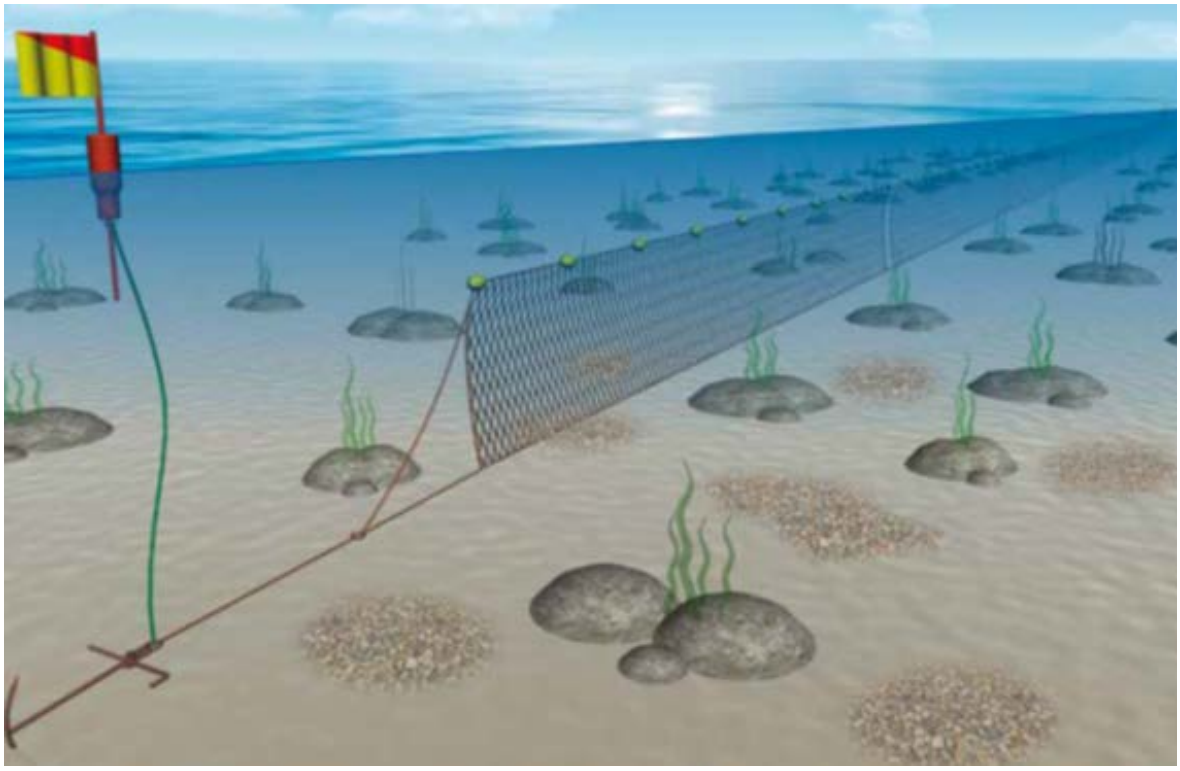

Figure 3-11 Typical fixed netting gear configuration (Source: Seafish, 2015)

3.3.4 Gears using Hooks

Small inshore vessels of under 10m 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 3-4 Profile of typical hook and line fishing vessel active across the Study Area

Parameter	Indicative details
Main target species	Bass, flounder
Nationality	English, Welsh
Vessel length	Majority under 10 m
Typical gear	Baited monofilament nylon lines Set and left to fish or attached to rod

Figure 3-12 Typical line-fishing gear depicting rod & line (left) and set long lines (right) (Source: Seafish, 2015)

3.3.5 Trawls

There are various forms of trawling in which one or two vessels (pair trawling) may be used to tow a net along to catch fish. The trawl net used is funnel-shaped and can be towed along the seabed, in mid-water or close to the surface of the water. Demersal trawls are designed to catch species above the seabed, whilst beam trawls target species that are found on and within the seabed.

Beam trawl nets are held open by a heavy steel beam which is towed along the seabed on a line approximately three times the depth of the water. Some beam trawls include tickler chains, which drag along the seabed in front of the net, disturbing fish in its path and encouraging them to rise into the net. Beam trawls can range in length from 4 m to 14 m and each trawlers tows two beam trawls at a time from derricks on either side of the vessel. Light beam trawling occurs throughout Welsh waters. Beam trawlers active in the Study Area primarily target brown shrimp. Shrimp trawls are a very lightweight version of a lightweight beam trawl but have a smaller cod end mesh and a sorting grid/veil attached.

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 occurs throughout Welsh waters, conducted by smaller boats using small doors. Otter trawlers active in the Study Area target thornback ray and brown shrimp, taking lesser volumes of sole, plaice and other demersal species.

Table 3-5 Profile of typical beam trawl vessel active across the Study Area

Parameter	Indicative details
Main target species	Brown shrimp
Nationality	English
Vessel length	Under 10 m
Horsepower	50 hp to 300 hp
Typical towing speed	3.5 to 8 knots
Typical gear	Twin beam, occasionally single beams; beam length 4 – 9 m 'Lightweight' beam trawl, with absence of chain mats or ticker chains Small net mesh size to target shrimp

Table 3-6 Profile of typical otter trawl vessel active across the Study Area

Parameter	Indicative details
Main target species	Thornback ray, brown shrimp, sole, plaice
Nationality	English, Welsh
Vessel length	Majority under 10 m
Horsepower	50 hp to 300 hp
Typical towing speed	2 to 6 knots
Typical gear	Demersal otter trawl Two trawl doors hold the net open horizontally Various forms of ground gear depending on target species

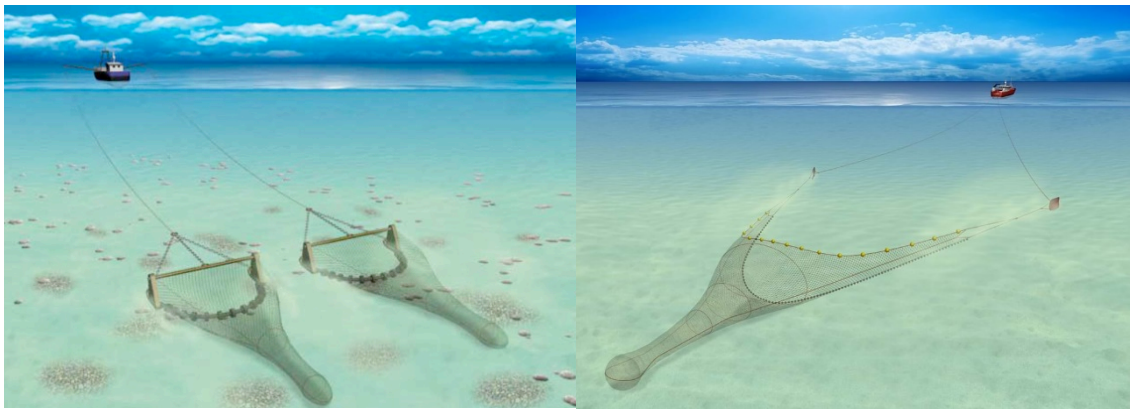

Figure 3-13 Typical beam (left) and otter (right) trawl gear configuration (Source: Seafish, 2015)

Figure 3-14 Example trawl vessels (Source: MarineTraffic.com, 2021)

3.4 Fishing Activity Assessment

3.4.1 Fishing Areal Activity Assessment

Fishing activity described in the Welsh National Marine Plan

The Welsh National Marine Plan presents mapped fishing activity for mobile and static gear. The maps are described as arising from several data sources, each covering different areas, gained by different methods, with different resolutions and with different inherent constraints. The information presented in the Welsh National Marine Plan is shown in the following figures:

- Figure 3-15 maps fishing activity for mobile gear; and
- Figure 3-16 maps fishing activity for static gear.

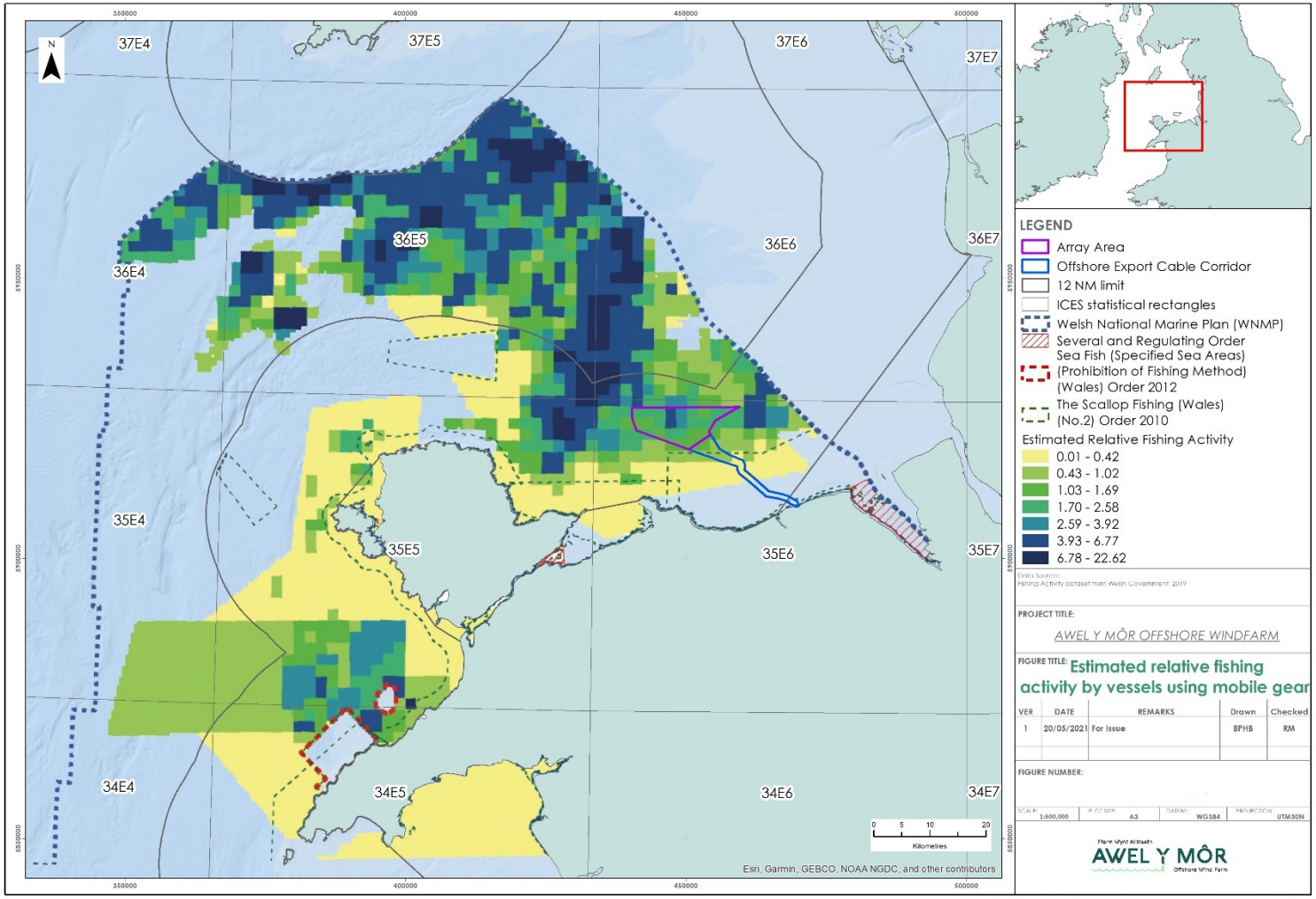

Figure 3-15 Estimated relative fishing intensity for mobile gear (Source: Welsh Government, 2019)

