Awel y Môr Offshore Wind Farm

Preliminary Environmental Information Report

Volume 4, Annex 12.1: Charter Angling Baseline Report

Date: August 2021

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Offshore Wind Farm

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Awel y Môr Offshore Wind Farm

Charter Angling Baseline Report

July 2021

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Acronyms

Term	Definition
AIS	Automatic Identification System
AyM	Awel y Môr Offshore Wind Farm
DCF	Data Collection Framework
EIA	Environmental Impact Assessment
EU	European Union
FLO	Fisheries Liaison Officer
ICES	International Council for the Exploration of the Sea
MCRS	Minimum Conservation Reference Size
MMO	Marine Management Organisation
NRW	Natural Resources Wales
TAC	Total Allowable Catch
UK	United Kingdom
UKFEN	UK Fisheries Economic Network

Units

Term	Definition
hp	Horsepower
m	Metres
NM	Nautical Mile

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 charter angling activity presented in this document is intended to inform the EIA for Awel y Môr by providing a detailed understanding of the charter angling 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 12: Other Marine Users and Activities of the Preliminary Environmental Information Report (PEIR), which has been prepared by GoBe Consultants and assesses impacts to recreational fishing activities.

A description of commercial fisheries activity, defined as fishing activity legally undertaken where the catch is sold for taxable profit, is provided in Volume 2, Chapter 8: Commercial Fisheries and Appendix 8.1: Commercial Fisheries Baseline Report. The ecology of the fish and shellfish species targeted by charter angling 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 charter angling assessment; and,
- Section 4 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. Poseidon are undertaking the Awel y Môr Commercial Fisheries impact assessment and have prepared this document to support the Other Marine Users impact assessment that will be undertaken by GoBe Consultants.

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 review of data and literature. This review has been augmented with information gained through direct consultation with the charter angling sector, and communication and discussion between the onshore Fisheries Liaison Officer (FLO) and the charter angling community.

2.2 Study Area

The Study Area used to develop this report is the same as the regional study area used in the Commercial Fisheries impact assessment (see Volume 2, Chapter 8: Commercial Fisheries). The justification for defining this study area is that it covers a wider area than Awel y Môr, ensuring that potential implications of displacement of charter angling activity can be adequately understood. Alignment with the Commercial Fisheries study area has also simplified engagement with the charter angling sector, since some charter vessel operators also work as commercial fishermen.

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 depicted in Figure 2-1 together with the study area assessed for charter angling activity. Note that this regional study area aligns with the regional Commercial Fisheries study area.

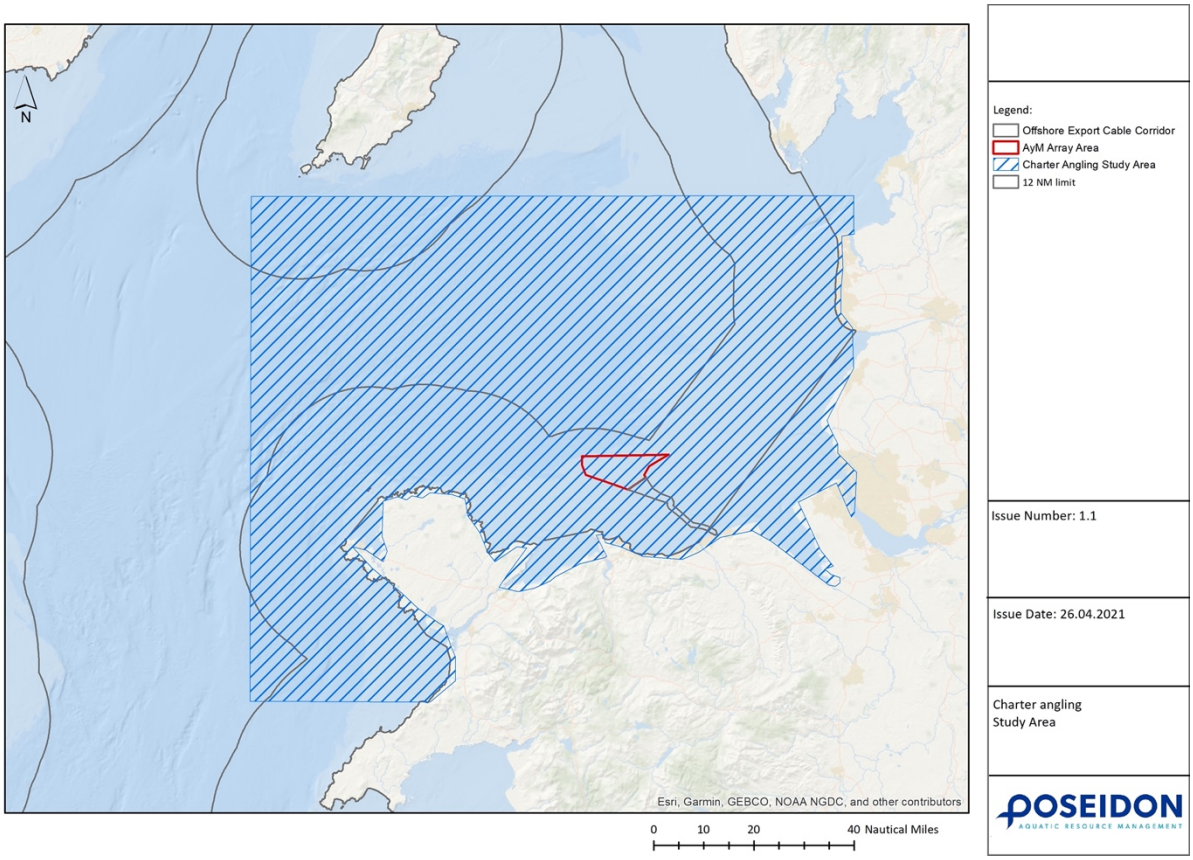

Figure 2-1 Charter Angling Study Area

2.3 Data Sources

A range of data sources and literature have been analysed; key sources are listed in Table 2-1 and a full bibliography is provided at the end of this report.

Table 2-1 Data sources used to inform this Technical Report.

Country	Data / Literature	Date	Source
UK	Participation, catches and economic impact of sea anglers resident in the UK in 2016 & 2017 (based on data gathered via the Sea Angling Diary Project)	2020	Centre for Environment, Fisheries and Aquaculture (Cefas)
England	Mapping recreational sea anglers in English waters	2020	Marine Management Organisation (MMO)
Wales	Socioeconomic and Spatial Review of Recreational Sea Angling in Wales	2015	Bangor University for the Welsh Government
England	Sea Angling 2012 – a survey of recreational sea angling activity and economic value in England	2013	Department for Environment, Food and Rural Affairs (Defra)
Wales	Generalised fishing intensity map for charter angling vessels	2013	FishMap Môn acessed via WISERD Data Portal

2.3.1 Data Limitations and Uncertainties

At a UK level, some data on participation in, catches and the economic value of sea angling is available. Following a "Sea Angling 2012" survey in England, a revised monitoring programme with new methods was tested in 2015 and expanded (to include Wales) in 2016 and 2017 to estimate numbers of UK-wide sea anglers, how often they fish, what they catch and how much they spend on their sport; the results of this monitoring programme, the 'Sea Angling Diary Project', are publicly available and have been reviewed in preparation of this report. In addition, several notable reviews of sea angling activity in UK waters have been reviewed (Armstrong et al., 2013; Drew, 2004; Lawrence, 2005; Monkman et al., 2015; Radford and Riddington, 2009; Roberts et al., 2017).

Equivalent data specific to angling in Wales is less readily available; a single key Welsh-specific review of sea angling in Wales exists, prepared in 2015 by Bangor University. There exists some mapping of Welsh charter vessel activity, though this is also now dated, having been generated in 2013.

In the absence of any complete lists of marine recreational fishers nor licensing schemes in the UK, data on sea angling to inform the above-named studies and mapping efforts has typically either been gathered via angler/vessel skipper survey, or based on voluntary submission of catch data (i.e. Sea Angling Diary Project). Bias in surveys can arise at the design stage, for example insufficient spatial coverage or use of non-random sample selection methods. During implementation, additional biases can arise such as non-response, prestige bias (exaggeration), recall errors, and rounding up or down of numbers. As such, the resulting data may not be fully representative of actual sea angling activity; consultation has been undertaken to further validate baseline data (see Sections 2.4 and 4) and provide a characterisation of the existing environment that is suitably robust for the purposes of EIA.

2.4 Informal Consultation

Poseidon have engaged with charter angling operators (vessel skippers) known to be active in and around the Study Area to inform this Technical Report. Operators have been identified by the Awel y Môr Fisheries Liaison Officer (FLO), together with an initial group charter angling stakeholder meeting held via Zoom on 29 September 2020, the purpose of which was to describe the planned Awel y Môr project to the local charter angling sector and to discuss existing charter angling activity across the Study Area.

