Awel y Môr Offshore Wind Farm

Preliminary Environmental Information Report

Volume 2, Chapter 8: Commercial Fisheries

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Glossary of terms

TERM	DEFINITION
Beam trawl	A method of bottom trawling with a net that is held open by a beam, which is generally a heavy steel tube supported by steel trawl heads at each end. Tickler chains or chain mats, attached between the beam and the ground rope of the net, are used to disturb fish and crustaceans that rise up and fall back into the attached net.
Bycatch	Catch which is retained and sold but is not the target species for the fishery.
Demersal	Living on or near the seabed.
Demersal trawl	A fishing net used by towing the trawl along or close to the seabed.
Fish stock	Any natural population of fish which is an isolated and self-perpetuating group of the same species.
Fishery	A group of vessel voyages which target the same species or use the same gear.
Fishing ground	An area of water or sea bed targeted by fishing activity.
Fleet	A physical group of vessels sharing similar characteristics (e.g. nationality).
Gear type	The method / equipment used for fishing.
ICES statistical rectangles	ICES standardise the division of sea areas to enable statistical analysis of data. Each ICES statistical rectangle is '30 min latitude by 1 degree longitude' in size (approximately 30 x 30 nautical miles). A number

TERM	DEFINITION
	of rectangles are amalgamated to create ICES statistical areas.
Landings	Quantitative description of the amount of fish returned to port for sale, in terms of value or weight.
Otter trawl	A net with large rectangular boards (otter boards) which are used to keep the mouth of the trawl net open. Otter boards are made of timber or steel and are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, pushes them outwards and prevents the mouth of the net from closing.
Pelagic	Of or relating to the open sea.
Pelagic trawl	A net used to target fish species in the mid water column.
Quota	A proportion of the Total Allowable Catch for a fish stock.
Scallop dredge	A method to catch scallop using steel dredges with a leading bar fitted with a set of spring loaded, downward pointing teeth. Behind this toothed bar (sword), a mat of steel rings is fitted. A heavy net cover (back) is laced to the frame, sides and after end of the mat to form a bag.
Stakeholder	Person or organisation with a specific interest (commercial, professional or personal) in a particular issue.
String	A series of static fishing gear (pots) joined together to form a single deployable line of pots.
Vessel Monitoring System	A system used in commercial fishing to allow environmental and fisheries regulatory organizations to

TERM	DEFINITION
	monitor, minimally, the position, time at a position, and course and speed of fishing vessels.

Abbreviations and acronyms

TERM	DEFINITION
AIS	Automatic Identification System
AyM	Awel y Môr Offshore Wind Farm
Cefas	Centre for Environment, Fisheries and Aquaculture Science
DCF	Data Collection Framework
DCO	Development Consent Order
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EU	European Union
FLCP	Fisheries Liaison and Co-existence Plan
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MPS	Marine Policy Statement
NPS	National Policy Statement

TERM	DEFINITION
NSIP	Nationally Significant Infrastructure Projects
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
UK	United Kingdom
UKFEN	UK Fisheries Economic Network
VMS	Vessel Monitoring System
WFA	Welsh Fishermen's Association
WNMP	Welsh National Marine Plan

Units

UNIT	DEFINITION
GBP	British pound sterling
hp	Horsepower
km	Kilometres
knots	Nautical mile per hour
kW	Kilowatts
m	Metres
NM	Nautical Mile
t	Tonne

8 Commercial Fisheries

8.1 Introduction

1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the results of the preliminary Environmental Impact Assessment (EIA) for the potential impacts of Awel y Môr Offshore Wind Farm (hereafter referred to as AyM) on commercial fisheries. Specifically, this chapter considers the potential impact of AyM seaward of Mean High Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases.

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

3 This chapter has been informed by the following PEIR chapters:

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

4 This chapter considers commercial fisheries activity, which is understood as fishing activity legally undertaken where the catch is sold for taxable profit. Potential impacts of AyM on charter angling, defined as fishing for marine species where the purpose is recreation and not sale or trade, are assessed in Volume 2, Chapter 12: Other Marine Users and Activities, and a description of existing recreational angling activity is provided in Volume 4, Annex 12.1.

8.2 Statutory and policy context

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

8.2.1 National Planning Policy

6 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to commercial fisheries, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3, DECC, 2011b).

7 NPS EN-3 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 1 below.

8 NPS EN-3 also highlights several factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 2.

Table 1: Summary of NPS EN-3 provisions relevant to commercial fisheries.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
NPS EN-3 Consultation	"Early consultation should be undertaken with statutory advisors and with representatives of the fishing industry which could include discussions of impact assessment methodologies. Where any part of a proposal involves a grid connection to shore, appropriate inshore fisheries groups should also be consulted" (paragraph 2.6.127 of NPS EN-3)	Consultation with representatives of the fishing industry has commenced and is ongoing. Engagement from March 2020 up to the end of April 2021 is summarised in Section 8.3.
	"Where a number of offshore wind farms have been proposed within an identified zone, it may be beneficial to undertake such consultation at a zonal, rather than a site-specific, level" (paragraph 2.6.128 of NPS EN-3)	Consultation has been undertaken at a scale that seeks to capture fishing activity in the region, including in and around AyM. Engagement from March 2020 up to the end of April 2021 is summarised in Section 8.3.
	"The assessment by the applicant should include detailed surveys of the effects on fish stocks of commercial interest and any potential reduction in	Relevant surveys and data are detailed in Volume 2, Chapter 6. In addition, consultation with the fishing industry (see Section 8.3) has identified key concerns as

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	such stocks, as well as any likely constraints on fishing activity within the project's boundaries" (paragraph 2.6.129 of NPS EN-3)	well as available data and potential impacts, which have been taken into account within the commercial fisheries assessment (see Sections 8.10, 8.11 and 8.12).
NPS EN-3 Baseline data	"Robust baseline data should have been collected and studies conducted as part of the assessment" (paragraph 2.6.129 of NPS EN-3)	Robust baseline datasets analysed include EU and UK landings statistics and spatial data and published reports, supported by industry consultation, as described in Section 1. Where data sources allow, a five-year trend analysis (extended in some cases) has been undertaken, using the most recent annual datasets available at the time of writing.
NPS EN-3 Safety Zones	"Where there is a possibility that safety zones will be sought around offshore infrastructure, potential effects should be included in the assessment on commercial fishing" (paragraph 2.6.130 of NPS EN-3)	The need for safety zones has been considered by the navigational risk assessment (NRA) completed for AyM. The risk assessment results have been taken into account within the commercial fisheries

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	"Where the precise extents of potential safety zones are unknown, a realistic worst case scenario should be assessed. Applicants should consult the MCA" (paragraph 2.6.131 of NPS EN-3)	assessment (see Sections 8.10, 8.11 and 8.12). Consultation has also been undertaken with the Maritime and Coastguard Agency (MCA) (see Chapter 10). It is assumed there would be safety zones of up to 500 m around infrastructure under construction, decommissioning and major maintenance works.
NPS EN-3 Fish stocks	"The assessment by the applicant should include detailed surveys of the effects on fish stocks of commercial interest and the potential reduction or increase in such stocks that will result from the presence of the wind farm development and of any safety zones" (paragraph 2.6.131 of NPS EN-3)	The AyM assessment has considered the effects on commercial fish stocks (see Chapter 6).

Table 2: Summary of EN-3 policy on decision-making relevant to commercial fisheries.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
NPS EN-3 Commercial fisheries	"The Secretary of State should be satisfied that the site selection process has been undertaken in a way that reasonably minimises adverse effects on fish stocks, including during peak spawning periods and the activity of fishing itself" (paragraph 2.6.132 of NPS EN-3)	The effects arising from AyM have been and will be discussed with statutory bodies during pre- and post-application consultation. AyM is taking, and will continue to take, steps to minimise the effects upon the fishing industry in the area through appropriate mitigation where required. Commitments related to commercial fisheries and adopted as part of AyM are provided in Section 8.9.
	"The Secretary of State should consider the extent to which the proposed development occupies any recognised important fishing grounds and whether the project would prevent or significantly impede protection of sustainable commercial fisheries or fishing activities. Where the IPC considers the wind farm would significantly impede protection of sustainable fisheries or fishing activity at recognised	The extent to which AyM impacts on recognised and important fishing grounds has been considered and consultation with fishing stakeholders in order to fully understand any potential impacts has been undertaken (see Section 8.3). The results of the commercial fisheries assessment are presented in Sections 8.10, 8.11 and 8.12.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	important fishing grounds, this should be attributed correspondingly significant weight" (paragraph 2.6.132 of NPS EN-3)	
	"The Secretary of State should be satisfied that the applicant has sought to design the proposal having consulted representatives of the fishing industry with the intention of minimising the loss of fishing opportunity taking into account effects on other marine interests. Guidance has been jointly agreed by the renewables and fishing industries on how they should liaise with the intention of allowing the two industries to successfully co-exist" (paragraph 2.6.133 of NPS EN-3)	AyM is taking, and will continue to take, steps to minimise the effects upon the fishing industry in the area through appropriate mitigation where required. Commitments related to commercial fisheries and adopted as part of AyM are provided in Section 8.9.
NPS EN-3 Mitigation for Commercial Fisheries	"Any mitigation proposals should result from the applicant having detailed consultation with relevant representatives of the fishing industry" (paragraph 2.6.134 of NPS EN-3)	Consultation with UK stakeholders from the fishing community is on-going (see Section 8.3).

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	"Mitigation should be designed to enhance where reasonably possible any potential medium and long-term positive benefits to the fishing industry and commercial fish stocks" (paragraph 2.6.135 of NPS EN-3)	A range of commitments are presented within Section 8.9.

8.2.2 Other Relevant Policies

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

10 The Welsh National Marine Plan (WNMP; Welsh Government, 2019) echoes the MPS, and Policy SAF-01b seeks to "enable established activities to continue and thrive wherever possible" (paragraph 404). The Policy also recognises that much of Wales' fishing activity is often very localised and dependent upon a particular area or habitat. Unlike larger, more nomadic vessels with mobile gears, Welsh inshore vessels cannot easily relocate to other areas where the available space and catch opportunity is likely to be limited. The WNMP supports development proposals that will support and enhance sustainable fishing activities.

8.2.3 Other Relevant Information and Guidance

11 In addition to the planning policy guidance listed above, the following guidance documents have been used to inform the assessment of potential impacts on commercial fisheries:

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network [UKFEN] and Seafish, 2012);
- Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014 and BERR, 2008);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);

- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b);
- Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms (RenewableUK, 2013);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Contract report: ME5403 (Cefas, 2012);
- Fisheries Liaison Guidelines - Issue 6 (UK Oil and Gas, 2015);
- Fishing and Submarine Cables - Working Together (International Cable Protection Committee, 2009); and
- Offshore Wind Farms – Guidance note for Environmental Impact Assessment in respect of Food and Environment Protection Act (FEPA) and Coast Protection Act (CPA) requirements (Centre for Environment, Fisheries and Aquaculture Science [CEFAS], Marine Consents and Environment Unit [MCEU], Department for Environment, Food and Rural Affairs [DEFRA] and Department of Trade and Industry [DTI], 2004).

8.3 Consultation and scoping

12 This section describes the outcome of, and response to, the Scoping Opinion in relation to commercial fisheries assessment and also provides details of the ongoing informal consultation that has been undertaken with stakeholders and individuals.

13 The Applicant submitted a Scoping Report and request for a Scoping Opinion in March 2020. A Scoping Opinion was received in July 2020. The Scoping Report set out the proposed commercial fisheries assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. Table 3 sets out the comments received in Section 4.7 of the PINS Scoping Opinion and how these have been addressed in this PEIR.

14 Informal engagement has been ongoing with a number of stakeholders in relation to commercial fisheries. A summary of the informal engagement undertaken between September 2020 up to and including April 2021 is outlined in this section. Informal engagement is ongoing at the time of PEIR preparation and will be updated from PEIR for DCO application.

Table 3: Summary of consultation relating to commercial fisheries.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
July 2020 PINS Scoping Opinion	Applicant proposed to scope out impact 'Additional steaming to other fishing ground during construction, operation and decommissioning'. PINS do not agree to scope this matter out and requests that the assessment considers this impact.	The impact assessment in Sections 8.10, 8.11 and 8.12 includes an assessment of the additional steaming impact.
July 2020 PINS Scoping Opinion	Applicant proposed to scope out impact 'Impacts to fishing activity from increased vessel traffic associated with construction, operation and decommissioning activities and works. PINS do not agree to scope this matter out and requests that the assessment considers this impact.	The impact assessment in Sections 8.10, 8.11 and 8.12 includes an assessment of impacts associated with increased vessel traffic.
July 2020 PINS Scoping Opinion	Shellfish Protected Waters. PINS states that the Environmental Statement should describe the precise location of the shellfish water protected areas and assessment should consider	Shellfish Protected Waters in coastal sites at Llandudno and Conwy do not overlap AyM (see Volume 4, Annex 3.1: Water Framework Directive Assessment).

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
	effects on these areas and resultant effects on the commercial shellfish trade.	
September 2020 Commercial fisheries stakeholder group meeting	A project update was provided to the stakeholder group. Respondents raised the following key concerns: • Underwater noise and effects of fish resources; • Potential for extension of the Traffic Separation Scheme north of AyM; • Long term effects from construction and operation; and • Cumulative effects from other projects.	Underwater noise and potential impacts to fish and shellfish receptors are assessed in Chapter 6. The impact to commercial resources is assessed in Sections 8.10, 8.11 and 8.12. The requirement for a Traffic Separation Scheme is considered in Chapter 9. Impacts have been assessed throughout the life time of the project in Sections 8.10, 8.11 and 8.12. Cumulative effects have been assessed and presented in Section 8.13.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
December 2020 Commercial fisheries stakeholder group meeting	A project update was provided to the stakeholder group. Respondents raised the following points: • Use of rock protection for cables; • Effects of noise and vibration during operational phase; and • Effects on existing wrecks within the array site.	The maximum design scenario, including assumptions related to rock protection, is presented in Table 10. Potential impacts to fish and shellfish receptors due to underwater noise and vibration are assessed in Chapter 6. The impact to commercial resources is assessed in Sections 8.10, 8.11 and 8.12. Wrecks are protected by Archaeological Exclusion Zones (AEZs), that vary in size according to the sensitivity of the wreck (see Chapter 11: Offshore Archaeology and Cultural Heritage).

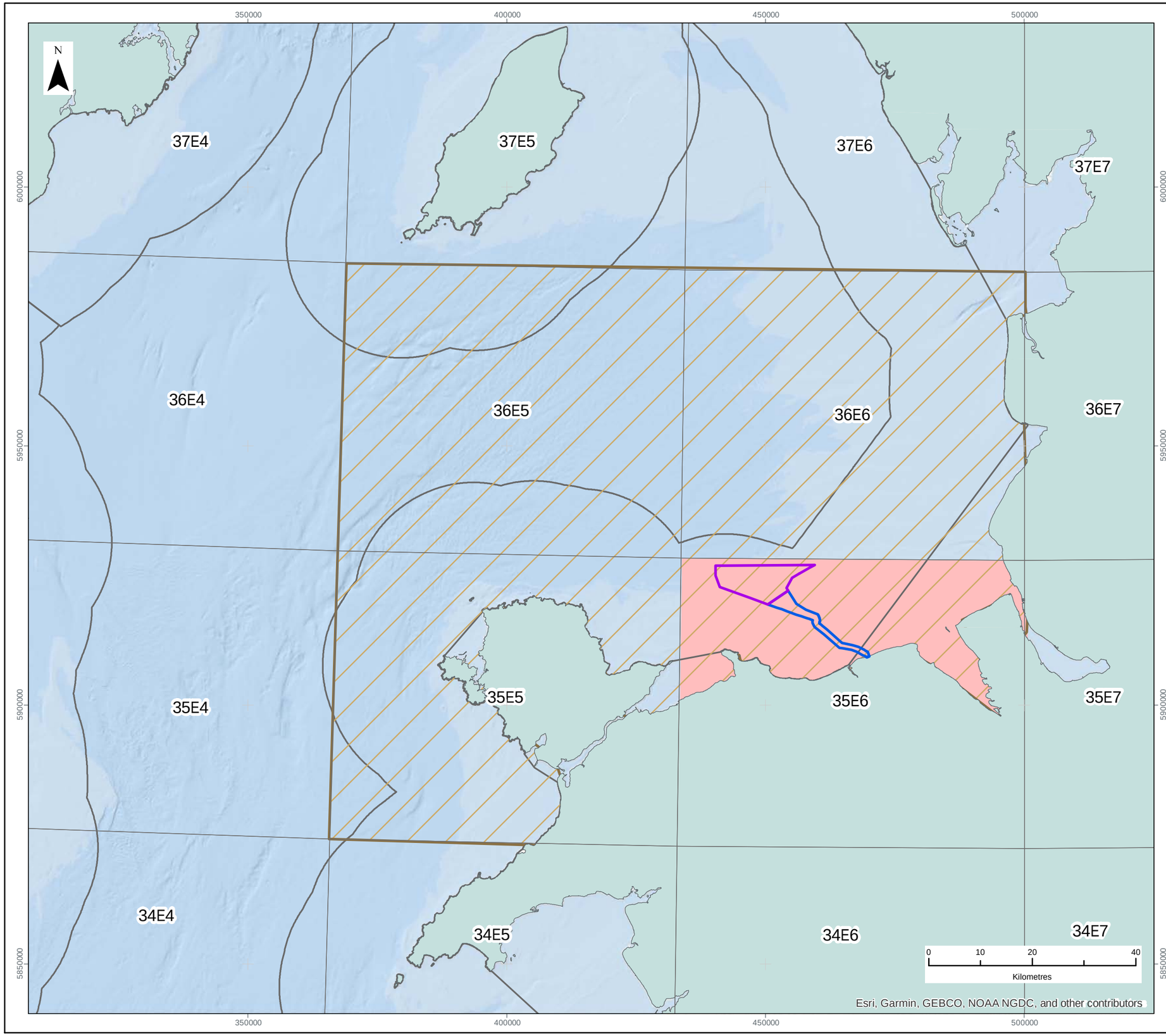
DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
March – April 2021 Individual stakeholder meetings	Individual interviews gathered information on commercial fishing activity, trends and operational patterns.	The commercial fisheries activity is presented in existing environment Section 8.7 and Appendix 8.1: Commercial Fisheries Technical Report.
April 2021 Commercial fisheries stakeholder group meeting	A project update was provided to the stakeholder group and opportunity given to discuss the Draft Fisheries Liaison Plan.	The Applicant is committed to development of a Fisheries Liaison Plan (FLP) as described in Section 8.9.

