RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Appendix 13-2 Commercial Fisheries Technical Report

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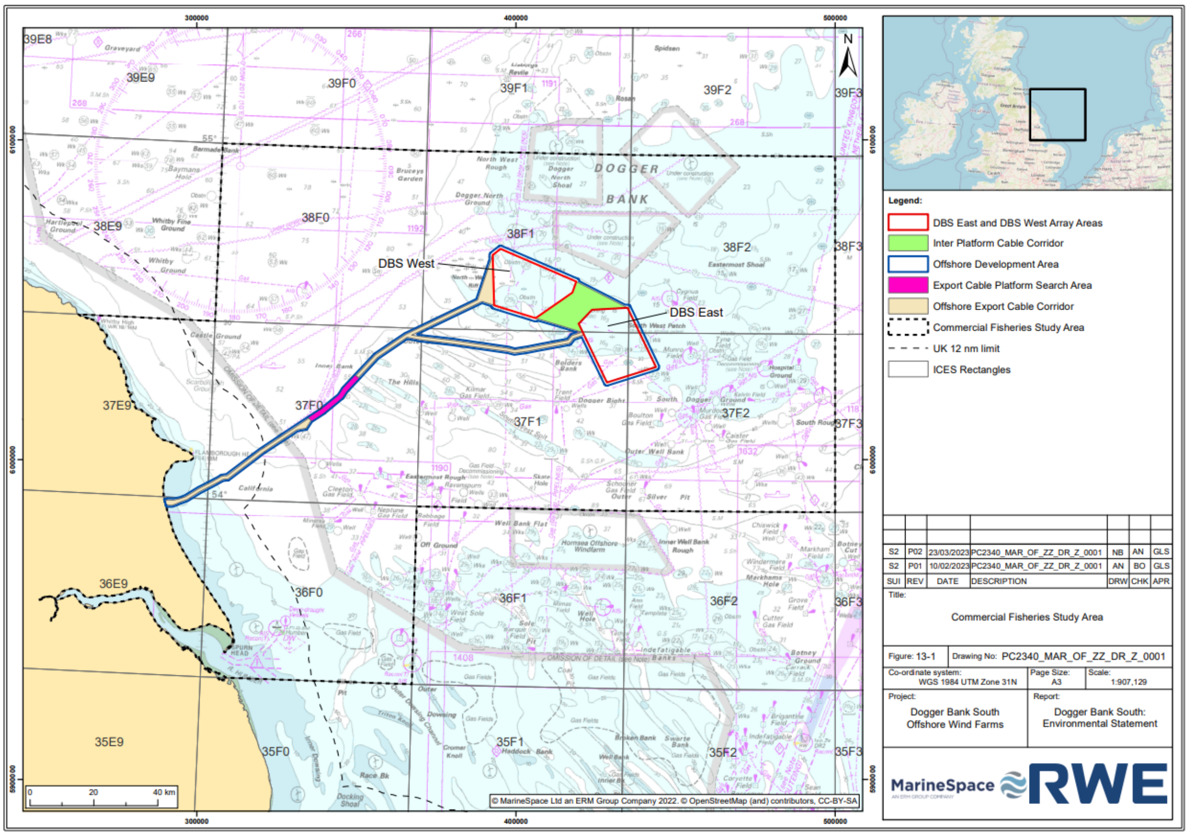
MarineSpace

Making Sense of the Marine Environment ™

Dogger Bank South Offshore Wind Farms – Commercial Fisheries Technical Report



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Dogger Bank South Offshore Wind Farms – Commercial Fisheries Technical Report

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Acronyms

AIS	Automatic Identification Systems
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFP	Common Fisheries Policy
CFWG	Commercial Fisheries Working Group
CNPMEM	Le Comité national des pêches maritimes et des élevages marins
DBS	Dogger Bank South
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESCA	European Sub-sea Cable Association
ESP	Electrical Switching Platform
EU	European Union
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FMPs	Fisheries Management Plans
HFIG	Holderness Fishing Industry Group
HPMA	Highly Protected Marine Area
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authorities
INNS	Invasive Non-native Species
MLS	Minimum Landing Size
MMO	Marine Management Organisation
MPA	Marine Protected Area
MPS	Marine Policy Statement

MSY	Maximum Sustainable Yield
NFFO	National Federation of Fishermen's Organisations
NRA	Navigational Risk Assessment
NtM	Notices to Mariners
PEIR	Preliminary Environmental Information Report
PMSL	Precision Marine Survey Ltd
SAC	Special Area of Conservation
SFF	Scottish Fishermen's Federation
SFPO	Swedish Fisherman's Producers Organisation
SMB	Surface Marker Buoys
SPFPO	Swedish Pelagic Federation Producer Organisation
SSB	Spawning Stock Biomass
STECF	EU Scientific, Technical and Economic Committee for Fisheries
SWFPA	Scottish White Fish Producers Association
SWFPO	South West Fisher Producers Organisations
TAC	Total Allowable Catch
VMS	Vessel Monitoring System

1. Introduction

1.1. Overview

MarineSpace Ltd has been commissioned by Royal HaskoningDHV to undertake a desk-based study on commercial fisheries activity within, and around, the proposed Dogger Bank South (DBS) East and DBS West offshore wind farms, collectively known as DBS offshore wind farms (hereafter referred to as the Projects). The Projects are located approximately 100km offshore, on the Dogger Bank in the southern North Sea.

The study will be used to inform the Environmental Statement (ES) being compiled for these Projects. Further details on the specific aims and objectives of the study are provided in section 1.3.

1.2. Project Description

The DBS East Array Area is approximately 349km^2 and the DBS West Array Area is approximately 355km^2. The DBS West array boundary lies approximately 100km from shore and the DBS East boundary is approximately 122km from shore at their closest points (Flamborough Head, East Yorkshire). The Array Areas would include up to 200 wind turbines, in addition to associated cables and offshore platforms.

The electricity generated by the Projects will be transmitted to the onshore electricity transmission network by export cables located within an Offshore Export Cable Corridor from the Array Areas to the coast. Based on the onshore grid connection point at Creyke Beck, East Yorkshire, a single landfall location has been identified close to Skipsea.

1.3. Aims and Objectives

The aim of this assessment is to describe commercial fishing activity at the DBS Array Areas, Offshore Export Cable Corridor and surrounding waters. This information will be used to inform the Environmental Impact Assessment (EIA) in relation to the Projects. To meet this aim, the following objectives have been defined:

- Undertake an assessment of commercial fishing activity in relation to the DBS Array Areas, Offshore Export Cable Corridor and wider area, to include:
    - Weight and value of landed catch (by vessel size class and species groups);
    - Weight and value of landed catch (by species);
    - Weight and value of landed catch by regional ports;
    - Fishing activity distribution, effort and intensity;
- To build upon the information from official data with additional data and knowledge obtained via direct consultation with representatives of local and regional fishing organisations. Consultation for the DBS Projects was undertaken by Precision Marine Survey Ltd (PMSL) as part of Fisheries Liaison work, and during the commercial fisheries stakeholder engagement consultations.

2. Commercial Fisheries Activity

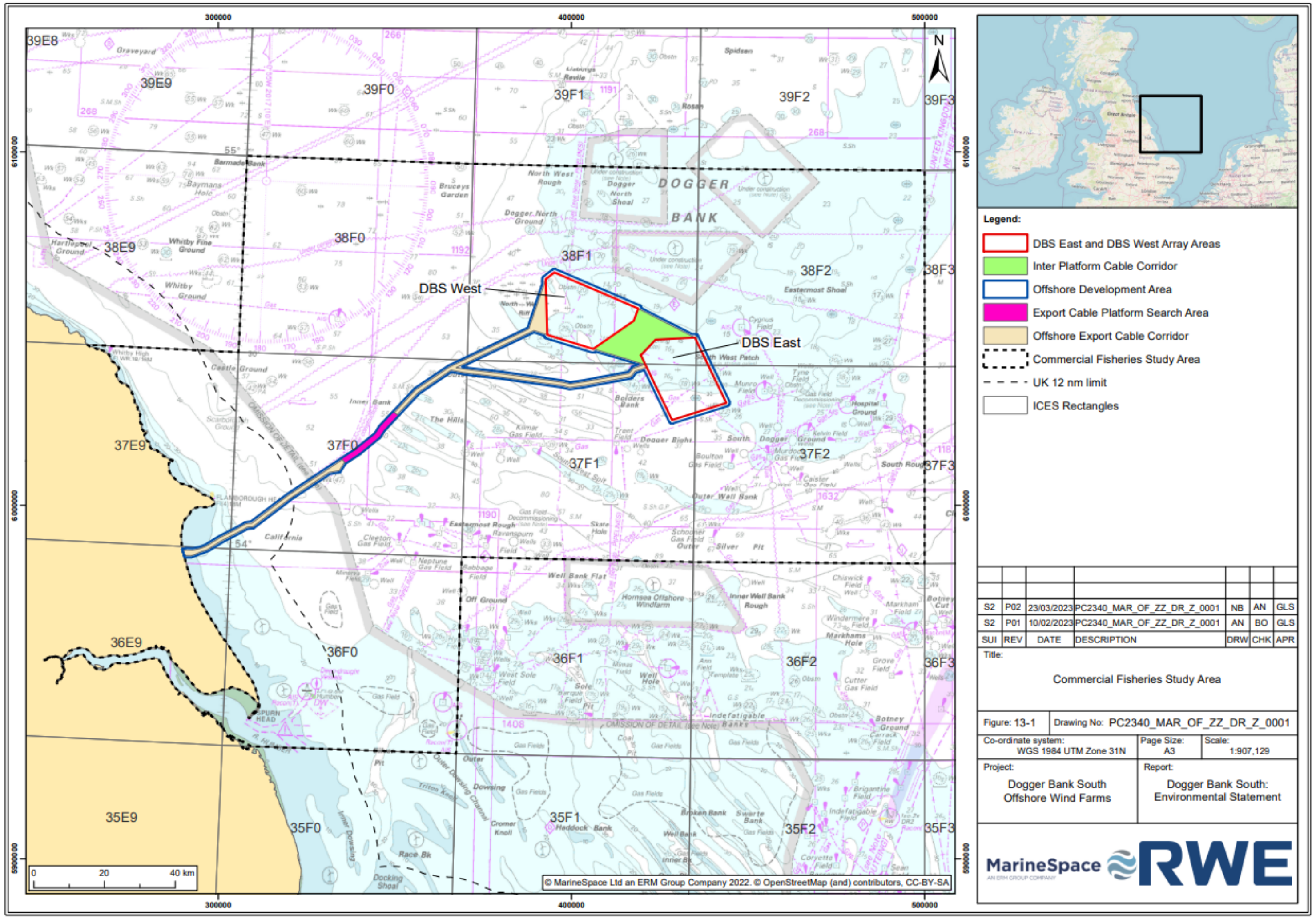
2.1. Overview of the Commercial Fisheries Study Area

2.1.1. Commercial Fisheries Study Area

The Projects are located within the International Council for the Exploration of the Sea (ICES) Division IVb (North Sea) statistical area, which is divided into statistical rectangles for the purpose of recording fisheries landings. The DBS Array Areas (Figure 13- 1) will be located within ICES Rectangles 37F1, 37F2, 38F1 and 38F2; and the Offshore Export Cable Corridor (also illustrated on Figure 13-1) will be located within 36E9, 37E9, 37F0, 37F1 and 38F1.

A broad Commercial Fisheries Study Area has been defined for the purposes of this technical report, to provide a wider regional context to the current fisheries activity, and to ensure that potential impacts on commercial fisheries (e.g., displacement of fishing vessels), from the Projects, are fully assessed. Therefore, for the purposes of this technical report, the Commercial Fisheries Study Area is defined as ICES 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2.

Figure 13-1: Location of the DBS Array Areas and Offshore Export Cable Corridor, within the Commercial Fisheries Study Area, with International Council for the Exploration of the Sea (ICES) Rectangles. Admiralty Charts reproduced under licence. Not to be used for navigation.



2.1.2. Shellfish

Within the commercial fisheries study area, UK-registered vessels target a range of shellfish species, such as king scallop, brown crab, lobster and whelk, and land into a range of ports that include Grimsby, Scarborough, Whitby, Bridlington and Hornsea. Vessels targeting *Nephrops* (Norway lobster) from the Netherlands, Germany and Belgium are also active in this region, albeit at a lesser level to that of UK-registered vessels targeting other shellfish species. Fishing effort for shellfish species within the commercial fisheries study area has seen a significant increase over the years as effort has diversified away from traditional Dogger Bank trawl fisheries, targeting Herring *Clupea harengus*, Plaice *Pleuronectes platessa* and other flat fish. Lately these changes have been driven by both local and global mechanisms. For instance, mean sea temperature rise in the North Sea has led to changes in seasonal abundance in species like Lobster *Homarus gammarus* (Morris et al. 2016). The prolonged season enables investment in gear type to target these species as local markets adapt to these trends. The high value whelk *Buccinum undatum* has become an important species in the area as global markets become more accessible for export. These markets have also driven up the price of brown crab.