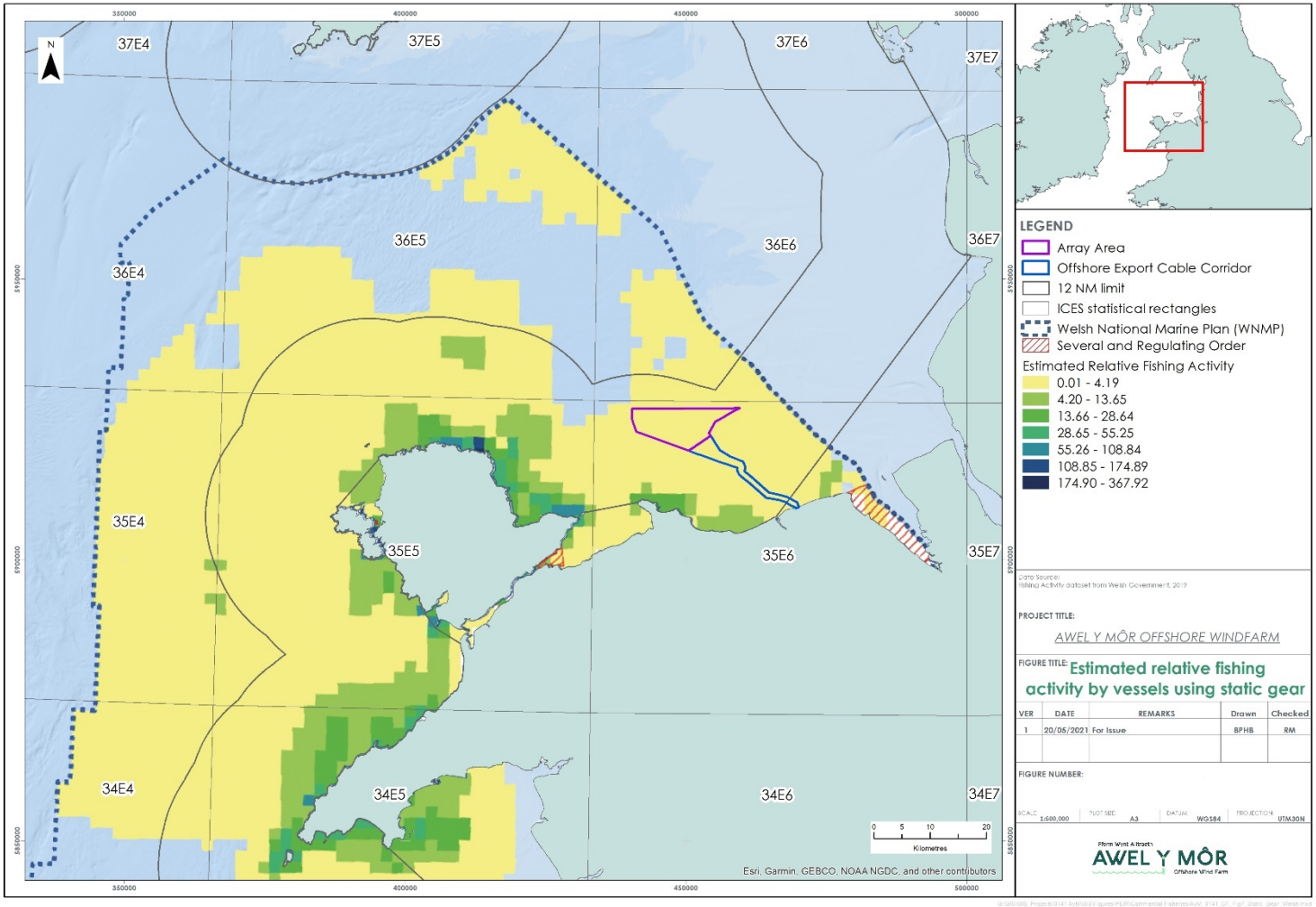

Figure 3-16 Estimated relative fishing intensity for static gear (Source: Welsh Government, 2019)

Data indicate that in the Study Area, mobile gear activity in the Awel y Môr export cable corridor is limited. Activity levels increase with distance offshore, and are notably high to the north and north-west of the Awel y Môr array area. Data indicate that static gear activity takes place throughout the Study Area, peaking slightly in nearshore waters of the Awel y Môr export cable corridor.

Fishing activity described by FishMap Môn

FishMap Môn was a collaborative project between Natural Resources Wales (NRW), recreational and commercial fishing sectors, and the Welsh Government. The project collected information on and mapped fishing activity based on the information gathered in interviews with fishermen. Outputs from the project include charts showing 'Fishing Intensity' for different fishing gear types. Intensity is described as one of three levels, noting that an actual intensity value is derived differently for each gear type. Data is presented in the following figures:

- Figure 3-17 maps fishing intensity for potting;
- Figure 3-18 maps fishing intensity for dredge gear targeting king scallop;
- Figure 3-19 maps fishing intensity for dredge gear targeting queen scallop;
- Figure 3-20 maps fishing intensity for netting; and
- Figure 3-21 maps fishing intensity for trawling.

FishMap Môn data indicate that potting, netting and dredging may take place within the Awel y Môr array area. Potting, netting and trawling may take place within the export cable corridor. Whilst potting, netting and dredging are undertaken across wider areas within the FishMap Môn project area, trawling appears to take place in more discrete locations.

Fishing intensity based on VMS data

VMS data sourced from MMO displays the value of catches by different gear types and covers UK registered vessels 15m and over in length:

- Figure 3-22 shows vessels ≥ 15m length actively fishing using pots and traps in 2017; and
- Figure 3-23 shows vessels ≥ 15m length actively fishing using dredges in 2017.

Data indicate that few large vessels over 15 m in length are active in the Study Area. Figure 3-23 indicates that while some scallop dredging may take place within the northernmost portion of the Awel y Môr OWF array area, dredging activity is more significant to the north and west of the study area further offshore. This was corroborated through consultation with the fishing industry. VMS data similarly suggests that larger vessels using passive gears (in this case pots to target whelks and lobster) may be present in the north easterly portion of the Awel y Môr OWF array area, but that greater activity is focused to the northeast of the Study Area.

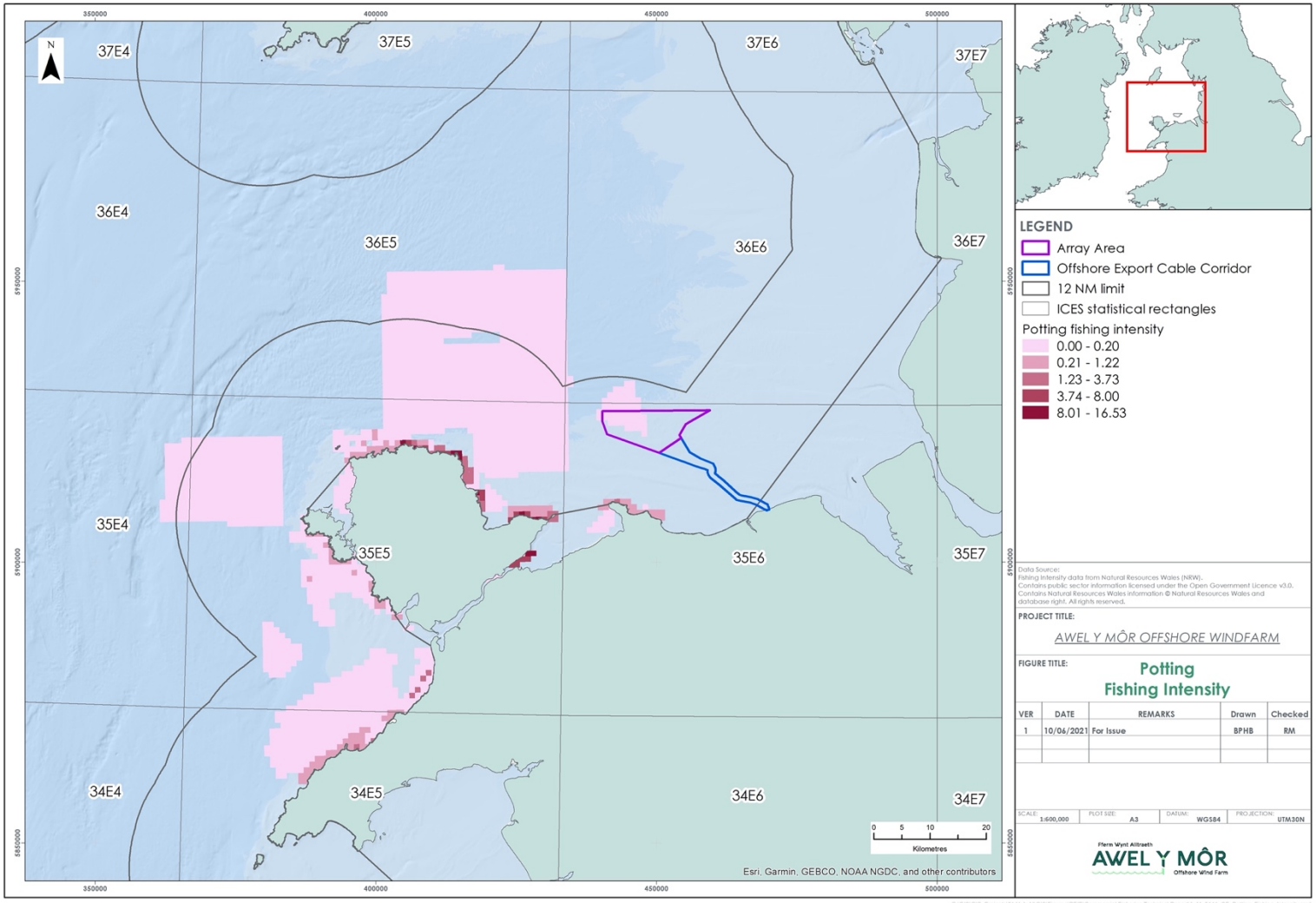

Figure 3-17 Fishing intensity for potting gear (Source: FishMap Môn)