Following the initial group meeting, Poseidon have engaged with individual operators via questionnaires and follow-up one to one interviews via video conference and telephone. A copy of the questionnaire issued to the charter anglers is shown in Annex A. In total, three operators joined the initial group meeting, and eight operators then participated in questionnaire completion and individual interviews with Poseidon. A further two operators provided comment via a representative.

2.4.1 Outcomes of consultation relevant to baseline characterisation are captured throughout this document where relevant, with key themes emerging from consultation summarised immediately below.Issues Raised during Informal Consultation

During consultation undertaken to inform this report, the issues presented in Table 2-2 were raised in relation to Awel y Môr.

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

Issue Raised	Where addressed in PEIR
Export Cable: Within the proposed cable route there are areas of rocky ground with boulders that are good fishing marks, including between Rhyl Flats and Gwynt y Môr. Consultees consistently raised concern that the installation of the cable would result in losing these marks.	The impact of loss of access to, or displacement from, fishing marks is described in **Volume 2, chapter 12: Other Marine Users and activities**. Project infrastructure will avoid sensitive environmental or archaeological receptors such as Annex 1 reefs and/or archaeological assets such as wrecks.
Underwater noise: The most substantial concern of the charter anglers interviewed was the effect of piling noise during the construction phase. The effect on fish behaviour, particularly foraging behaviour, are of key concern and considered to impede fish foraging for food, resulting in the loss of opportunity for anglers to catch fish during construction. In addition to noise of piling, noise of additional construction vessel movements was also cited as a concern. Consultees cited experience from previous wind farm construction phases, where clients stopped booking trips, as they knew they would be unlikely to catch fish.	The potential impact on fish and shellfish species of underwater noise and vibration associated with AyM construction are assessed in **Section 6.10.1** of **Volume 2, Chapter 6: Fish and Shellfish Ecology.** The potential for this impact to have an effect on charter angling activity is considered in **Section 12.10.3** of **Volume 2, Chapter 12: Other Marine users and Activities.**
Vibration: Concern was also raised on the effect of vibration of the operational wind turbines. Examples were cited of catching tope, rays and other species outside the existing operational wind farms, but within the wind farm array area. It is postulated by the consultees that the wind farms create a barrier to the fish from entering the wind farms and while wrecks outside the wind farm are plentiful, wrecks accessible inside the wind farm are not.	The potential impact on fish and shellfish species of underwater noise and vibration associated with AyM construction are assessed in **Section 6.10.1** of **Volume 2, Chapter 6: Fish and Shellfish Ecology.** The potential for this impact to have an effect on charter angling activity is considered in **Section 12.10.3** of **Volume 2, Chapter 12: Other Marine users and Activities.**

Issue Raised	Where addressed in PEIR
Electromagnetic fields: Consultees consistently raised concern of the potential EMF effects during the operational phase, particularly for shark and ray species, including tope, spurdog, smooth hound and thornback ray, as well as other species, such as cod. Again, the concern is focused on behavioural effects and the potential for EMF to change foraging patterns, leading to species not feeding normally and therefore reducing the chance of being caught by an angler.	The potential impact on fish and shellfish species of EMF associated with AyM are assessed in **Section 6.11.4** of **Volume 2, Chapter 6: Fish and Shellfish Ecology.**
Vessel traffic separation schemes (TSS) and traffic separation zone (TSZ): Anchoring is prohibited in these separation zones because charter angling vessels (or any vessel) cannot impede commercial vessels in a TSZ. A TSZ is in place between Gwynt y Môr and the Douglas Oil Platform, which has resulted in charter anglers not being able to anchor at a number of wrecks in this area. The area can be fished in drift, but this does not allow the same level of access to the wrecks being targeted. Concern has been raised that a TSZ will be necessary north of the Awel y Môr boundary.	Potential impacts to shipping and navigational features are discussed in detail in **Volume 2, Chapter 9: Shipping and Navigation**. AyM is not proposing to introduce any extension to the TSS, which are managed by the Maritime and Coastguard Agency (MCA). The potential for reduction in access to fishing marks on charter angling activity is considered in **Section 12.11.2** of **Volume 2, Chapter 12: Other Marine users and Activities.**
Shipping holding area: The area between Burbo Bank Extension and Gwynt y Môr is now used as a holding area for vessels coming into port at Liverpool. Vessels will anchor while waiting for entry slots to the port. This has resulted in charter angling in this area being less attractive due to the number of large vessels anchored in the proximity. Concern was raised that additional shipping holding areas may be necessary due to Awel y Môr.	
Running costs and survival of business: Consultees cited increased fuel costs, due to increased milage and steaming time as a consequence of having to fish further offshore and at more marks per trip to ensure customers caught some fish. One consultee stated, “the biggest concern is the need to make sure we survive as a business moving forward”.	It is considered that fishing will be able to continue in the operational AyM and it is not considered that there will be an increase in steaming time as a consequence of the presence of the wind farm. The potential for this impact to have an effect on charter angling activity is considered in **Section 12.11.2** of **Volume 2, Chapter 12: Other Marine users and Activities.**

3. Baseline Environment

3.1 Charter Angling Definition

This report only considers charter angling, defined here as fishing for marine species primarily using rod and line or hand-held line where the purpose is recreation and not for the sale or trade of the catch. This definition is aligned with that used by the Welsh Government, Natural Resources Wales (NRW) and the International Council for the Exploration of the Sea (ICES). This report specifically considers sea angling from charter vessels (i.e. operating as a business), and does not consider recreational sea angling from private vessels or from the shore.

Charter vessels are usually privately operated, purpose-built fishing boats, and host fishing trips for paying clients; anglers wishing to partake in sea fishing. Charter vessels can range widely in design and size, depending on the type of trips (e.g. nearshore enthusiast or family fishing through to wreck fishing and deepwater fishing for more experienced anglers) undertaken and geographical location, with vessels operating around much of the coastline of the UK. Anglers may fish for leisure and return their catch to sea, or may retain the catch for personal consumption.

3.2 Marine Recreational Fishing Overview

This section of the report provides an overview of marine recreational fishing activity in UK waters. It does not always disaggregate charter angling from other forms of marine recreational fishing (e.g. from shore or other platform). The information presented below has been summarised following review of a number of data and literature sources, all of which are referenced throughout the text.

3.2.1 Introduction

Expenditure on marine recreational fishing in Europe is significant and has been estimated to be €5.9 billion each year (Hyder et al., 2018), creating a total economic impact of €10.5 billion and supporting almost 100,000 jobs (Hyder et al., 2017). In addition, there are many social benefits including environmental improvement, experiencing nature, spending time with friend and family, and health and wellbeing (McManus et al., 2011; Armstrong et al., 2013; Griffith et al., 2017).

Although most individual fisher's catches are small, the combined catches of fishers on all their fishing trips in a year can be large enough to have a significant impact on some fish stocks (Armstrong et al., 2013; Cooke and Cowx 2004; Hyder et al., 2017; 2018; Lewin et al. 2006; 2019; Radford et al., 2018), and potentially have other environmental impacts such as lead loss and introduction of non-native species (Lewin et al., 2006; 2019). In Europe, recreational removals (harvest plus fish that die after release) for some species can represent between 2-43% of the total catch (Hyder et al., 2017; 2018; Radford et al., 2018). Along with fish kept for eating, this includes fish that are released but die due to injuries or stress (Kerns et al., 2012), with high released rates found in Europe (Ferter et al., 2013).

3.2.2 Participation in the UK

Marine recreational fishing is a high participation activity. In 2003, an omnibus survey in England and Wales estimated there were 1.1 million sea anglers equating to a participation rate of 5% for over 16-year-olds (Drew, 2004). Surveys to assess public attitudes to angling in England and Wales found that 2 million (5%) and 1.9 million (4%) of individuals aged 12 years or over in 2005 and 2010 respectively, had been sea angling in the past year (Simpson and Mawle, 2005; 2010). The most recent information on marine recreational fishing participation and effort in Great Britain (England, Wales and Scotland) was carried out in 2012 using an omnibus survey of over 12,000 households which estimated that 2.2% or 1.08 million

people of 16 years or older had been sea angling in the past year, with 884,000 from England, 125,000 from Scotland, and 76,000 from Wales (Armstrong et al., 2013).

Several studies have been done in the UK to assess the economic value and impact of sea angling (Armstrong et al., 2013; Drew, 2004; Lawrence, 2005; Monkman et al., 2015; Radford and Riddington, 2009; Roberts et al., 2017). In 2003, the expenditure by sea anglers resident in England and Wales was estimated at £538 million per year based on 12.7 million angler days of activity, and with this spending supporting nearly 19,000 jobs directly and £71 millions of supplier income (Drew, 2004). In Wales, the total annual expenditure of sea anglers was estimated as £39 million for visitors and a further £87 million for residents, supporting around 1,700 jobs (Monkman et al., 2015).