2.1.2.1. King Scallop

King scallops *Pecten maximus* are most common in areas of fine gravel and clean firm sand, and at water depths of 20m to 70m. Within the commercial fisheries study area, king scallop are primarily targeted using towed dredges, by vessels >10m in length.

The scallop industry is one of the highest value commercial fisheries in the UK (Cappel *et al*., 2018). King scallop are a non-quota species and, therefore, are not subject to Total Allowable Catch (TAC) limits; however, there are technical management measures and minimum landings sizes (MLS) in place. There are restrictions on the number of dredges used, which depend on the distance from the coast. Beyond 12nm, there are no regulatory limits on the maximum number of dredges permitted to be towed behind a vessel. Instead, the number of dredges is limited by the size and engine capacity of the fishing vessels. At the time of writing, there are various restrictions on commercial fishing within the commercial fisheries study area; of relevance to dredging for king scallop, a temporary closure for scallop fishing was introduced within the offshore region in April 2021, and this closure became permanent when a bottom towed fishing gear byelaw was enacted from 13 June 2022 (discussed in more detail within section 2.1.5).

2.1.2.2. Potting for brown crab, lobster, and whelk

Potting for lobster, brown crab *Cancer pagurus* and whelk occurs across the commercial fisheries study area (ICES, 2019), with vessels targeting these species operating mainly out of Bridlington, but also across Hornsea, Withernsea and Flamborough. There are no TACs or quotas for lobster, brown crab, or whelk, however, all are subject to an MLS.

Within the Commercial Fisheries Study Area, Project specific consultation has established that whelk is landed mainly as bycatch rather than specifically targeted. Typical whelk grounds are located around Pickerell, north east of Flamborough Head. However, stakeholders have indicated a decline in whelk fishing, which as of 2022, is primarily due to a decreased first sale value of whelk (£/kg) and an increase in the current cost of fuel.

With regard to the lobster and brown crab fishery within the Commercial Fisheries Study Area, Project specific consultation indicated that as of December 2022, there has been an observed increase in the first sale value of lobster and brown crab, rising to £38.50/kg and £5/kg, respectively. However, implications of Brexit are still causing market unsettlement, primarily due to the additional administrative burdens and involved costs in exporting to Europe (an estimated 15 to 20% increase in EU exporting admin costs has been reported via project specific consultation).

2.1.3. Demersal Fish

Within the Commercial Fisheries Study Area, UK and EU registered vessels target a range of demersal fish species, such as sandeel, plaice and sole. These demersal fish species are targeted primarily by vessels >10m in length that deploy a mix of demersal seine, beam trawl and otter trawl gear. Within the commercial fisheries study area, a bottom towed fishing gear byelaw was enacted in 2022 that overlaps with the majority of the Array Areas and prohibits bottom towed fishing (discussed in more detail within section 2.1.5).

2.1.3.1. Trawling for flatfish

The North Sea has been an important traditional fishing ground for a mix of beam trawl, otter trawl and demersal seine vessels for many decades (Polet and Depestele, 2010). Flatfish, specifically plaice and sole, are an important catch for these vessels, with sole often caught as bycatch while trawling for plaice. There are TACs and MLSs in place for both plaice and sole.

Within the North Sea, plaice and sole stock levels are assessed on an annual basis using a robust stock assessment model. Following years of decline from 2014 to 2019, the ICES stock assessments highlight that plaice stocks have grown above levels at which are considered healthy, with this growth anticipated to continue with current catch levels. ICES advises that when the Maximum Sustainable Yield (MSY) approach is applied, catches in 2023 should be no more than 150,705 tonnes, an increase of 5% from the advice provided in 2022 (ICES, 2022b). With regard to sole stocks, ICES stock assessments indicate that in 2021, Spawning Stock Biomass (SSB) was observed at highest levels since 1995 (45,001 tonnes), while in 2022 this declined slightly to 42,148 tonnes. ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 9,152 tonnes, a decline of 40% from the advice given in 2022. This is due to the downward revision of the large 2018 year class and its contribution to SSB, with SBB predicted to decline in 2023 (ICES, 2022c).

2.1.4. Pelagic Fish

Within the commercial fisheries study area, UK and EU registered vessels target a range of pelagic fish species, such as sandeel, sprat, mackerel, and herring. These pelagic fish species are targeted primarily by vessels >10m in length, with vessels as large as 140m observed in the commercial fisheries study area. Pelagic trawls and seines both operate in this region.

2.1.4.1. Trawling for herring

The herring fishery is located throughout the commercial fisheries study area, with the “Hills” noted by Project specific consultation as an area particularly populated with herring. Herring within the commercial fisheries study area are targeted by a mix of gear types, including pelagic trawls, mid-water trawls and pelagic seine nets, predominantly by a range of non-UK registered vessels from

Denmark, France, Germany, Sweden, and the Netherlands. Within inshore waters, drift nets and seine nets are typically used however gillnets have been used to catch herring historically.

While ICES stock assessments highlight that herring stock in the North Sea has been on the decline since 2016, the stock is not currently in an overfished state, as in 2021, the SSB has remained above target levels (ICES, 2021). ICES advised that when the MSY approach is applied, catches in 2022 should be no more than 532,183 tonnes, a 45% increase from the advice provided in 2021 (ICES, 2021).

2.1.4.2. Trawling for sandeel

Following settlement, sandeel are largely stationary, with a complex of sub-populations in existence across the North Sea. Sandeel within these sub-populations have a dependency on sandy sediments, into which they bury during the night and winter months. The sandeel fishery is seasonal, with Project specific consultation establishing that activity within the commercial fisheries study area occurs from April to late June, predominantly by Swedish and Danish trawlers >10m in vessel length that deploy small-mesh demersal gear. An area known as the “Hills”, located southwest of DBS West is considered an important fishing ground for sandeel by the fishery, with landings mostly consisting of *Ammodytes marinus* (other sandeel species are also landed). The fishery is widely considered an industrial fishery, as sandeel catch are processed for their fish meal and oil for use in various types of food for animal and human consumption.

In order to avoid local depletion of sandeel stock, ICES provide advice for seven areas of the North Sea (Division IVb). The commercial fisheries study area is located within Sandeel Area 1 – Dogger Bank. Due to the low stock size and low year class size in 2021, ICES advised that when the Maximum Sustainable Yield (MSY) approach is applied, there should be zero catch in 2022 (ICES, 2022a).

2.1.5. Commercial Fisheries Restrictions

Within the Commercial Fisheries Study Area there are various restrictions on commercial fishing, which are displayed in Figure 2.1.1 and Figure 2.1.2, and outlined in Table 2.1.1.

Within the inshore region (6 nm) of the Commercial Fisheries Study Area, there are multiple restrictions which overlap with the Offshore Export Cable Corridor; these include permits to utilise certain gear types, and prohibitions of other gear types. Further information is outlined in Table 2.1.1.

The Dogger Bank Special Area of Conservation (SAC) (Specified Area) Bottom Towed Fishing Gear Byelaw 2022[1] is the only restriction within the offshore region of the Commercial Fisheries Study Area. The area within which the byelaw applies covers approximately 12,399km^2. The byelaw overlaps with the entirety of the DBS Array Areas and overlaps with approximately 22km of the DBS East Offshore Export Cable Corridor and approximately 7km of the DBS West Offshore Export Cable Corridor (Figure 2.1.2). This byelaw prohibits bottom-towed[2] fishing across the whole of the Dogger Bank SAC and a buffer zone, to protect sensitive shallow water sandbank habitats. Any fishing vessels transiting through the SAC must have all bottom-towed fishing gear inboard, lashed and stowed. The byelaw was introduced by the Marine Management Organisation (MMO) and came into force on 13 June 2022. It is discussed in more detail within section 4, regarding the implications on fishing activity.

It should be noted that, prior to the byelaw being implemented, there was a temporary closure for scallop dredges between 12 July 2020 to 4 April 2021, within ICES rectangles 39F1, 39F2, 39F3, 38F1, 38F2, 38F3, 37F1 and 37F2. However, this closure is no longer in place.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1068913/Dogger_Bank_SAC_Byelaw.pdf

[2] For the purposes of this byelaw, bottom towed fishing gear refers to any trawls, seines, dredges or similar gear, including trawls towed on, or very close to, the sebed, which are actively moved in the water by 1 or more fishing vessels, or by any other mechanised system, and in which any part of the gear is designed and rigged to operation on, and be in contact with, the seabed. This includes demersal seines and semi-pelagic towed gear.

Figure 2.1.1: Inshore fisheries restrictions within the Commercial Fisheries Study Area

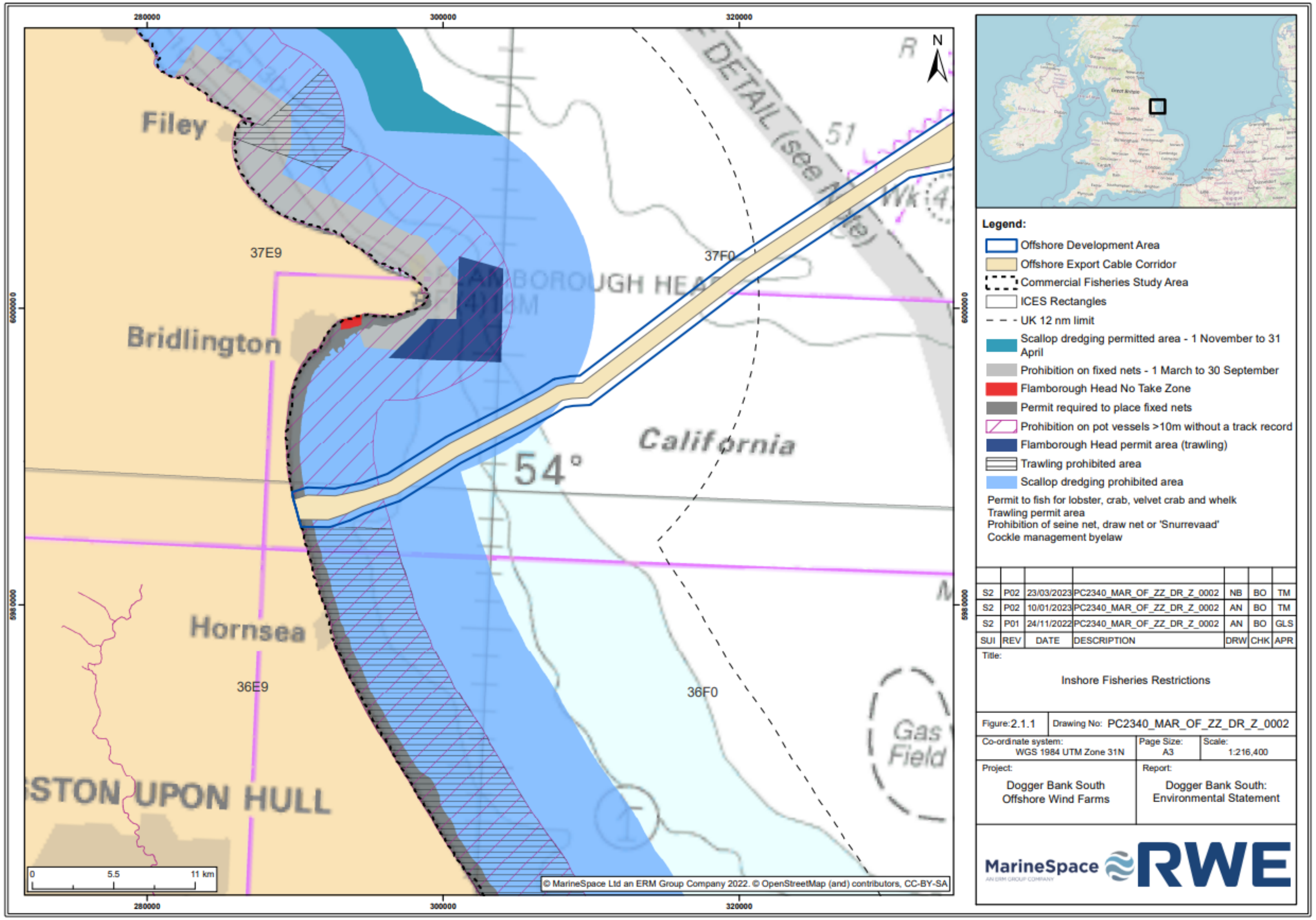


Figure 2.1.2: Offshore fisheries restrictions within the Commercial Fisheries Study Area