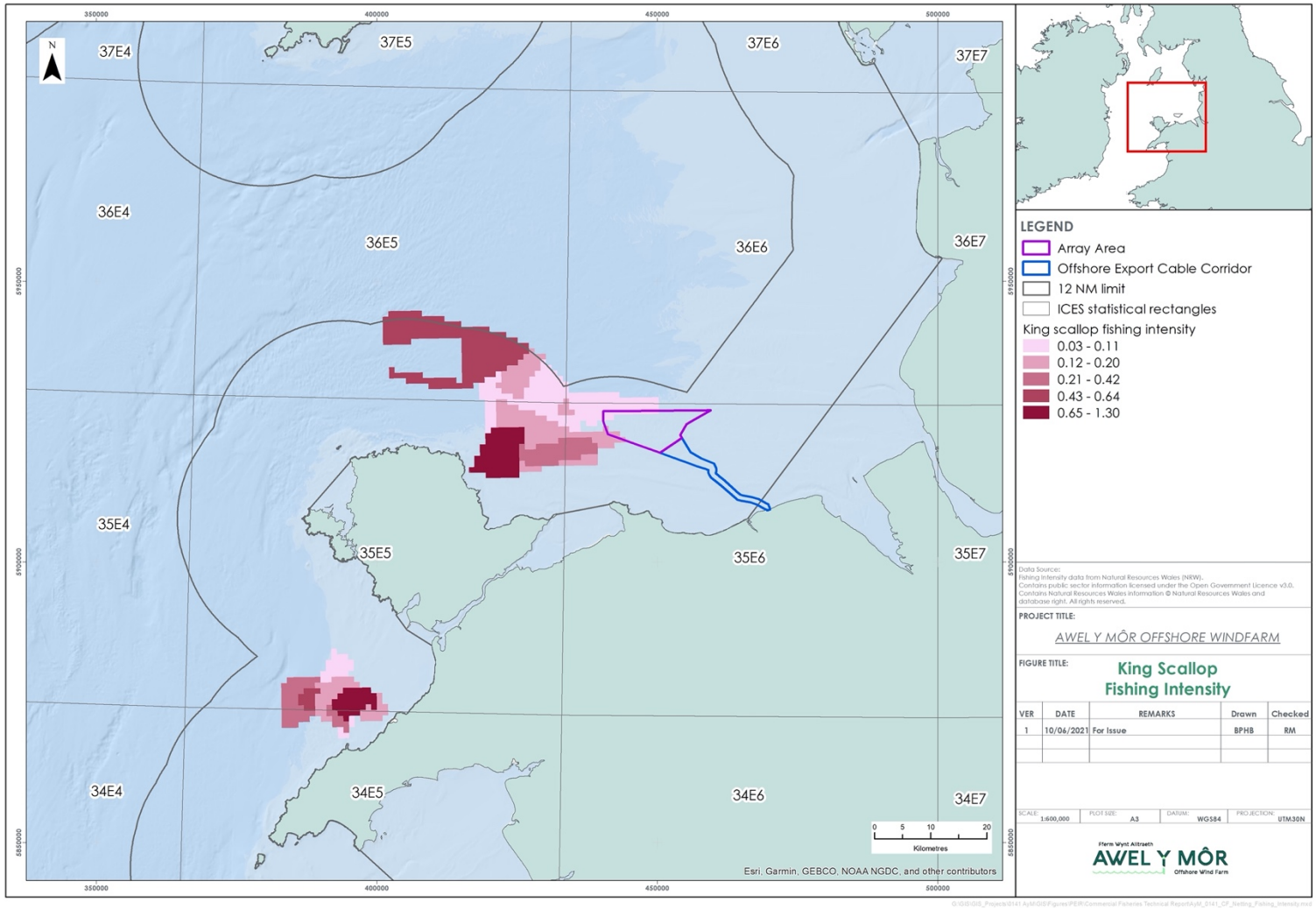

Figure 3-18 Fishing intensity for dredge gear targeting king scallop (Source: FishMap Môn)

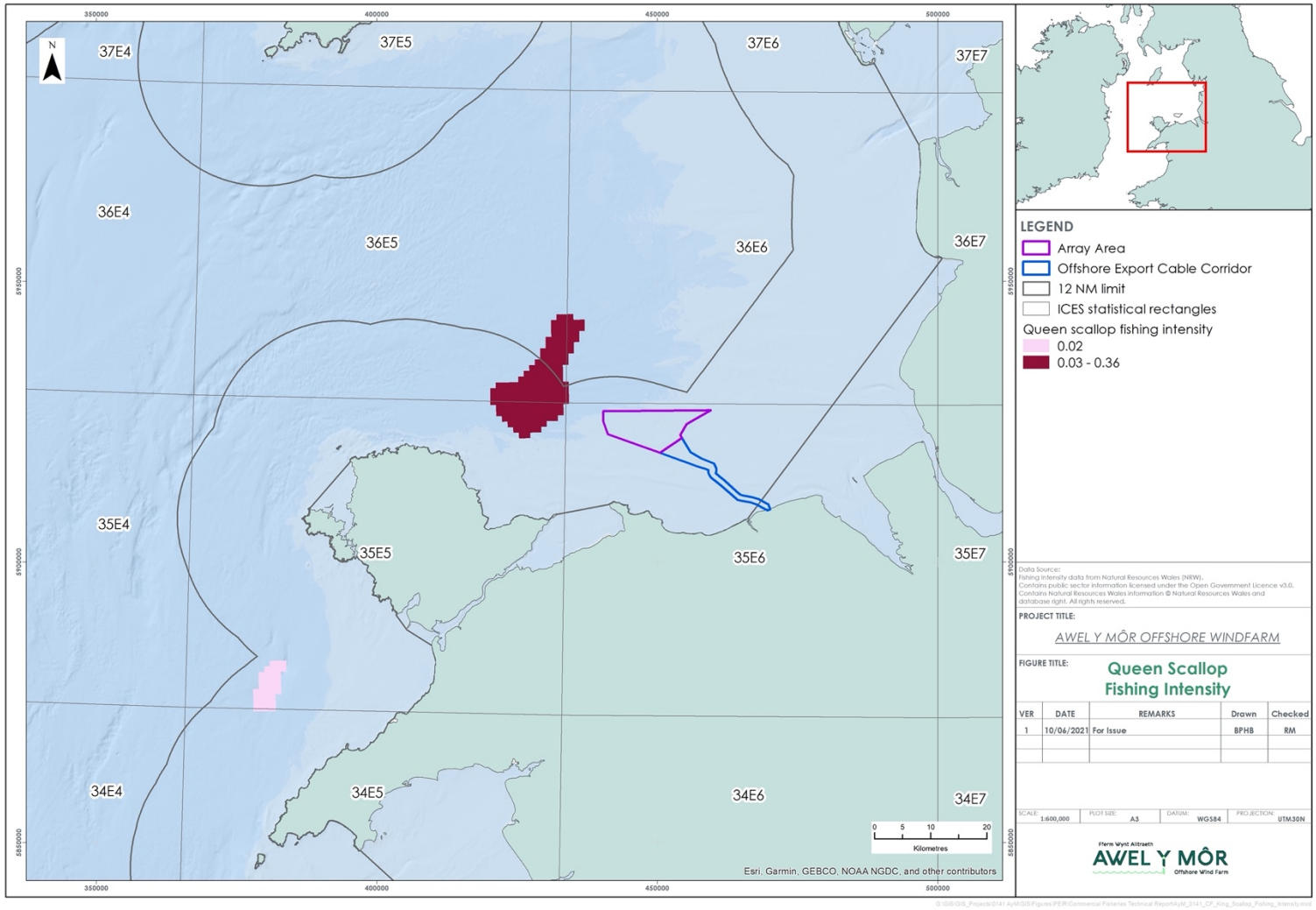

Figure 3-19 Fishing intensity for dredge gear targeting queen scallop (Source: FishMap Môn)

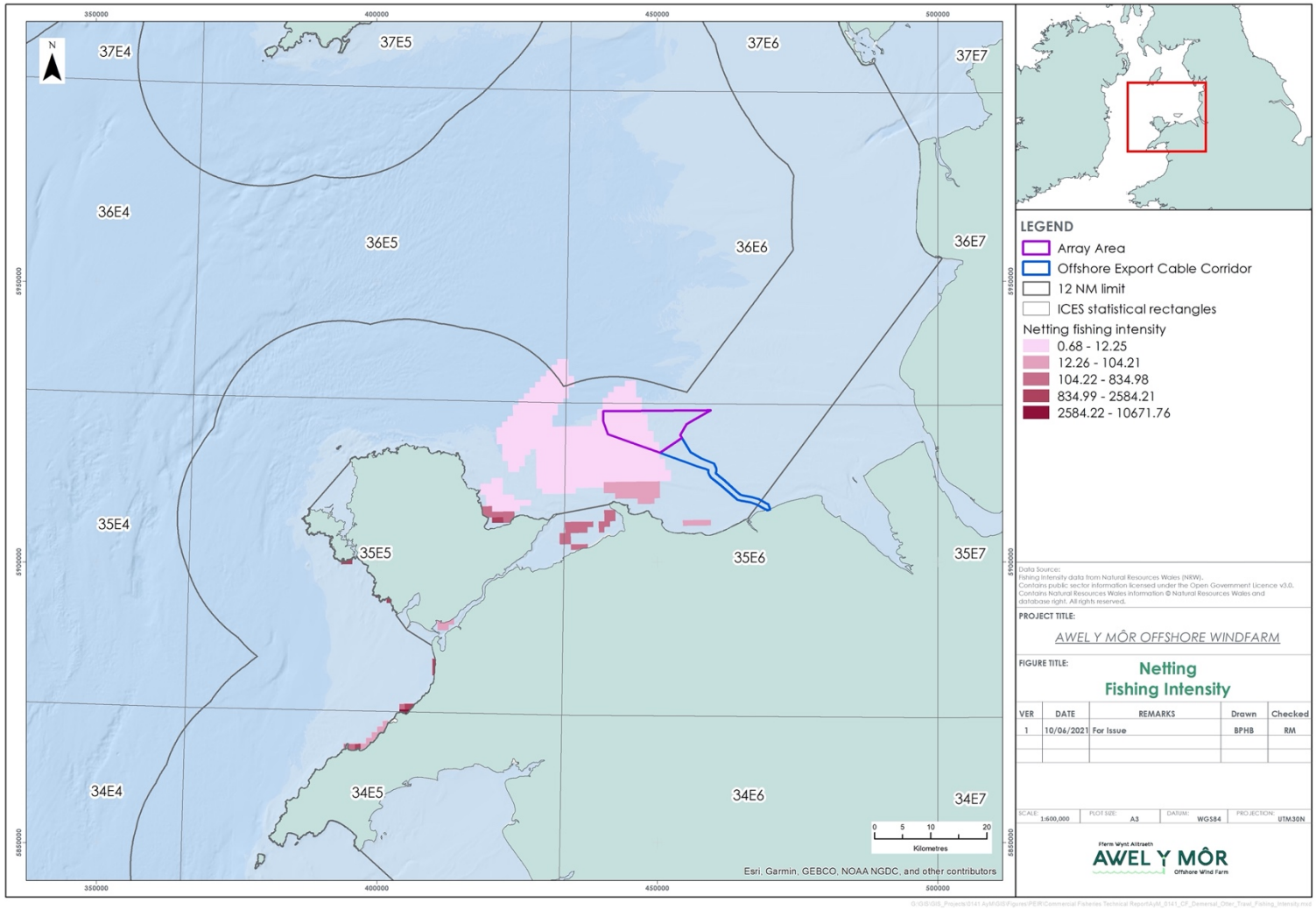

Figure 3-20 Fishing intensity for netting gear (Source: FishMap Môn)