In the most recent study of sea angling activity in the UK (Cefas, 2020), it was estimated that 874,000 16+ year olds in the UK went sea angling in 2016 (99,000 of those in Wales), and 902,000 in 2017 (69,000 of those in Wales). Sea angling participation numbers and rates by type of fishing platform are shown in Figure 3-1 and Figure 3-2.

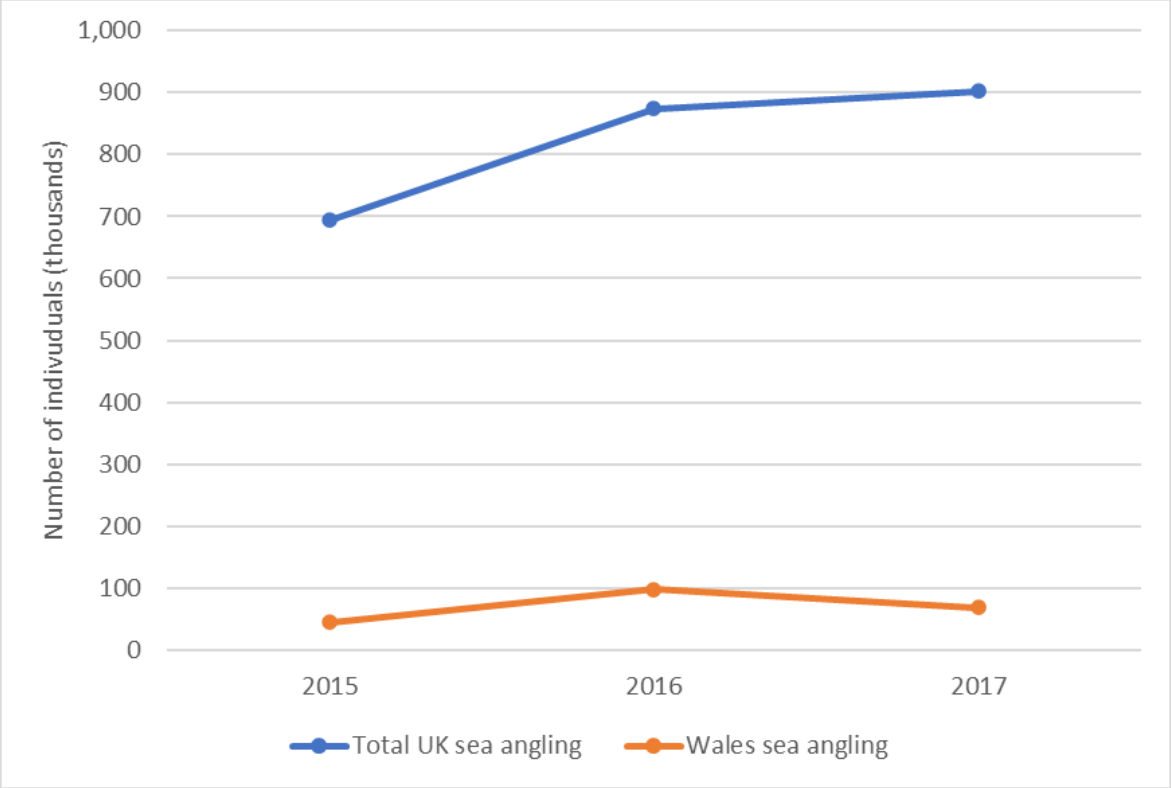

Figure 3-1 Sea angler numbers (thousands) for the UK as a total, and for Wales (Source: Cefas, 2020)

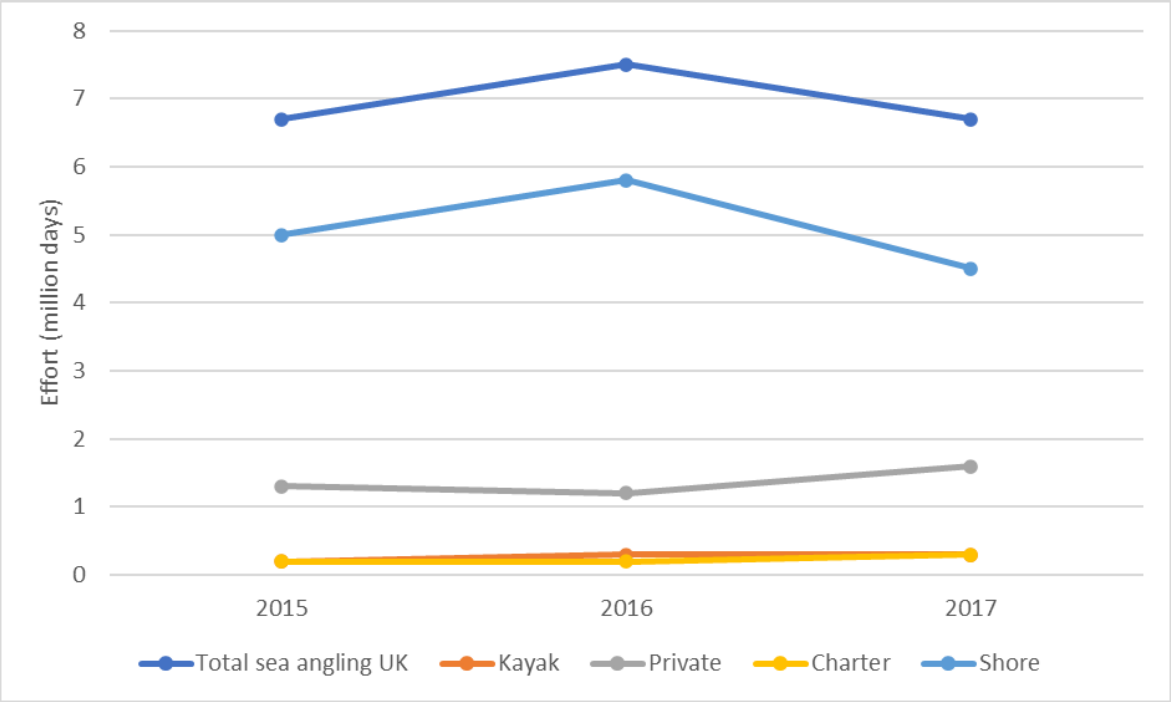

Figure 3-2 Sea angler effort (million days) for the UK as a total, and by platform type (Source: Cefas, 2020)

3.2.3 Catches in the UK

In the most recent study of sea angling activity in the UK (Cefas, 2020), it was estimated that the total number of fish kept and released were fewer in 2016 (49.7 million) than 2017 (54.5 million), but release rates were similar and were in the region of 80%. Catches per angler were similar in 2016 and 2017.

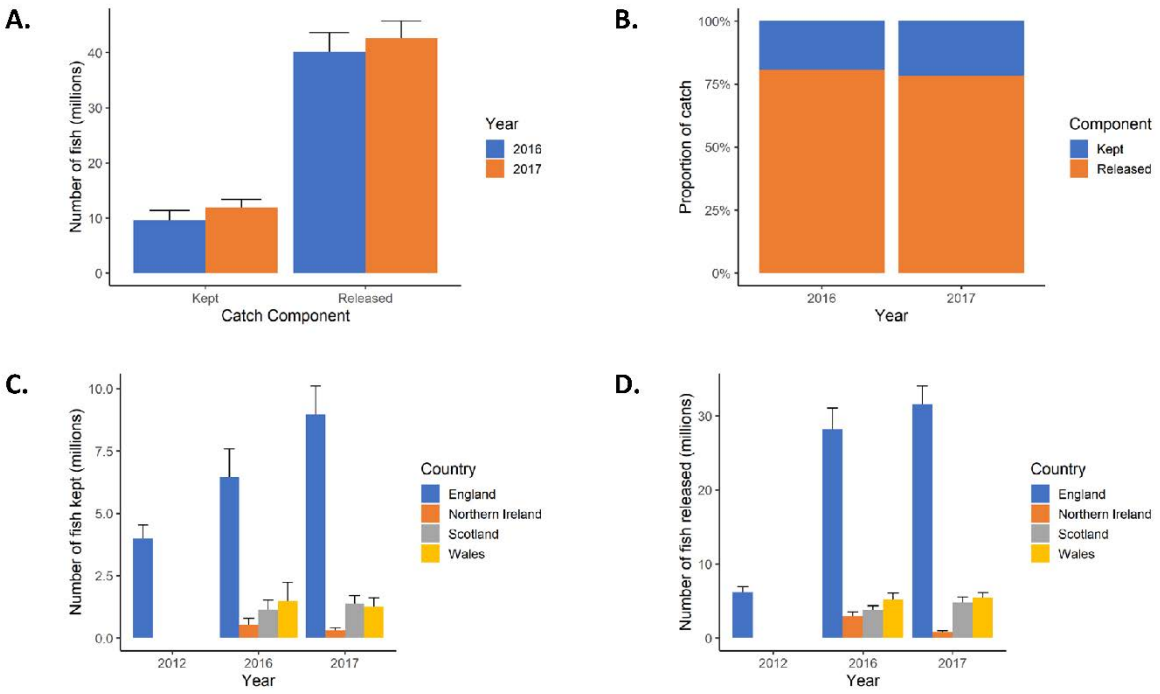

Figure 3-3 Numbers of fish kept and released (A) and release proportions (B) for the whole UK in 2016 and 2017 (A&B); and numbers of fish kept (C) and released (D) for individual countries within the UK in 2012, 2016 and 2017 (Source: Cefas, 2020)

The same study reported that in total, 100 fish species were caught by sea anglers in the UK in 2016 and 2017 varying from small, unusual species (e.g. tompot blenny), common angling species (e.g. cod, bass, dab, whiting and mackerel) to large pelagic fish (e.g. blue shark). The composition of species in the catch was similar between 2016 and 2017 with the same top four most common species being whiting, mackerel, dogfish and bass. The next four most common species were cod, pollack, dab and bib, but appeared in a different order in the two years the study was undertaken.