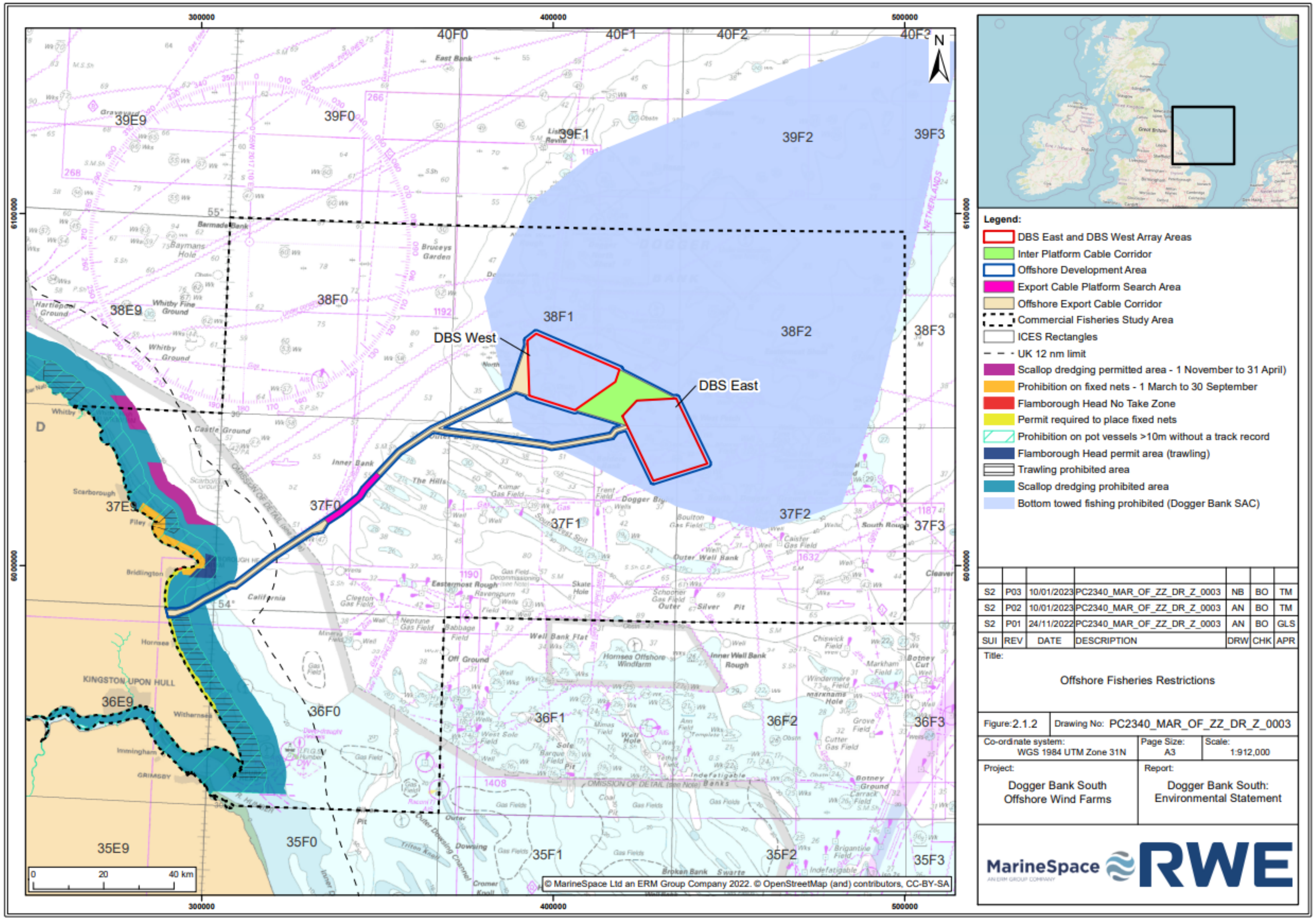


Table 2.1.1: Fisheries restrictions within the Commercial Fisheries Study Area

Byelaw	Description	Legislative data	Overlap with Projects
Bottom Towed Fishing Gear Byelaw (Dogger Bank SAC)	A person must not use bottom-towed fishing gear in the specified area. A vessel transiting through the specified area must have all bottom towed fishing gear inboard, lashed and stowed.	13 June 2022	Array areas and a proportion of the Offshore Export Cable Corridor
NEIFCA Byelaw III: Trawling Prohibition Exceptions	Trawling is prohibited unless a permit has been issued by the Authority and the overall length of the vessel, from which trawling is carried out, does not exceed 18.3 m, and the engine power of the vessel does not exceed 400 KW.	30 July 2002	0-1.5 nm of the south part of the Offshore Export Cable Corridor
NEIFCA Byelaw IV: Prohibition of Seine Net, Draw Net Or 'Snurrevaad'	No person shall use in fishing for sea fish any seine net or any draw net of the kind known as the Danish seine or 'snurrevaad'.	06 February 1959	0-11 nm of the Offshore Export Cable Corridor
NEIFCA Byelaw XVII: Method and Area of Fishing (Fixed Netting) Byelaw 2016	**Area C** A person must not fish or place fixed nets unless that person holds a permit. **Area D** Flamborough and Filey Coast pSPA - A person must not fish or place fixed nets between 01 March and 30 September.	27 April 2016	Approximately 0-0.45 nm of the Offshore Export Cable Corridor (Area D – n/a)
NEIFCA Byelaw XXII: Permit to fish for lobster, brown crab, velvet crab and whelk 2017	No person shall fish for or take shellfish by means of static gear except under a specified permit issued by the Authority.	17 May 2017	0-11 nm of the Offshore Export Cable Corridor
NEIFCA Byelaw XXIII: Method and area of fishing (Scallop dredges) 2015	**Scallop dredging permitted area** A person must not use a scallop dredge within the permitted area unless that person holds a valid scallop dredging permit. A person must not use a scallop dredge between 01 May and 31 October of the same year inclusive. **Scallop dredging prohibited area** A person must not use a scallop dredge within	17 December 2015	0-11 nm of the Offshore Export Cable Corridor (Prohibited area – n/a)

Byelaw	Description	Legislative data	Overlap with Projects
	the prohibited area.		
NEIFCA Byelaw XXVI: Flamborough Head Fishing Byelaw	No vessel shall engage in any trawling activities unless that vessel holds a valid special permit. Beam and multi-rig vessel trawling are prohibited.	16 April 2014	n/a
NEIFCA Byelaw XXVII: Flamborough Head No Take Zone	No person or persons shall use any instrument or method of fishing, including hand gathering, for the removal or taking of seafish (including shellfish). This does not apply to salmon species, or trout which migrate to and from the sea.	27 January 2009	n/a
NEIFCA Crustacea Conservation Byelaw XXVIII	A person must not use a pot from a vessel exceeding 10 m overall length. A person must not use a pot unless the pot has at least 1 unobstructed escape gap (per chamber) in its exterior wall. A person must not use any pot with a size exceeding 50 cm high x 60 cm wide x 110 cm long.	14 July 2018	0-3 nm of the Offshore Export Cable Corridor
Prohibition on Removal of Tope or Parts Thereof. **Byelaw XXV**	No person shall remove from any fishery any tope of the species *Galeorhinus galeus* or part(s) thereof which is detached from the body. Any tope, if caught, shall be returned immediately to the sea in a position as near as possible to that part of the sea from which it was taken.	12 November 2009	0-6 nm of the Offshore Export Cable Corridor

2.2. Data Sources

This section details the data sources used to characterise the commercial fishing activity in the Commercial Fisheries Study Area, which include official sources, site-specific surveys, and feedback from consultation.

2.2.1. Official Data Sources

Information on commercial fisheries within the Commercial Fisheries Study Area was collected though a detailed review of official datasets, which is summarised in Table 2.2.1. Additional VMS data has been obtained from non-UK organisations, and used to inform the Environmental Statement.

Where possible, data have been collated for a ten year period, as requested by fisheries stakeholders, to capture yearly changes to quota allocations. The most recently available datasets have been collated from the various sources, where possible.

There is a range of different limitations and assumptions associated with the data, as summarised in Table 2.2.1. Feedback from consultation (discussed further in section 2.2.3), and data from site-specific surveys (discussed further in section 2.2.2), have been used to supplement the official datasets, particularly where there are recognised data limitations. A confidence level has been assigned to each dataset, informed by the assessment team's expert judgment, and based on the various data limitations (e.g., age of dataset, spatial resolution and size of vessels included). Care has been taken when interpreting the data, particularly those with lower confidence levels.

It should be noted that the official data sources do not reflect commercial fishing activity since the implementation of the Dogger Bank SAC byelaw, due to the time period captured within the datasets. Therefore, the baseline presented by these datasets does not fully represent current fishing activity, particularly within the DBS Array Areas; this is discussed further in sections 3 and 4.

Table 2.2.1: Summary of key official data sources

Dataset	Spatial Coverage	Year	Source	Confidence Level and Limitations
MMO fleet landings by ICES Rectangle	Commercial Fisheries Study Area	2012-2022	MMO	• High confidence • Finest available level of spatial resolution is by ICES Rectangle; • Vessels ≤10 m are not required to complete logbooks, so may be under-represented within the data; • Duplication of species under different common names and grouping at higher taxonomic levels.
MMO UK and foreign fleet landings into the UK by port	Commercial Fisheries Study Area	2012-2022	MMO	• High confidence • Vessels ≤10 m are not required to complete logbooks, so may be under-represented within the data.

Dataset	Spatial Coverage	Year	Source	Confidence Level and Limitations
EU STECF non-UK landings by ICES Rectangle	Commercial Fisheries Study Area	2006-2016	EU STECF	• Medium confidence • Finest available level of spatial resolution is by ICES Rectangle; • Data are provided by Member States - variable levels of confidence; • Vessels ≤10 m are not required to complete logbooks, so may be under-represented within the data; • Duplication of species under different common names and grouping at higher taxonomic levels.
MMO fishing activity data for UK vessels (≥15 m) – VMS data	Commercial Fisheries Study Area	2010-2020	MMO	• Medium confidence • Finest available level of spatial resolution is by ICES Subrectangle; • Uncertainty in exact position of fishing footprint due to resolution; • Processing of the VMS data obtains a proxy of effort based on time, position, and a certain speed. However, vessel speed is not 100% accurate as an indicator of fishing activity, since it does not identify whether fishing is occurring or not; • Vessels <15 m are not included within the dataset.
MMO fish landings to UK ports – spatial data	Commercial Fisheries Study Area	2010-2020	MMO	• Medium confidence • Vessels ≤10 m are not required to complete logbooks, so may be under-represented within the data.

Dataset	Spatial Coverage	Year	Source	Confidence Level and Limitations
ICES fishing activity data for mobile bottom contacting gear vessels (>12 m) using VMS data	Commercial Fisheries Study Area	2010-2020	ICES	• Medium confidence • Data only for mobile bottom contacting gears; • Finest available level of spatial resolution is by ICES Subrectangle; • Uncertainty in exact position of fishing footprint; • Processing of the VMS data obtains a proxy of effort based on time, position, and a certain speed. However, vessel speed is not 100% accurate as an indicator of fishing activity, since it does not identify whether fishing is occurring or not; • Vessels <12 m are not included within the dataset; • Data are provided by Member States - variable levels of confidence.
Cefas inshore fishing activity	Commercial Fisheries Study Area out to 12 nm	2010-2012	Cefas	• Low level of confidence – based on surveillance and sightings data, so areas which were visited less often would result in lower confidence; • Data outdated; • Only vessels <15 m included.

2.2.2. Site-Specific Surveys

Scouting surveys were undertaken during 2022 to assess the distribution and intensity of fishing effort throughout the DBS Array Areas and Offshore Export Cable Corridor (Table 2.2.2). These surveys focused on the identification of passive gear (e.g., pots and traps which target shellfish), through observations of surface marker buoys (SMBs). Other vessels were also noted transiting the DBS Array Areas and Offshore Export Cable Corridor. Surveys of the DBS Array Areas included a 2km buffer around the site boundaries and surveys of the Offshore Export Cable Corridor included a 500m (nearshore)/850m (offshore) buffer. Upon arrival at the survey area, the scout vessel proceeded along predetermined transects. Individual transects were sited approximately 500 metres apart, depending on environmental conditions. As the vessel commenced its run along the transect, observers were positioned on the starboard and portside inside the vessel so they could commence a visual search for static gears and fishing vessel from inside of the wheelhouse. Additionally, guard vessel observations of surface marker buoys were recorded during summer 2022 along the DBS Offshore Export Cable Corridor.

Information on SMBs from the scouting surveys and guard vessel observations has been used to supplement the official datasets and feedback from consultation with fisheries stakeholders. However, locations of SMBs have not been displayed within this report, due to the commercial sensitivities. Polygons have been produced to identify areas of relative SMB intensity. The limitations of these data are summarised in Table 2.2.2.

Vessel traffic surveys of the DBS Array Areas were undertaken during January/February, July, and October/November 2022, to inform the Navigation Risk Assessment (NRA), which is being undertaken as part of the wider EIA studies. Vessel traffic surveys of the ECR and platform area were also undertaken during the winter and summer of 2022. Automatic Identification System (AIS) data were collected, which included information on date and ship name; and radar data were collected, which included information on the date. Further information on the vessel traffic surveys is provided in Chapter 14 – Shipping and Navigation. These data were collated during the summer and winter, to account for seasonal variation and peak times in both marine traffic and fishing activity. However, the data are limited by the short time period captured (14 days per DBS array area, during each survey). Therefore, they have only been used to supplement the official datasets, and feedback from consultation with fisheries stakeholders. Surveys of the potential location for the export cable platforms have been undertaken, and the results have been included within the Environmental Statement.