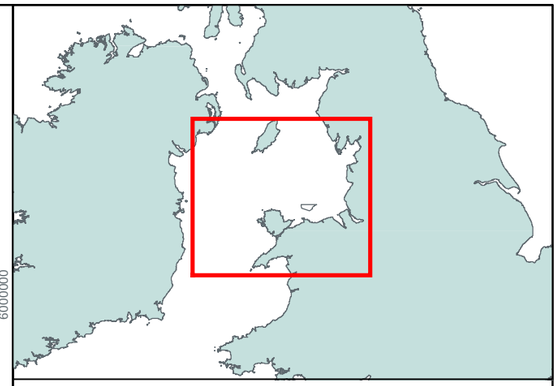
8.4 Scope and methodology

8.4.1 Spatial scope and study area

15 AyM 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. AyM is located inside of 12NM limits. 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.

16 The AyM array area and offshore export cable corridor (ECC) are entirely located within ICES rectangle 35E6, which represents the commercial fisheries study area. The study area is shown in Figure 1; note that AyM occupies only a portion of the ICES rectangle. In order to understand fishing activity in waters adjacent to AyM, baseline data has also been gathered and analysed for surrounding ICES rectangles 36E6, 36E5 and 35E5, which are also shown in Figure 1 as the regional study area.





LEGEND

- Array Area
- Offshore Export Cable Corridor
- Regional Study Area
- Commercial Fisheries Study Area
- 12 NM limit
- ICES statistical rectangles

Data Source:

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE:

Commercial Fisheries Study Area

VER	DATE	REMARKS	Drawn	Checked
1	20/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 1

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:750,000	A3	WGS84	UTM30N

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

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8.4.2 Temporal scope

17 The temporal scope of the assessment for commercial fisheries is consistent with the period over which AyM would be carried out and therefore covers the construction, operational and decommissioning periods as described in Volume 2, Chapter 1: Offshore Project Description.

8.4.3 Potential receptors

18 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the construction, operation and, or decommissioning of AyM. The receptors identified that may experience likely significant effects for commercial fisheries are outlined in Table 4. These receptors have been identified based on desktop analysis of baseline data and stakeholder engagement to date has validated this list.

Table 4: Receptors requiring assessment for commercial fisheries.

RECEPTOR GROUP	RECEPTORS INCLUDED WITHIN GROUP
Potting fleet (i.e. vessels fishing with pots and traps)	Welsh and English vessels targeting whelk, brown crab, lobster and common prawn
Netting fleet (i.e. vessels fishing with nets)	Welsh and English vessels targeting mixed demersal species including bass, flounder and thornback ray
Dredging fleet (i.e. vessels fishing with dredges)	English, Scottish, Northern Irish and Welsh vessels targeting king scallop and queen scallop

8.4.4 Potential effects

19 Potential effects on commercial fisheries receptors that have been scoped in for further assessment are summarised in Table 5, in line with the Scoping Opinion. The effects have the potential to occur across all project phases (i.e. during construction, during operation and maintenance, and during decommissioning) unless otherwise indicated in Table 5. No potential effects have been scoped out from further assessment.

Table 5: Potential effects on commercial fisheries scoped in for further assessment.

RECEPTOR	ACTIVITY OR IMPACT	POTENTIAL EFFECT
All fishing fleets	Reduction in access to, or exclusion from established fishing grounds	Construction / operation and maintenance / decommissioning activities and physical presence of constructed AyM infrastructure leading to reduction in access to, or exclusion from established fishing grounds. Potential for some loss of fishing opportunities.
All fishing fleets	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	Construction / operation and maintenance / decommissioning activities and physical presence of constructed AyM infrastructure leading to displacement from the AyM array area and offshore ECC leading to gear conflict and

RECEPTOR	ACTIVITY OR IMPACT	POTENTIAL EFFECT
		increased fishing pressure on adjacent grounds.
All fishing fleets	Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	Array area and offshore ECC construction / operation and maintenance / decommissioning activities leading to disturbance of commercially important fish and shellfish resources and therefore displacement or disruption of fishing activity.
All fishing fleets	Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity	Movement of vessels associated with AyM construction / operation and maintenance / decommissioning activities adding to the existing volume of marine traffic in the area, leading to interference of fishing activity.
All fishing fleets	Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the AyM area	Construction / operation and maintenance / decommissioning activities and physical presence of constructed AyM infrastructure leading to deviations to fishing vessel steaming routes, with time and cost implications.

RECEPTOR	ACTIVITY OR IMPACT	POTENTIAL EFFECT
All fishing fleets	Physical presence of infrastructure leading to gear snagging (operation and maintenance and decommissioning phases only)	Physical presence of constructed AyM infrastructure posing a snagging risk to fishing gear.

8.4.5 Methodology for baseline data gathering

20 Baseline data collection has been undertaken to obtain information over the study areas described in Section 8.4.1.

Desk Study

21 The data sources that have been collected and used to inform this commercial fisheries assessment are summarised in Table 6. As well as UK data sources, data has been sourced from European fisheries bodies. Relevant literature from a number of additional sources has also been reviewed and is appropriately referenced throughout Section 8.7.

Table 6: Data sources used to inform the commercial fisheries PEIR assessment.

DATA	TIME PERIOD	SOURCE
Landings statistics		
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	2015 – 2019 (data from 2010 onwards considered in analysis of	Marine Management Organisation (MMO)

DATA	TIME PERIOD	SOURCE
landing; species; live weight (tonnes); and value	long-term trends) (2020 data not yet available)	
Landings statistics for EU (including UK) 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
Spatial data		
Vessel Monitoring System (VMS) data for UK-registered vessels of 15m length and over	2017	MMO
Scallop dredge grounds in the Irish Sea mapped by ICES Working Group on Scallops	2019	ICES
Fishing intensity for nine gear types in a defined project area off the north Wales coastline	2013	FishMap Môn project
Fishing activity for mobile and static gear in Welsh waters	2019	Welsh Government

22 Landings statistics for UK registered vessels were obtained from the MMO with the following parameters: year; month; gear type; ICES rectangle; species; live weight (tonnes) and first sales value (£) across a five-year period (2015 to 2019; this includes the period in which Gwynt y Môr Offshore Wind Farm (GyM) became operational).

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

24 Vessel Monitoring System (VMS) is a form of satellite tracking using transmitters on board fishing vessels. Annual VMS data are collated by the MMO for all vessels ≥15m registered to the UK, including all gear types. VMS data for UK vessels have been analysed for 2017.

Data Limitations

25 Limitations of landings data include the spatial size of ICES rectangles which can misrepresent actual activity across AyM and care is therefore required when interpreting the data. A further limitation of landings data is the potential under-reporting of landings associated with potting vessels, which may occur as a result of estimating catches (as opposed to accurate weighing) and not reporting catches that fall below the acceptable limit as defined within the UK Registration of Buyers and Sellers (i.e. when purchases of first sale fish direct from a fishing vessel are wholly for private consumption, and less than 30kg is bought per day).

26 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 is no longer available by ICES rectangle.

27 Limitations of VMS data are primarily focused on the coverage being limited to vessels ≥15m for MMO data. 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 does not include vessels typically operating in inshore areas (i.e. which typically comprises of vessels <15m in length).

28 FishMap Môn spatial data is understood to have been derived from interviews with fishermen; in the absence of being able to obtain the project report or access metadata, is not clear how representative the resulting intensity maps are. Maps of fishing activity by the Welsh Government for inclusion in the WNMP provide a useful indication of the spatial extent of mobile and static gear activity, though it is noted that a number of data sources have been compiled in preparation of these maps and that individual data sources are not referenced.

29 Data limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources and consultation with the fishing industry. As data form only part of the evidence base, the limitations identified are not considered to significantly affect the certainty or reliability of the impact assessments in Sections 8.10, 8.11 and 8.12.

8.5 Assessment criteria and assignment of significance

30 The project-wide generic approach to assessment is set out in Volume 1, Chapter 3: EIA Methodology. The assessment methodology for commercial fisheries is consistent with the approach.

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

32 In assessing the magnitude of the impact, the value and vulnerability of the receptor, i.e. the fishing fleet under assessment, together with the reversibility of the impact, are considered. Due to the range in scale, value (in terms of both landings and income/profit) and operational practises, within the commercial fishing fleets assessed, specific economic criteria were not set for defining value within the categories of high, medium or low. Instead, these classifications were based on judgement informed by the baseline characterisation and consultation with the industry. Magnitude of impact is defined in Table 7.

Table 7: Impact magnitude definitions.

MAGNITUDE	DEFINITION
High (Adverse)	Impact is of long-term duration (e.g. greater than 8 years duration) and/or is of extended physical extent; and Impact is expected to result in one or more of the following: • substantial loss of target fish or shellfish biological resource (e.g. loss of substantial proportion of resource within project area); and • substantial loss of ability to carry on fishing activities (e.g. substantial proportion of effort within project area).
High (Beneficial)	Impact is expected to result in one or more of the following: • large scale or major improvement of resource quality, measurable against biomass reference points; and • extensive restoration or enhancement of habitats supporting commercial fisheries resources.
Medium (Adverse)	Impact is of medium-term duration (e.g. less than 8 years) and/or is of moderate physical extent; and Impact is expected to result in one or more of the following:

MAGNITUDE	DEFINITION
	▲ partial loss of target fish or shellfish biological resource (e.g. moderate loss of resource within project area); and ▲ partial loss of ability to carry on fishing activities (e.g. moderate reduction of fishing effort within project area).
Medium (Beneficial)	Impact is expected to result in one or more of the following: ▲ moderate improvement of resource quality; and ▲ moderate restoration or enhancement of habitats supporting commercial fisheries resources.
Low (Adverse)	Impact is of short-term duration (e.g. less than 2-3 years) and/or is of limited physical extent; and Impact is expected to result in one or more of the following: ▲ minor loss of target fish or shellfish biological resource (e.g. minor loss of resource within project area); and ▲ minor loss of ability to carry on fishing activities (e.g. minor reduction of fishing effort within project area).
Low (Beneficial)	Impact is expected to result in one or more of the following: ▲ minor benefit to or minor improvement of resource quality; and ▲ minor restoration or enhancement of habitats supporting commercial fisheries resources.
Negligible (Adverse)	Impact is of very short-term duration (e.g. less than 1 year) and/or physical extent of impact is negligible; and Impact is expected to result in one or more of the following: ▲ slight loss of target fish or shellfish biological resource (e.g. slight loss of resource within project area); and

MAGNITUDE	DEFINITION
	▲ slight loss of ability to carry on fishing activities (e.g. slight loss of fishing effort within project area).
Negligible (Beneficial)	Impact is expected to result in one or more of the following: ▲ very minor benefit to or very minor improvement of resource quality; and ▲ very minor restoration or enhancement of habitats supporting commercial fisheries resources.

33 The definitions employed in assigning receptor sensitivity are provided in Table 8.

Table 8: Sensitivity/importance of the receptor.

RECEPTOR SENSITIVITY/ IMPORTANCE	DESCRIPTION/ REASON
High	Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. And/or: No alternative fishing grounds are available.
Medium	Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. And/or: Low levels of alternative fishing grounds are available and/or fishing fleet has low operational range.
Low	Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability. And/or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.

RECEPTOR SENSITIVITY/ IMPORTANCE	DESCRIPTION/ REASON
Negligible	Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. And/or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.

34 The significance of the effect upon commercial fisheries is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in Table 9.

Table 9: Matrix to determine effect significance.

		SENSITIVITY			
		HIGH	MEDIUM	LOW	NEGLIGIBLE
ADVERSE MAGNITUDE	HIGH	Major	Major	Moderate	Minor
	MEDIUM	Major	Moderate	Minor	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
BENEFICIAL MAGNITUDE	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	MEDIUM	Major	Moderate	Minor	Negligible
	HIGH	Major	Major	Moderate	Minor

Note: Effects of 'moderate' significance or greater are defined as significant with regard to the EIA Regulations.

8.6 Uncertainty and technical difficulties encountered

35 Limitations associated with the data used to inform the description of the existing environment are described in Section 8.4.5 above, and further in Annex 8.1: Commercial Fisheries Technical Report. As explained above, these limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources and consultation with the fishing industry. As data form only part of the evidence base, the limitations identified are not considered to significantly affect the certainty or reliability of the impact assessments in Sections 8.10, 8.11 and 8.12.

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

8.7 Existing environment

37 This section presents the existing baseline for commercial fisheries, using the most recent datasets available at the time of writing (2012-2016 for EU DCF data; 2015-2019 for MMO data; 2017 for MMO VMS data).

38 This section provides an overview of all landings from the AyM commercial fisheries study area (i.e. ICES rectangles 35E6) followed by analysis on a fishery-by-fishery basis, where details on the nationality of vessels, species caught, and location of fishing activity is provided.

39 This section should be read in conjunction with Annex 8.1: Commercial Fisheries Technical Report, which provides an extended description of baseline conditions, including fishing gear and vessel characteristics and profiles of fishing activity on a country basis.

8.7.1 Overview of landings from the study area

40 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). Data are presented for the annual (2015-2019) landed weight and value by UK vessels in Figure 2 and Figure 3 respectively, indicating that landings are dominated by shellfish species.

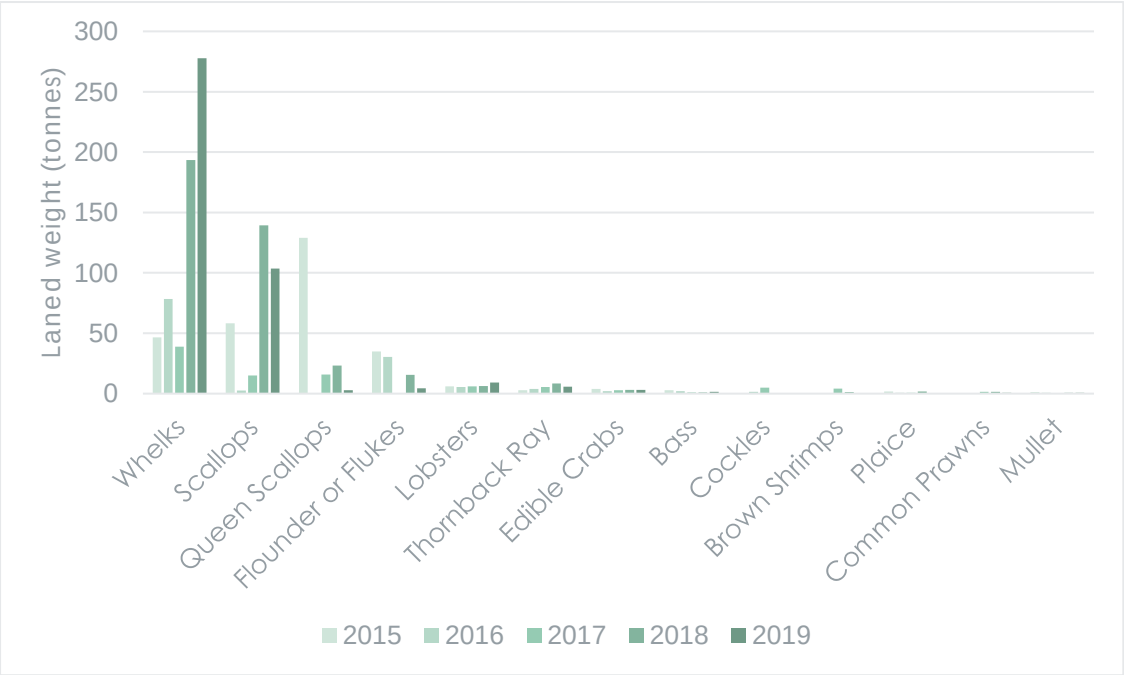


Figure 2: Key species by annual landed weight (tonnes) (2015 to 2019) from the Study Area (MMO, 2020).