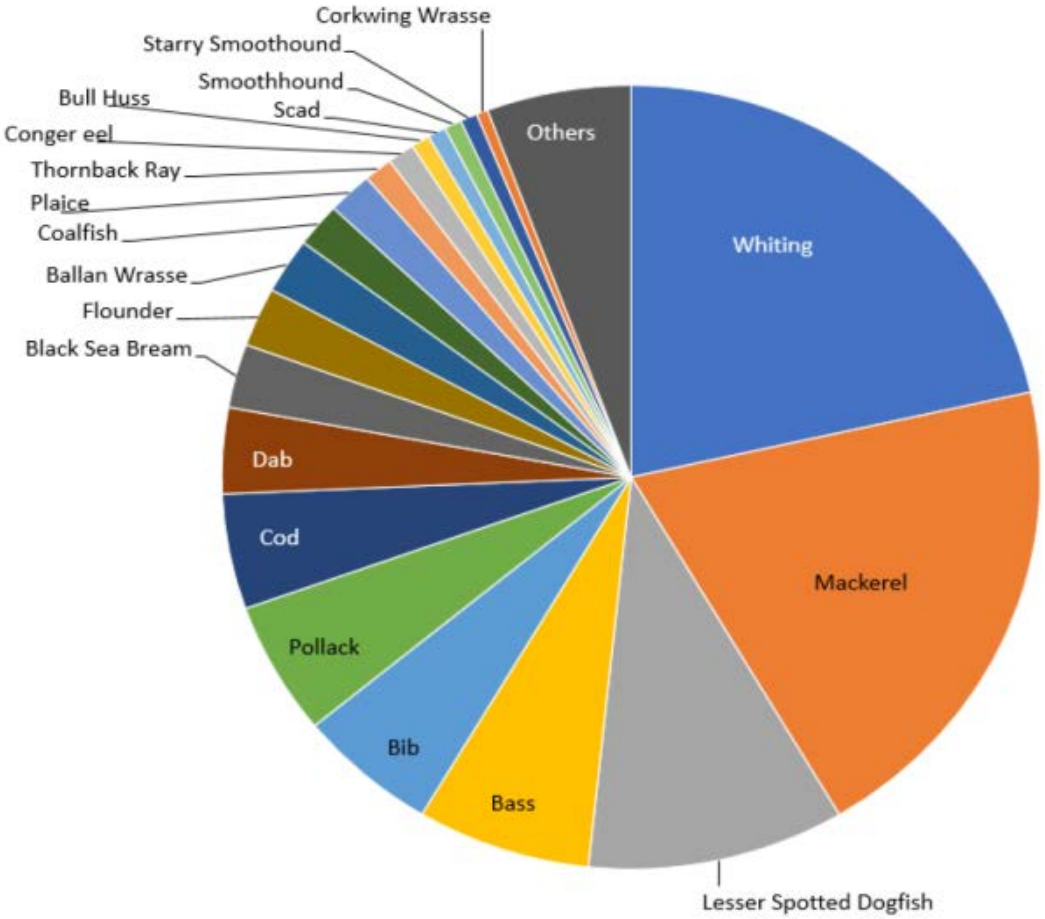

Figure 3-4 Catch composition by number for the UK in 2017 with the top 20 most commonly caught fish displayed (Source: Cefas, 2020)

3.2.4 Economic Impact

In the most recent study of sea angling activity in the UK (Cefas, 2020), the average per fishing trip expenditure was found to be £75 in 2016 and £86 in 2017, with over £750 spent each year on capital items (i.e. physical goods to enable the activity). The total expenditure was similar between years with anglers spending £1.11 billion in 2016 and £1.32 billion 2017; after removing imports and taxes, scaling up to the whole UK population left a direct expenditure of £696 million in 2016 and £847 million in 2017 (Cefas, 2020).

In 2016, the total economic impact of sea angling was £1.58 billion, providing £326 million of GVA (direct) and supporting around 13,600 jobs (Cefas, 2020). The total was slightly higher in 2017, with a total economic impact of sea angling was £1.94 billion, providing £388 million of GVA (direct) and supporting around 16,300 jobs (Cefas, 2020).

3.3 Charter Angling Activity in North Wales

This section of the report describes charter angling activity in North Wales and where possible, specifically within the Study Area. In contrast to the information presented in Section 3.2 above, the descriptions provided below have largely been derived via informal consultation (see Section 2.4). Where other sources of information are used, these are fully referenced in the text.

3.3.1 Vessels and Gear Types

A 2015 study reported that there were approximately 60 charter angling vessels confirmed as operating across Wales, with some additional unquantified activity within 12 nautical miles (NM) of Wales from approximately 12 boats operating from the northern ports of Devon and Somerset (Monkman, et al., 2015; Figure 3-5). Whilst not an accurate indication of charter vessel numbers active off North Wales, it is noted that twelve vessels are listed for North Wales on the UK Charter Boats website.

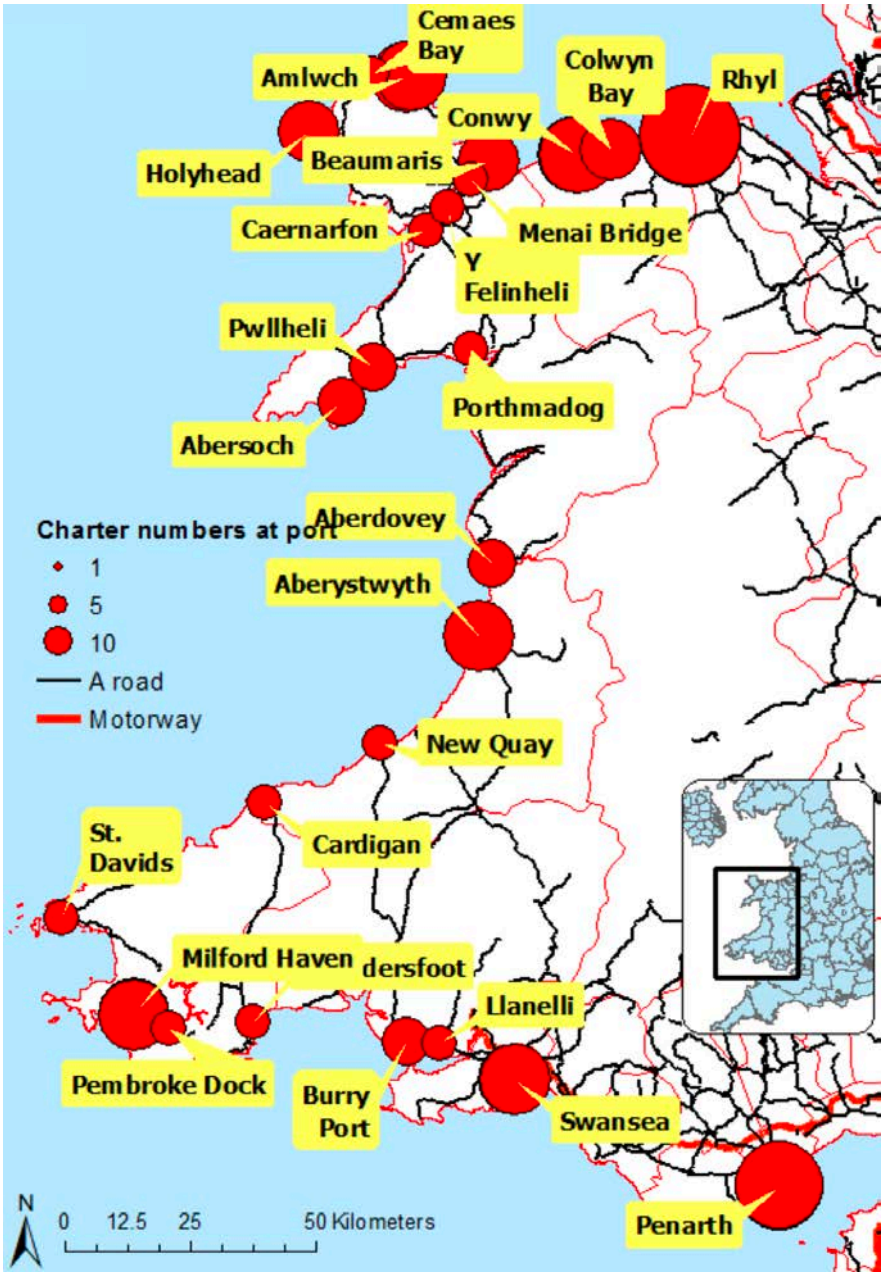

Figure 3-5 Number of charter vessels by home port (Source: Monkman et al., 2015)

Typical vessel parameters are shown in Table 3-1 and examples of charter vessels are shown in Figure 3-6.