AIS data collected between May 2020 – December 2022 has been obtained and has been used to inform the Environmental Statement.

Table 2.2.2: Summary of site-specific surveys used to inform the commercial fisheries baseline

Dataset	Spatial Coverage	Dates	Source	Limitations
Scouting survey - Spring	DBS Array Areas + 2km buffer	16 March – 3 April 2022	PMSL, 2022a	• Survey covered Project areas + buffers, so does not provide comparison of fishing activity outside these areas; • It is not possible to determine from the SMBs whether there are pots left on location; • Limited time period.

Dataset	Spatial Coverage	Dates	Source	Limitations
Scouting survey - Summer	DBS Array Areas + 2 km buffer	12 – 28 August 2022	PMSL, 2022b	• Survey covered Project areas + buffers, so does not provide comparison of fishing activity outside these areas; • It is not possible to determine from the SMBs whether there are pots left on location; • Limited time period; • A commercial agreement was in place for gear relocation for two fishing vessels under one operator in this area.
Scouting survey - Summer	Offshore export cable corridor + buffer (500 m for nearshore areas and 850 m for offshore areas)	18 May – 8 June 2022	PMSL, 2022c	• Survey covered Project areas + buffers, so does not provide comparison of fishing activity outside these areas; • It is not possible to determine from the SMBs whether there are pots left on location; • Limited time period; • Construction activities for the Dogger Bank A offshore export cable were being undertaken during this time period, which could have affected fishing activity (e.g. displaced static gear).
Scouting survey - Summer	Inshore (0-6 nm) part of the Offshore Export Cable Corridor + buffer (500 m)	28 – 30 August 2022	PMSL, 2022b	• Survey covered Project areas + buffers, so does not provide comparison of fishing activity outside these areas; • It is not possible to determine from the SMBs whether there are pots left on location; • Limited time period.

Dataset	Spatial Coverage	Dates	Source	Limitations
				• Centre lines were surveyed for the offshore areas.
Scouting Survey – Winter	DBS Array Areas, Offshore Export Cable Corridor and buffer	31 October – 2 December.	PMSL, 2022e	• Survey covered Project areas + buffers, so does not provide comparison of fishing activity outside these areas; • It is not possible to determine from the SMBs whether there are pots left on location; • Limited time period;
Guard vessel observations	DBS Offshore Export Cable Corridor	17 June – 25 July 2022	PMSL, 2022d	• Observations could be duplicated with the scouting surveys, so polygons have been used to represent the areas of observed fishing gear. Therefore, these observations only provide an indication of gear positions.
Vessel traffic survey - Winter	DBS Array Areas + 10 nm buffer	DBS East array area: 13-27 January 2022 DBS West array area: 28-31 January; 2-13 February 2022	Anatec, 2022a	• Short time period captured; • Radar data do not allow fishing vessel to be identified; • Fishing vessels <15 m are not required to have AIS.
Vessel traffic survey - Summer	DBS Array Areas + 10 nm buffer	DBS East array area: 03-17 July 2022 DBS West array area: 17-31 July 2022	Anatec, 2022b	• Short time period captured; • Radar data do not allow fishing vessel to be identified; • Fishing vessels <15 m are not required to have AIS.

Dataset	Spatial Coverage	Dates	Source	Limitations
Vessel traffic survey - Autumn	DBS Array Areas + 10 nm buffer	DBS East array area: 16-30 October 2 022 DBS West array area: 30 October-13 November 20 22	Anatec, 2022c	• Short time period captured; • Radar data do not allow fishing vessel to be identified; • Fishing vessels <15 m are not required to have AIS.
Vessel traffic survey - Winter	DBS ECR and platform area	24 January – 7 February 2023	Anatec, 2023	• Short time period captured; • Radar data do not allow fishing vessel to be identified; • Fishing vessels <15 m are not required to have AIS.
Vessel traffic survey - Summer	DBS ECR and platform area	17 June – 1 July	Anatec, 2023	• Short time period captured; • Radar data do not allow fishing vessel to be identified; • Fishing vessels <15 m are not required to have AIS.

2.2.3. Feedback From Consultation

Commercial fisheries stakeholders consulted with include:

- Andy Wheeler (represents <10 m fishers);
- Anglo-Dutch fishing industry;
- Coastal Shellfish Ltd;
- Danish Pelagic Fishermen's Association;
- Danmarks Fiskeriforening (Danish Fishing Association);
- Deep Wind Offshore;
- Deutscher Fischerei Verband (German Fisheries Association);
- Fiskerbåt (Norwegian Fishing Vessel Owners Association);
- Holderness Fishing Industry Group (HFIG);
- Independent fishers (e.g., beach netter, potter etc);
- Independent Scottish sandeel fishers (Sunbeam Fishing);
- Le Comité national des pêches maritimes et des élevages marins (CNPMEM) (Normandie and Boulogne);
- National Federation of Fishermen's Organisations (NFFO);

- Nederlandse Vissersbond;
- Norwegian Fishing Industry Representative;
- Rederscentrale (Belgium);
- Scottish Fishermen's Federation;
- Scottish White Fish Producer Association (SWFPA);
- Sør-Norges Trålerlag (Norwegian Fishermen's Association);
- South West Fish Producer Organisation;
- Swedish Fishermen's Producer Organisation;
- Swedish Pelagic Federation Producer Organisation (SPFPO);
- Visafslag; and
- VisNed (North West Dutch Fisheries Producer Organisation).

Consultation has been undertaken with key local and regional fisheries stakeholders. Consultation has been undertaken through the following: Project Commercial Fisheries Working Group (CFWG), port visits and fisheries specific questionnaires; these are summarised Table 2.2.3.

Outputs from these consultations have been used to further develop understanding of existing fishing activity in the region. It is intended that these consultations will continue over the consenting phase of the Projects, to ensure that all relevant information from fisheries stakeholders is presented within the EIA. A summary of the key issues raised during consultation activities, specific to commercial fisheries is presented in section 3.3, along with relevant Scoping Opinion responses.

Table 2.2.3: Summary of key consultation meetings with fisheries stakeholders

Date	Consultation type	Stakeholder
30/03/2022	CFWG 1	CNPMEM Boulogne; CNPMEM Normandie; Danish Pelagic Fishermen's Association; Danish Fishing Association; Deep Wind Offshore and Former Norwegian FLO; German Fisheries Association; NFFO; North West Dutch Fisheries Producer Organisation; Rederscentrale; SWFPA; SPFPO; VisNed.
02/09/2022	Scoping Response	Planning Inspectorate
23/11/2022	Port visit	Andy Wheeler Consulting (Holderness Fisher Representative)
23/11/2022	Port visit	Independent fisher (Bridlington static gear)
24/11/2022	Port visit	HFIG
24/11/2022	Port visit	Intertidal netter
24/11/2022	Port visit	Independent fisher (Bridlington static gear)
09/12/2022	Port visit	SPFPO

Date	Consultation type	Stakeholder
13/12/2022	Port visit	CNPMEM
14/12/2022	Port visit	Rederscentrale
06/01/2023	CFWG 2	German Fisheries Association; HFIG; Independent Bridlington Fishermen; Independent Fisheries Consultant (Holderness Fishing Industry Representative); NFFO; SWFPA; VisNed.
23/01/2023	Port visit	SWFPA
11/07/2023	CFWG 3	German Fisheries Association; HFIG; Independent Bridlington Fishermen; Independent Fisheries Consultant (Holderness Fishing Industry Representative); NFFO; SWFPA; VisNed; SFF.
06/06/2023	Statutory consultation	All fisheries stakeholders
22/11/2023	CFWG 4	Deep Wind Offshore and Former Norwegian FLO; VisNed; CNPMEM Boulogne;

Datasets provided by fisheries stakeholders are summarised in Table 2.2.4 and presented in section 3.3.

Table 2.2.4: Summary of key datasets provided by fisheries stakeholders

Dataset	Spatial Coverage	Dates	Source
Danish Sandeel Fishing Grounds	North Sea	2018	Danish Fishermen's PO, 2018
Dutch VMS for Beam Trawling	North Sea	2018-2022	
Danish sandeel landings	North Sea	2018-2021	Danish Sandeel SFPO
German sandeel landings	North Sea	2018-2021	

2.3. UK Vessels - MMO Landings Data

The MMO publishes summaries of fishing activity for UK commercial fishing vessels that are deemed to have been fishing within a specified calendar year. These summaries have been aggregated by month of landing, the ICES Rectangle where fishing activity took place, the length group of the vessel, and the gear group used. For each aggregation level, the quantity (tonnes) of live weight of fish landed, the actual landed weight (tonnes), and value (sterling) of live weight of fish landed are given for specified species, with the remaining species combined into a composite group based on the species group to which they are classified. There is a range of different limitations and assumptions associated with this dataset, as summarised in Table 2.2.1.

Data compiled by the MMO were reviewed for the period of 2012-2022 (the most up to date dataset available). The data were filtered to show only landings from the Commercial Fisheries Study Area. Data were further filtered to show data by vessel size class, species group and gear types.

2.3.1. Landings Weight and Value by Vessel Size Class and ICES Rectangle

The data interrogated allow for investigation of the contribution made by the different size classes to the total weight and value of catches from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, which constitute the Commercial Fisheries Study Area. Figure 2.3.1, Table 2.3.1 and Table 2.3.2 illustrate the contribution of landings of the >10 m vessels, and the ≤10 m vessels from the Commercial Fisheries Study Area. Figure 2.3.1 indicates that there is a relatively consistent relationship between the total weight of fish landed and the value of the catch, across the separate vessel size classes and ICES rectangles.

In general, larger vessels (>10 m) contributed more to the overall weight and value of fish landed for each ICES rectangle within the Commercial Fisheries Study Area, with the exception of 36E9, which covers an inshore area, where landings were higher for ≤10 m vessels (Figure 2.3.1). Within 37E9, which also covers an inshore area, the value of landings caught by ≤10 m vessels were higher than for >10 m, but the weight of landings was lower. The greatest weight landed between 2012-2022, by vessels >10 m, was 34,043 tonnes from within 37F0, whereas the lowest weight landed by vessels >10 m, was 406 tonnes, from within 36E9. Confidence in the data can be taken as the assessment of the total value of landings corresponds with the landed weight across the rectangles, during the 2012-2022 period assessed via this study. The maximum landed value was £70,562,044, by vessels >10 m from within 36F0, whereas the minimum landed value was £1,949,720, by vessels >10 m from within 36E9. Given the offshore location of the array area (100km offshore) landings in ICES rectangles where the DBS Array Areas are located (37F1, 37F2, 38F1 and 38F2), by vessels ≤10 m are low. This would be expected as <10m vessels do not regularly work outside of 12 nm (territorial waters).

Figure 2.3.1: Total weight (tonnes) of landings and total value (£) of landings from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) based on vessel size classes (UK vessels) (Source: MMO, 2023a)

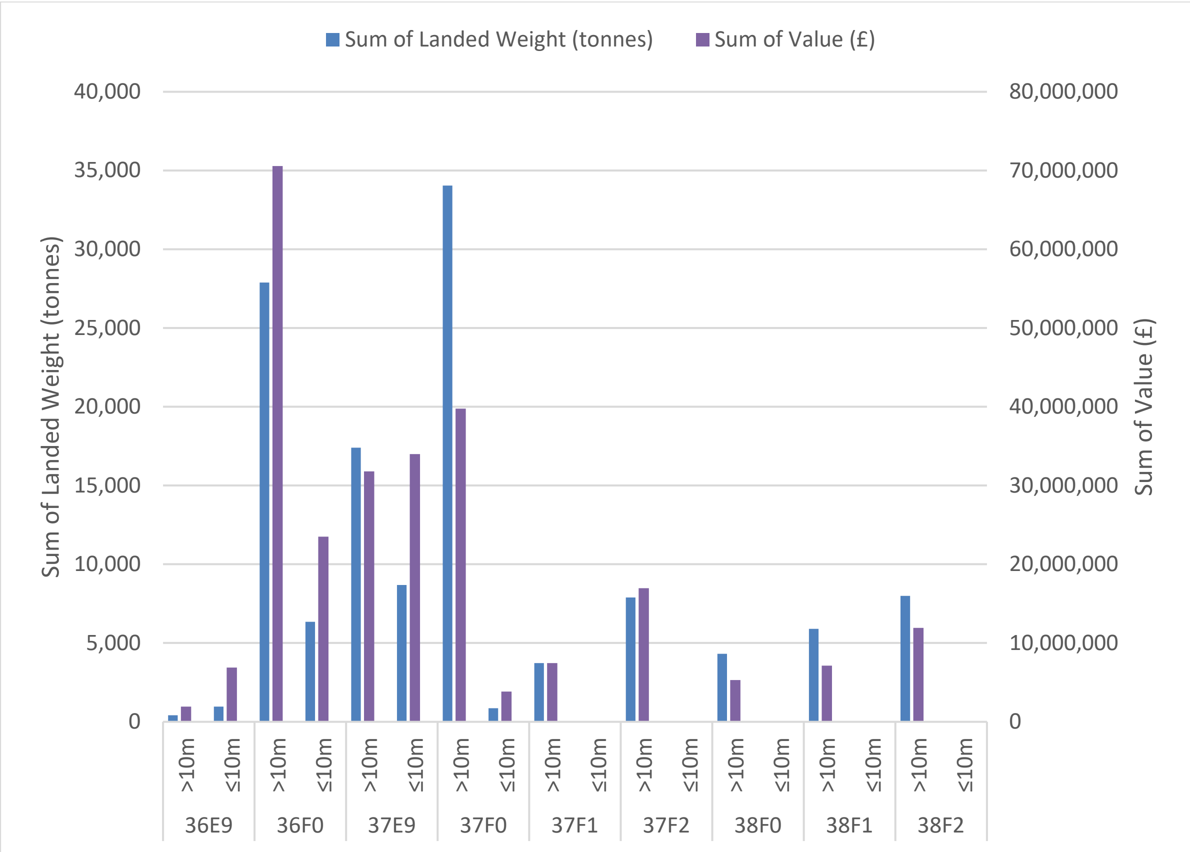


Table 2.3.1: Total landings (tonnes) from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) based on vessel size classes (UK vessels) (Source: MMO, 2023a)