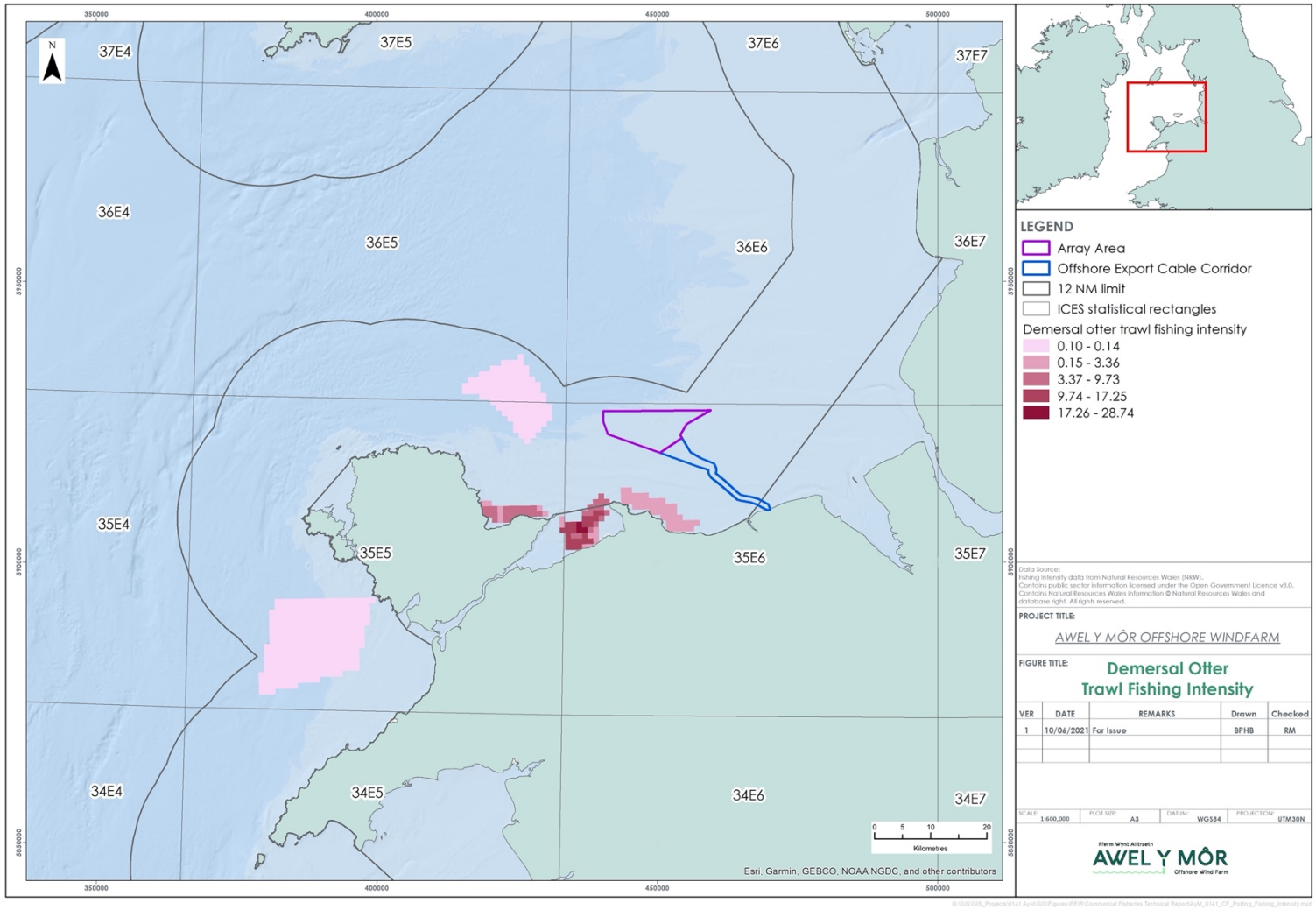

Figure 3-21 Fishing intensity for trawling gear (Source: FishMap Môn)

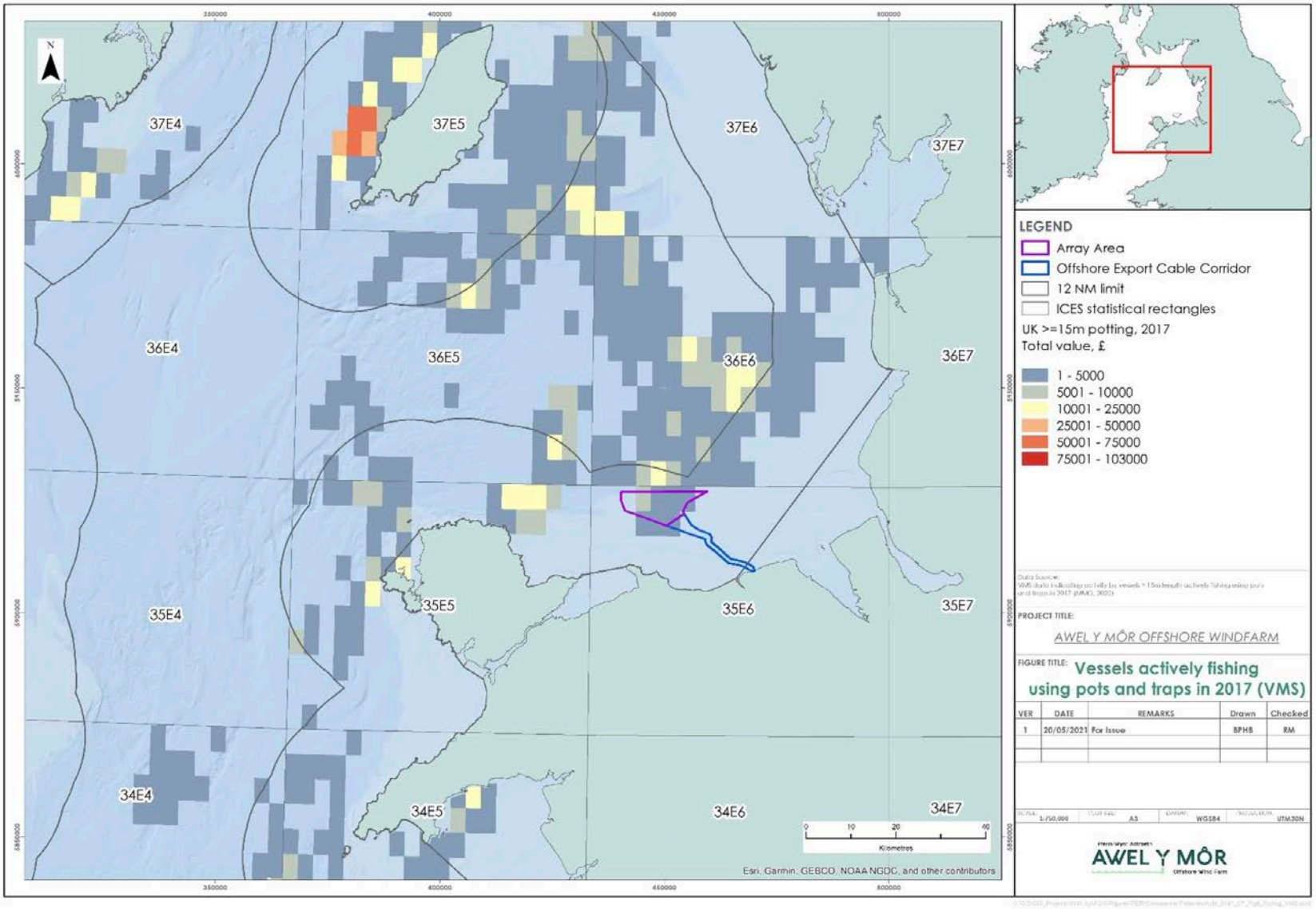

Figure 3-22 Vessels ≥ 15m length actively fishing using pots and traps in 2017 (Source: MMO, 2019)