Table 3-1 Typical charter angling vessel parameters, as derived from literature review and consultation

Parameter	Indicative details
Vessel length	~ 9 m – 13 m
Horsepower	~ 300 hp – 600 hp
Typical gear	Rod and line with bait and/or lures
Home ports	Local Welsh ports including Rhyl, Conwy and Rhos on Sea, and more widely ports in the Mersey
Number of crew	1 – 2 crew
Hours fished in angling day	Trips can range between 5 and 13 hours
Anglers per boat	Angler capacity is ~ 10 - 12 people
Days fished per year	Varies per vessel, ranging from 40 to 180 days per year typically, but more in some cases
Distance travelled from port per day	Varies depending upon trip type, ranging from 5 to 60 miles
Charge or angler per trip	~ £450 - £750 for full day vessel charter

Figure 3-6 Example of charter angling vessels active off North Wales (Source: Charter Boats UK, 2021)

Sea angling from charter vessels is typically undertaken using a rod and line, and whilst the line can be rigged in various ways depending on the fishing ground and target species, it is fundamentally weighted and rigged with multiple hooks and baits or lures to attract fish, which bite the hook and are then reeled in. Bait species typically include sandeel, rag worm, lugworm and crab.

3.3.2 Target Species and Catches

In an interview-based study by Richardson (2006) recreational sea anglers in Wales specified their top three target species while fishing on the specified platform (e.g. shore, kayak, charter boat). For anglers engaged in charter boat fishing, the top three targeted species were: bass, tope and black bream. In the same study, charter vessel skippers ranked rays as the top preference species of their customers, followed by mackerel and then pollack (Monkman et al., 2015).

Data on species caught by sea anglers in Wales is limited; the limited data that does exist seems to be affected by prestige bias, with 'trophy' species being bass, conger eel, bull huss, tope, rays and pollack being more frequently recorded than mackerel or dogfish (Monkman et al., 2015).

During informal consultation undertaken to support preparation of this report, the species listed in Table 3-2 were identified by charter vessel skippers as those caught typically in and around the Study Area. During consultation it was identified that up to 25 different fish species are regularly caught across the Study Area.

Table 3-2 Species caught from charter angling vessels active in the Study Area (derived from consultation responses)

Caught species		
Rays	Dab	Scad
Bull huss	Flounder	Pouting
Tope	Gurnards	Dragonet
Lesser spotted dogfish	Black bream	Tompot blenny
Smooth hounds	Wrasse	Launce
Whiting	Cod	Weever
Mackerel	Bass	John dory
Herring	Pollock	Red mullet
Garfish	Coalfish ('coley')	Spurdog
Plaice	Ling	Conger eel
Sprats	Squid	Turbot

During consultation it was noted that target species and catches vary seasonally, and depending on the nature of the fishing trip. Target species vary depending on length of trip (e.g. 5 hour trip inshore compared to 12 hour trip offshore), fishing location (wrecks, rock/boulder marks, drift fishing or anchored), and customer preferences; some request targeting particular species (e.g. tope, ray, conger eel), while others seek to catch as many different species as possible.

Consultation notes that anglers typically catch the following fish on different angling trip types:

- Wreck: cod, pollock, ling, coalfish, conger eels
- Mixed offshore: tope, thornback ray, bull husk, 3 sp of gurnard, plaice, dab, mackerel, herring
- Inshore: bass, smooth hound, thornback ray, tope, flatfish species (plaice, flounder, dab and turbot), whiting and cod.
- Rock / boulder marks: ballan wrasse, other wrasse species, blennies and gobies.

Charter angling activity, and therefore peaks in catches, are understood to take place from May/June through to October, though angling activity continues throughout winter at lower levels. A number of target species are known to have a seasonal presence; for example, bass are targeted from May onwards with the largest fish often caught in autumn months and

mackerel, gurnards and tope are targeted across a similar time period. In contrast, plaice are more likely to be found in catches in autumn, and herring, whiting, dab and cod are targeted across spring and winter months.

Catch and Release

Recreational sea anglers frequently release the fish they catch (termed catch and release) with release rates dependent on many factors, including species, fish size, post-capture and pre-capture fish health, previously retained catch quantities, harvest control rules; ability and facility to store, process and transport; and angler outlook. Studies have shown that release rates are high in general, and this was also reported in consultation responses. Table 3-3 shows example release rates for species typically targeted in the Study Area.

Harvest control rules are in place for some species targeted by recreational anglers, notably bass where there is currently a limit in place of two fish per person per day between March and November. In December, January and February, any bass caught by anglers must be released (Welsh Government, 2021).

Table 3-3 Sea angling release rates for caught and target species in Wales (Source: Armstrong and Hyder, 2013)

Species	Shore-based angling (%)	At-sea angling (%)
Bass	82	57
Cod	56	27
Dogfish	88	91
Mackerel	9	28
Coalfish	79	65
Rays	100	23
Tope	100	No data
Whiting	87	66
Wrasse	97	51

Catch Trends

In the absence of catch data for charter angling vessels, trends in catch composition and volume cannot be quantified. In consultation undertaken to inform this report, charter vessel skippers were asked about trends in catches of key species. General descriptions of these anecdotally-reported trends are provided by species below and where possible, placed within the context of reported wider Irish Sea trends. Further information on species population trends is provided in Volume 2, Chapter 6: Fish and Shellfish Ecology, which considers future baseline trends and how they may be influenced by factors such as climate change and fishing effort.

The region has been renowned for angling, particularly for key prize species including tope and gurnards. National federation competitions were regularly held in the area, including:

- National Federation of Sea Anglers; and
- European Federation of Sea Anglers.

Top international anglers travelled to the area for these competitions. Such competitions are no longer held locally and have moved to different locations (e.g. Weymouth). Charter angling

consultees consider that this could be a result of the offshore wind farms in the region, both the physical presence and the postulated effect on species declines. It has been stressed by the consultees that *'the fishing in the region is still very good, but nowhere near where it used to be'.*

Tope: Tope is a key target species, with the North Wales region renowned for consistent catches of large tope. It is thought that large females come into inshore areas during their breeding season, to live bear between 6-30 pups. Average age of maturity is 11 years, and can reach up to 190 cm (Barnes, 2008), with pups approximately 35 cm at birth.

Consultees consistently cited significant decline in the numbers caught post construction of wind farms in the region: including North Hoyle, Rhyl Flats, Gwynt y Môr, Burbo Bank and Burbo Bank extension. Consultees stated that during the construction phases of these offshore wind farms 'the best tope fisheries dispersed overnight'.

It has been noted that tope have returned, but not in the same quantities as before. Specimens have, however, remained consistent in size, with large females caught early in the season (e.g. 60 lb) and small males caught in the summer months (18-25 lb). Based on a number of consultee responses, typically current operators catch a range of 1-15 tope per trip per day, while previously 20-40 tope would be regularly caught per trip per day (ranges relate to duration of trips 5 hrs to 12 hrs). One consultee estimated an 80-90% reduction in total numbers of tope caught per year, compared to 15 years ago.

It is observed that more widely across the Irish Sea, tope populations are in decline. Catches by anglers off Northern Ireland have reportedly declined (National Museums Northern Ireland Habitats website, accessed 2021) and off the coast of Ireland anglers have reported declines in tope catches from the 1960s (Fitzmaurice et al., 2003).

Gurnards: Three species of gurnards are caught in the region: tub gurnard (the most common and largest species), grey gurnard and red gurnard. The North Wales region, and particularly Rhyl has been renowned for catches of large gurnards.

Consultees consistently cited significant decline in the numbers caught post construction of wind farms in the region: including North Hoyle, Rhyl Flats, Gwynt y Môr, Burbo Bank and Burbo Bank extension.

Current catch rates of gurnard are 1-4 small specimens (~1 lb) per day per trip. Previously gurnards of a good size (3-6 lb) were regularly caught in the region, with up to 30 fish being taken per day per trip throughout summer months.

Furthermore, consultees consistently cited that gurnards have never returned to the extent or sizes achieved pre-construction. A population study of gurnard off the North Wales coast observes that changes in gurnard size and age distributions over time relate to an increase in inshore fishing in recent years (McCarthy et al., 2018).