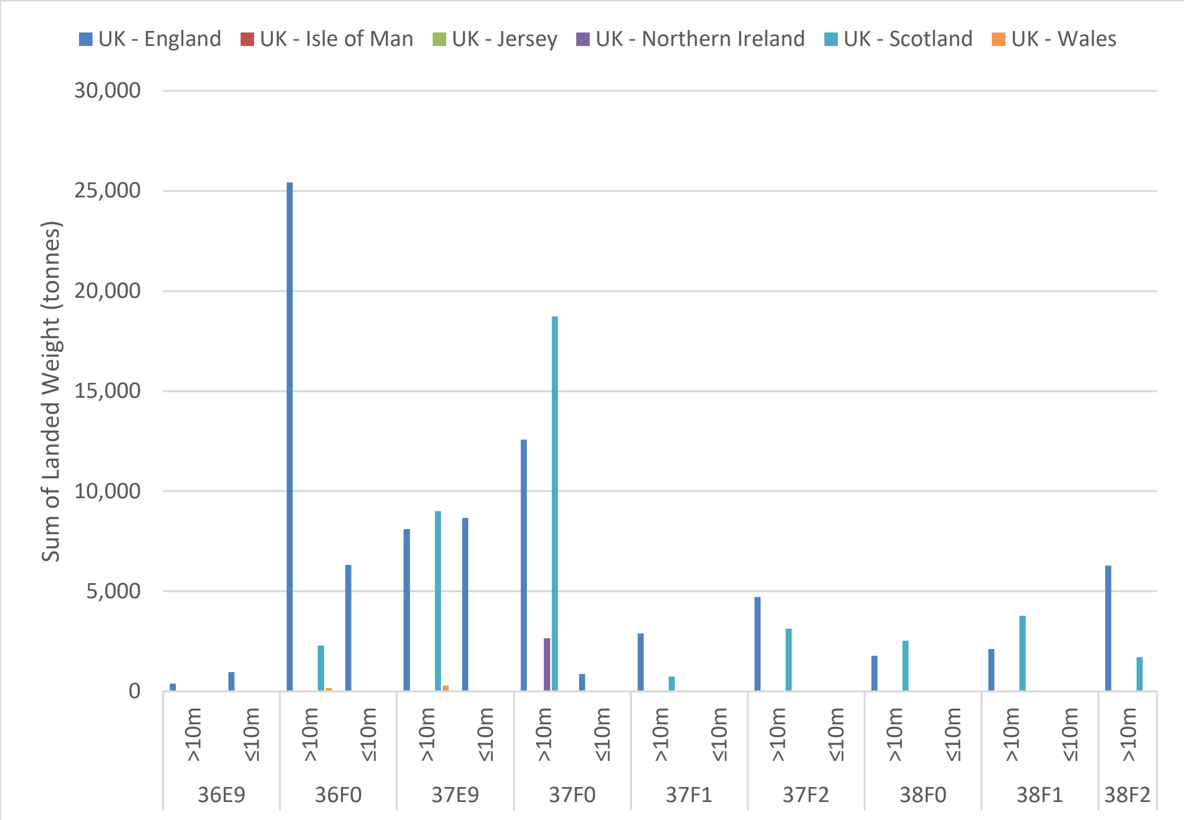
ICES Rectangle	Vessel Size Class	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total (t)
36E9	≤10 m	91.53	122.53	107.26	111.31	90.15	74.74	64.69	69.13	44.86	76.14	112.39	964.74
	>10 m	43.72	62.53	36.45	45.52	25.51	42.26	30.33	20.15	24.26	41.75	34.43	406.93
36F0	≤10 m	604.91	576.28	547.73	604.79	695.02	616.71	689.75	957.12	656.26		404.86	6,353.42
	>10 m	2,088.59	2,428.11	3,176.18	2,881.28	3,038.06	3,204.20	3,096.17	2,473.52	2,490.61		3,014.30	27,890.99
37E9	≤10 m	833.39	1,217.91	986.85	876.25	728.10	804.25	760.75	788.30	513.67	662.40	515.95	8,687.80
	>10 m	379.96	419.63	1,450.42	1,461.60	943.05	1,210.62	1,606.19	2,533.73	523.25	2,069.79	4,812.98	17,411.21
37F0	≤10 m	143.81	123.21	162.70	88.66	69.85	58.64	54.15	47.09	38.06	36.03	44.41	866.61
	>10 m	1,104.86	2,992.41	1,551.17	2,155.63	1,063.95	1,296.73	1,680.28	3,059.18	1,849.35	15,958.17	1,331.90	34,043.62
37F1	≤10 m	0.12			7.69	0.41							8.22
	>10 m	455.36	323.78	225.34	366.64	606.13	431.88	366.41	314.95	229.74	307.18	93.56	4,252.05
37F2	≤10 m				15.63	0.66	0.03						16.31
	>10 m	1,026.37	829.71	1,311.32	1,217.00	1,364.46	910.52	537.69	214.36	274.03	142.29	61.44	7,889.20
38F0	≤10 m				0.40					0.51			0.91
	>10 m	164.94	331.77	190.28	29.84	37.78	50.14	179.78	375.79	344.93	2,384.20	230.11	4,319.55
38F1	≤10 m				0.72	0.08							0.80
	>10 m	647.19	970.86	151.80	1,246.54	215.68	289.39	110.08	779.05	972.20	263.13	256.29	5,902.20
38F2	≤10 m												0.00
	>10 m	1,042.99	794.31	928.82	1,098.89	1,324.20	1,014.70	506.70	308.08	564.32	369.74	49.28	8002.30
Total Landed Weight (t)		8,627.73	11,193.04	10,826.32	12,208.40	10,203.07	10,004.79	9,682.95	11,940.44	8,526.06	22,310.81	10,961.88	126,485.50

Table 2.3.2: Total value of landings (£) from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) based on vessel size classes (UK vessels) (Source: MMO, 2023a)

ICES Rectangle	Vessel Size Class	2012	2013	2014	2015	2016	2017	2018	2019	2020	2012	2022	Total (£)
36E9	≤10 m	414,221	497,289	653,233	680,558	663,902	595,182	492,059	634,246	377,061	790,671	1,102,006	6,900,428
	>10 m	152,982	223,343	121,835	203,318	118,328	201,188	158,619	98,011	130,003	288,806	253,287	1,949,720
36F0	≤10 m	1,536,905	1,516,612	1,634,565	1,910,255	2,670,219	2,728,311	2,604,047	3,351,115	2,453,215		3,105,056	23,510,300
	>10 m	4,316,277	5,012,389	6,049,846	5,895,067	6,778,830	8,411,665	8,517,781	7,574,875	6,559,330		11,445,986	70,562,044
37E9	≤10 m	2,575,909	2,745,784	2,565,700	2,454,603	2,636,637	3,683,977	3,894,683	4,023,47	2,382,604	3,779,400	3,258,955	34,001,731
	>10 m	824,324	915,797	2,853,130	2,867,546	2,255,050	3,334,278	4,178,075	4,299,932	1,601,283	3,262,437	5,416,398	31,808,250
37F0	≤10 m	487,625	410,705	529,790	291,637	315,444	321,925	307,421	302,901	239,177	293,978	344,920	3,845,523
	>10 m	1,358,581	1,308,727	2,400,928	3,301,879	2,146,556	3,112,420	4,319,026	4,835,227	2,915,310	11,622,734	2,446,357	39,767,745
37F1	≤10 m	527			7,219	1,079							8,825
	>10 m	957,108	561,015	484,718	641,260	1,107,943	874,188	907,338	666,505	425,899	538,499	287,745	7,452,218
37F2	≤10 m				31,056	8,050	89						39,194
	>10 m	2,219,376	1,526,073	2,609,991	2,446,580	3,500,349	2,169,206	1,432,453	503,306	213,568	167,795	180,110	16,968,808
38F0	≤10 m				590					1,512			2,101
	>10 m	206,813	126,579	329,995	45,535	57,144	111,742	402,948	1,013,116.	498,918	1,866,488	659,533	5,318,811
38F1	≤10 m				1,962	325							2,287
	>10 m	883,089	502,889	154,236	625,835	314,420	404,414	275,875	1,472,528	1,396,383	480,303	622,465	7,132,437
38F2	≤10 m												-
	>10 m	1,624,112	1,058,011	1,254,731	1,686,662	2,022,708	1,463,056	1,117,170	539,056	656,227	355,441	132,953	11,910,126
Total Value (£)		17,557,847	16,405,212	21,642,699	23,091,561	24,596,982	27,411,642	28,607,496	29,314,297	19,850,488	23,446,557	29,255,776	261,180,557

Figure 2.3.2 summarises the total landed weight, by UK vessels, by vessel size class, within the Commercial Fisheries Study Area. Overall, UK vessels that landed the greatest weight were within the >10 m size category. English and Scottish vessels appeared most active within the Commercial Fisheries Study Area, particularly within ICES Rectangles 36F0 and 37F0, where the highest landed weights were recorded (25,429 and 12,580 tonnes, respectively).

Figure 2.3.2: Total landed weight (tonnes) within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) displayed by UK vessel nationality and vessel length (Source: MMO, 2023a)



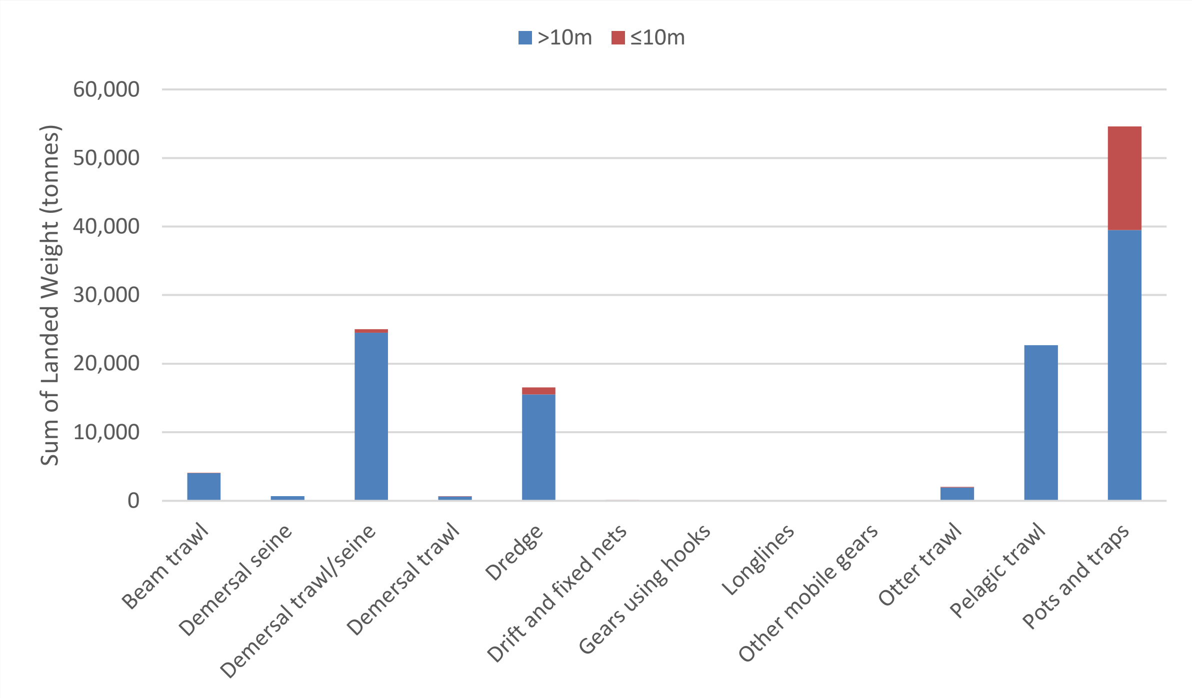
2.3.2. Landings Weight and Value by Gear Type

Interrogation of the MMO data provided information on the types of fishing gear used by the UK ≤10 m and >10 m fleets, within the Commercial Fisheries Study Area. These data are illustrated in Figure 2.3.3. The data shows that five main identifiable gear types were recorded as being used to target fish stocks, specifically:

- Beam trawl;
- Pelagic trawl;
- Demersal trawl/seine;
- Dredge; and
- Pots and traps.