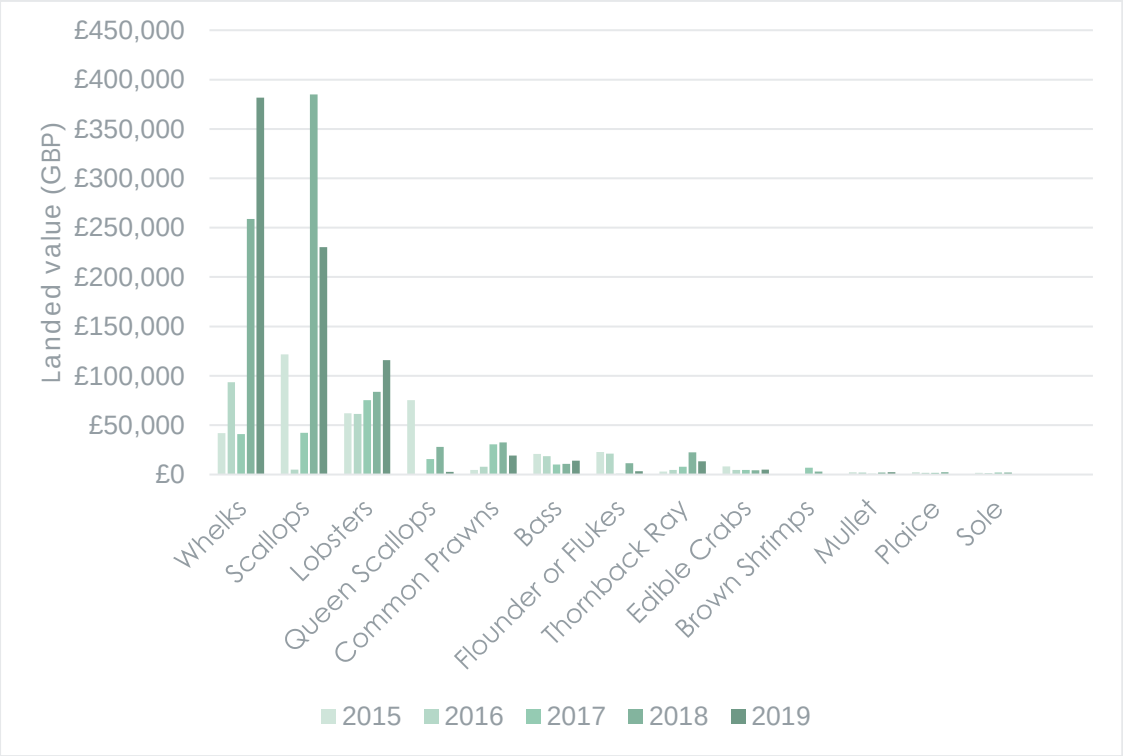


Figure 3: Key species by annual landed value (GBP) (2015 to 2019) from the Study Area (MMO, 2020).

41 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).

42 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*.

43 Informal engagement, and information provided by the AyM Fisheries Liaison Officer, has indicated that approximately 20 fishermen are regularly active in and around AyM. Of these, five fishermen responded to informal engagement invitations and completed questionnaires and follow-up interviews, noting that one of these fishermen is the owner of four vessels. Engagement outcomes indicate that fishing activity across AyM is predominantly undertaken by vessels deploying pots and nets. Scallop dredging in and around AyM is typically undertaken by a single vessel, with additional scallop dredgers occasionally fishing the area. Local fleets are described in more detail in Annex 8.1: Commercial Fisheries Technical Report.

44 The longer-term trend in landings values is depicted in Figure 4, which indicates that landings from the study area have historically been dominated by shellfish species. Between 2010 and 2017, which includes the period of GyM construction, annual landings values fluctuated. Landings values notably increased in 2018 and 2019 as a result primarily of increases in landings of whelk and king scallop.

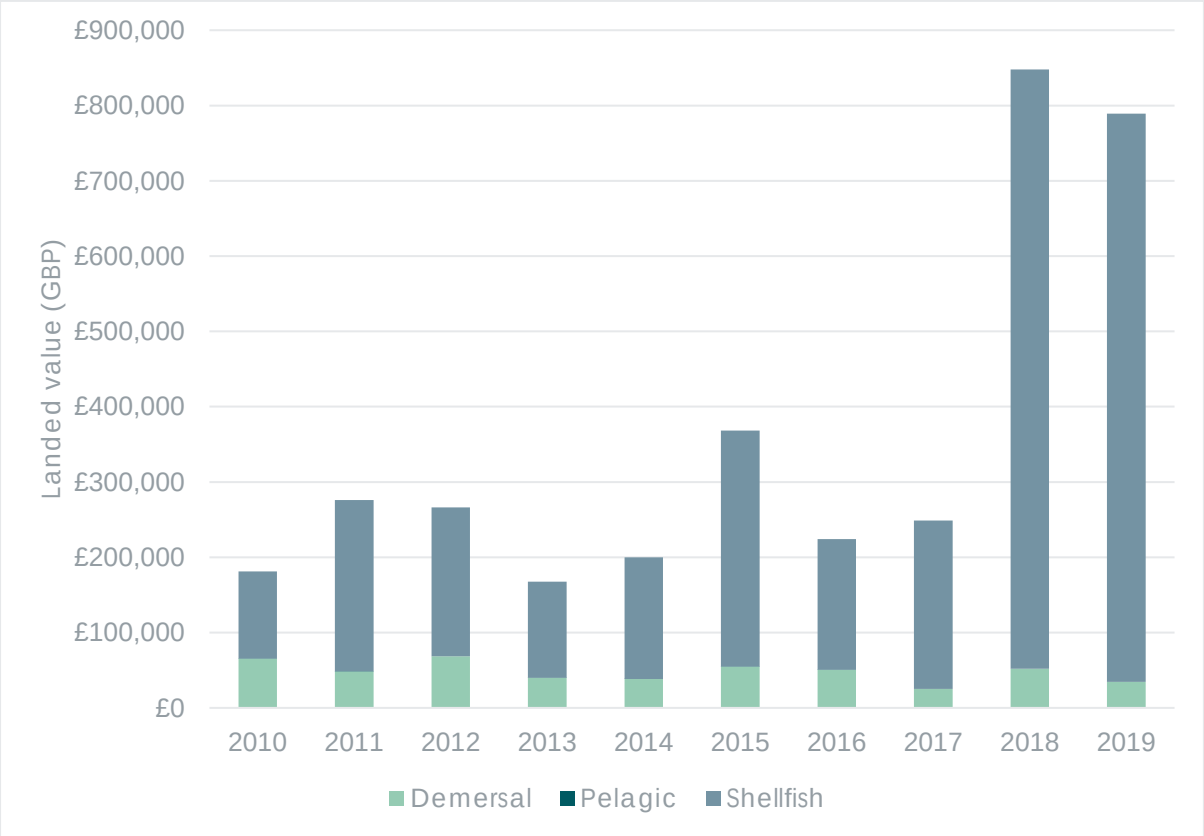


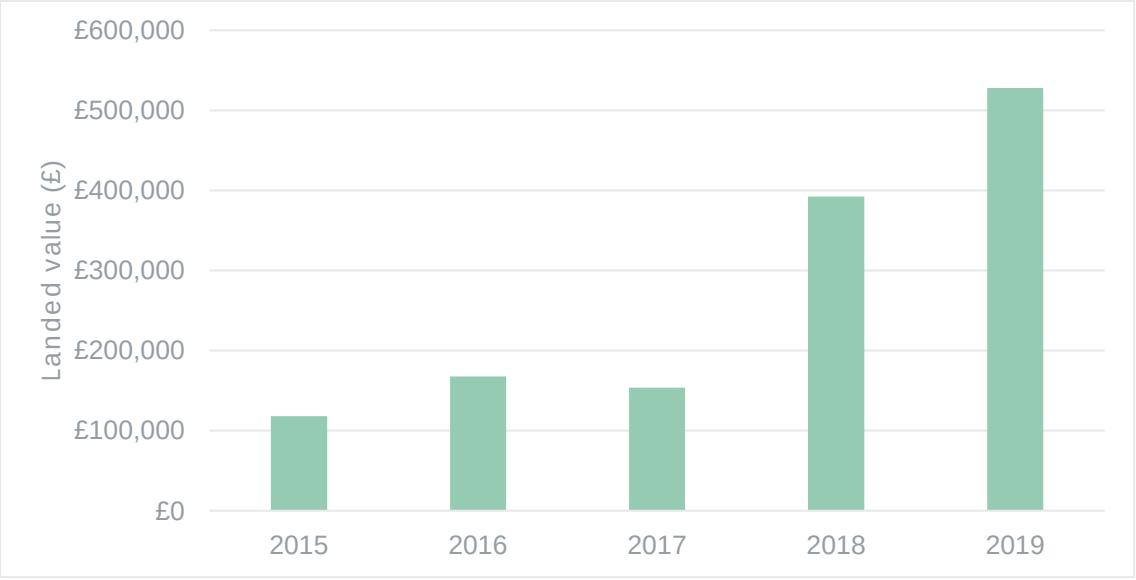
Figure 4: Annual landed value (GBP) 2010 – 2019 by species group (MMO, 2020).

8.7.2 Potting fishery

45 In the AyM commercial fisheries study area, landings by vessels using pots and traps are exclusively undertaken by the UK fleet, primarily by Welsh vessels. An average of 130 tonnes of whelk are landed annually from the study area, and whelk are also the most valuable species targeted by the potting fishery, with an annual average landed value of £163,000. The potting fishery also targets lobster Homarus gammarus, landing an average of 7 tonnes per year, crab *Cancer pagurus* landing 3 tonnes per year, and common prawn *Palaemon serratus* landing just under 1 tonne per year from the study area. The value of landings targeted by the potting fleet have increased across recent years, reflecting both an increase in the volume of shellfish species landed from the study area, and increases in shellfish prices.

46 Landings statistics indicate that the majority of landings from the study area are made by potting vessels over 10m length. Figure 6 presents VMS data showing activity by vessels ≥ 15m length actively fishing using pots and traps in 2017. The data indicate potting activity in the array area by these larger vessels, which also target grounds to the north and west of AyM.

47 Figure 7 presents mapping of estimated fishing activity by vessels using static gears, based on data presented in the WMNP. The map indicates static gear activity across the study area, and across a significant portion of the wider regional study area. The data presented in the map indicate areas of greater activity outwith the AyM array area and offshore ECC.



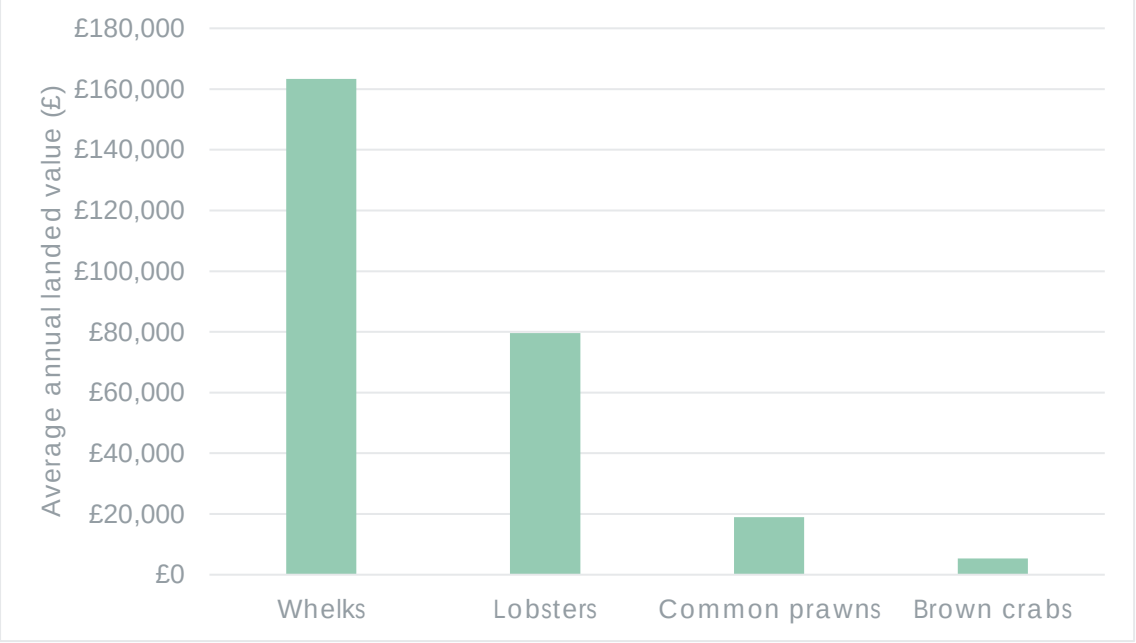
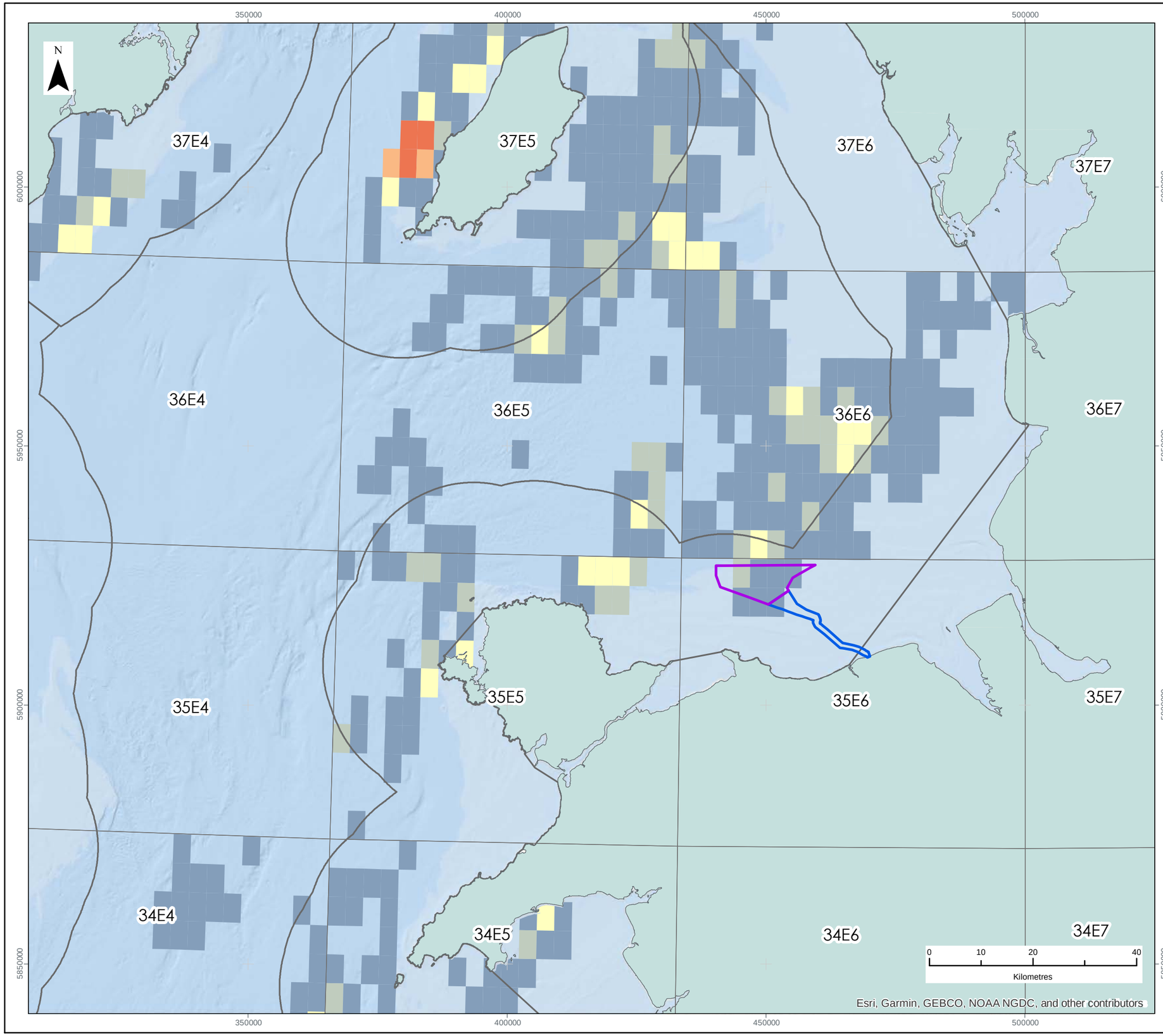
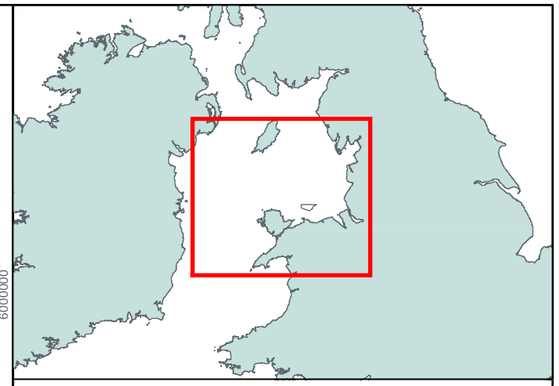


Figure 5: Potting fishery landings profile from AyM study area (MMO, 2020).