Commercial fisheries landing data can be useful to inform trends in fish abundance, but are also influenced by a range of external factors such as, quota levels (for managed species) and market driven prices for specific species. Furthermore, the ability for commercial fisheries to land fish during offshore wind farm development phases is less influenced by fish behaviour than charter angling, e.g., fish may stop foraging and therefore are not possible to catch using baited lines, but may still be caught by commercial trawls.

Nevertheless, statistics for UK commercial fishing vessels are presented in Figure 3-7 indicating consistent landings of gurnard and latchet from all sea areas from 2015 to 2019; both grey gurnards and red gurnards showed increases in overall landings across this period. Figure 3-7 also presents landings of gurnard species, specifically from the Irish Sea (ICES Division 7a) indicating overall small landings of these species, but with a noticeable increase from 2015 to 2019. Commercial landings of gurnard species from the study area were negligible across the timeseries.

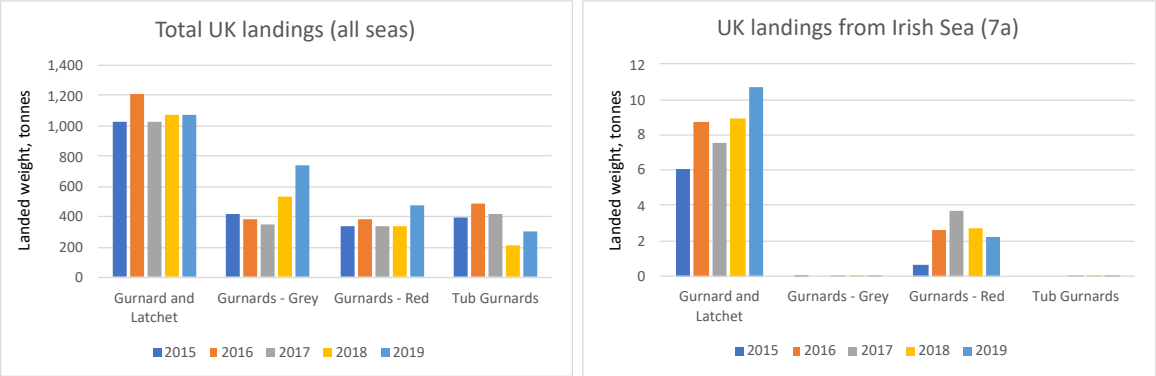

Figure 3-7 Annual commercial landings (tonnes) of gurnard species by UK commercial fishing vessels indicating total UK landings from all seas (left) and UK landings from the Irish Sea (right) (Source: MMO, 2020)

Thornback ray: Significant decreases in thornback ray were noted from 2000-2003, with approximately 20 being caught in an entire season (per boat). However, since 2015 numbers and catches have increased dramatically with up to 20 being caught on a single trip per day. ICES reports, based on trawl surveys, an increase in stock size of thornback ray more widely across the Irish Sea (ICES, 2020).

Bull huss: Consultees consistently cited increases in catches of bull huss across the North Wales region. Typically catches of bull huss range from 20-30 to 50-60 per day per trip, dependant on the length of trip. Numbers have been very good consistently for 15 years or more.

Cod: Consultees cited a decrease in catches of cod across 2005-2019, with currently 1 cod caught per trip per day (on a good day). It is recognised, however, that trends in cod are linked to stock-level declines across the Irish Sea associated with a number of environmental (e.g. sea temperature) and human factors (e.g. commercial fishing pressure and bycatch).

The latest ICES stock assessment for cod in the Irish Sea (ICES, 2020) illustrates the dramatic decline in the cod Irish Sea stock size and downward trend of spawning stock biomass relative to maximum sustainable yield (Figure 3-8).

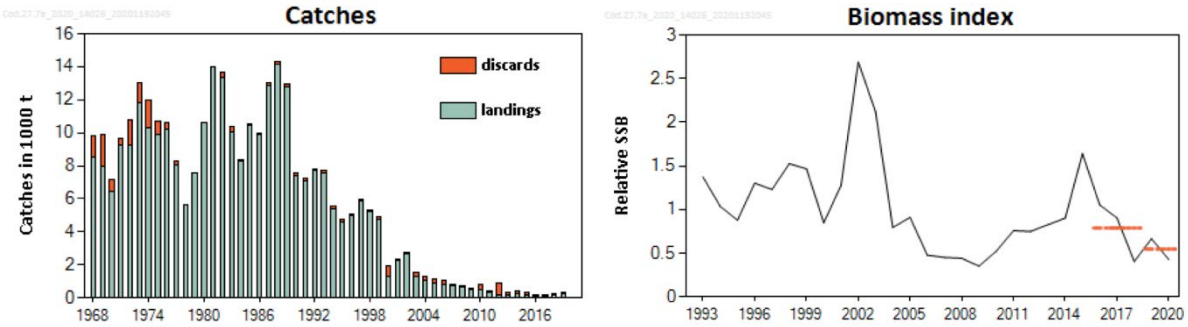

Figure 3-8 Commercial catches of cod from the Irish Sea (left) and stock size relative to biomass index (right) (Source: ICES, 2020)

Black bream: A number of consultees cited a decrease in the number of black bream, particularly with the reduction of productive fishing marks within existing wind farms.

Pollack: Decline in the number of pollack caught during wreck fishing was noted, particularly inside 20 mile and during offshore wind farm construction. Stakeholders consider that levels have not returned since completion of construction works. Commercial landing statistics indicate an overall decline in total UK landings of pollack for all seas, while the trends in landings from the Irish Sea are more sporadic, with growth in 2018, followed by decline in

2019 (Figure 3-9). Notably, a significant drop in 2016 commercial landings of pollack is recorded.

Conger eel: the wrecks in the area that can be fished at anchor no longer produce the level of conger eels caught pre offshore wind farm construction. It is cited that this trend has also been noted by divers. Commercial landings show variable levels of conger eel landings from the Irish Sea, with growth in 2017 and 2018 and a drop in 2019 (Figure 3-9). Notably, a significant drop in 2016 commercial landings of conger eel is recorded.

Wrasse, gobies and blennies: several species, including ballan wrasse and 'mini species' of gobies and blennies are noted to be caught within wind farms, where rock armour around turbine bases have provided suitable habitat. Commercial landings of wrasse from all UK areas, including the Irish Sea, are very low and it is not possible to determine trends.

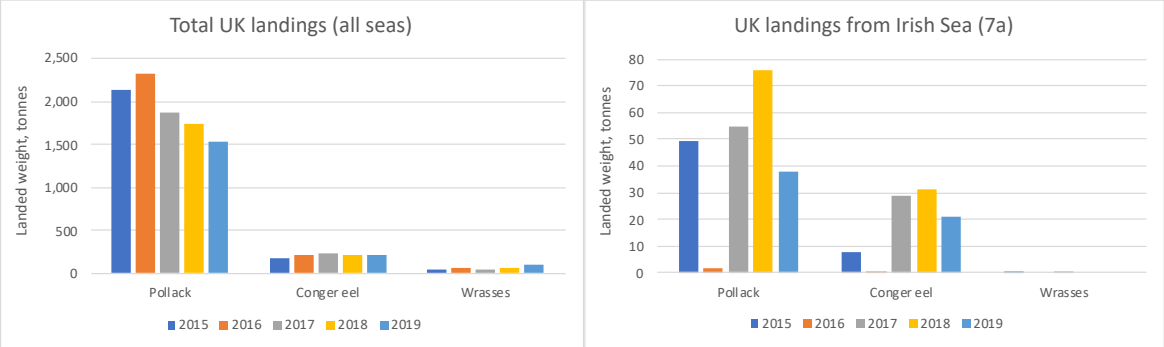

Figure 3-9 Annual commercial landings (tonnes) of pollack, conger eel and wrasses by UK commercial fishing vessels indicating total UK landings from all seas (left) and UK landings from the Irish Sea (right) (Source: MMO, 2020)

Flatfish: dabs, plaice and turbot were all cited by consultees as having declined markedly during offshore wind farm construction, and have not returned since. Commercial landings of plaice have decreased at a UK level from 2015 to 2019, while landings form the Irish Sea showed a marked decrease from 2015 to 2016, where levels have remained fairly consistent up to 2019. Turbot landings are relatively low in weight, with no apparent trends, and landings of dab have remained consistently low at a UK and Irish Sea level.