Of the total types of gear within the data sets, approximately 43% of total landings by weight from the Commercial Fisheries Study Area by the ≤10 m and >10 m UK fleets were caught using pots and traps (Figure 2.3.3). This indicates the importance of the shellfish industry in the region, noting pots and traps predominantly target shellfish such as brown crab, lobster, and whelk. Landings from vessels using demersal trawls/seines, pelagic trawls and dredges were also notably high and were used by vessels >10 m in length. These data also provide a useful indication of the types of species being targeted by the fishing fleets, which is discussed in more detail in section 2.3.3 and 2.3.4.

Figure 2.3.3: Total landings (tonnes) based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)



2.3.3. Landings Weight and Value by Species Group and Vessel Size Class

The MMO data were used to determine the most important species groups in terms of the total weight landed and value of landings, from the different UK vessel size classes within the Commercial Fisheries Study Area (2012-2022). These data are presented in Figure 2.3.4 and Figure 2.3.5.

The data shows that shellfish were the most important for UK vessels, with the majority caught by both vessel size classes in terms of both weight of species landed and value of landings, most notably within 36F0, 37E9 and 37F0. Demersal species were more important for the >10 m vessel size class, particularly across ICES rectangles 37F2, 38F1 and 38F2. Pelagic species were also important for the >10 m vessel size class, markedly within 37F0 which overlaps with the Offshore Export Cable Corridor but contributed significantly less towards landed weight and value than demersal and shellfish species. The greatest weight of landed fish, and greatest value of landed fish, were from shellfish, landed by the >10 m vessel size class from 36F0, which is south of the Offshore Export Cable Corridor.

Figure 2.3.4: Sum of landings weight from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022), displayed by vessel size class and species group (UK vessels) (Source: MMO, 2023a)

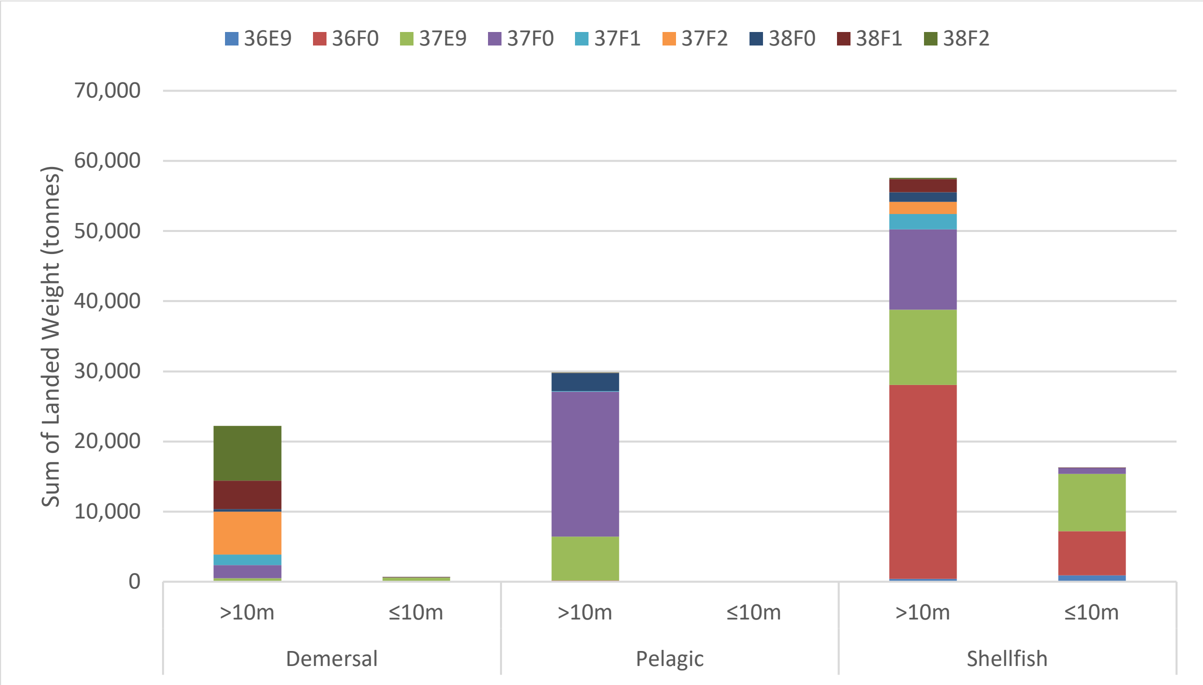
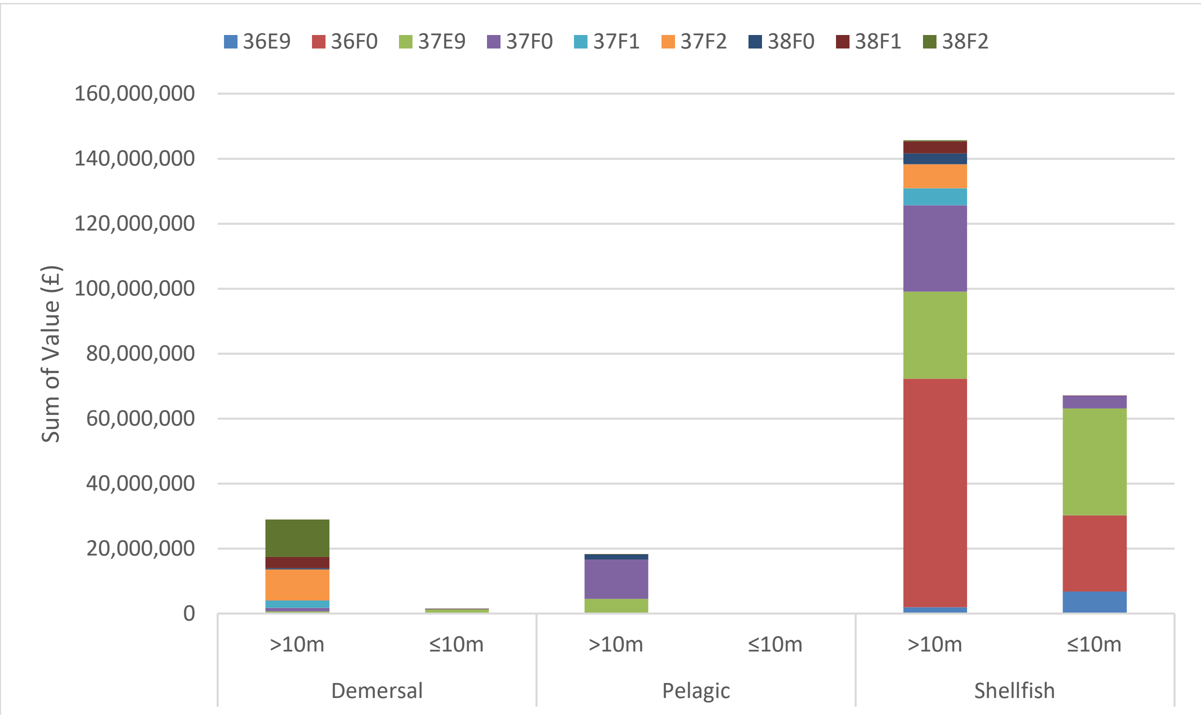


Figure 2.3.5: Sum of landings value from ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022), displayed by vessel size class and species group (UK vessels) (Source: MMO, 2023a)



2.3.4. Landings Weight and Value by Species

The MMO data were used to determine the most important species in terms of the total weight landed and value of landings in the Commercial Fisheries Study Area (2012-2022) for UK vessels; vessel size classes were aggregated for these analyses. On average, 65 species classes were landed across all the rectangles. The greatest number of species landed was 76 (ICES 37E9). The lowest number of species landed was 48 (36E9). However, these data are believed to contain some inaccuracies and inflated figures, due to duplication of species under different common names, and groupings at higher taxonomic levels.

Total landed weight and value for each species class were determined for the 2012-2022 time period, within the relevant ICES rectangles. Species were then filtered to identify the species with the highest landed weight and corresponding values (Figure 2.3.6 to Figure 2.3.14), in order to identify the most commercially important species within each ICES rectangle. Only the top ten species within each ICES rectangle were considered for this analysis, given that they contributed over 90% of the total weight and value of catches.

Within ICES Rectangle 36E9 (Figure 2.3.6), Brown crab (C.P. mixed sexes) was the species with the greatest weight of landings (646 tonnes), whereas lobster (616 tonnes) accounted for the highest value of landings (£7,585,377) and second highest landings by weight during 2012-2022. The following eight most commercially important species had significantly lower landings by weight and value; these were *Nephrops*, cod *Gadus morhua*, scallop, whelk, whiting, *Merlangius merlangus,* haddock *Melanogrammus aeglefinus*, velvet crab *Necora puber* and sole.

Within ICES Rectangle 36F0 (Figure 2.3.7) brown crab (C.P. mixed sexes) was the species with the greatest weight of landings (24,197 tonnes), whereas lobster accounted for the highest value of landings (£46,952,850). Landed weight and value was notable for whelk and scallop. The following six most commercially important species had significantly lower landings by weight and value; these were crab (velvet), herring, brown shrimp *Crangon* spp., cod, whiting and velvet belly *Etmopterus spinax*.

Within ICES Rectangle 37E9 (Figure 2.3.8) scallop was the species with the greatest weight of landings (8,303 tonnes), closely followed by brown crab (C.P. mixed sexes) (8,027 tonnes). However, lobster, scallop and brown crab accounted for the highest value of landings at £28,408,736, £ 18,098,161, and £ 12,522,105, respectively. The following seven most commercially important species had significantly lower landings by weight; these were herring, cod, whiting, whelk, thornback ray *Raja clavate*, *Nephrops* and plaice.

Within ICES Rectangle 37F0 (Figure 2.3.9) herring was the species with the greatest weight of landings (20,600 tonnes), closely followed by brown crab (C.P. mixed sexes) (6,230 tonnes) and scallop (5,153 tonnes). Herring accounted for the highest value of landings (£11,976,773). Scallop, brown crab, and lobster were also found to make significant contributions to the total landed weight and value of ICES Rectangle 37F0. The remaining six most commercially important species had significantly lower landings by weight and value; these were sandeel, whiting, cod, mixed squid and octopi, squid, haddock, and mackerel.

Within ICES Rectangle 37F1 (Figure 2.3.10) brown crab (C.P. mixed sexes) was the species with the greatest weight of landings (1,406 tonnes) and the highest value of landings (£2,447,975). Plaice and *Nephrops* also made significant contribution to the total landed weight and value within ICES Rectangle 37F1. The remaining seven most commercially important species had significantly lower landings by weight and value; these were scallop, cod, dab, herring, lemon sole *Microstomus kitt*, lobster.

Within ICES Rectangle 37F2 (Figure 2.3.11) plaice was the species with the greatest weight of landings (5,099 tonnes). *Nephrops* also accounted for a significant proportion of the total landed weight (1,609) and the highest value of landings (£7,228,089). Landed weight of sandeel was notable, and landed value of turbot was notable. The remaining six most commercially important species were lemon sole, cod, dab, gurnard *Triglidae* spp, whelk and herring, and were significantly lower.

Within ICES Rectangle 38F0 (Figure 2.3.12) herring was the species with the greatest weight of landings (2,449 tonnes), while brown crab (C.P. mixed sexes) was the species with the highest value of landings (£2,242,823). Scallop and sprat *Sprattus sprattus* both accounted for notable landed weights, ranging between 348 to 208 tonnes, with scallop accounting for the third highest landed values (£665,771). The remaining six most commercially important species were whiting, haddock, gurnard, plaice, cod, *Nephrops* and lemon sole.

Within ICES Rectangle 38F1 (Figure 2.3.13) plaice was the species with the greatest weight of landings (2,067 tonnes) and brown crab (C.P. mixed sexes) accounted for the highest value of landings (£2,949,913). Scallop and sandeel recorded the second and third highest landings in terms of value, of £ 651,042 and £ 370,875, respectively. The remaining six most commercially important species were dab, horse mackerel *Trachurus trachurus*, lemon sole, whelk, turbot, *Nephrops* and gurnard.

Within ICES Rectangle 38F2 (Figure 2.3.14) plaice was the species with the greatest weight of landings (7,306 tonnes) and the highest value of landings (£10,151,197). The following nine most commercially important species had significantly lower landings by weight and value; these were lemon sole, dab *Limanda limanda*, turbot, sandeel, scallop, gurnard, sole, brown crab (C.P. mixed sexes) and grey gurnard *Eutrigla gurnardus*.