LEGEND

- Array Area
- Offshore Export Cable Corridor
- 12 NM limit
- ICES statistical rectangles

UK >=15m potting, 2017
Total value, £

- 1 - 5000
- 5001 - 10000
- 10001 - 25000
- 25001 - 50000
- 50001 - 75000
- 75001 - 103000

Data Source:
VMS data indicating activity by vessels ≥ 15m length actively fishing using pots and traps in 2017 (MMO, 2020)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE: Vessels actively fishing using pots and traps in 2017 (VMS)

VER	DATE	REMARKS	Drawn	Checked
1	20/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 6

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:750,000	A3	WGS84	UTM30N

Fferm Wynt Alltraeth
AWEL Y MÔR Offshore Wind Farm

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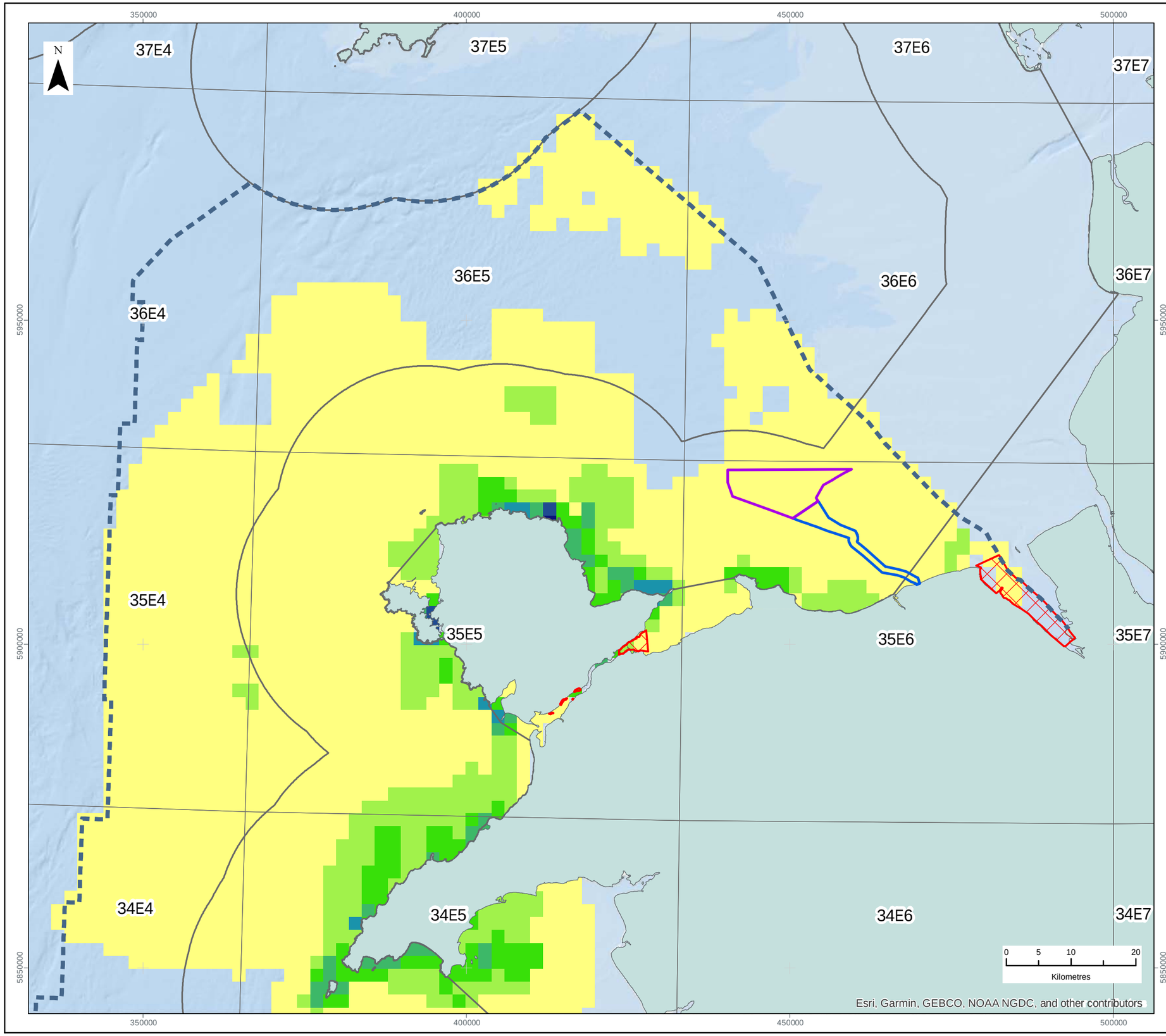

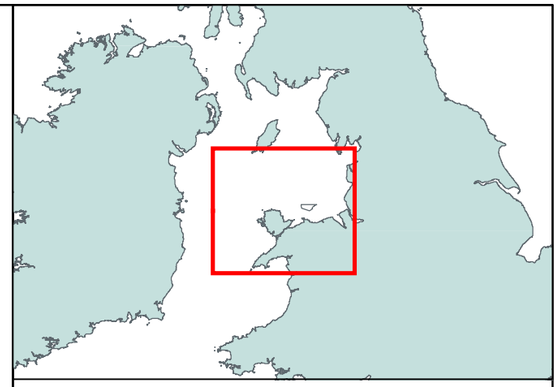

LEGEND

- Array Area
- Offshore Export Cable Corridor
- 12 NM limit
- ICES statistical rectangles
- Welsh National Marine Plan (WNMP)
- Several and Regulating Order

Estimated Relative Fishing Activity

- 0.01 - 4.19
- 4.20 - 13.65
- 13.66 - 28.64
- 28.65 - 55.25
- 55.26 - 108.84
- 108.85 - 174.89
- 174.90 - 367.92

Data Source:
Fishing Activity dataset from Welsh Government, 2019

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE:

Estimated relative fishing activity by vessels using static gear

VER	DATE	REMARKS	Drawn	Checked
1	31/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 7

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:600,000	A3	WGS84	UTM30N

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AWEL Y MÔR
Offshore Wind Farm

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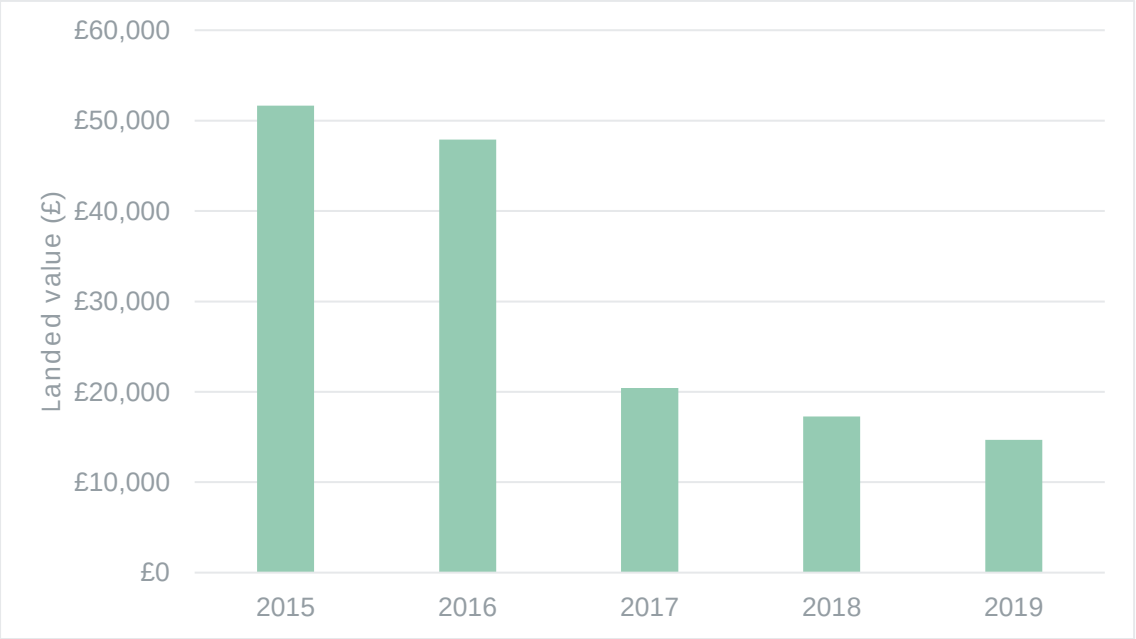
8.7.3 Netting fishery

48 In the AyM commercial fisheries study area, landings by vessels using fixed and drift nets are exclusively undertaken by the UK fleet, primarily by Welsh vessels, the majority of which are under 10m length.

49 Bass *Dicentrarchus labrax* are the most valuable species landed from the study area by the netting fishery, with an annual average landed value of £11,000. An average of 1.3 tonnes of bass are landed annually from the study area. The netting fishery also targets flounder *Platichthys flesus*, landing an annual average of 13 tonnes, and thornback ray or 'roker' *Raja clavata*, landing an annual average of 3 tonnes.

50 Figure 7 above presents mapping of estimated fishing activity by vessels using static gears, including fixed and drift nets, based on data presented in the WNMP. The map indicates static gear activity across the study area, and across a significant portion of the wider regional study area. The data presented in the map indicate areas of greater activity outwith the AyM array area and offshore ECC.



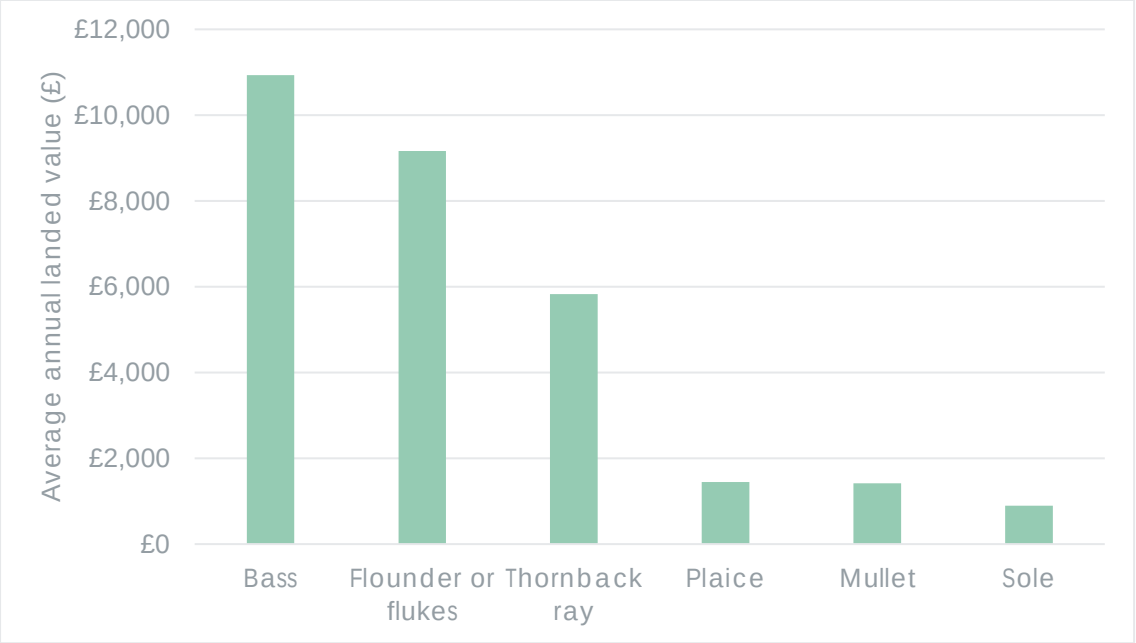


Figure 8: Netting fishery landings profile from AyM study area (MMO, 2020).

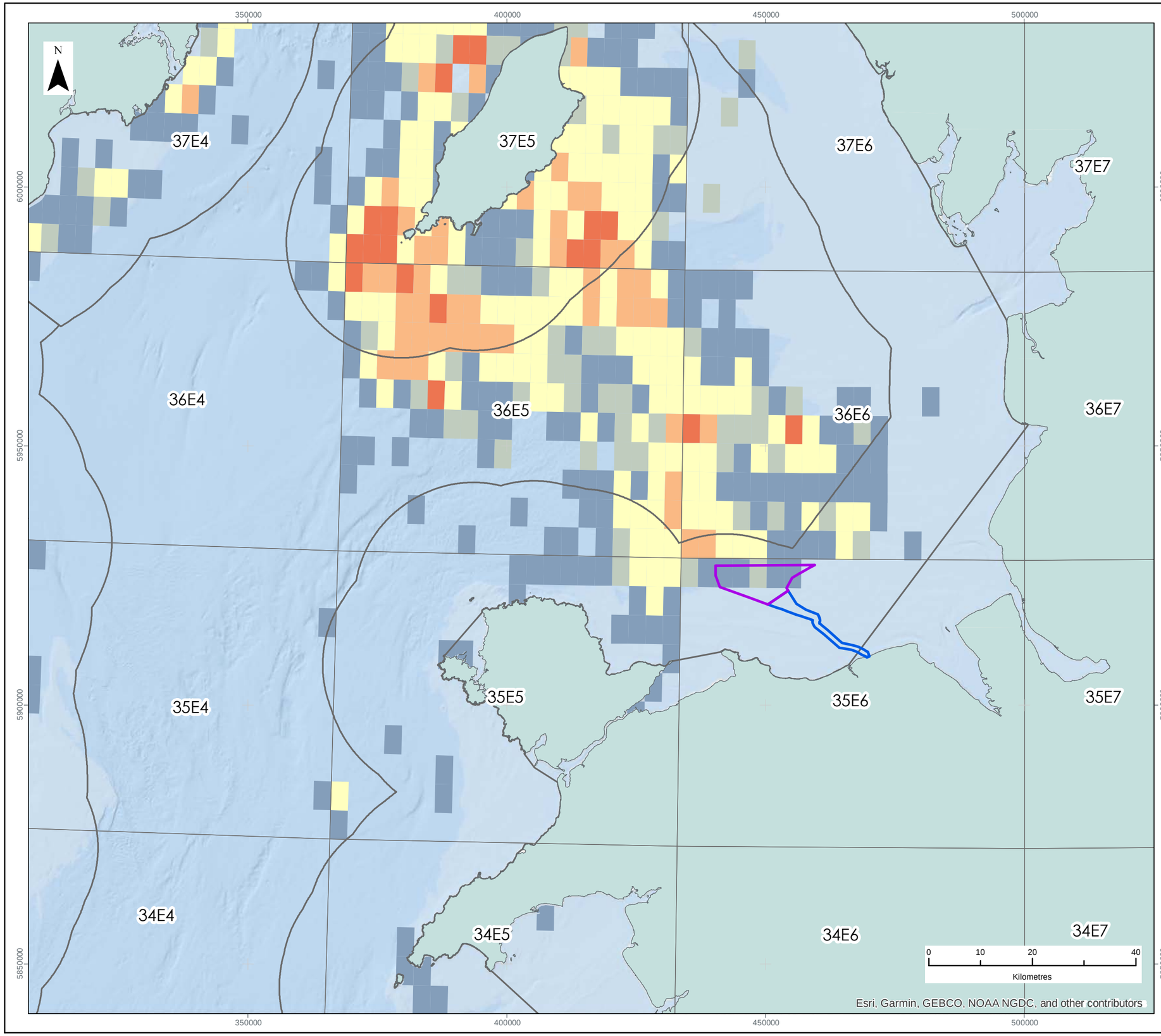
8.7.4 Dredge fishery

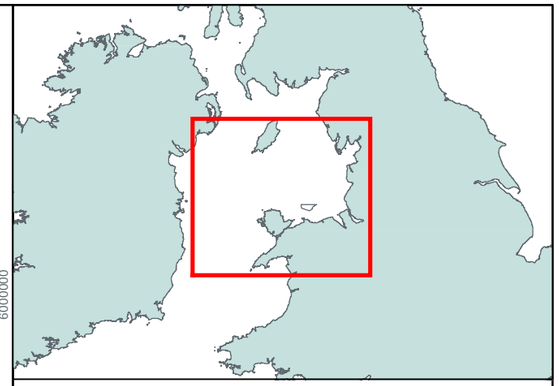
51 In the AyM commercial fisheries study area landings by vessels using dredges are almost exclusively undertaken by the UK fleet, in this case comprised primarily of English and Scottish vessels over 10m length. The dredge fishery targets scallops – primarily king scallop *Pecten maximus* but also lesser volumes of queen scallop *Aequipecten opercularis* - with minimal landings of other commercial species.

52 Annual landings by the dredge scallop fishery are variable, with lower catches from the study area in 2016 and 2017, compared with 2015 and 2018/19. Annual landed value of scallops from the study area peaked in 2018 at £412,000. This reflects the somewhat cyclable nature of scallop fisheries, where certain grounds are more productive in certain years and are therefore targeted on a cyclable basis.

53 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. Figure 10, showing VMS data from 2017, that while some scallop dredging may take place within the northernmost portion of the AyM array area, dredging activity is more significant to the north and west of the study area further offshore. This is also demonstrated in Figure 12, which presents data on scallop dredge fishing areas derived from a long-term time series (2009 to 2019) of VMS data. This was corroborated through consultation with the fishing industry.

Figure 9: Dredge fishery landings profile from AyM study area (MMO, 2020).