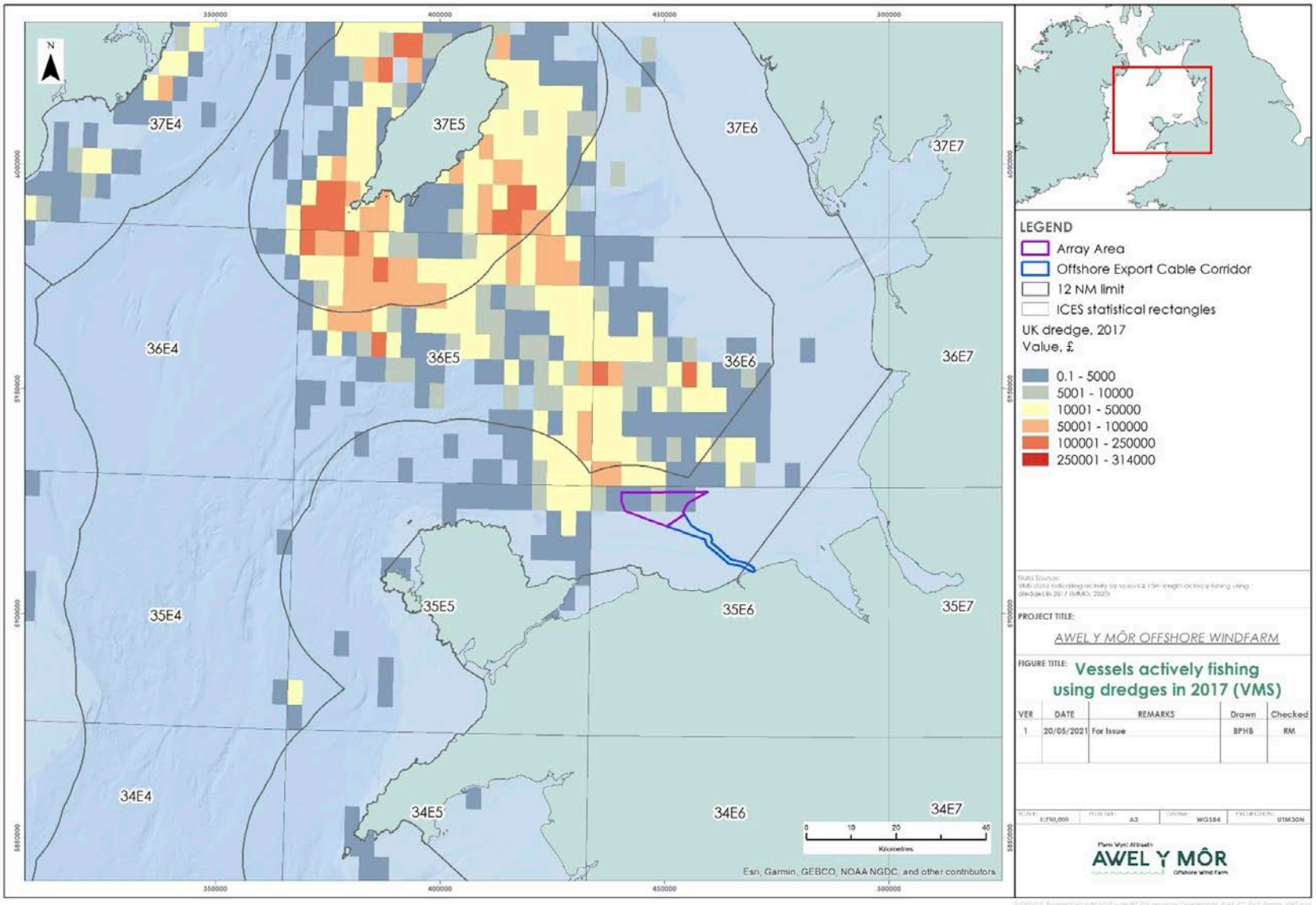

Figure 3-23 Vessels ≥ 15m length actively fishing using dredges in 2017 (Source: MMO, 2019)

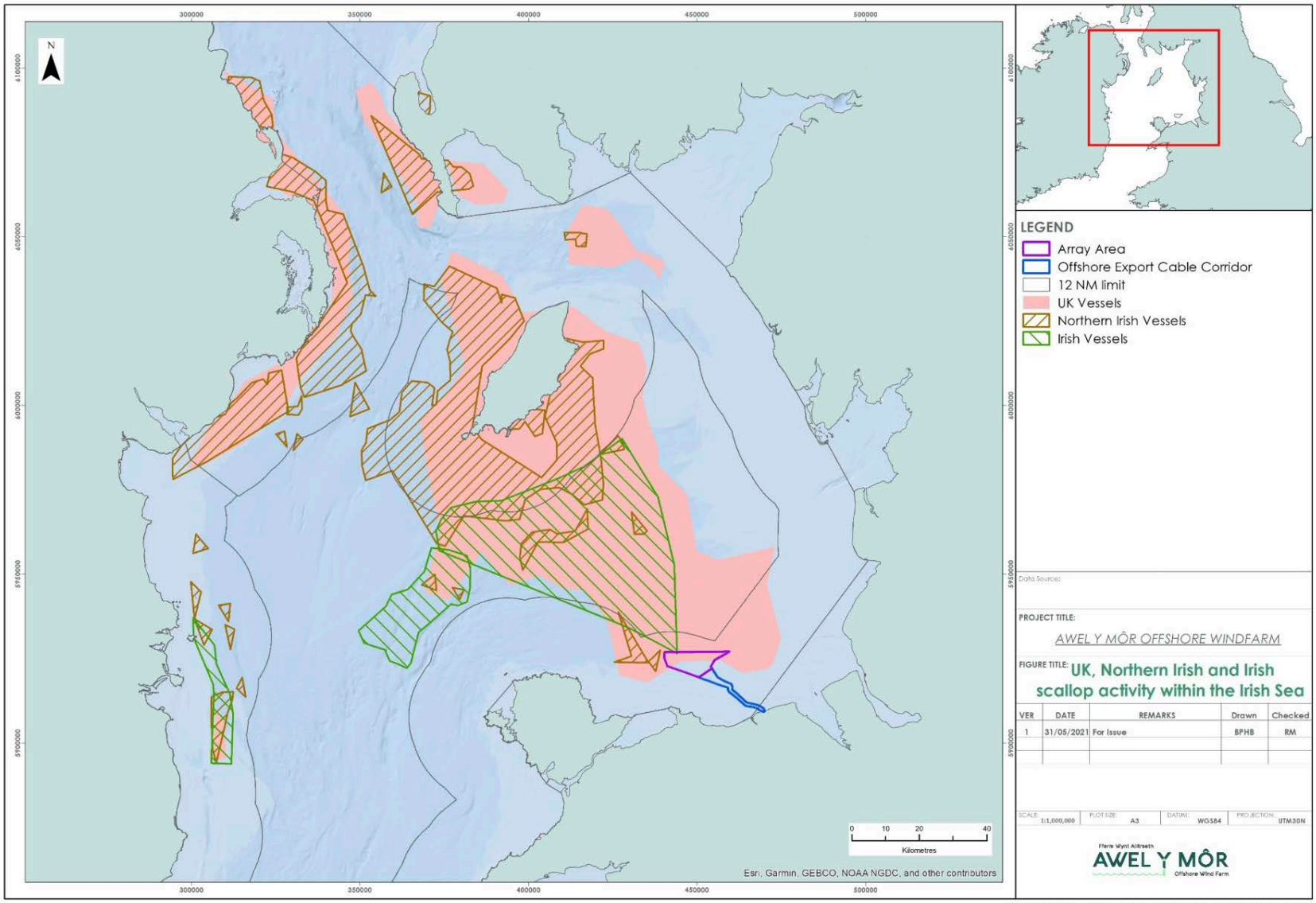

Figure 3-24 Scallop dredge grounds in the Irish Sea mapped by ICES Working Group on Scallops (Source: ICES, 2019)

3.4.2 Welsh Fisheries Activity Assessment

Landings trends, fishing grounds and key species

The trends in weight landed by Welsh-registered vessels from the Study Area are presented in Figure 3-25 for gear type and Figure 3-26 for species.

Welsh landings from the Study Area are dominated by vessels targeting whelk with pots. To a lesser extent, Welsh vessels target other shellfish species with static gear and dredges, and bass and a variety of demersal species primarily using nets.

Landings of whelk peaked in 2019. Landings of thornback ray, lobster and crab fluctuated over the time series, whilst landings of bass, king scallops and plaice have shown a general downward trend.

The average annual first sales value of Welsh landings from the Study Area is approximately £230,000, including whelk at £90,000 and lobster at £80,000. The value of landings from the Study Area have more than doubled over the period 2015 to 2019.

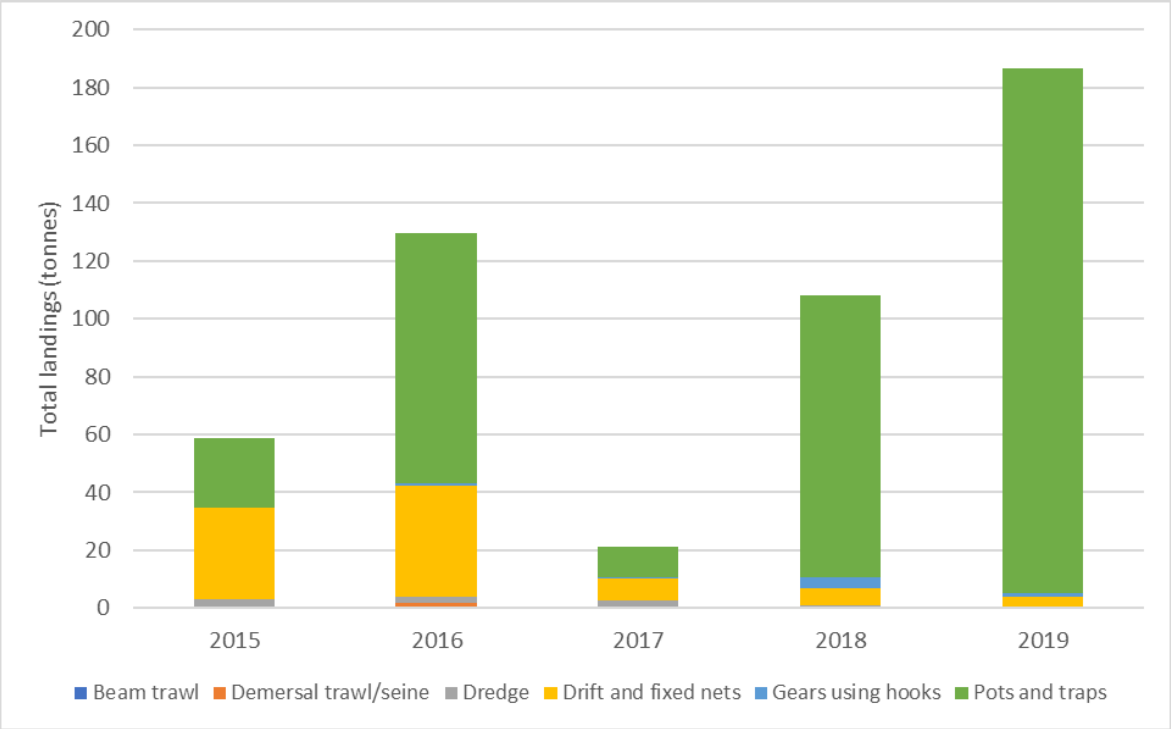

Figure 3-25 Landed weight of all landings by Welsh registered vessels from ICES rectangle 35E6 (Study Area) indicating gear type (MMO, 2021)