Figure 2.3.6: Top 10 species caught in ICES Rectangle 36E9 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

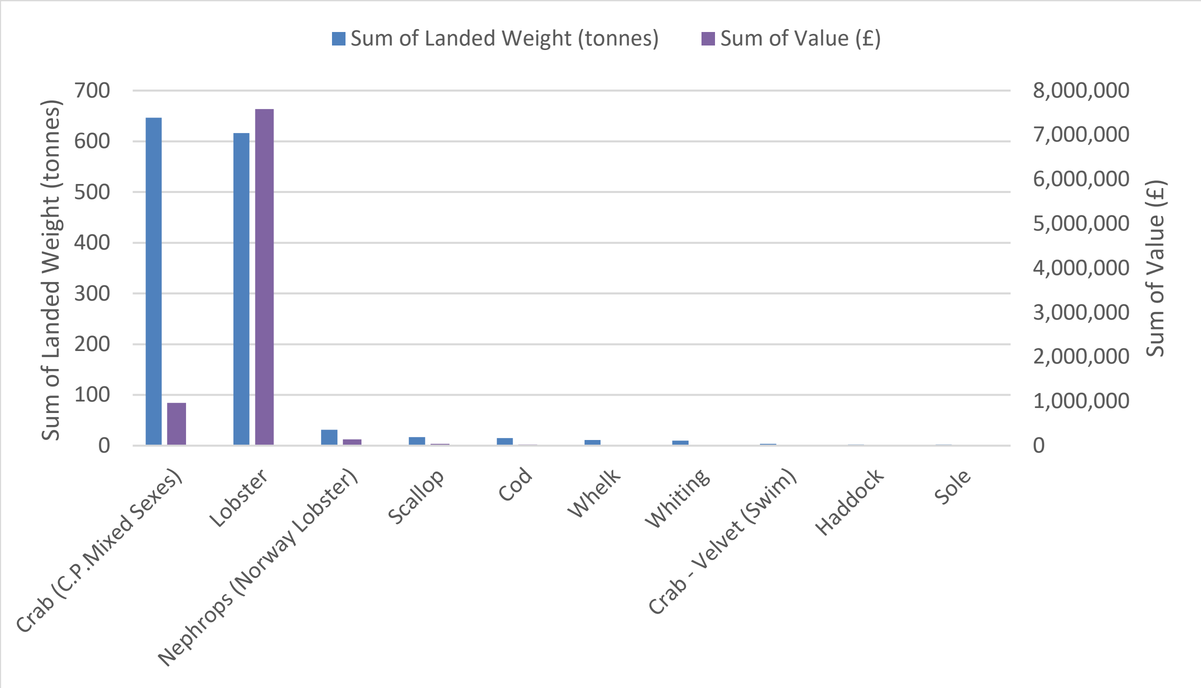


Figure 2.3.7: Top 10 species caught in ICES Rectangle 36F0 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

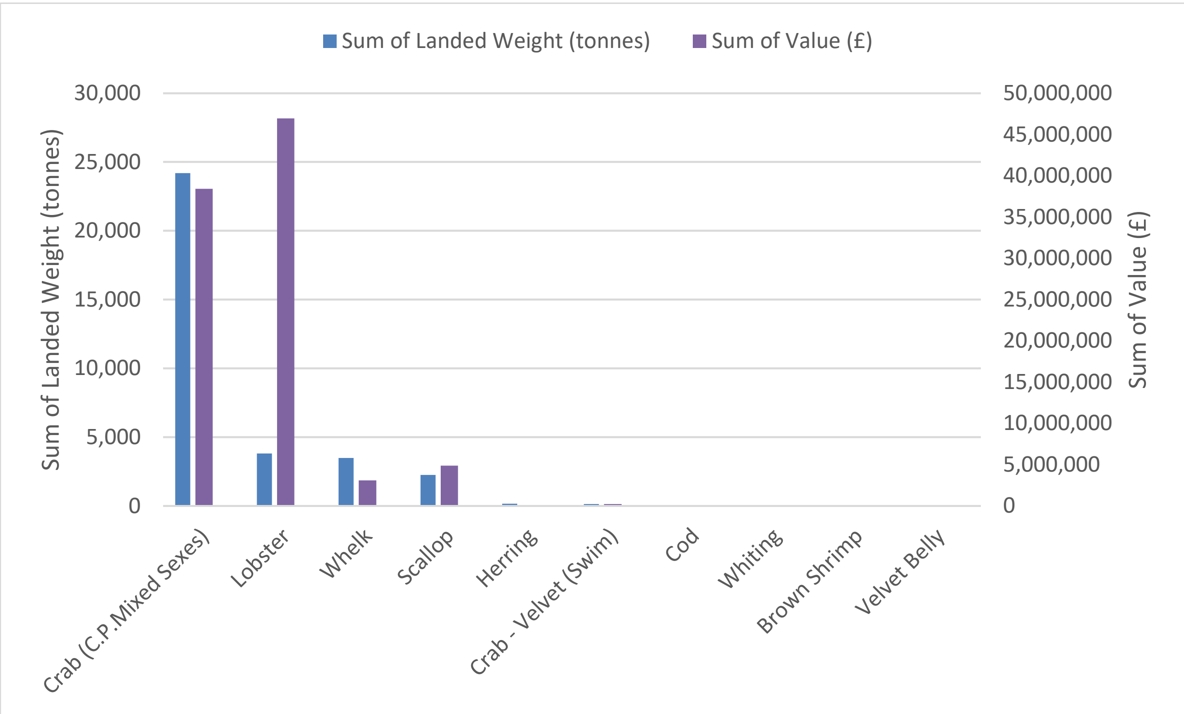


Figure 2.3.8: Top 10 species caught in ICES Rectangle 37E9 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

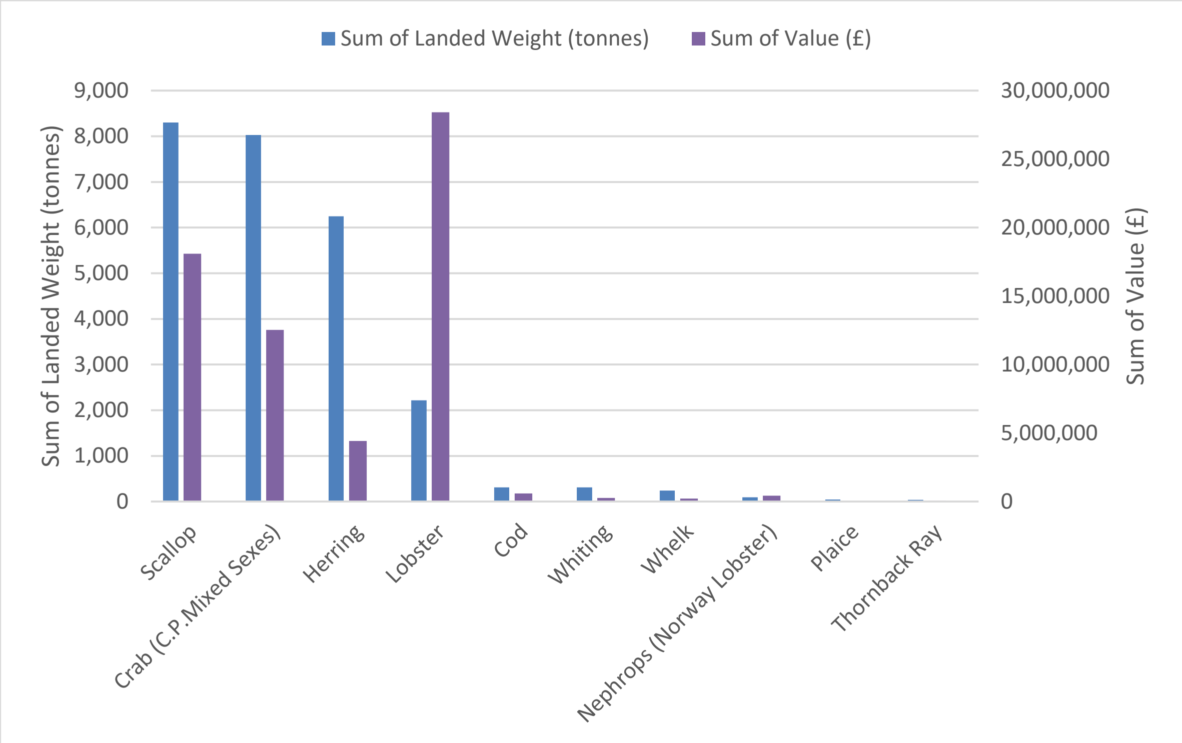


Figure 2.3.9: Top 10 species caught in ICES Rectangle 37F0 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

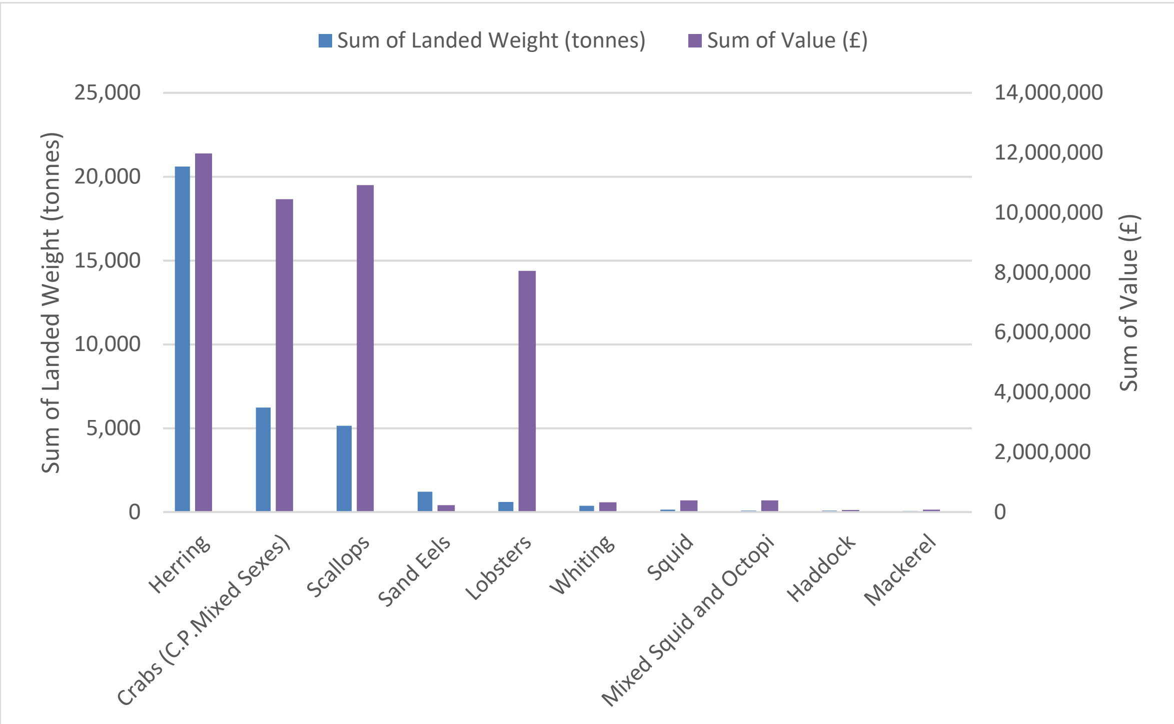


Figure 2.3.10: Top 10 species caught in ICES Rectangle 37F1 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

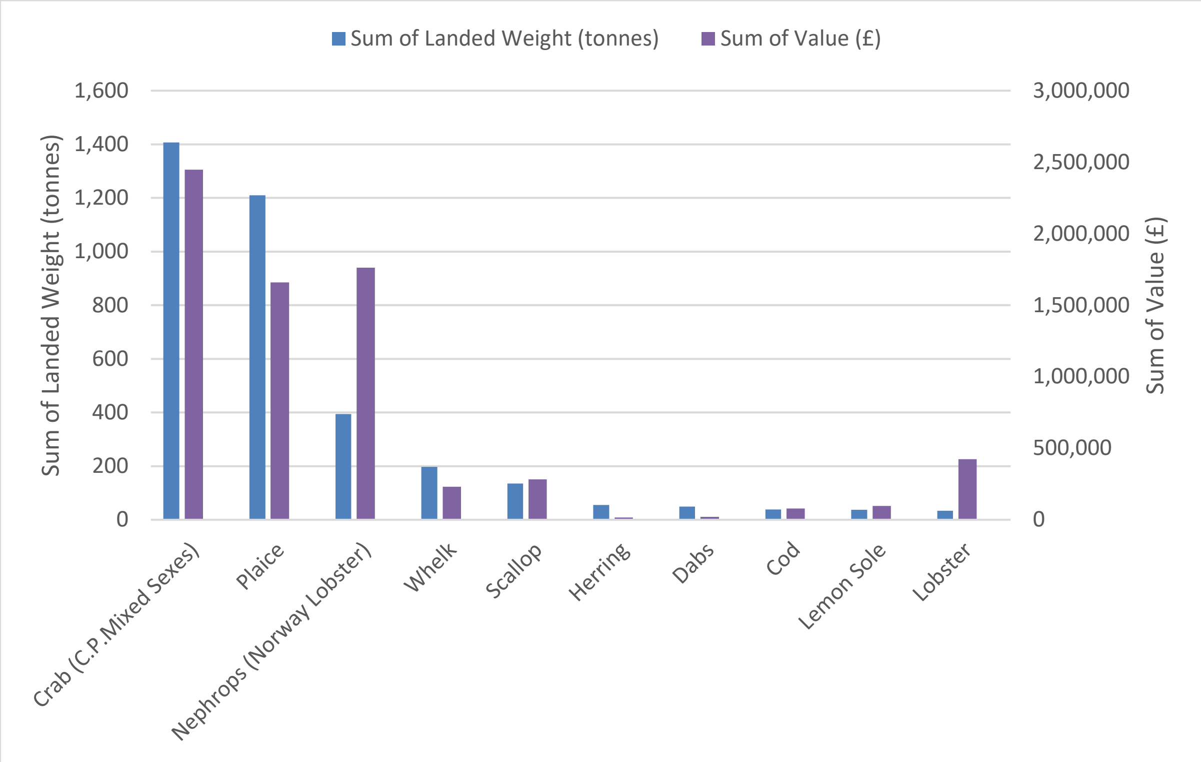


Figure 2.3.11: Top 10 species caught in ICES Rectangle 37F2 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