LEGEND

- Array Area
- Offshore Export Cable Corridor
- 12 NM limit
- ICES statistical rectangles

UK dredge, 2017
Value, £

- 0.1 - 5000
- 5001 - 10000
- 10001 - 50000
- 50001 - 100000
- 100001 - 250000
- 250001 - 314000

Data Source:
VMS data indicating activity by vessels ≥ 15m length actively fishing using dredges in 2017 (MMO, 2020)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE: Vessels actively fishing using dredges in 2017 (VMS)

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1	20/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 10

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:750,000	A3	WGS84	UTM30N

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AWEL Y MÔR
Offshore Wind Farm

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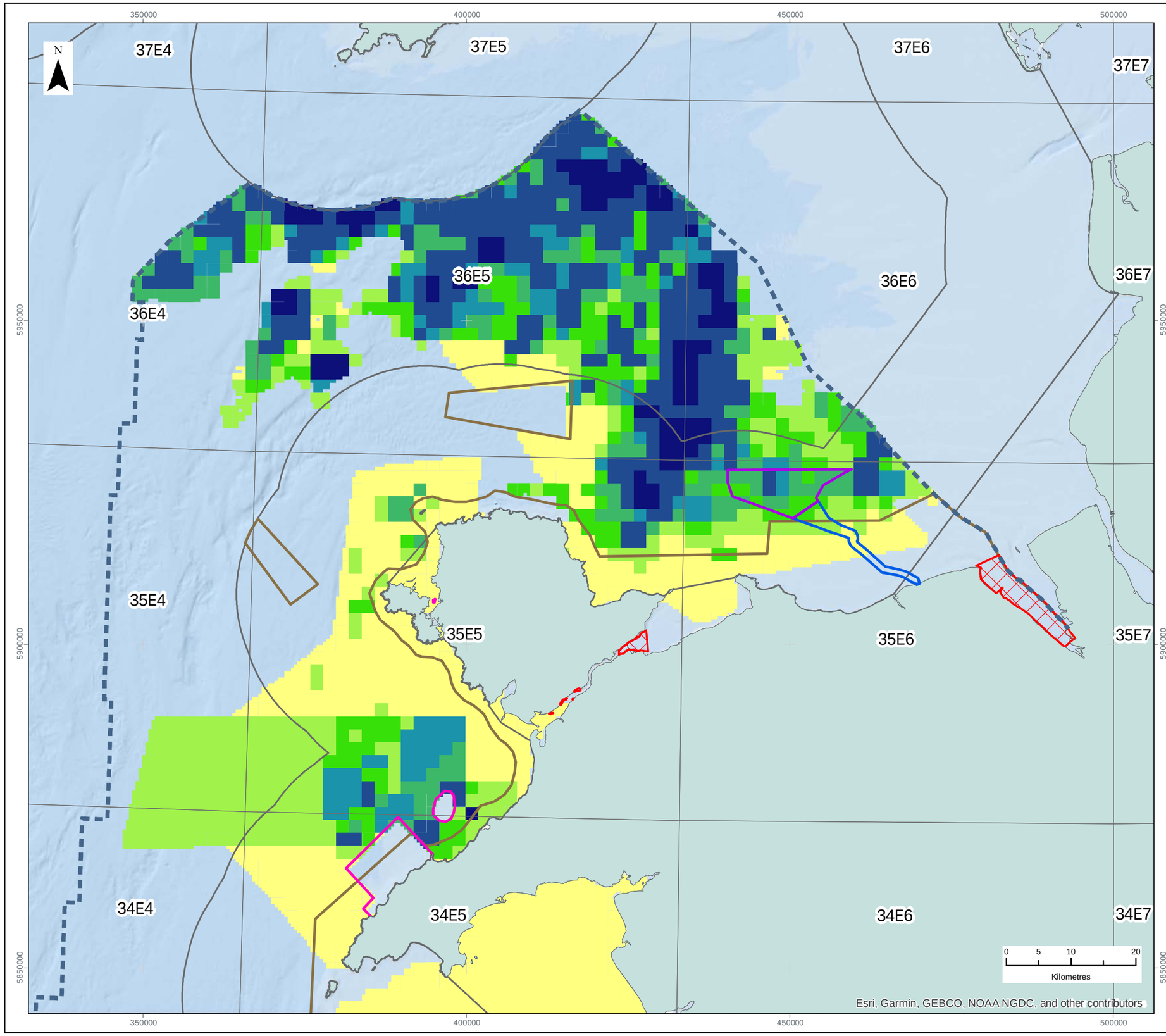

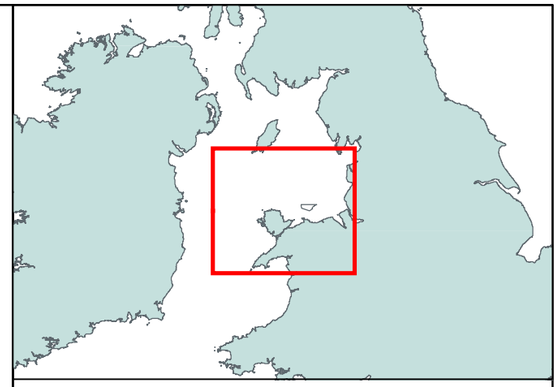

LEGEND

- Array Area
- Offshore Export Cable Corridor
- 12 NM limit
- ICES statistical rectangles
- Welsh National Marine Plan (WNMP)
- Several and Regulating Order
- Sea Fish (Specified Sea Areas) (Prohibition of Fishing Method) (Wales) Order 2012
- The Scallop Fishing (Wales) (No.2) Order 2010

Estimated Relative Fishing Activity

- 0.01 - 0.42
- 0.43 - 1.02
- 1.03 - 1.69
- 1.70- 2.58
- 2.59 - 3.92
- 3.93 - 6.77
- 6.78 - 22.62

Data Source:
Fishing Activity dataset from Welsh Government, 2019

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE:

Estimated relative fishing activity by vessels using mobile gear

VER	DATE	REMARKS	Drawn	Checked
1	31/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 11

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
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AWEL Y MÔR Offshore Wind Farm

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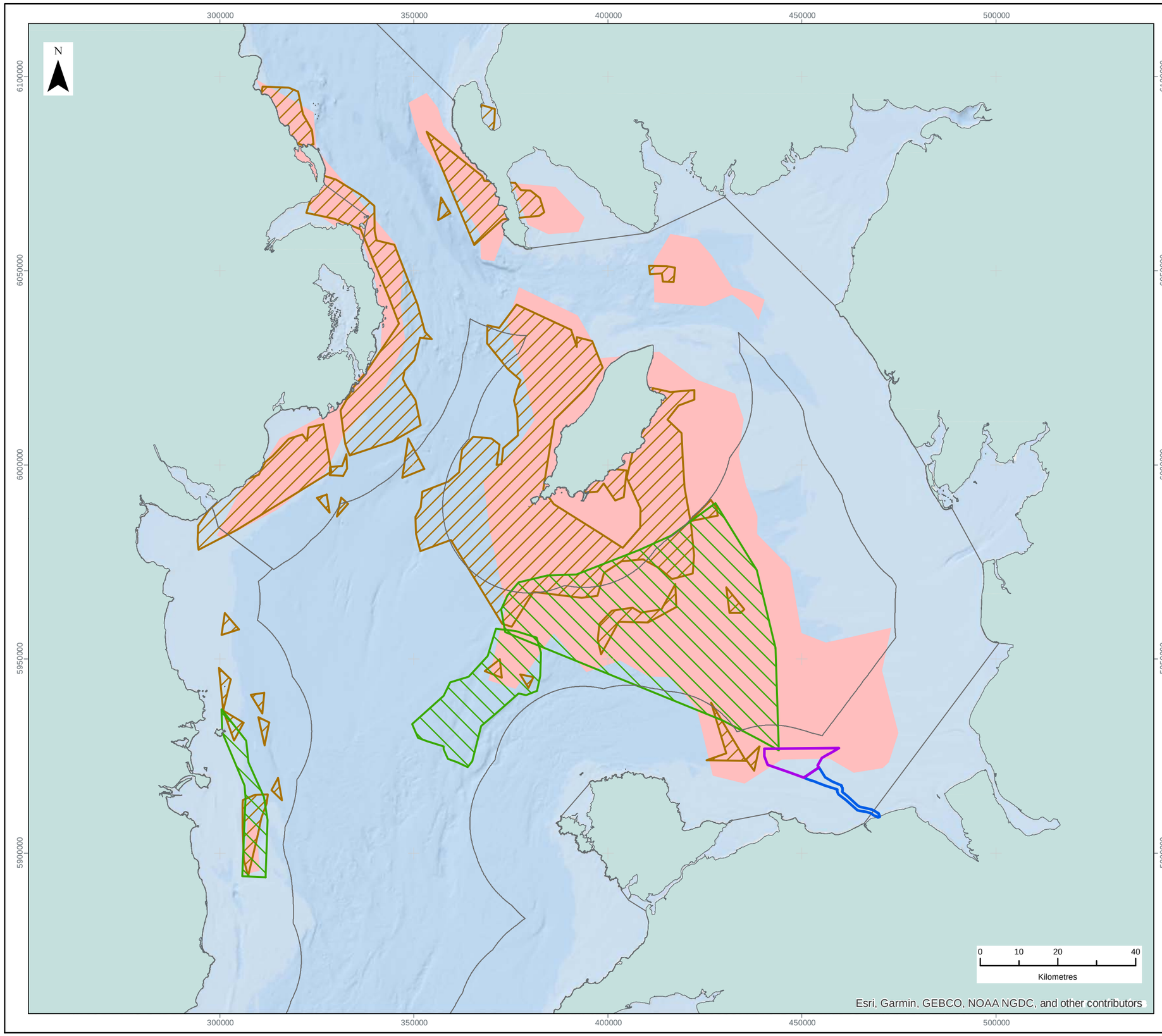

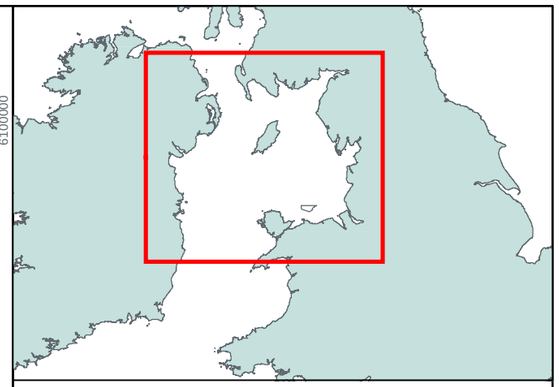

LEGEND

- Array Area
- Offshore Export Cable Corridor
- 12 NM limit
- UK Vessels
- Northern Irish Vessels
- Irish Vessels

Data Source:

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE: UK, Northern Irish and Irish scallop activity within the Irish Sea

VER	DATE	REMARKS	Drawn	Checked
1	31/05/2021	For Issue	BPHB	RM

FIGURE NUMBER:

Figure 12

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:1,000,000	A3	WGS84	UTM30N

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AWEL Y MÔR Offshore Wind Farm

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8.7.5 Other fishing activity

54 Landings statistics indicate that the following fleets also make landings from the study area, though landings volumes are low:

- English vessels under 10m length undertaking 'light' beam trawling and primarily targeting brown shrimp *Crangon crangon*;
- Welsh and English vessels under 10m length undertaking 'light' demersal otter trawling to target thornback ray and brown shrimp, in addition to small volumes of other demersal species including sole *Solea solea* and plaice *Pleuronectes platessa*;
- English and Welsh vessels under 10m length using gears with hooks to target a variety of species, including bass and flounder; and
- Irish vessels targeting *Nephrops*.

55 Landings volumes from the study area for each of these fleets are shown in Figure 13.

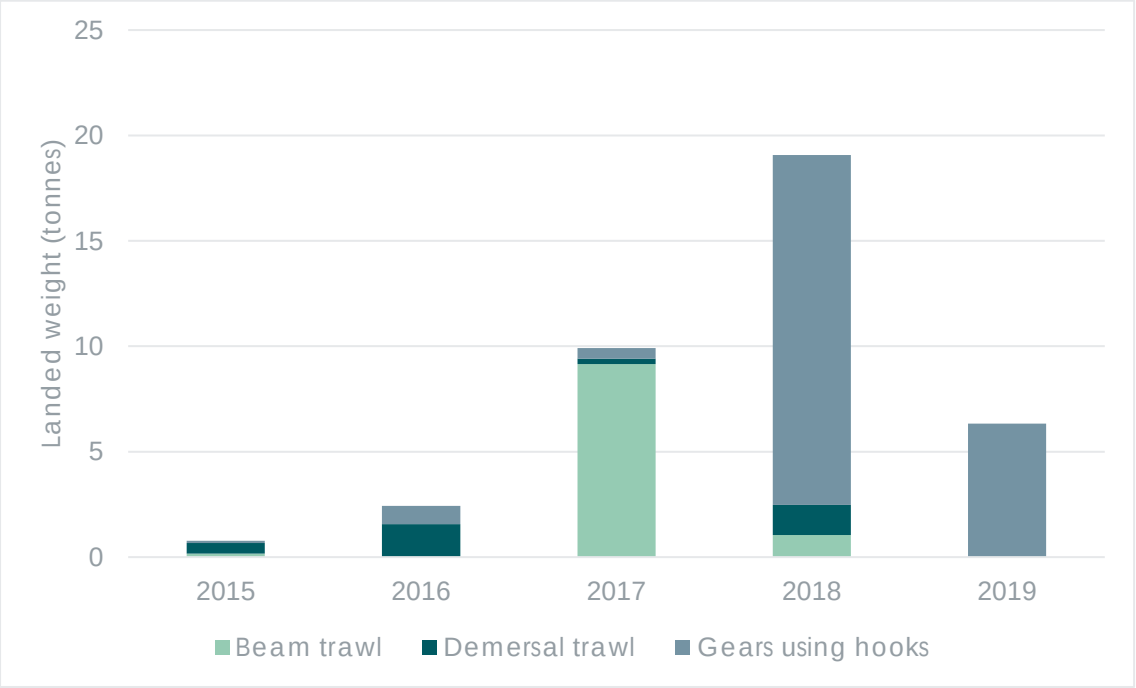

Figure 13: Landings by beam trawl, demersal otter trawl and gears using hooks from the AyM study area (MMO, 2020).

8.7.6 Evolution of the baseline

56 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that "A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of AyM (operational lifetime anticipated to be up to 25 years from first power), long-term trends mean that the condition of the baseline environment is expected to evolve. Commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors. This includes the following:

- Market demand: commercial fishing fleets respond to market demand, which is impacted by a range of factors, 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.

57 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.

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

59 25% of the EU's fisheries quota in UK waters will be transferred to the UK over the five-year transition period. Overall, the biggest gains are for Western and North Sea stocks and associated fisheries, including mackerel, sole and herring. There have been increases in the UK share of TACs for the following species relevant to the study area:

- Herring (25% increase in quota for Irish Sea);
- Whiting (22% increase for Irish Sea);
- Haddock (8% increase for Irish Sea); and
- Skates and rays (5% increase for Western stocks).

60 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.

61 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; much of the catch landed by UK vessels is exported to EU markets and potential tariff/non-tariff barriers could affect which species are targeted and to what extent. It is 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.

62 In summary, fishing activity in the study area is likely to remain consistent with the current baseline in terms of fleets in operation and species targeted.

8.8 Key parameters for assessment

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

64 The design parameters that have been identified to be relevant to commercial fisheries are outlined in Table 10 below and are in line with the Project design envelope (Volume 2, Chapter 1).

Table 10: Maximum design scenario.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
CONSTRUCTION		
Reduction in access to, or exclusion from established fishing grounds	Construction duration: 3 years Safety Zones: • 500 m Safety Zones around construction activities = 0.79 km² per structure under construction at any one time • 50m exclusion zones around incomplete structures = 7,854 m² per partially constructed structure at any one time Seabed preparation: seabed levelling/excavating, debris and boulder clearance Total permanent reduction of access: • Wind turbines: Up to 91 turbines on gravity-based foundations (1,037,780 m² seabed footprint inclusive of scour protection) • Offshore substations: Up to 2 Offshore Substation Platforms (OSPs) on gravity-based jacket foundations (21,600 m² seabed footprint inclusive scour protection) • Met mast: Up to 1 met mast on a monopile foundation (855 m² inclusive of scour protection)	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential to restrict access to fishing grounds. The construction footprint comprises the full permanent seabed area of structures, scour protection, cable crossings and cable protection plus the temporary footprint of preparatory works. The impact area also incorporates exclusion zones around major activities. It is important to note that the temporal aspect of temporary works will not apply in full

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
	• 145km of buried inter-array cables (31,900 m^2 seabed footprint), with mechanical protection along up to 20% of route length (262,320 m^2 seabed footprint) • 2 x 32 km of export cables and 10km interlink cable (25,206 m^2 seabed footprint), with mechanical protection along up to 20% of route length (248,598 m^2 seabed footprint) • Up to 15 cable crossings with mechanical protection (39,300 m^2 seabed footprint)	throughout the 3-year offshore construction phase, as activities will be completed sequentially.
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential for displacement.
Disturbance of commercially important fish and shellfish resources leading to displacement or	See fish and shellfish ecology maximum design scenario presented in Volume 2, Chapter 6.	The scenarios presented in fish and shellfish ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
disruption of fishing activity		Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for the fish and shellfish chapter, rather than any one impact in particular.
Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity	• Likely maximum of 35 vessels operating simultaneously during construction phase • Seabed preparation: Up to 4 vessels • Foundation installation: Up to 38 vessels across 12-month installation duration • Wind turbine installation: Up to 15 vessels across 9-month installation duration • OSP installation: Up to 4 vessels across 15-month installation duration • Array cable installation: Up to 12 vessels across 12-month installation duration • Export and interlink cable installation: Up to 12 vessels across 6-month installation duration	The maximum number of turbines and associated infrastructure will lead to the highest level of construction activities and therefore highest level of construction vessel round trips. The maximum number of vessels transits and the maximum duration of the construction would result in the greatest potential for interference.
Additional steaming to alternative fishing	As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
grounds for vessels that would otherwise fish within the AyM area		exclusion throughout the construction phase and hence the greatest potential for additional steaming to alternative grounds.
OPERATION		
Reduction in access to, or exclusion from established fishing grounds	Total permanent reduction in access: • Wind turbines: Up to 91 turbines on gravity-based foundations (1,037,780 m^2 seabed footprint inclusive of scour protection) • Offshore substations: Up to 2 Offshore Substation Platforms (OSPs) on gravity-based jacket foundations (21,600 m^2 seabed footprint inclusive of scour protection) • Met mast: Up to 1 met mast on a monopile foundation (855 m^2 inclusive of scour protection) • 145km of buried inter-array cables (31,900 m^2 seabed footprint), with mechanical protection along up to 20% of route length (262,320 m^2 seabed footprint)	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential to restrict access to fishing grounds. It comprises the maximum footprint of infrastructure on the seabed plus maintenance activities throughout the operational and maintenance phase and associated temporary safety zones.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
	• 2 x 32 km of export cables and 10km interlink cable (25,206 m^2 seabed footprint), with mechanical protection along up to 20% of route length (248,598 m^2 seabed footprint) • Up to 15 cable crossings with mechanical protection (39,300 m^2 seabed footprint) Temporary reduction in access: • Major component replacement: Up to 317 events requiring jack-up vessel activity (11,623 m^2 seabed footprint per year) • Array cable repairs: Up to 6 events (6,000 m^2 seabed footprint per event) • Export and interlink cable repairs: Up to 4 events (6,000 m^2 seabed footprint per event) • Safety Zones: 500 m safety zones around manned offshore platforms and temporary 500 m safety zones around turbines and offshore platforms undergoing major maintenance. Operational design life of 25 years	The smaller the spacing between turbines the greater the potential for vessels to have restricted access to the site. The assessment assumes that fishing will resume around and between infrastructure within AyM where possible, with the exception of an assumed 50m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance or replacement. Furthermore, the individual decisions made by skippers with their own perception of risk will determine the likelihood of whether their fishing will resume within AyM. Inclement weather will be a