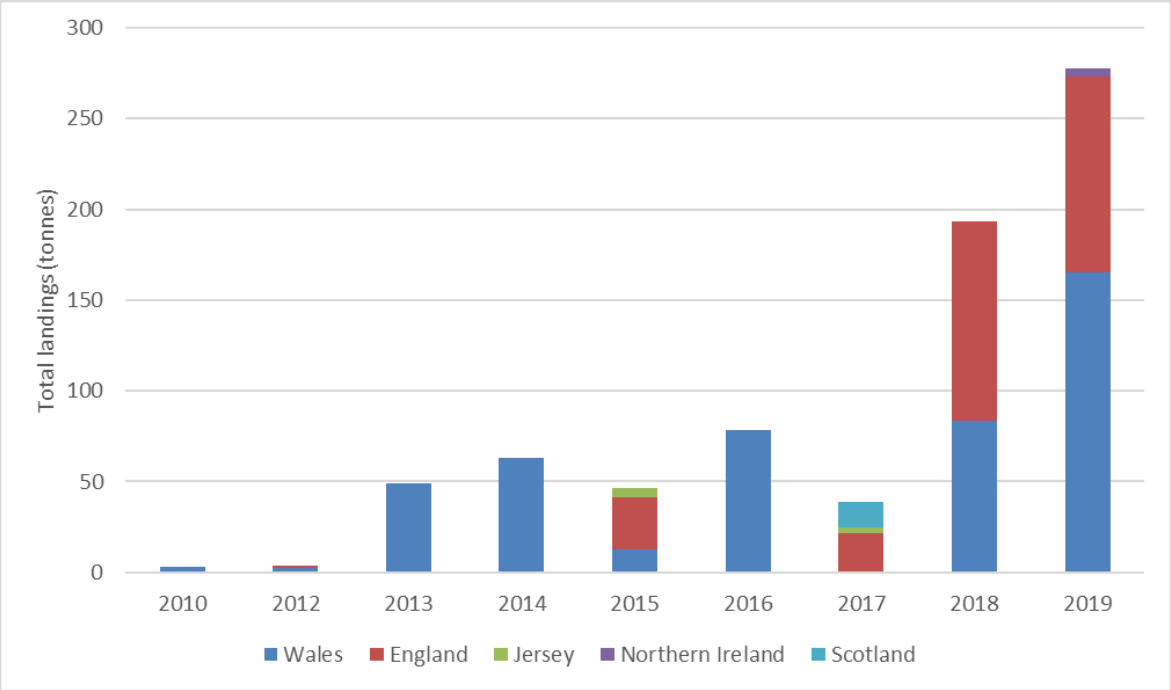

Figure 3-26 Landed weight of all whelk landings by UK (including Welsh) registered vessels from ICES rectangle 35E6 (Study Area) (MMO, 2021)

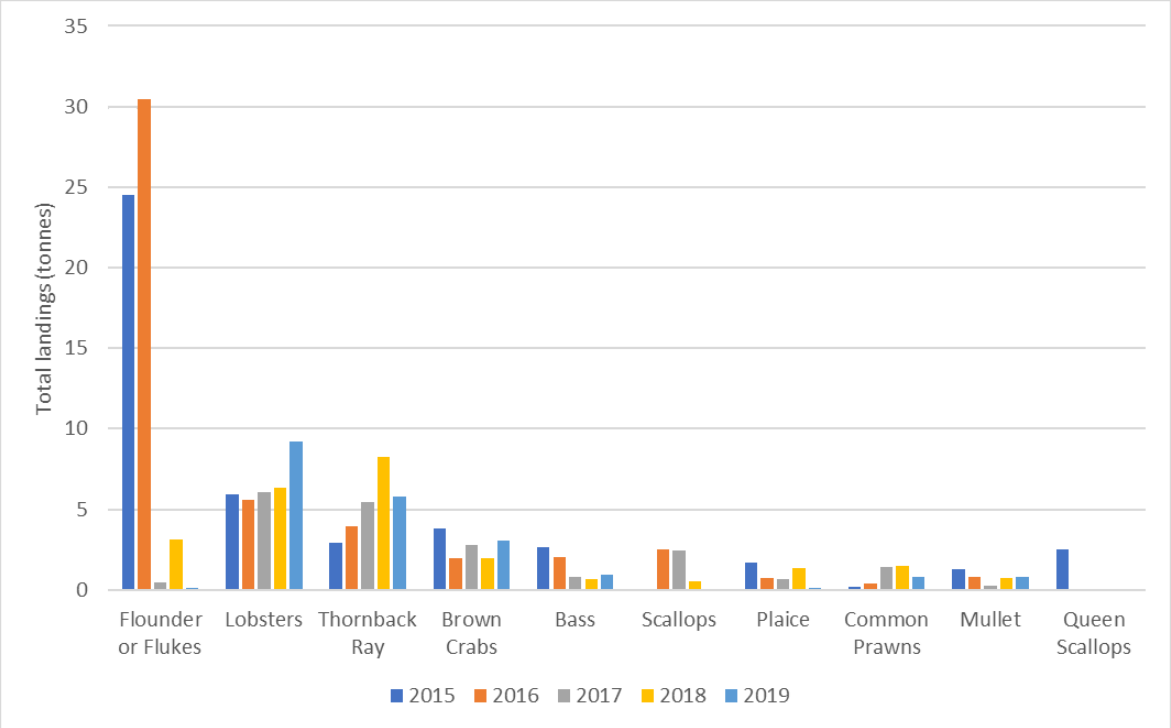

Figure 3-27 Landed weight of all landings by Welsh registered vessels from ICES rectangle 35E6 (Study Area) indicating species (MMO, 2021)

Based on the spatial data presented in Section 3.4.23.4.1 and feedback from industry consultation to date, Welsh-registered vessels target shellfish with pots on grounds within the Study Area. Whelk, and to a lesser extent scallop (targeted by dredgers), are targeted further offshore within the Study Area. In the inshore portion of the Study Area, activity is slightly more varied, with potting for shellfish, netting for demersal species, and some indication of light trawling.

Outside of the Study Area, and in surrounding ICES rectangles 36E6, 36E5 and 35E5, fishing activity by Welsh-registered vessels is similar to that described immediately above, with shellfish species – notably whelk – dominating landings in terms of both landed weight and value.

Ports and vessel fleets

A number of organisations represent UK vessels operating across the commercial fisheries study area including the Welsh Fisherman's Association (WFA).

Vessels of 10 m or more length account for approximately 70% of landings by Welsh vessels from the Study Area. These larger vessels exclusively target shellfish species, including whelk, lobster, crab and king scallop. Smaller vessels operating further inshore deploy pots to target whelk and lobster and nets 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. In summary, data indicates that across the Study Area there are three broad categories of fishing activity by Welsh vessels, namely Welsh vessels landing whelks, Welsh vessels landing other shellfish, and Welsh vessels landing mixed demersal species.

The MMO provides landings statistics by port of landing. The landings in this dataset are not linked to ICES rectangle, so it is not possible to attribute location of fishing to the landed catch, but the dataset does provide useful trend analysis for landings into specific ports, including those shown in Figure 3-28, located in north Wales. Landings into the ports shown in Figure 3-28 are dominated by shellfish species. Larger ports including Holyhead and Pwllheli take landings from vessels registered around the UK and in some cases in wider Europe, whilst smaller ports within the Study Area, including Conwy and Rhyl, take landings primarily from Welsh-registered vessels. It is understood from consultation that fishermen active across the Study Area also land into other UK ports, including Fleetwood and Whitehaven.

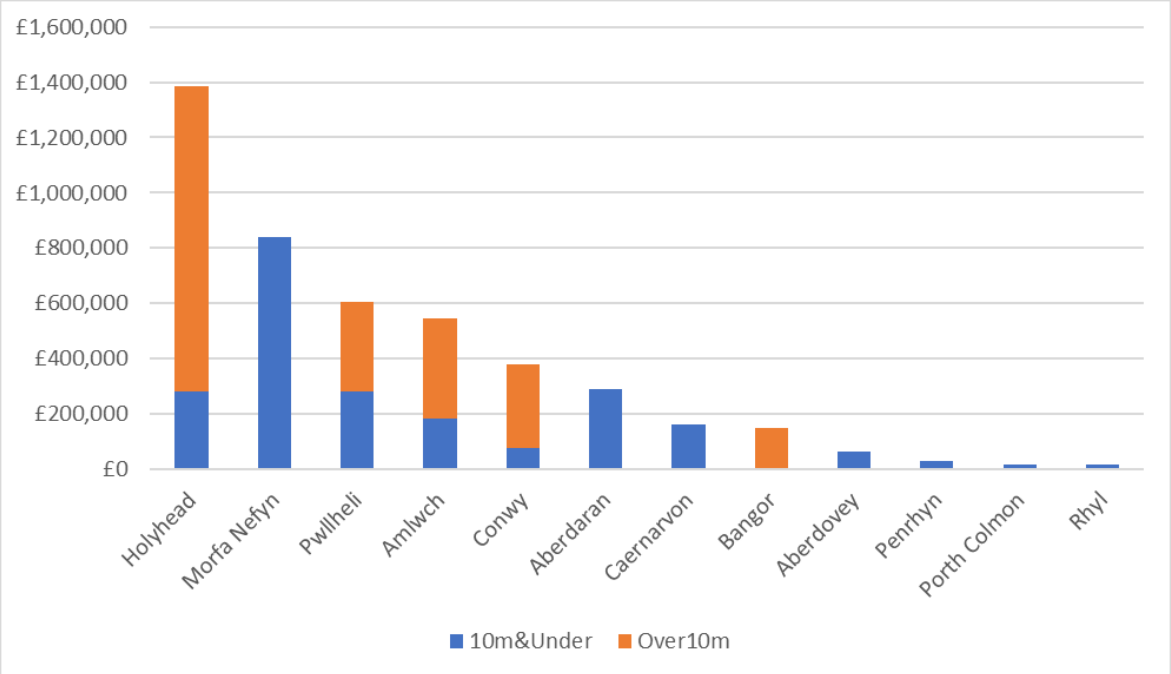

Figure 3-28 Value of landings to Welsh ports proximate to the Study Area in 2019 (MMO, 2021)

3.4.3 Other UK Fisheries Activity Assessment

Landings trends, fishing grounds and key species

The trends in weight landed by non-Welsh UK-registered vessels from the Study Area are presented in Figure 3-29 for vessel registration and Figure 3-30 for species.

Landings by UK-registered vessels, not including those registered in Wales, are dominated by English and Scottish vessels dredging for king and queen scallops and potting for whelk. To a lesser extent, English vessels target flounder and brown shrimp. There is some presence of vessels from Northern Ireland, also targeting king scallops and whelk. The majority of vessels active in the Study Area are over 10 m in length, targeting those grounds also fished by Welsh-registered vessels.