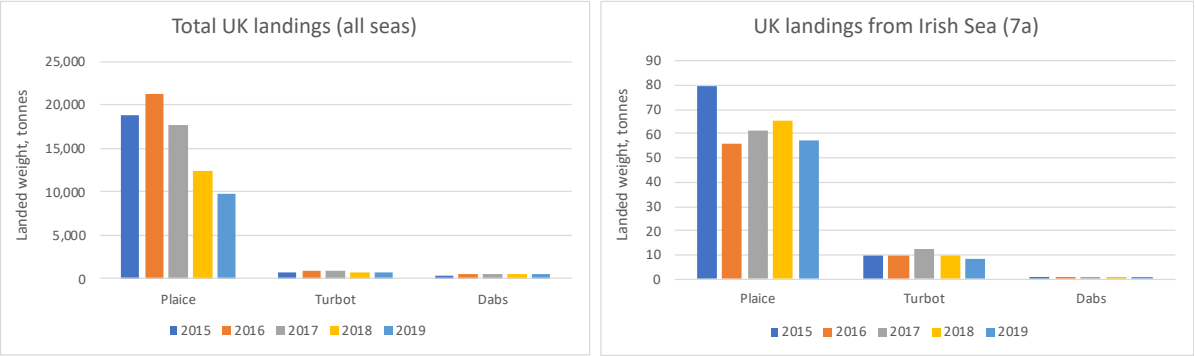

Figure 3-10 Annual commercial landings (tonnes) of pollack, conger eel and wrasses by UK commercial fishing vessels indicating total UK landings from all seas (left) and UK landings from the Irish Sea (right) (Source: MMO, 2020)

3.3.3 Areas Fished

Spatial data on charter angling catches for Wales are limited; the publicly available spatial datasets are depicted below.

Figure 3-11 shows annual charter boat intensity derived from survey data collected in 2003 and 2004; it shows relatively high levels of angling effort in the Study Area.

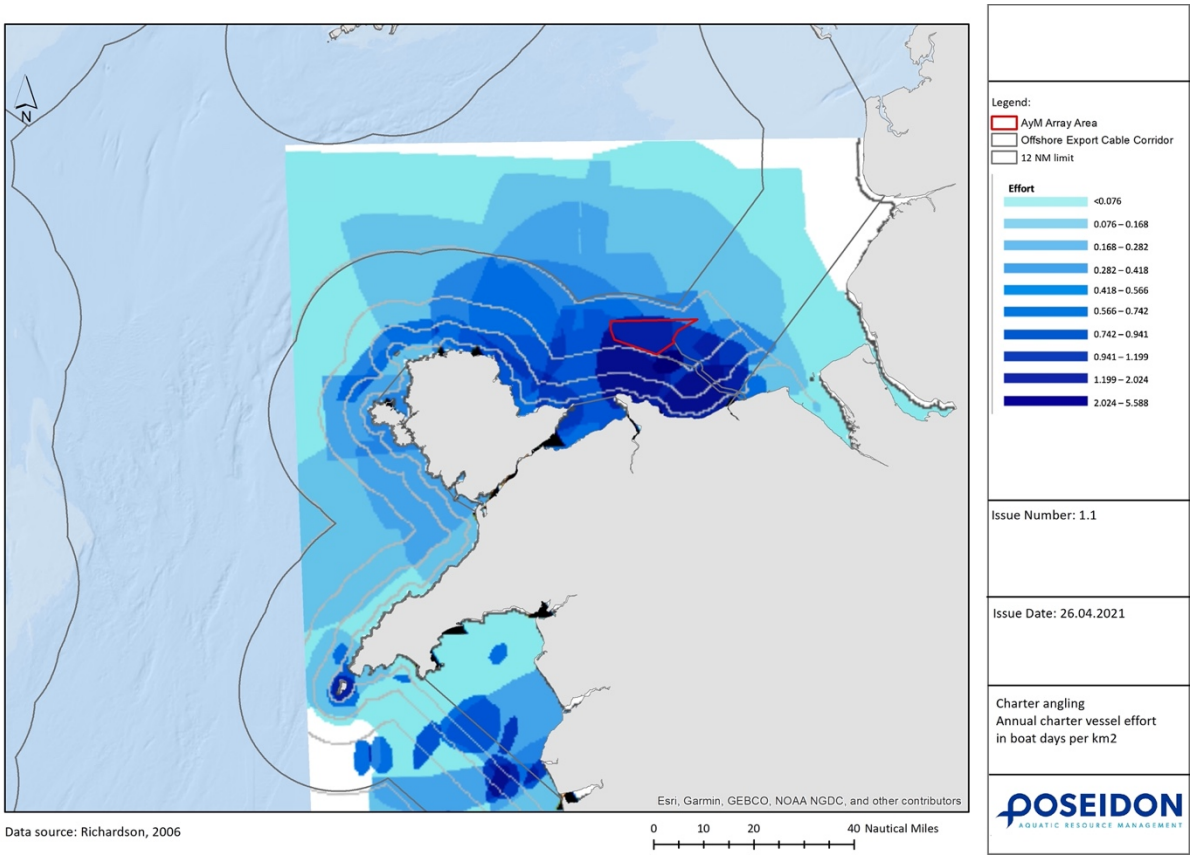

Figure 3-11 Annual charter vessel effort in boat days per km2 per year, derived from survey data collected in 2003 and 2004 (Source: Richardson, 2006)

Figure 3-12 shows charter vessel activity as mapped by the FishMap Môn project (Aron et al., 2014), with data derived from interviews with charter boat skippers (noting that at the time, 26 of an identified 28 skippers in the North Wales project area participated).

Consultation has identified that charter vessels do routinely fish in the Study Area, and within the Awel y Môr array area and export cable corridor. Various grounds and wreck marks are targeted, with activity throughout the year and some seasonal increases peak charter vessel activity between June and October. Some charter vessel skippers also confirmed that they fish within the adjacent operational wind farms of Rhyl Flat and Gwynt y Môr.

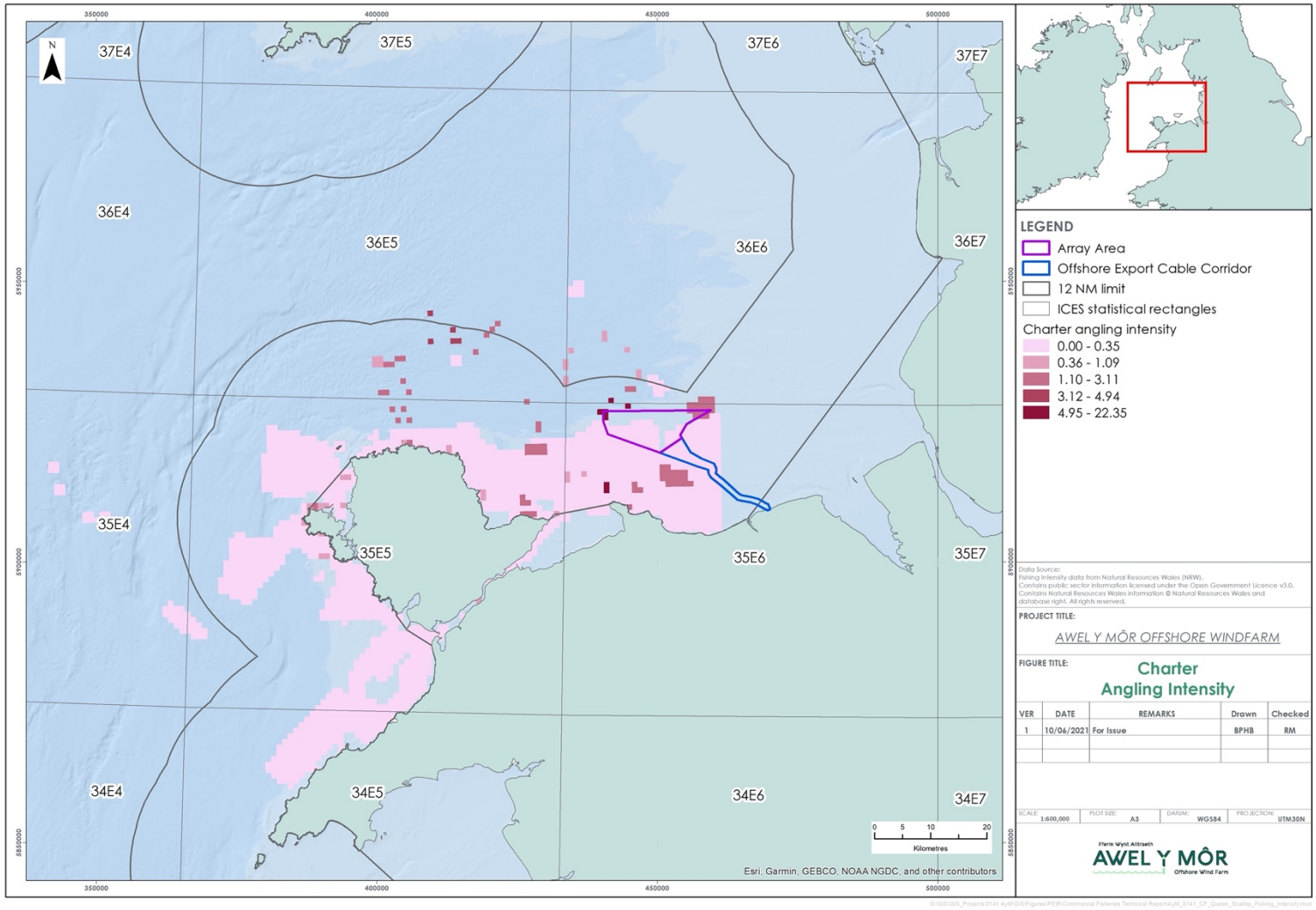

Figure 3-12 Charter vessel intensity, as mapped by the FishMap Môn project (Source: Aron et al. 2014)

4. Summary

This report, prepared to inform EIA for Awel y Môr, describes charter angling activity across a Study Area that includes Awel y Môr and adjacent regional waters. In preparing this report, publicly available data and literature have been reviewed, and informal engagement undertaken with operators of charter angling vessels known to be active in the Study Area.