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
		significant contributor to this risk perception.
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above)
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	See fish and shellfish ecology maximum design scenario presented in Volume 2, Chapter 6.	The scenarios presented in fish and shellfish ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for fish and shellfish chapter, rather than any one impact in particular.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity	Vessel activity: • Up to 2 jack-up vessels (10 annual round trips to port) • Up to 2 lift vessels (10 annual round trips) • Up to 2 Service Operations Vessels (52 annual round trips) • Up to 6 Crew Transfer Vessels (1095 annual round trips) • Up to 2 cable maintenance vessels (1 annual round trip) • Up to 8 auxiliary vessels (64 annual round trips)	The maximum number of turbines and associated infrastructure will lead to the highest level of operation and maintenance activities and therefore highest level of operation and maintenance vessel round trips.
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the AyM area	As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential for additional steaming to alternative grounds.
Physical presence of infrastructure leading to gear snagging	As for 'Reduction in access to, or exclusion from established fishing grounds' (see above).	This represents the maximum potential for interactions between infrastructure and fishing gear.
DECOMMISSIONING		

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
Reduction in access to, or exclusion from established fishing grounds	In the absence of detailed methodologies and schedules, decommissioning works and associated implications for commercial fisheries are considered analogous with those assessed for the construction phase.	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned. Decommissioning is likely to include removal of all of the wind turbine components and part of the foundations (those above seabed level) and removal of all other surface infrastructure. Some or all of the array cables, inter-platform cables, and offshore export cables may be removed. Scour and cable protection would likely be left in situ.
Displacement leading to gear conflict and increased fishing	As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above)	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
pressure on adjacent grounds		
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	See fish and shellfish ecology maximum design scenario presented in Volume 2, Chapter 6.	The scenarios presented in fish and shellfish ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the maximum design scenario for fish and shellfish chapter, rather than any one impact in particular.
Increased vessel traffic associated with AyM within fishing grounds leading to	As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above)	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
interference with fishing activity		
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the AyM area	As per the justification for 'Reduction in access to, or exclusion from established fishing grounds' (see above)	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.
Physical presence of infrastructure leading to gear snagging	Upon decommissioning, the following remaining in-situ: • Scour protection • Seabed preparation material • Cables	This represents the maximum potential for interactions between infrastructure and fishing gear.
CUMULATIVE EFFECTS		
Cumulative effects are addressed in Section 8.13 of this document.		

8.9 Embedded mitigation

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

66 Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to commercial fisheries are listed in Table 11. The assessment of impacts presented in Sections 8.10, 8.11 and 8.12 take account of these measures.

Table 11: Embedded mitigation relating to commercial fisheries.

PARAMETER	MITIGATION MEASURES EMBEDDED INTO THE PROJECT DESIGN
Fisheries liaison	The Applicant is committed to ongoing liaison with fishermen throughout all stages of the project, based upon FLOWW (2014, 2015) guidance and the following: • Appointment of a company Fisheries Liaison Officer (FLO) to maintain effective communications between the project and fishermen; • Appropriate liaison with relevant fishing interests to ensure that they are fully informed of development planning and any offshore activities and works; • Timely issue of notifications including Notice to Mariners (NtMs), Kingfisher Bulletin notifications and other navigational warnings to the fishing community to provide advance warning of project activities and associated Safety Zones and advisory safety distances; and • Development, prior to construction, of a Fisheries Liaison Plan (FLP), setting out in detail the planned approach to fisheries liaison and means of delivering any other relevant mitigation measures. The FLP has been developed, consulted on with fisheries stakeholders and disseminated in June 2021.

PARAMETER	MITIGATION MEASURES EMBEDDED INTO THE PROJECT DESIGN
Marking and lighting	The Applicant is committed to marking and lighting the project in accordance with relevant industry guidance and as advised by relevant stakeholders including the Maritime and Coastguard Agency (MCA), Civil Aviation Authority (CAA) and Trinity House. The Applicant will also ensure the project is adequately marked on nautical charts.
Dropped objects	A dropped objects plan will be developed for reporting and recovery of dropped objects where they pose a potential hazard to other marine users.
Cable burial	Development of, and adherence to, a Cable Specification and Installation Plan (CSIP) post consent. The CSIP will set out appropriate cable burial depth in accordance with industry good practice, minimising the risk of cable exposure. The CSIP will also ensure that cable crossings are appropriately designed to mitigate environmental effects, these crossings will be agreed with relevant parties in advance of CSIP submission. The CSIP will include a detailed Cable Burial Risk Assessment (CBRA) to enable informed judgements regarding burial depth to maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. The CSIP will be Conditioned in the Marine Licence.

8.10 Environmental assessment: construction phase

67 The following impacts of the offshore construction of AyM on commercial fisheries, as per the impacts listed in Table 10, have been assessed:

- AyM array area construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds;

- AyM offshore export cable construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds;
- Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds;
- Displacement from AyM offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds;
- AyM array area and offshore ECC construction activities leading to disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity;
- Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity; and
- Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area.

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

8.10.1 AyM array area construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds

69 During construction of AyM, commercial fisheries will be prevented from fishing where construction activities are taking place. In addition, Safety Zones of 500 m diameter will be sought around significant infrastructure under construction. The total offshore construction duration will be three years, with a number/range of construction activities being undertaken simultaneously across the site.

Magnitude of impact

70 This impact will lead to a localised loss of access to fishing grounds and the fish and shellfish resources within these grounds for a range of fishing opportunities during the period of construction, which will directly affect fleets over a short-term duration (i.e., less than 5 years). The impact is predicted to be intermittent with localised exclusion surrounding construction activities.

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

72 Potting fishery: the UK potting fleet targets whelk and other shellfish species across a wide area from inshore grounds extending out into and beyond the array area. VMS data indicates that vessels over 15m length, understood to be primarily targeting whelk, are active in the AyM array area and across extensive grounds to the north and east of AyM. An average annual first sales value of £272,000 landings is taken from the study area by UK potting vessels. Noting that the array area overlaps with approximately 8.3% of this study area, this equates to a pro-rata value of approximately £23,000 (based on uniform landings across the entire study area). While such a simplistic calculation brings higher level of uncertainty to the resulting figure, it does demonstrate the potential opportunity within the array area. During construction, potting vessels will be required to remove pots from areas under construction and either relocate, or bring to shore depending on available grounds and fishing preferences. Potting fishermen will therefore experience loss of earnings for the time taken to relocate gear, and (potentially) a loss of earnings associated with not being able to fish the specific grounds under construction (e.g. if alternative grounds are either not available, or not as productive). Potting typically involves a number of fleets of pots being deployed across a range of areas, and it is therefore unlikely that all pots deployed by a single vessel will be impacted at any one time.

73 Netting fishery: the UK netting fleet targets bass, flounder, thornback ray and variety of other demersal species using fixed nets. An average annual first sales value of £30,000 landings is taken specifically within the study area by UK (Welsh and English) netting vessels. Limited spatial data is available for netting activity, though the majority of netting vessels are under 10m length and expected to predominantly operate in waters inshore of the AyM array area.

74 Dredge fishery: the UK dredging fleet target scallop across a relatively wide area offshore. An average annual first sales value of £181,000 landings is taken specifically within the study area by UK dredging vessels. VMS data indicate some dredging within the northernmost extent of the AyM array area, though the same data indicates that scallop grounds to the north of the array area are significantly more important to this fleet.

75 The impact is predicted to be of regional spatial extent, short term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **medium adverse** for potting fisheries and dredge fisheries and **low adverse** for netting.

Sensitivity of receptor

76 The fleets targeting the AyM array area are typically larger vessels that operate across large areas of the Irish Sea. Given adequate notification it is expected that these vessels will be in a position to avoid construction areas. Fleets are considered to have a large operational range that is not limited to the AyM array area.

77 The UK potting fleet operate across distinct areas of ground, from the coastline out to beyond 12NM. The whelk fishery that overlaps with the AyM array area is comprised of several vessels and is considered to have moderate-high levels of alternative fishing grounds; is deemed to be of medium vulnerability, high recoverability and low-medium value. The sensitivity of this receptor is therefore, considered to be **medium**.

78 The UK netting fleet, comprised of several multi-gear vessels that can deploy pots and nets, are typically <15m in length and operate across more distinct areas of ground, typically inshore of the array area. On this basis, the UK netting fleet is deemed to be of negligible vulnerability, high recoverability and low value across the AyM array area. The sensitivity of the receptor is therefore, considered to be **negligible**.

79 The UK dredge fleet is considered to have moderate-high levels of alternative fishing grounds; is deemed to be of low vulnerability, high recoverability and low-medium value. The sensitivity of this receptor is therefore, considered to be **low**.

Significance of residual effect

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

81 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **medium adverse**. The effect is ***moderate adverse***, which is significant in terms of the EIA Regulations. In response to this, and specific to the UK potting fleet, the Fisheries Liaison Plan (FLP) will explore options to encourage co-existence and further mitigate the effect, including cooperation agreements and associated payments. With the commitment to development of a FLP that will explore mitigation options for the UK potting fleet, the impact magnitude is reduced to **minor adverse** and the residual effect is of ***minor adverse*** significance, which is not significant in EIA terms.

82 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **low adverse**. The effect is ***negligible adverse***, which is not significant in terms of the EIA Regulations.

83 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **medium adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.10.2 AyM offshore export cable construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds

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

Magnitude of impact

85 This impact will lead to a loss of access to fishing grounds and the fish and shellfish resources within these grounds for a range of fishing opportunities during the construction activities, which will directly affect various fishing fleets over a short-term duration. The impact is predicted to be intermittent and of relevance to national fishing fleets and is described below on a fishery basis.

86 Potting fishery: the AyM offshore ECC overlaps with fishing ground targeted by UK potting vessels targeting whelk in the northernmost extent of the ECC and other shellfish species such as lobster and crab in areas further inshore. During the construction process vessels with pots set along the AyM offshore ECC will need to move these pots and cease fishing activities at particular construction locations. The provision of sufficient notice of planned construction activity together with the support of offshore FLOs where appropriate, will facilitate this process.

87 Netting fishery: the UK netting fleet targets bass, flounder, thornback ray and variety of other demersal species using fixed nets. An average annual first sales value of £30,000 landings is taken specifically within the study area by UK (Welsh and English) netting vessels. Limited spatial data is available for netting activity, though the majority of netting vessels are under 10m length and expected to operate across grounds in the offshore ECC.

88 Dredge fishery: the Wales Scallop Fishing Order, introduced in 2010, restricts where scallop dredgers may operate. From 0-1NM no dredging is permitted, from 1-3NM dredging vessels must be below 10m length with six dredges, from 3-6NM vessels must have no more than 8 dredges and from 6-12NM vessels may have up to 14 dredges. A closed season runs from May to October in Welsh waters. On this basis, dredging for scallop within the AyM offshore ECC will be very limited.

89 The impact is predicted to be of regional spatial extent, short term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **medium adverse** for potting and netting fisheries and **low adverse** for dredge fisheries.

Sensitivity of receptor

90 The sensitivity of receptors is broadly as described in paragraphs 76 to 79. Fleets are considered to have a large operational range. The sensitivity of the potting fleet is considered to be **medium** and the sensitivity of the dredge fleet is considered to be **negligible**. The netting fleet, understood to be more active in inshore waters, are deemed to be of medium vulnerability, high recoverability and low value. The sensitivity of this receptor is considered to be **low**.

Significance of residual effect

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

92 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **medium adverse**. The effect is ***moderate adverse***, which is significant in terms of the EIA Regulations. In response to this, and specific to the UK potting fleet, the Fisheries Liaison Plan (FLP) will explore options to encourage co-existence and further mitigate the effect, including cooperation agreements and associated payments. With the commitment to development of a FLP that will explore mitigation options for the UK potting fleet, the impact magnitude is reduced to **minor adverse** and the residual effect is of ***minor adverse*** significance, which is not significant in EIA terms.

93 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

94 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **low adverse**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.10.3 Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds

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

Magnitude of impact

96 The impact is predicted to be of regional spatial extent, short-term duration, intermittent and with medium reversibility. It is predicted that the impact will affect the receptor directly. The impact is of relevance to national fishing fleets as described below.

97 Potting fishery: conflict over diminished grounds may occur if displaced potting gear is relocated into actively fished potting grounds. In practice, conflict can lead to the entanglement of potting lines, which is time consuming to separate and can create operational difficulties (for example, the lines have to be cut and re-tied at each pot to disentangle and reassemble the string of pots).

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

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

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

100 On balance, the displacement effect to potters targeting the AyM array area is considered to have a lower magnitude of impact than the exclusion impact causing the displacement (as set out in paragraph 75). Taking all of these aspects into consideration, the magnitude of the displacement impact is assessed to be low for UK potters.

101 Netting fishery: displacement from the AyM array area is not expected to affect the netting fishery since it is understood to predominantly take place in waters inshore of the array area.

102 Dredge fishery: displacement from AyM array area is not expected to affect the dredge fishery since key fishing grounds and therefore dredge fishery activity are located outside of the array area.

103 The impact is predicted to be of regional spatial extent, short term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **low adverse** for potting fisheries and **negligible** for netting and dredge fisheries.

Sensitivity of receptor

104 Fleets are considered to have a large operational range that is not limited to the AyM array area.

105 The UK potting fleet operate across distinct areas of ground, from the coastline out to beyond 12NM. This form of static fishing gear is considered to have a high vulnerability to gear conflict interactions since it is left unattended on the seabed. Displacement from the AyM array area may lead to exploration of grounds outside the AyM array area, which includes areas currently targeted by potters and depending upon location, dredgers. The UK potting fleet is, therefore, deemed to be of medium vulnerability, with high recoverability and low-medium value. The sensitivity of the UK potting fleet is therefore, considered to be **medium**.

106 The UK netting fleet is typically <15m in length and operate across more distinct areas of ground, typically inshore of the array area. On this basis, the UK netting fleet is deemed to be of negligible vulnerability, high recoverability and low value across the AyM array area. The sensitivity of the receptor is therefore, considered to be **negligible**.

107 The UK dredge fleet is considered to have moderate-high levels of alternative fishing grounds; is deemed to be of negligible vulnerability, high recoverability and low-medium value. The sensitivity of this receptor is therefore, considered to be **negligible**.

Significance of residual effect

108 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

109 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

110 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.10.4 Displacement from AyM offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds

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

Magnitude of impact

112 The impact is predicted to be of regional spatial extent, medium-term duration, intermittent and with medium reversibility. It is predicted that the impact will affect the receptor directly. The impact is of relevance to national fishing fleets as described below.

113 Potting fishery: vessels deploying traps and pots across the AyM offshore export cable corridor will be required to temporarily relocate gear to other grounds during the construction phase. Each individual vessel may deploy a range of pot numbers e.g. from 300 to 3,000 pots. However, it is not likely that all fleets (or traps/pots from one vessel) will overlap the offshore export cable corridor given that a number of fleets of pots and a range of grounds are targeted at any given time. Due to the volumes of gear, vessels leave their pots on the ground (i.e. do not bring pots back to shore in between fishing trips, with the exception of carrying out gear maintenance on specific pots/strings).

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

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

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

116 On balance, the displacement effect to potters targeting the AyM array area is considered to have a lower magnitude of impact than the exclusion impact causing the displacement (as set out in paragraph 75). Taking all of these aspects into consideration, the magnitude of the displacement impact is assessed to be low for UK potters.

117 Netting fishery: displacement from the AyM offshore ECC is expected to have some effect on the netting fishery. Fixed nets are considered to be static gear since they remain *in situ* for a period of time, and there is some potential for vessels being required to temporarily relocate gear to other grounds during the construction phase. Netting activity is understood to take place across a wide inshore area.

118 Dredge fishery: displacement from the AyM offshore ECC is not expected to affect the dredge fishery since key fishing grounds and therefore dredge fishery activity are located outside of the offshore export cable corridor.

119 The impact is predicted to be of regional spatial extent, short term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **low adverse** for potting and netting fisheries and **negligible** for dredge fisheries.

Sensitivity of receptor

120 Fleets are considered to have a moderate operational range that is not limited to the AyM offshore ECC.

121 The UK potting fleet operate across distinct areas of ground, from the coastline out to beyond 12NM. This form of static fishing gear is considered to have a high vulnerability to gear conflict interactions since it is left unattended on the seabed. Displacement from the AyM offshore ECC area may lead to exploration of grounds outside the AyM offshore ECC, which includes areas currently targeted by potters and netters. The UK potting fleet is, therefore, deemed to be of medium vulnerability, with high recoverability and low-medium value. The sensitivity of the UK potting fleet is therefore, considered to be **medium**.

122 In broad alignment with the potting fleet, the UK netting fleet is deemed to be of medium vulnerability, with high recoverability and low value. The sensitivity of the UK potting fleet is therefore, considered to be **low**.

123 The UK dredge fleet is considered to have moderate-high levels of alternative fishing grounds; is deemed to be of negligible vulnerability, high recoverability and low-medium value. The sensitivity of this receptor is therefore, considered to be **negligible**.