Landings of king scallop have fluctuated, peaking in 2018. Landings of whelk have increased, peaking in 2019.

The average annual first sales value of UK-registered vessel (not including Welsh-registered vessels) landings from the Study Area is approximately £260,000. Landings by English vessels account for £195,000 of this, followed by Scottish vessels with a landings value of approximately £50,000. Whelk and scallop provide the most valuable landings, with an average annual first sales value of approximately £160,000 each. The value of landings from the Study Area has shown an increasing trend over the period 2015 to 2019, peaking in 2018 before a slight decrease in 2019.

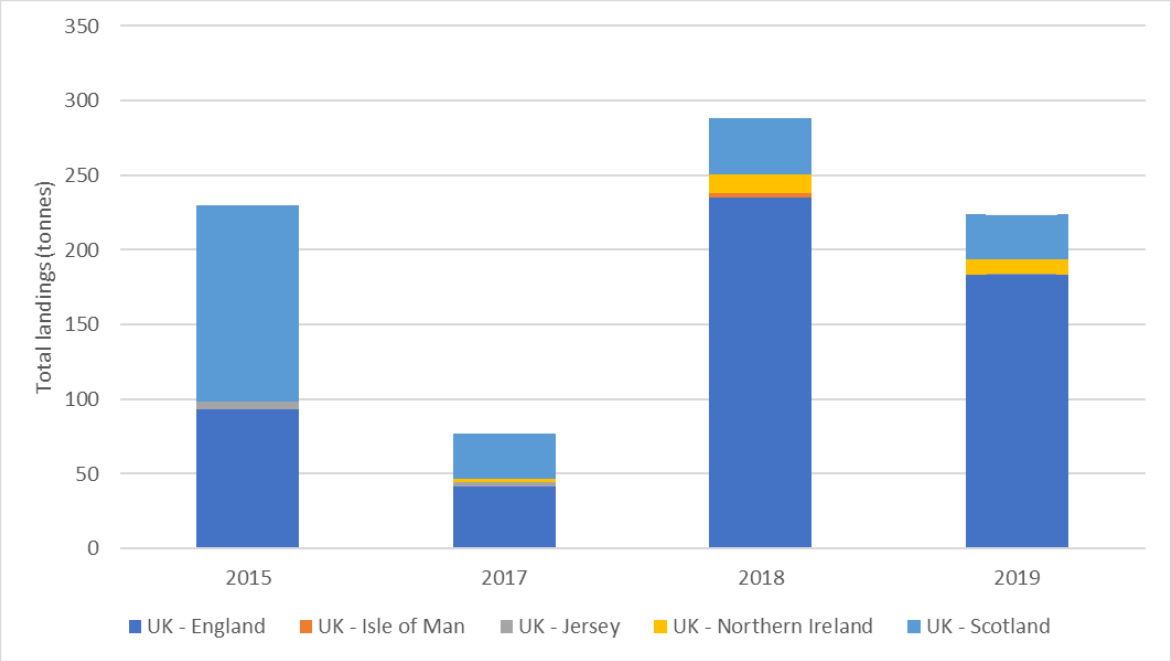

Figure 3-29 Landed weight of all landings by UK (not including Welsh) registered vessels from ICES rectangle 35E6 (Study Area) (MMO, 2021)

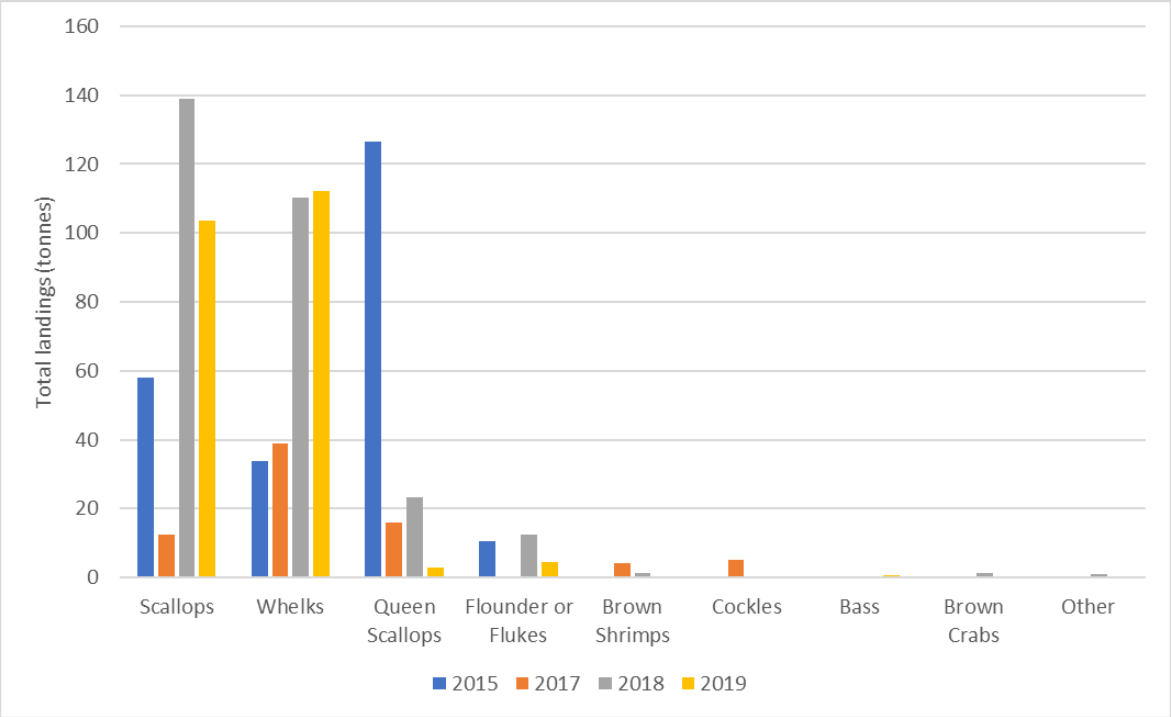

Figure 3-30 Landed weight of all landings by UK (not including Welsh) registered vessels from ICES rectangle 35E6 (Study Area) indicating species (MMO, 2021)

Outside of the Study Area, and in surrounding ICES rectangles 36E6, 36E5 and 35E5, fishing activity by UK-registered vessels is dominated by Scottish dredgers targeting king and queen scallop, and English vessels targeting a similar suite of species to those identified in Figure 3-30, namely shellfish species – primarily whelk and scallops – and demersal species including bass and sole.

Ports and vessel fleets

Consultation with this fishing industry indicates that vessels targeting whelk operate from Fleetwood and Whitehaven, as well as Holyhead in Wales. These vessels vary the port of landing based on the fishing grounds targeted.

Vessels operating dredge gear and targeting scallop across the region, including across the Study Area are also based in Kirkcudbright and Isle of Man.

The winter vessel traffic survey presented within Volume 4, Annex 4.9.1: AyM Navigational Risk Assessment Technical Baseline found limited fishing activity across the NRA study area (which encompasses an area with 10NM buffer from the array and 5NM buffer from the offshore ECR). Three to four unique fishing vessels were recorded per day in the NRA study area, with the majority of activity recorded to the west of the array area.

3.4.4 Other European Fisheries Activity Assessment

As described in Section 3.1 above, publicly available landings data indicates that the only non-UK fleet active in the Study Area are Irish vessels targeting *Nephrops*, with landings recorded only in 2015 and 2016 during the wider time series of 2012 to 2016. Landings peaked in 2015 at 1.4 tonnes of *Nephrops*. Larger vessels, over 15 m in length, targeted the species using bottom trawls.

Outside of the Study Area, and in surrounding ICES rectangles 36E6, 36E5 and 35E5, EU DCF data indicates the presence of Irish-registered scallop dredgers and Belgian-registered beam trawlers landing demersal species, primarily sole and place.

4. 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 2020-2021 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 Exclusive Economic Zones (EEZs, 12-200 NM) to fish. In this period, EU vessels will also be able to fish in specified parts of UK waters between 6-12 NM.

25% of the EU's fisheries quota in UK waters will be transferred to the UK over the five-year transition period. After this, there will be annual discussions on fisheries opportunities. Either party will be able to impose tariffs on fisheries where one side reduces or withdraws access to its waters without agreement. A party can suspend access to waters or other trade provisions where the other party is in breach of the fisheries provisions. At this stage it is not clear which fish stocks the quota transfer is associated with.

Across the wider Irish Sea it is not yet understood to what extent EU vessels currently fishing in the region will lose access to these grounds. In the Awel y Môr Study Area, where there is limited activity by non-UK fishing vessels, it is also not clear how a future baseline scenario may evolve as a result of Brexit. Fleets active in the Study Area primarily target non-quota shellfish species; without quota holdings, these vessels would be unlikely to be impacted by quota changes. Changes in access to waters are also unlikely to impact local fishing fleets. Market changes have the potential to impact fishing activity in the Study Area; some of the catch landed by UK vessels is exported to EU markets (e.g. brown crab) and potential tariff/non-tariff barriers could affect which species are targeted and to what extent. The key species landed by potters in the area, is whelk, which is primarily exported to non-EU countries, including Korea, Taiwan and Singapore. The trade in UK landed whelk has

therefore not been as affected by the Brexit process and associated implications on shellfish exports in comparison to other species. In terms of future baseline scenarios, it is therefore possible, for example, that the UK fleet will more heavily target whelk given that prices have increased in recent years and they are exported to non-EU countries.

5. Summary

The key fleet metiers operating across the Awel y Môr Study Area include (in no particular order):

- UK (Welsh, Scottish and English-registered) vessels targeting shellfish species, particularly whelk, king and queen scallop, lobster, common prawn and crab; and
- UK (Welsh and English-registered) vessels targeting mixed demersal species, particularly bass, flounder and thornback ray.

Larger vessels, including dredgers and potters, target particular species year-round, but a portion of vessels in these metiers will form part of a local UK multi-purpose fleet comprised typically of vessels under 10m in length which switch between gears (e.g. pots, nets and gears using hooks) to adapt to seasonal variations in fisheries.

Landings from the Study Area by these fleets from the based on landed volume and value are dominated by shellfish species; over 90 per cent of landings by UK vessels between 2015 and 2019 were of shellfish with the remainder accounted for by demersal species. Over the same time period, Welsh-registered vessels were responsible for 47 per cent of landings from the Study Area by value, English-registered vessels for 39 per cent and Scottish-registered vessels for 11 per cent. These vessels operate out of and land to a number of regional and wider UK ports.

Industry consultation to date has indicated that several vessels regularly fish in the Study Area, targeting shellfish species with pots and dredges, and netting for mixed demersal species.