Charter angling from vessels is a popular recreational activity in Welsh waters. Studies have estimated that approximately 60 charter angling vessels operate in waters around the Welsh coastline, and consultation undertaken to inform this report indicated that a number of charter angling vessels are regularly active in the Study Area.

Within the Study Area, charter angling vessels target a variety of grounds year-round. Around 25 species of fish are regularly caught by anglers on charter vessels, including 'trophy' species such as bass, tope and conger eel, and other more commonly encountered species such as mackerel and coalfish. Consultation undertaken to inform this report indicated that there are grounds targeted by charter angling vessels within Awel y Môr boundaries.

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Annex A: Questionnaire proforma used in sector consultation.

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

Coversheet

Project Name:	Awel Y Môr Offshore Wind Farm Project

Document Title:	Charter Angling Business Questionnaire
Classification:	Confidential

Date:	11/03/2020	**Pages:**	4
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	

Charter Angling Business 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 operating practices

2a	Number of angling days per year	
2b	Hours fished in an angling day	
2c	Number of anglers per boat	Capacity: Typical/average number per trip:
2d	Typical distance travelled from port per day	
2e	Charge per angler per trip	

3. Working patterns (approximate / on average)

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

3e	Seasonality	**Seasonality for all grounds targeted**	**Typically target AyM & surrounding areas**
	Example	Actively operate from Mar-Dec	July to September
	General operations		
	When targeting specific species (specify species)		
	Other (specify)		

4. Typical catches

4a	Typical catches:	Weekly	Annually
	Tope (specify units: number/kg)		
	Gurnard (number/kg)		
	Thornback ray (number/kg)		
	Bull huss (number/kg)		
	Cod (number/kg)		
	Others: specify		
4b	Notable trends or annual variations:	e.g. increase or decrease in catches in specific years	
	Tope		
	Gurnard		
	Thornback ray		
	Bull huss		
	Cod		
	Other: specify		

5. Where do you fish

5a	Based on the map provided on the next page, please indicate the location of fishing grounds you target including: i. routinely target and ii. occasionally target. Including details of target species where relevant. 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

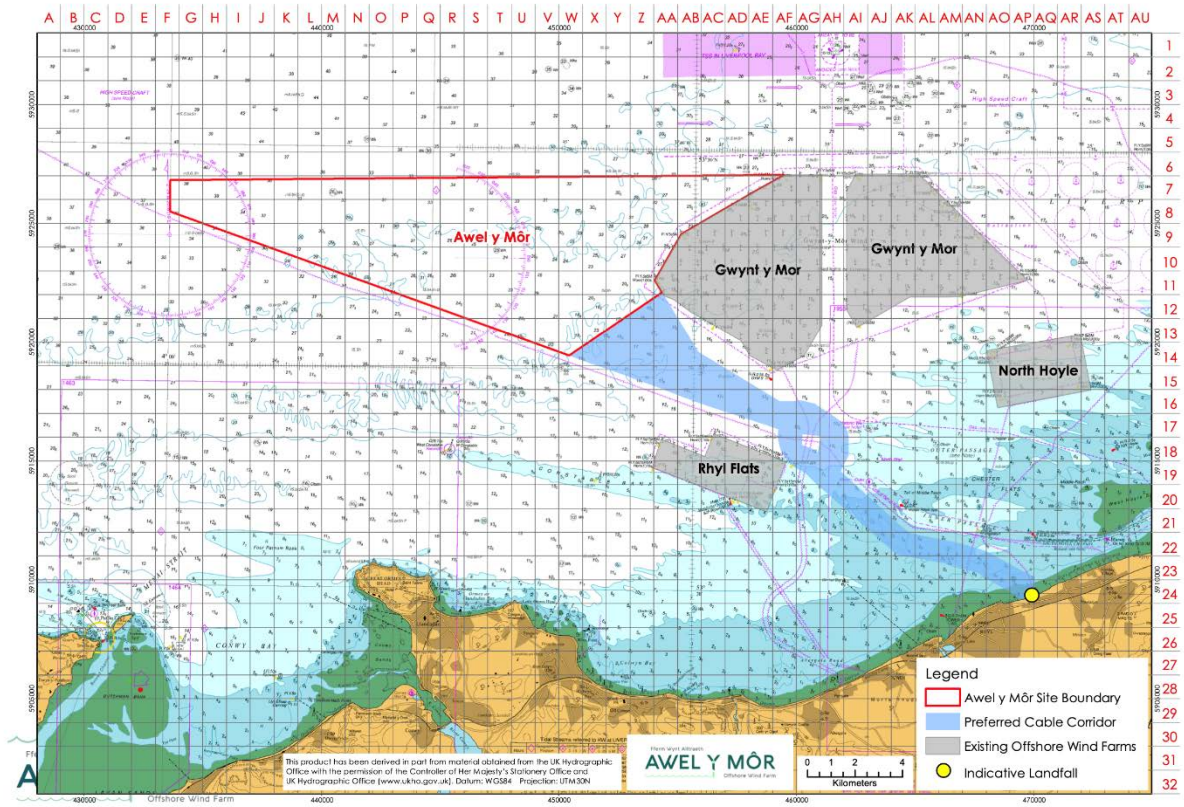
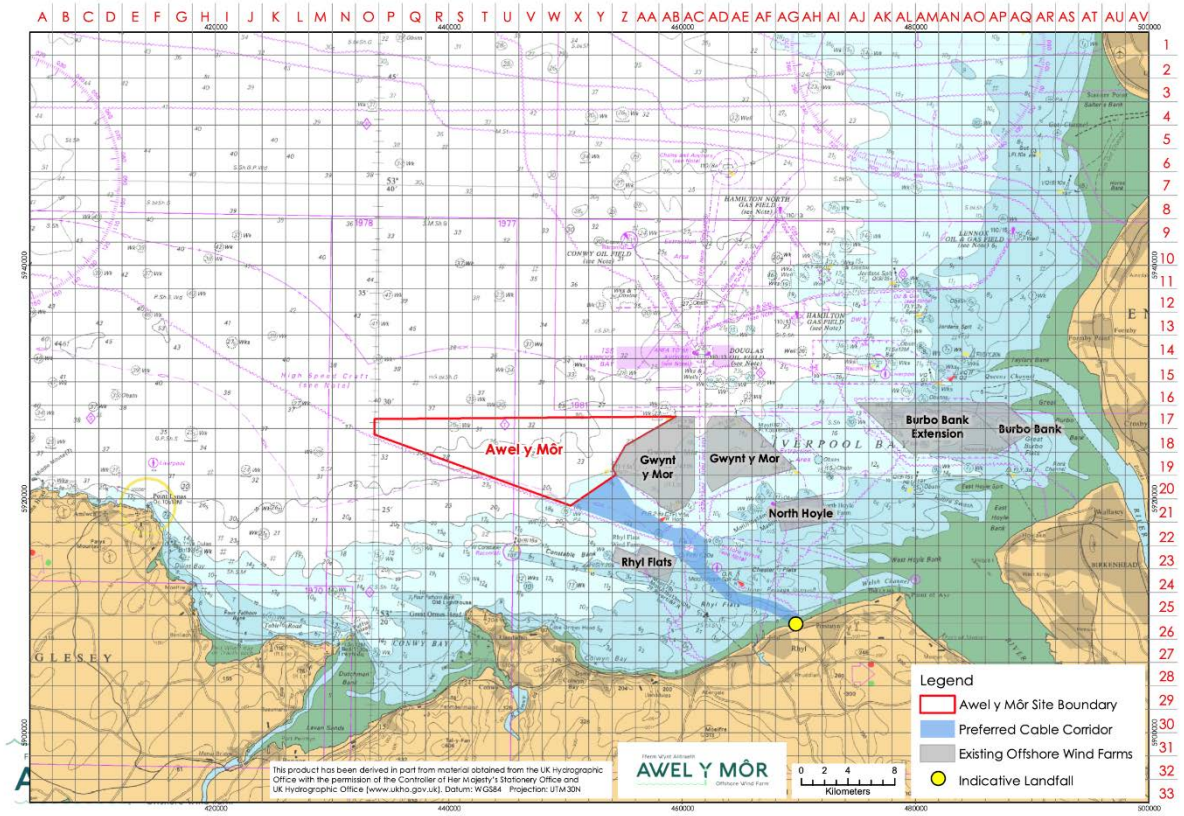


Chart 2



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