Significance of residual effect

124 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

125 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

126 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.10.5 AyM array area and offshore ECC construction activities leading to disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity

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

Magnitude of impact

128 Detailed assessments of the following potential construction impacts have been undertaken in Volume 2, Chapter 6:

- Mortality, injury, behavioural impacts and auditory masking arising from noise and vibration;
- Temporary increase in SSC and sediment deposition;

- Direct and indirect seabed disturbances leading to the release of sediment contaminants; and
- Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish arising from construction activities.

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

130 Details of the fish and shellfish ecology assessment are summarised in Table 12; justifications for this assessment will not be repeated in this chapter. Evidence, modelling and justifications for these assessments are provided in Volume 2, Chapter 6.

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

Table 12: Significance of effects of construction impacts on fish and shellfish ecology.

POTENTIAL IMPACT	MAGNITUDE	SENSITIVITY	SIGNIFICANCE OF EFFECT
Mortality, injury, behavioural impacts and auditory masking arising from noise and vibration	Low	Medium	Minor adverse

POTENTIAL IMPACT	MAGNITUDE	SENSITIVITY	SIGNIFICANCE OF EFFECT
Temporary increase in SSC and sediment deposition	Low	Medium	Minor adverse
Direct and indirect seabed disturbances leading to the release of sediment contaminants	Low	Medium	Minor adverse
Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish arising from construction activities	Low	Medium	Minor adverse

Sensitivity of receptor

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

133 Due to the range of alternative areas targeted and the distribution of key commercial species throughout the Irish Sea, fleets are deemed to be of low vulnerability, high recoverability and medium-low value. The sensitivity of the receptor for all fleets is therefore considered to be **low**.

Significance of residual effect

134 Potting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is Not Significant in terms of the EIA Regulations.

135 Netting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

136 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.10.6 Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity

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

Magnitude of impact

138 Vessel movements (i.e. construction vessels transiting to and from areas undergoing construction works) related to the construction of AyM will add to the existing level of shipping activity in the area (see Volume 2, Chapter 10 for a full assessment of additional vessel movements).

139 Continuous liaison with the fishing industry will be undertaken including location and duration of construction activities; further details will be provided in an outline Fisheries Coexistence and Liaison Plan which will be included as part of the DCO/Marine Licence Application.

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

Sensitivity of receptor

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

142 All other fishery fleets are expected to be in a position to avoid the AyM construction areas. Dredge fisheries are deemed to be of negligible vulnerability, high recoverability and low-medium value. The sensitivity of the receptor is therefore, considered to be **negligible**.

Significance of residual effect

143 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low-medium** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

144 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

145 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **low adverse**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.10.7 Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area

146 A detailed Navigational Risk Assessment has been undertaken and is discussed in Volume 2, Chapter 10, which includes full consideration of commercial fishing vessels while transiting (e.g. from a collision and allision perspective). This assessment focuses on the potential impact of longer steaming distances to alternative fishing grounds while construction processes are ongoing.

Magnitude of impact

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

148 The construction programme for AyM will be communicated through Notice to Mariners and Kingfisher Bulletins with ample warning provided. Construction works will only necessitate minor deviations for fishing vessels transiting along the AyM offshore ECC and through the array area during the construction phase. Localised impacts are anticipated but will be limited to the immediate area of construction activity and associated construction vessels. The magnitude is therefore, considered to be **low adverse** for all fishing fleets.

Sensitivity of receptor

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

150 The UK dredge fleet targeting the outermost extent of the AyM array area is expected to operate across wider areas of the Irish Sea and in the case of larger vessels, beyond this range. Given adequate notification it is expected that these vessels will be in a position to avoid construction areas with limited impact upon steaming times.

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

Significance of residual effect

152 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

153 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

154 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **low adverse**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.11 Environmental assessment: operational phase

155 The following impacts of the offshore operation and maintenance phase of AyM have been assessed on commercial fisheries.

- Physical presence of AyM array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds;
- Physical presence of AyM offshore ECC leading to reduction in access to, or exclusion from established fishing grounds;
- Displacement from AyM array area and offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds;
- AyM operation and maintenance activities leading to displacement or disruption of commercially important fish and shellfish resources;
- Increased vessel traffic within fishing grounds as a result of changes to shipping routes and maintenance vessel traffic from AyM leading to interference with fishing activity;
- Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area;
- Physical presence of AyM array area infrastructure leading to gear snagging; and
- Physical presence of the offshore ECC leading to gear snagging.

156 The environmental impacts arising from the operation and maintenance of AyM are listed in Table 10 alongside the maximum design scenario against which each operation and maintenance phase impact has been assessed.

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

8.11.1 Physical presence of AyM array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds

158 The assessment assumes that commercial fisheries will be prevented from actively fishing within the footprint of installed infrastructure within the AyM array area together with associated safety zones for maintenance activities and assumed safe operating distances, as set out in Table 10. Minimum turbine spacing is 830m, including between turbines and all other infrastructure.

159 Out with this area, the assessment assumes that fishing will be possible within the AyM array area where turbine spacing and turbine layout allow productive grounds to be targeted, with the exception of Safety Zones around infrastructure undergoing major maintenance and advisory safety distances around vessels undertaking major maintenance activities. In addition, the individual decisions made by the skippers of fishing vessels with their own perception of risk will determine the likelihood of whether their fishing will resume within the AyM array area. Inclement weather will be a significant contributor to this risk perception. The type and dimension of fishing gear also influences the potential opportunities within the array area. For example, trawl gears typically require a greater distance for safe operation and these gears are unlikely to target grounds in the vicinity of infrastructure.

Magnitude of impact

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

161 Evidence on the value and importance of the AyM array area to commercial fishing fleets is the same as that presented for construction in paragraphs 72 to 75.

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

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

163 It is expected that potting activity will resume within the AyM array area during the operation and maintenance phase.

164 Netting fishery: based on the predominance of netting located in inshore areas, and not within the AyM array area, the presence of AyM is not expected to restrict the baseline operation of netting activity.

165 Dredge fishery: the AyM array area is located to the south and east of established scallop grounds. The presence of the AyM array area is not expected to restrict the baseline operation of scallop dredge fisheries.

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

Sensitivity of receptor

167 The sensitivity of the commercial fisheries receptors is the same as that presented for construction in paragraphs 76 to 79, summarised as **low** for potting and dredging fisheries and **negligible** for netting fisheries.

Significance of residual effect

168 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **medium adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

169 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

170 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **medium adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.11.2 Physical presence of AyM offshore ECC leading to reduction in access to, or exclusion from established fishing grounds

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

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

173 Notwithstanding this, subsea cables are widespread throughout the waters of Europe, providing power and telecommunications links, and it is understood that fishing does take place in the vicinity of subsea cables (KIS-ORCA, 2019).

Magnitude of impact

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

175 Notices to Mariners will be issued in advance of any maintenance works. Potting and netting vessels may be required to temporarily relocate pots and nets during maintenance works, although such works are likely to be infrequent. Scallop dredging is not expected to take place within the AyM offshore ECC.

176 The impact is predicted to be of local spatial extent and of short-term duration for maintenance works that may be required along the export cables. It is predicted that the impact will affect the receptor directly. Given that fishing is likely to resume across the majority of the AyM offshore cable corridor, the magnitude is considered to be **low adverse** for potting and netting fleets and **negligible** for the dredge fleet.

Sensitivity of receptor

177 The sensitivity of receptors is broadly as described in paragraphs 75 to 78. Fleets are considered to have an operational range beyond that of the AyM offshore ECC. The sensitivity of the potting fleet is considered to be **low** and the sensitivity of the dredge fleet is considered to be **negligible**. The netting fleet, understood to be more active in inshore waters, are deemed to be of medium vulnerability, high recoverability and low value. The sensitivity of this receptor is considered to be **low**.

Significance of residual effect

178 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

179 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

180 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.11.3 Displacement from AyM array area and offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds

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

Magnitude of impact

182 The magnitude of impact of displacement during the operational and maintenance phase is expected to be the same or similar to that during construction for the dredge fleet. Given that potting and netting can resume across the AyM area, the magnitude for UK potters and netters is considered to be low.

183 The impact is predicted to be of regional spatial extent, short term duration, intermittent and with high reversibility. It is predicted that the impact will affect the receptor directly. Based on the justifications above, the magnitude is therefore considered to be **low adverse** for potting and netting and **negligible** for dredging.

Sensitivity of receptor

184 The sensitivity of the commercial fisheries receptors is the same as that presented for construction, summarised as medium for the potting fleet, **negligible-low** for the netting fleet and **negligible** for the dredge fleet.

Significance of residual effect

185 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

186 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **negligible-low** and the magnitude is **low adverse**. The effect is ***negligible - minor adverse***, which is not significant in terms of the EIA Regulations.

187 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **negligible** and the magnitude is **negligible**. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.11.4 AyM operation and maintenance activities leading to displacement or disruption of commercially important fish and shellfish resources

Magnitude of impact

188 Detailed assessments of the following potential operation and maintenance impacts have been undertaken in Volume 2, Chapter 6:

- Long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection;
- Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection; and
- EMF effects arising from cables during operational phase

189 The approach to this assessment follows that outlined for construction, with details of the fish and shellfish ecology assessment summarised in Table 13.

190 The impact is predicted to be of regional spatial extent, of relevance to national fishing fleets, and of short-term duration. It is predicted that the impact will affect the receptor directly through loss of resources. The magnitude is therefore considered to be low in relation to all potential impacts.

Table 13: Significance of effects of operational phase impacts on fish and shellfish ecology.

POTENTIAL IMPACT	MAGNITUDE	SENSITVITY	SIGNIFICANCE OF EFFECT
Long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection	Low	Medium	Minor adverse
Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection	Low	Medium	Minor adverse
EMF effects arising from cables during operational phase	Low	Low	Minor adverse

Sensitivity of receptor

191 As described for construction in paragraphs 132 and 133 fleets are deemed to be of low vulnerability, high recoverability and medium-low value. The sensitivity of the receptor for all fleets is therefore considered to be low.

Significance of residual effect

192 Potting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

193 Netting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

194 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.11.5 Increased vessel traffic within fishing grounds as a result of changes to shipping routes and maintenance vessel traffic from AyM leading to interference with fishing activity

Significance of residual effect

195 The effects of the operational and maintenance phase are expected to be the same or similar to the effects from construction (see paragraphs 138 to 145). The significance of effect is therefore ***minor adverse*** for UK potting and netting fisheries, and ***negligible*** for the UK dredge fleet, which is not significant in EIA terms.

8.11.6 Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area

196 A detailed Navigational Risk Assessment has been undertaken and is discussed in Volume 2, Chapter 10, which includes full consideration of commercial fishing vessels while transiting (e.g. from a collision and allision perspective). This assessment focuses on the potential impact of longer steaming distances to alternative fishing grounds during operation and maintenance.

Magnitude of impact

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

198 During the operation and maintenance phase, fishing will be possible across the AyM area, with the exception of in the footprint of installed infrastructure and in Safety Zones around infrastructure undergoing major maintenance and advisory safety distances around vessels undertaking major maintenance activities. Such activities will be communicated through Notice to Mariners and Kingfisher Bulletins with ample warning provided.

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

200 The magnitude is considered to be low for all fishing fleets.

Sensitivity of receptor

201 The sensitivity of commercial fishing fleets to this impact is expected to be the same or similar to that for construction (see paragraphs 149 to 151) and is ow for UK potting and netting fishing fleets and negligible for the UK dredge fishery.

Significance of residual effect

202 Potting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

203 Netting fishery: overall, it is predicted that the sensitivity of the receptor is low and the magnitude is low. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

204 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is negligible and the magnitude is low. The effect is ***negligible***, which is not significant in terms of the EIA Regulations.

8.11.7 Physical presence of AyM array area infrastructure leading to gear snagging

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

Magnitude of impact

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

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

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

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

Sensitivity of receptor

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

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

Significance of residual effect

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

213 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

214 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

215 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **medium** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.11.8 Physical presence of the offshore ECC leading to gear snagging

Magnitude of impact

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

Sensitivity of receptor

217 Due to the nature and operation of mobile gear (i.e. it is actively towed and dredge gear directly penetrates the seabed with near continuous contact) there is increased vulnerability to this impact. Limited dredging activity is expected to take place within the AyM offshore ECC. The sensitivity is therefore considered to be **low** for dredge fisheries.

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

Significance of residual effect

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

220 Potting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

221 Netting fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

222 Dredge fishery: overall, it is predicted that the sensitivity of the receptor is **low** and the magnitude is **low adverse**. The effect is ***minor adverse***, which is not significant in terms of the EIA Regulations.

8.12 Environmental assessment: decommissioning phase

223 The following impacts of the offshore decommissioning of AyM have been assessed on commercial fisheries:

- AyM array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds;
- AyM offshore ECC decommissioning activities leading to reduction in access to, or exclusion from established fishing grounds;
- Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds;
- Displacement from the AyM offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds;
- Decommissioning activities leading to displacement or disruption of commercially important fish and shellfish resources;
- Increased vessel traffic within fishing grounds as a result of changes to shipping routes and transiting decommissioning vessel traffic from AyM array area and AyM offshore ECC leading to interference with fishing activity;
- Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area; and
- Physical presence of any infrastructure left in situ leading to gear snagging.

224 The environmental impacts arising from the decommissioning of AyM are listed in Table 10 along with the maximum design scenario against which each decommissioning phase impact has been assessed.

8.12.1 AyM array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds

Significance of residual effect

225 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 80 to 83). The significance of effect is therefore ***minor adverse*** for the potting and dredge fleets and ***negligible*** for the netting fleet, which is not significant in EIA terms.

8.12.2 AyM offshore ECC decommissioning activities leading to reduction in access to, or exclusion from established fishing grounds

Significance of residual effect

226 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 91 to 94). The significance of effect is therefore ***minor adverse*** for the UK potting and netting fleets and ***negligible*** for the UK dredge fleet, which is not significant in EIA terms.

8.12.3 Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds

Significance of residual effect

227 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 108 to 110). The significance of effect is therefore ***minor adverse*** for the potting fleet and ***negligible*** for the netting and dredge fleets, which is Not Significant in EIA terms.

8.12.4 Displacement from the AyM offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds

Significance of residual effect

228 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 124 to 126). The significance of effect is therefore ***minor adverse*** for the UK potting and netting fleets and ***negligible*** for the UK dredge fleet, which is not significant in EIA terms.

8.12.5 Decommissioning activities leading to displacement or disruption of commercially important fish and shellfish resources

Significance of residual effect

229 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (noting that subsea noise emissions are likely to be substantially less than those arising from construction) (see paragraphs 134 to 136). The significance of effect is ***minor adverse*** for all fisheries, which is not significant in EIA terms.

8.12.6 Increased vessel traffic within fishing grounds as a result of changes to shipping routes and transiting decommissioning vessel traffic from AyM array area and AyM offshore ECC leading to interference with fishing activity

Significance of residual effect

230 The effects of decommissioning activities are expected to be the same or similar to the effects from construction (see paragraphs 143 to 145). The significance of effect is therefore ***minor adverse*** for UK potting and netting fisheries, which is not significant in EIA terms, and ***negligible*** for dredge fisheries, which is not significant in EIA terms.

8.12.7 Additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area

Significance of residual effect

231 The effects of the decommissioning phase are expected to be the same or similar to the effects from construction (see paragraphs 152 to 154), The significance of effect is therefore ***minor adverse*** for UK potting and netting fisheries, which is not significant in EIA terms, and ***negligible*** for dredge fisheries, which is not significant in EIA terms.

8.12.8 Physical presence of any infrastructure left *in situ* leading to gear snagging

Significance of residual effect

232 The effects of decommissioning activities are expected to be the same or similar to the effects from operation phase for any infrastructure that is left in situ (see paragraphs 212 to 215, and 219 to 222). The significance of effect is ***minor adverse*** for all fisheries, which is also not significant in EIA terms.

8.13 Environmental assessment: cumulative effects

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

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

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

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

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

238 For the potential effects for commercial fisheries, other planned developments were screened into the assessment based on a CEA study area of the Irish Sea for the scallop fleet, and the regional study area shown in Figure 1 for the potting and netting fleets, to provide appropriate coverage of relevant fishing grounds.

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

240 Developments screened into the CEA for commercial fisheries are presented in Table 13.

Table 14: Projects considered within the commercial fisheries cumulative effect assessment.

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Subsea cable	Havhingsten / CeltixConnect-2 (CC-2)	Under construction	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 1
Tidal Energy	West Anglesey Demonstration Zone (Morlais)	Application submitted	High - Third party project details published in the public domain and confirmed as being 'accurate' by The Crown Estate	Tier 1
Offshore Wind Farm	Arklow Bank Phase 2	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 2
Offshore Wind Farm	Dublin Array	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 2

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Tidal Energy	Bardsey Sound (Enlli)	Application submitted	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	DeepGreen 1/10	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Solway Firth-Venturi Enhanced Turbine Technology (VETT)	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Holyhead Deep	In Pre-Planning	High - Third party project details published in the public domain and confirmed as being 'accurate' by The Crown Estate	Tier 3
Offshore Wind Farm	EnBW and BP 1 and 2 – Round 4	Concept/early planning	Low – Limited data available in the public domain	Tier 3

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Offshore Wind Farm	Cobra & Flotation Energy – Round 4	Concept/early planning	Low – Limited data available in the public domain	Tier 3
Offshore Wind Farm	Isle of Man	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	Codling Wind Park	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	North Irish Sea Array	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	Braymore Point	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Offshore Wind Farm	Codling Wind Park Extension	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	Cooley Point	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	Cloger Head	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	South Irish Sea Array	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Offshore Wind Farm	Oriel	Concept	Medium - Third party project details published in the public	Tier 3

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
			domain but not confirmed as being 'accurate'	
Offshore Wind Farm	Kilmichael Point	Concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Colwyn Bay Tidal Lagoon	Early concept	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Port of Mostyn Tidal Lagoon	In Planning	High - Third party project details published in the public domain and confirmed as being 'accurate' by The Crown Estate	Tier 3
Tidal Energy	Mersey Tidal Power	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Tidal Energy	Morecambe Bay Tidal Lagoon	In development	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Duddon Estuary Tidal Lagoon	In development	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Bardsey Sound	Pre-Planning	High - Third party project details published in the public domain and confirmed as being 'accurate' by The Crown Estate	Tier 3
Tidal Energy	West Cumbrian Tidal Lagoon	In planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Mull of Galloway	In development	Medium - Third party project details published in the public	Tier 3

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
			domain but not confirmed as being 'accurate'	
Tidal Energy	Strangford Lough Array	Pre-Planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	Strumble Head Tidal Energy Project	Early planning	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	St. David's Head	In development	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3
Tidal Energy	North Wales Tidal Energy Project between Prestatyn and Llandudno.	In development	Medium - Third party project details published in the public domain but not confirmed as being 'accurate'	Tier 3

241 Certain impacts assessed for AyM alone are not considered in the cumulative assessment due to:

- the highly localised nature of the impacts (i.e. they occur entirely within AyM only);
- management measures in place for AyM (Section 9.9) will also be in place on other projects reducing their risk of occurring; and/or
- where the potential significance of the impact from AyM alone has been assessed as negligible.