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Annex A: Questionnaire proforma used in industry consultation.

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

Coversheet

Project Name:	Awel Y Môr Offshore Wind Farm Project

Document Title:	Commercial Fisheries Questionnaire
Classification:	Confidential

Date:	11/03/2020	**Pages:**	5
Prepared by:	Fiona Nimmo, Poseidon	**Approved by:**	RWE
Document Status:	Final version for issue		

Project details overview

Wind turbine scenario	Greatest number of turbines	Largest turbines
Number of turbines	91 turbines	48 turbines
Minimum spacing (centre to centre)	830 m	1,150 m
Foundation concepts considered	Monopile; gravity base; suction bucket; multileg with piles; multileg with gravity base; multileg with suction bucket	
Offshore platforms:	Up to 2 offshore substation platforms	
Array cables	Up to 145 km length of array cable Up to 20% requiring remedial protection Up to 15m width of seabed disturbance during laying of cable	
Export cable	2 offshore export circuits Up to 71.3 km total length of offshore export cable Up to 20% requiring remedial protection Up to 15 m width of seabed disturbance during laying of cable Up to 1,000m width of offshore export cable corridor	

Commercial Fisheries Questionnaire

Confidentiality: Answers to this questionnaire will be treated confidentially; meaning that information will be collated across all questions, any figures or values will be presented as ranges, and no organisation / individual will be named or attributed to any specific answer. Answers to this questionnaire will inform the baseline analysis of commercial fisheries and charter angling businesses operating within and around the Awel y Môr offshore wind farm site and export cable corridor.

Name: .....

Contact No: Mobile: .....

Home: .....

Email: .....

1. Introduction

1a	Position Held: e.g. master / owner/ both	
1b	Licence type	
1c	Vessel name	
1d	Vessel Registration No.	
1e	Vessel details	Length of vessel (m): Horsepower (kw): GT: Year of ownership:
1f	Plotter make and model	
1g	Port(s) catch is landed into	
1h	Number of crew	

2. Description of gear

For potting		
2a	Total number of pots	For whelk pots: For crab/lobster pots:
2b	Number of pots per string	For whelk pots: For crab/lobster pots:
2c	Length of string	For whelk pots: For crab/lobster pots:
2d	Details for setting / hauling gear	E.g. direction, tidal state etc.
2e	Soak time (hours)	
2f	Other comments	

For dredging		
2g	Number of dredges per side	
2h	Duration of each tow (minutes)	
2i	Speed when fishing (knots)	
2j	Other comment	
For netting		
2k	Type of netting	Fixed, bottom/mid-water set: Entangle /gill net:
2l	Details of gear	Length & height of net: Mesh size: Number of nets/fleets:
2m	Soak time (hours)	
2n	Details for setting / hauling gear	E.g. direction, tidal state etc.
2o	Other comments	
For other gear		
2p	Please specify	
2q	Details of gear	
2r	Other comments	

3. Working patterns (approximate / on average)

3a	Do you operate:	Full-time, part-time or seasonally
3b	Number of weeks fished per year	
3c	Number of days fished per year	
3d	Specific daily pattern: start time / tidal dependent	

3e	Seasonality:	**Seasonality for all grounds targeted**	**Typically target AyM & surrounding areas**
	Example	Actively fish from March to Dec	July to September
	Whelk		
	Lobster / crab		
	King scallop		
	Queen scallop		
	Thornback ray		

	Other (specify)		

4. Typical landings

4a	Typical landings:	Weekly	Annually
	Whelk (tonnes)		
	Brown crab (tonnes)		
	Lobster (tonnes)		
	King scallop (tonnes)		
	Queen scallop (tonnes)		
	Thornback ray (tonnes)		
	Other: specify (tonnes)		
4b	Notable trends or variations:	e.g. increase or decrease in landings in specific years	
	Specify species:		

5. Where do you fish

5a	Based on the map provided on the next page, please indicate the location of fishing grounds you target for specific species including areas that you: i. routinely target and ii. occasionally target. Please choose Chart 1 or Chart 2 as most appropriate to your operations.
5b	Please provide any further description of the areas you target, including seasonality, areas avoided, key grounds etc

6. Other information

6a	Do you have any other information on other marine species which you think are relevant to an environmental impact assessment and fisheries baseline?
6b	Do you have any further relevant information or comments?

7. Experience and concerns

7a	What has been your previous experience of wind farms in the region?
7b	Do you currently fish within a wind farm? If yes, please provide details.
7c	What are your concerns related to Awel y Môr offshore wind farm?

Chart 1

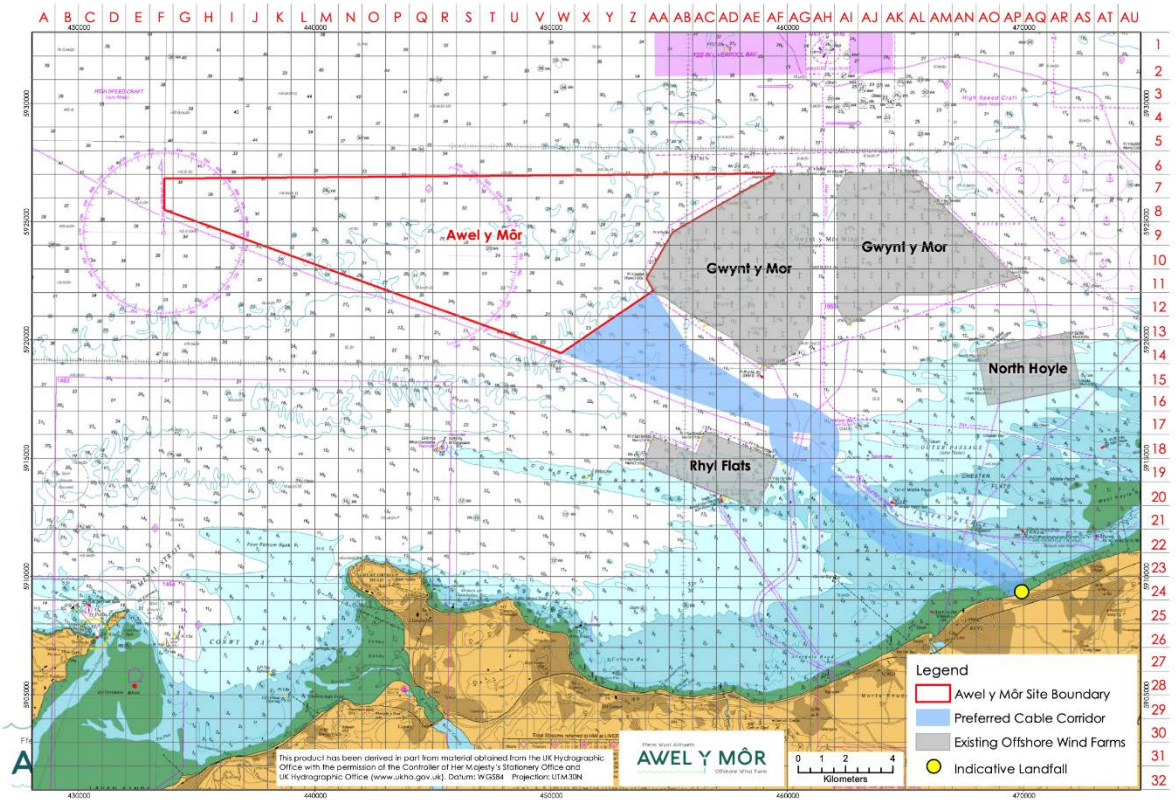
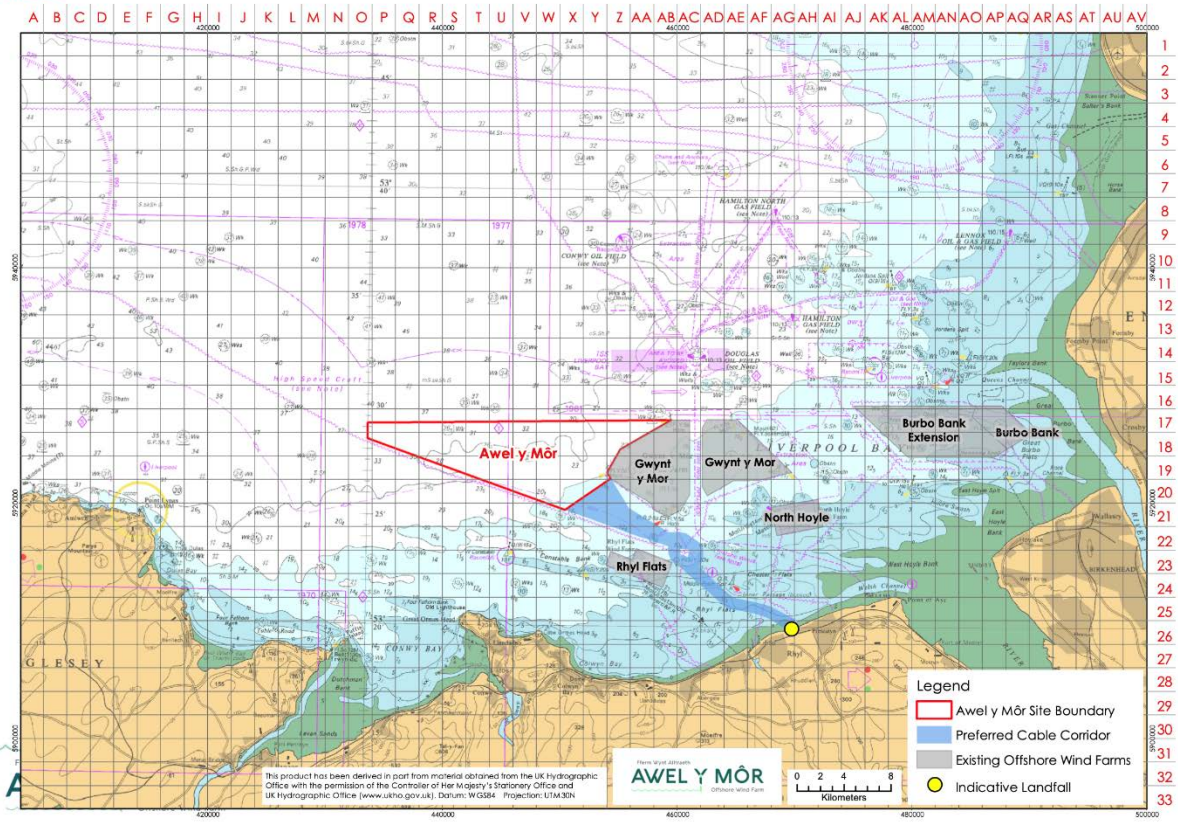


Chart 2



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