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

- increased risk of gear snagging;
- displacement or disruption of commercially important fish and shellfish resources;
- increased vessel traffic within fishing grounds as a result of changes to shipping routes and project related vessel traffic leading to interference with fishing activity; and
- additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the AyM area.

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

- reduction in access to, or exclusion from established fishing grounds; and
- displacement leading to gear conflict and increased fishing pressure on established fishing grounds.

244 A description of the significance of cumulative effects upon commercial fisheries arising from each identified impact is given below.

245 The following table sets out the basis for the CEA relevant to commercial fisheries.

Table 15: Cumulative MDS.

POTENTIAL EFFECT	SCENARIO	JUSTIFICATION
Cumulative reduction in	Tier 1:	Outcome of the CEA will be greatest when the

POTENTIAL EFFECT	SCENARIO	JUSTIFICATION
access to, or exclusion from established fishing grounds	▲ Operation and maintenance of the Havhingsten-CeltixConnect-2 subsea cable ▲ Construction, operation, and maintenance of Morlais tidal energy project Tier 2: ▲ Construction, operation, and maintenance of Arklow Bank Phase 2 offshore wind farm ▲ Construction, operation, and maintenance of Dublin Array offshore wind farm Tier 3: ▲ Construction, operation, and maintenance of other tidal energy projects listed in Table 13 ▲ Construction, operation, and maintenance of other offshore wind farm projects listed in Table 13	greatest number of other developments are considered.
Cumulative displacement leading to gear conflict and increased fishing pressure on established fishing grounds		

Reduction in access to, or exclusion from established fishing grounds

Tier 1

246 There is potential for cumulative reduction in access to or exclusion from established fishing grounds as a result of construction activities associated with AyM and other projects. For the purposes of this PEIR, this additive impact has been assessed within the Irish Sea for the scallop dredge fleet and within a smaller regional study area for the potting and netting fleets, which is considered to be representative of the fishing grounds exploited by the fleets active across AyM.

247 The projects identified under Tier 1 are the Havhingsten-CeltixConnect-2 subsea cable, which is in construction and expected to be operational in 2021, and the Morlais tidal energy project, which if consent is granted in 2021 is expected to undertake offshore construction in 2023.

248 There is potential for the UK scallop dredge fleet active in the northern extent of AyM to also target grounds in the location of the Havhingsten-CeltixConnect-2 subsea cable. It is not anticipated that the UK potting and netting fleets operating in the AyM commercial fisheries study area will routinely target ground in the area of the subsea cable route. There is expected to be five years between the completion of the subsea cable and the commencement of AyM construction, limiting the scale of cumulative impact on the UK scallop fleet.

249 The impact assessment for the Havhingsten-CeltixConnect-2 subsea cable did not consider reduction in access from established fishing grounds. In assessing the impact of temporary displacement of both static and mobile gear fishing fleets from the cable route, it concluded that the magnitude of the impact was 'medium' and that the significance was 'moderate' and 'tolerable'.

250 The UK dredging fleet target scallop across a relatively wide area offshore and vessels typically have large operating ranges. Scallop grounds extend far beyond the extent of AyM and the Havhingsten-CeltixConnect-2 subsea cable, covering much of the Irish Sea. Whilst the UK scallop dredge fleet demonstrate some vulnerability to cumulative impacts of exclusion, they are judged to be of low vulnerability, high recoverability and high value.

251 The sensitivity of the UK scallop dredge fleet is judged to be **low** and the magnitude of impact is assessed as **medium adverse**. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 1 projects is ***minor adverse***, which is not significant in EIA terms.

252 Given the location of the Havhingsten-CeltixConnect-2 subsea cable at the outer extent of the regional study area and therefore beyond grounds commonly targeted by the local potting and netting fleets, the sensitivity of the UK potting and netting fleets is judged to be **negligible** and the magnitude of impact is assessed as **negligible**. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 1 projects is ***negligible***, which is not significant in EIA terms.

253 It is not anticipated that the UK potting and netting fleets operating in the AyM commercial fisheries study area will routinely target ground in the area of the Morlais tidal energy site as a result of the project's inshore location and the highly tidal nature of the site. It is not anticipated that the UK scallop dredge fleet active in the northern extent of AyM will target grounds in the location of the Morlais tidal energy project. There is expected to be several years between the completion of the tidal energy project and the commencement of AyM construction, limiting the scale of cumulative impact on local fishing fleets.

254 The impact assessment for the Morlais tidal energy project considered reduction in access from established fishing grounds, concluding a medium impact magnitude for the nearshore static fleet with vessel length of 10m of less, a low impact magnitude for the static fleet operating further offshore, and a low impact magnitude for vessels over 10m length deploying mobile gear. The significance of the impact for the static gear fleets was 'minor adverse' and for the mobile fleet was 'negligible'.

255 The UK potting and netting fleets operate over a relatively wide area offshore and vessels typically target grounds that extend beyond the extent of AyM and the Morlais tidal energy project, covering much of the regional study area. Whilst the UK potting and netting fleets demonstrate some vulnerability to cumulative impacts of exclusion, they are judged to be of low-medium vulnerability, high recoverability and high value.

256 The sensitivity of the UK potting and netting fleets is judged to be **low** and the magnitude of impact is assessed as **medium adverse**. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 1 projects is ***minor adverse***, which is not significant in EIA terms.

257 Given the location of the Morlais tidal energy project, out with grounds commonly targeted by the UK scallop dredge fleet, the sensitivity of the scallop dredge fleet is judged to be **negligible** and the magnitude of impact is assessed as **negligible**. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 1 projects is ***negligible***, which is not significant in EIA terms.

Tier 2

258 The Tier 2 assessment includes two additional offshore wind farm projects: Arklow Bank Phase 2 and Dublin Array, located off the Irish coast approximately 130km away from AyM. Construction of these projects is currently anticipated to be complete ahead of the commencement of construction of AyM.

259 Based on the location of these projects, the magnitude of impact is considered to be consistent with the Tier 1 assessment for all fishing fleets.

260 The sensitivity of receptors is consistent with the Tier 1 assessment for all fishing fleets.

261 The sensitivity of the UK scallop dredge fleet is judged to be low and the magnitude of impact is assessed as medium. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 2 projects is ***minor adverse***, which is not significant in EIA terms.

262 The sensitivity of the UK potting and netting fleets is judged to be negligible and the magnitude of impact is assessed as negligible. Therefore, the significance of effect from the reduced access, or exclusion from established grounds from the installation of AyM cumulatively with the Tier 2 projects is ***negligible***, which is not significant in EIA terms.

Tier 3

263 The Tier 3 projects identified in Table 14 may contribute to cumulative effects on commercial fisheries receptors where fishing fleets active in those project areas overlap with the range of fishing fleets operational in AyM. However, at this stage and in the absence of project details on which to base assessment, it is not possible to quantify the level of impact further. If and when further project details become available, they will be duly considered in the assessment of cumulative effects.

Displacement leading to gear conflict and increased fishing pressure on established fishing grounds

Tier 1

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

265 In relation to the Havhingsten-CeltixConnect-2 subsea cable there is a negligible magnitude of impact for reduced access to fishing grounds for UK potting and netting fleets and medium magnitude for the UK scallop fleet.

266 The sensitivity of the receptors is consistent with the assessment of reduced access to fishing grounds and is therefore low for the UK scallop dredge fleet and negligible for the UK potting and netting fleets.

267 The maximum sensitivity of receptors in the area is low and the greatest magnitude of impact has been assessed as medium. Therefore, the significance of effect from the displacement of commercial fisheries leading to gear conflict and increase pressure from the installation of AyM cumulatively with the Tier 1 projects is ***minor adverse***, which is not significant in EIA terms.

268 In relation to the Morlais tidal energy project there is a **medium adverse** magnitude of impact for reduced access to fishing grounds for UK potting and netting fleets and **negligible** magnitude for the UK scallop fleet.

269 The sensitivity of the receptors is consistent with the assessment of reduced access to fishing grounds and is therefore **low** for the UK potting and netting fleets and **negligible** for the UK scallop dredge fleet.

270 The maximum sensitivity of receptors in the area is low and the greatest magnitude of impact has been assessed as medium adverse. Therefore, the significance of effect from the displacement of commercial fisheries leading to gear conflict and increase pressure from the installation of AyM cumulatively with the Tier 1 projects is ***minor adverse***, which is not significant in EIA terms.

Tier 2

271 The Tier 2 assessment includes two additional offshore wind farm projects: Arklow Bank Phase 2 and Dublin Array, located off the Irish coast approximately 130km away from AyM. Construction of these projects is currently anticipated to be complete ahead of the commencement of construction of AyM.

272 Based on the location of these projects, the magnitude of impact is considered to be consistent with the Tier 1 assessment for all fishing fleets.

273 The sensitivity of receptors is consistent with the Tier 1 assessment for all fishing fleets.

274 The maximum sensitivity of receptors in the area is low and the greatest magnitude of impact has been assessed as medium. Therefore, the significance of effect from the displacement of commercial fisheries leading to gear conflict and increase pressure from the installation of AyM cumulatively with the Tier 2 projects is ***minor adverse***, which is not significant in EIA terms.

Tier 3

275 The Tier 3 projects identified in Table 13 may contribute to cumulative effects on commercial fisheries receptors where fishing fleets active in those project areas overlap with the range of fishing fleets operational in AyM. However, at this stage and in the absence of project details on which to base assessment, it is not possible to quantify the level of impact further. If and when further project details become available, they will be duly considered in the assessment of cumulative effects.

8.14 Inter-relationships

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

- project lifetime effects: i.e. those arising throughout more than one phase of the project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and
- receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

A description of the likely inter-related effects arising from AyM on commercial fisheries is provided in Volume 2, Chapter 14: Inter-Related Effects. In summary, effects on commercial fisheries are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual project phase.

8.15 Transboundary effects

277 Transboundary effects arise when impacts from a development within one state affect the environment of other states outside of the UK EEZ.

278 Due to the localised nature of any potential impacts and very limited foreign fishing fleet activity (some potential for Irish vessels targeting *Nephrops* within the study area, but not specifically within the AyM array area or offshore ECC), transboundary impacts are unlikely to occur.

279 Effects on biological resources could occur over a range of 10s of kilometres from AyM and could therefore interact with the following states: Ireland and Isle of Man. Based on the minor to negligible significance of disruption to commercial species during all phases of AyM, it is expected that the impact on stocks in Irish and Isle of Man waters is negligible. Therefore, the potential transboundary impact of effects on commercial fish stocks in the waters of other states on commercial fisheries is concluded to be of **negligible** significance, and is therefore considered to be not significant in EIA terms.

280 Effects on commercial fishing fleets from Ireland, in terms of reduction in access to grounds within AyM and displacement into alternative grounds, are unlikely given the lack of Irish vessel activity within AyM. The potential transboundary impact of constraints on foreign commercial fishing activities is concluded to be of **negligible** significance, and is therefore considered to be not significant in EIA terms.

8.16 Summary of effects

281 Table 16 presents a summary of the preliminary assessment of significant impacts, any relevant embedded environmental measures and residual effects on commercial fisheries receptors.

Table 16: Summary of effects.

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
CONSTRUCTION				
AyM array area construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds	Potting fleet: Medium	Potting fleet: Medium	Development of Fisheries Liaison Plan (FLP), including cooperation agreements and associated payments.	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Negligible	None proposed beyond existing commitments (Section 9.9)	Netting fleet: Negligible (Not Significant)
	Dredging fleet: Medium	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)
AyM offshore export cable construction activities and physical presence of	Potting fleet: Medium	Potting fleet: Medium	Development of FLP, including cooperation agreements and associated payments.	Potting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds	Netting fleet: Medium	Netting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds	Potting fleet: Low	Potting fleet: Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Negligible	Netting fleet: Negligible		Netting fleet: Negligible (Not Significant)
	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Displacement from AyM offshore ECC leading to gear	Potting fleet: Low	Potting fleet: Low-Medium	None proposed beyond existing	Potting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
conflict and increased fishing pressure on adjacent grounds	Netting fleet: Low	Netting fleet: Low	commitments (Section 9.9)	Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
AyM array area and offshore ECC construction activities leading to disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	Potting fleet: Low	Potting fleet: Low	See measures set out in Volume 2, Chapter 6: Fish and shellfish ecology	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
Increased vessel traffic associated with AyM within fishing grounds leading to interference with fishing activity	Potting fleet: Low	Potting fleet: Low-Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the AyM area	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
OPERATION				
Physical presence of AyM array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds	Potting fleet: Medium	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Negligible	Netting fleet: Negligible		Netting fleet: Negligible (Not Significant)
	Dredging fleet: Medium	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)
Physical presence of offshore export cable and infrastructure within the AyM offshore ECC leading to reduction in	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
access to, or exclusion from established fishing grounds	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Displacement from AyM array area and offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds	Potting fleet: Low	Potting fleet: Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Negligible-Low		Netting fleet: Negligible-Minor Adverse (Not Significant)
	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
AyM operation and maintenance activities leading to	Potting fleet: Low	Potting fleet: Low	See measures set out in Volume 2, Chapter	Potting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
displacement or disruption of commercially important fish and shellfish resources	Netting fleet: Low	Netting fleet: Low	6: Fish and shellfish ecology	Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)
Increased vessel traffic within fishing grounds as a result of changes to shipping routes and maintenance vessel traffic from AyM leading to interference with fishing activity	Potting fleet: Low	Potting fleet: Low-Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low-Medium		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Additional steaming to alternative fishing grounds for vessels	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing	Potting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
that would otherwise fish within the AyM area	Netting fleet: Low	Netting fleet: Low	commitments (Section 9.9)	Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Physical presence of AyM array area infrastructure leading to gear snagging	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Medium		Dredging fleet: Minor adverse (Not Significant)
Physical presence of the export cable and associated	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing	Potting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
infrastructure leading to gear snagging	Netting fleet: Low	Netting fleet: Low	commitments (Section 9.9)	Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)
DECOMMISSIONING				
AyM array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds	Potting fleet: Medium	Potting fleet: Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Negligible		Netting fleet: Negligible (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
AyM offshore ECC decommissioning activities leading to reduction in access to, or exclusion from established fishing grounds	Potting fleet: Medium	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Medium	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Displacement from AyM array area leading to gear conflict and increased fishing pressure on adjacent grounds	Potting fleet: Low	Potting fleet: Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Negligible	Netting fleet: Negligible		Netting fleet: Negligible (Not Significant)
	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
Displacement from the AyM offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds	Potting fleet: Low	Potting fleet: Low-Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Negligible	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Decommissioning activities leading to displacement or disruption of commercially important fish and shellfish resources	Potting fleet: Low	Potting fleet: Low	See measures set out in Volume 2, Chapter 6: Fish and shellfish ecology	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
Increased vessel traffic within fishing grounds as a result of changes to shipping routes and transiting decommissioning vessel traffic from AyM array area and AyM offshore ECC leading to interference with fishing activity	Potting fleet: Low	Potting fleet: Low-Medium	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low-Medium		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the AyM area	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
	Dredging fleet: Low	Dredging fleet: Negligible		Dredging fleet: Negligible (Not Significant)
Physical presence of any infrastructure left in situ leading to gear snagging	Potting fleet: Low	Potting fleet: Low	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Minor adverse (Not Significant)
	Netting fleet: Low	Netting fleet: Low		Netting fleet: Minor adverse (Not Significant)
	Dredging fleet: Low	Dredging fleet: Low-Medium		Dredging fleet: Minor adverse (Not Significant)
CUMULATIVE EFFECTS				
Reduction in access to, or exclusion from	Potting fleet: Negligible	Potting fleet: Negligible	None proposed beyond existing	Potting fleet: Negligible (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
established fishing grounds	Netting fleet: Negligible	Netting fleet: Negligible	commitments (Section 9.9)	Netting fleet: Negligible (Not Significant)
	Dredging fleet: Medium	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)
Displacement leading to gear conflict and increased fishing pressure on established fishing grounds	Potting fleet: Negligible	Potting fleet: Negligible	None proposed beyond existing commitments (Section 9.9)	Potting fleet: Negligible (Not Significant)
	Netting fleet: Negligible	Netting fleet: Negligible		Netting fleet: Negligible (Not Significant)
	Dredging fleet: Medium	Dredging fleet: Low		Dredging fleet: Minor adverse (Not Significant)

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