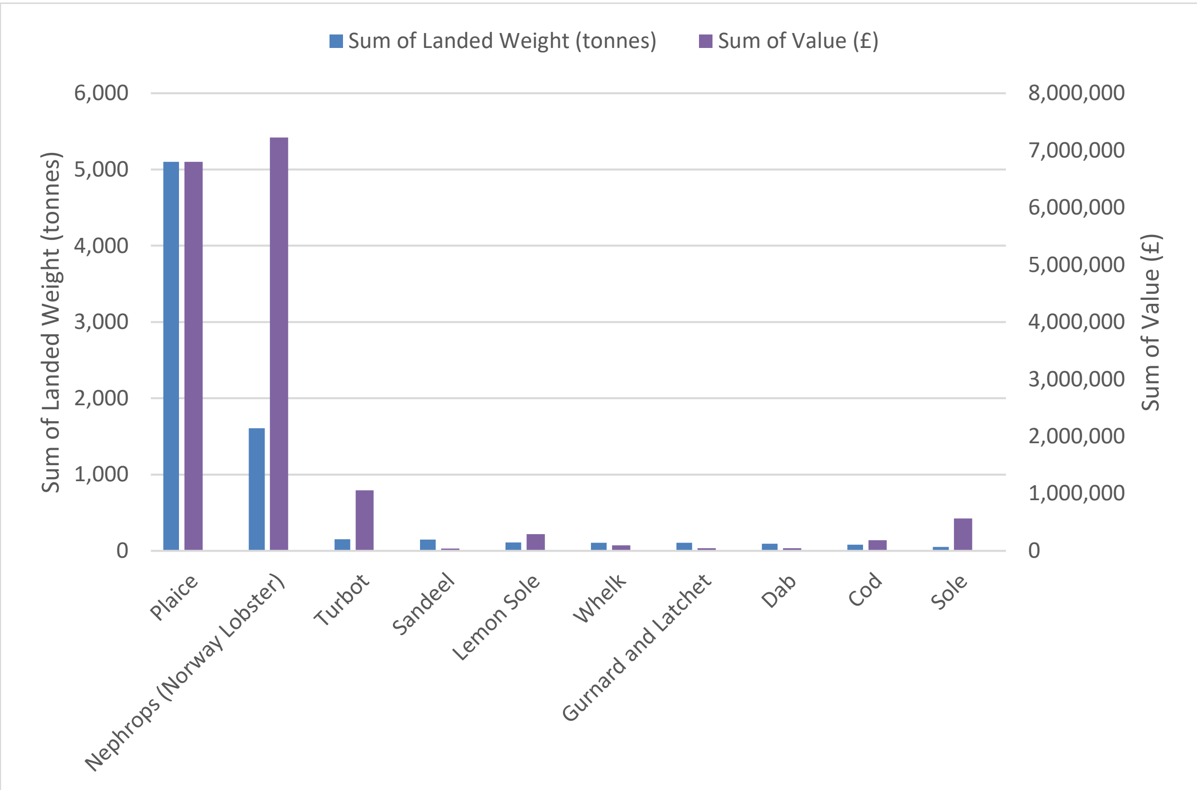


Figure 2.3.12: Top 10 species caught in ICES Rectangle 38F0 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

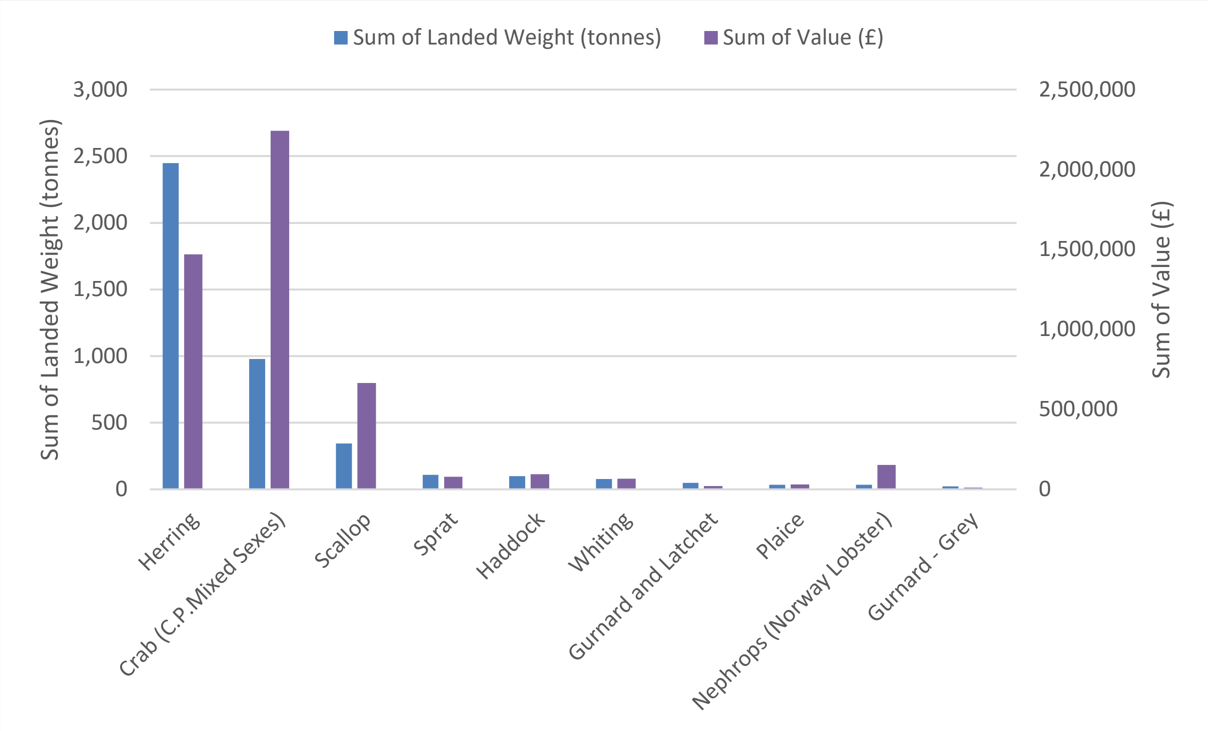


Figure 2.3.13: Top 10 species caught in ICES Rectangle 38F1 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)

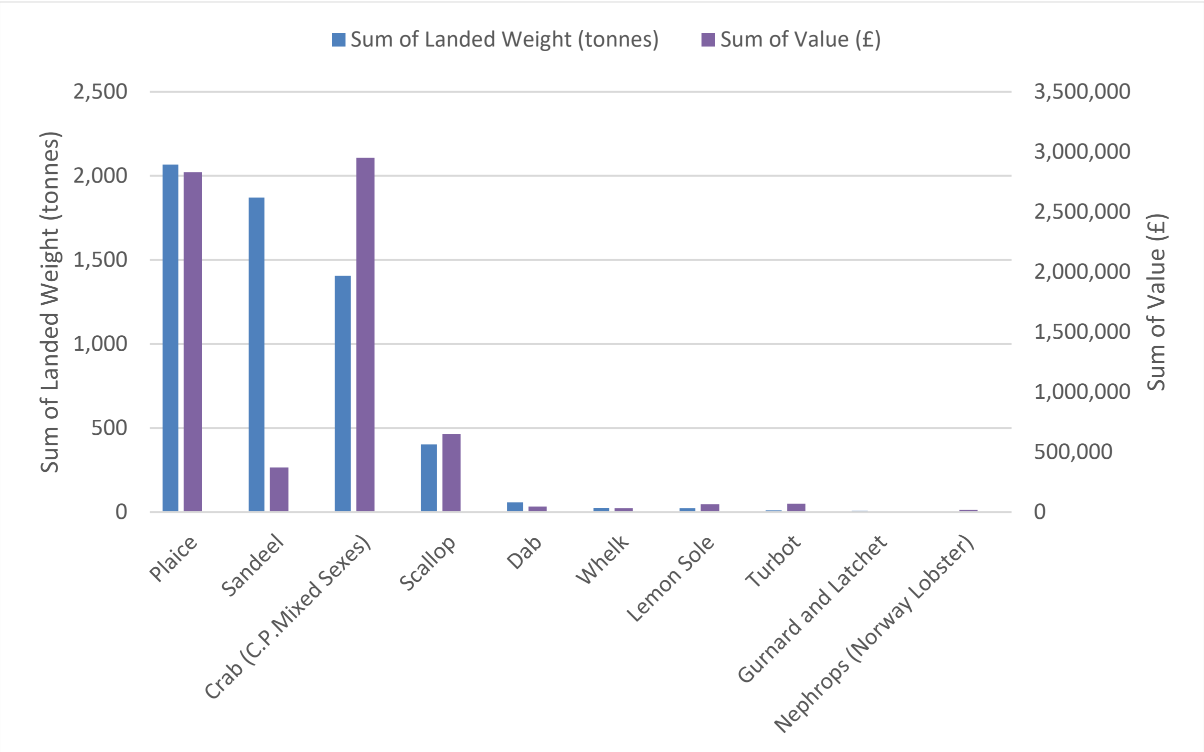
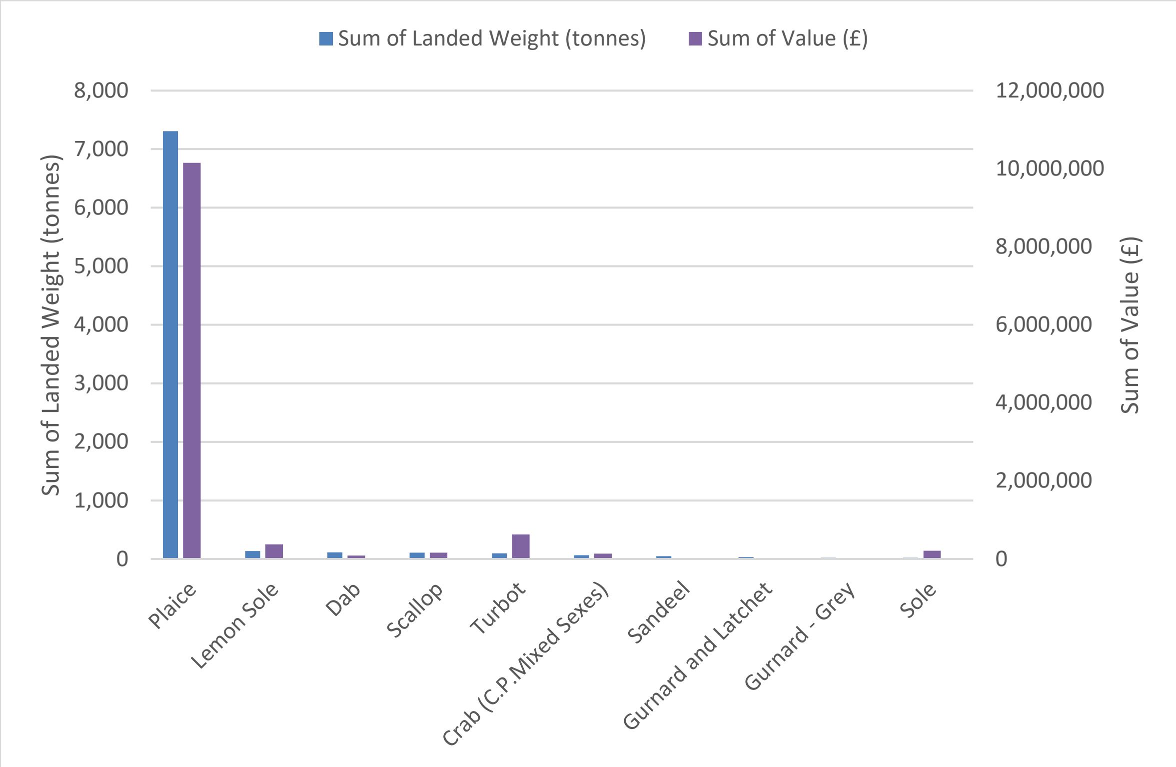


Figure 2.3.14: Top 10 species caught in ICES Rectangle 38F2 (2012-2022) based on highest weight (tonnes) and corresponding value (£) (UK vessels) (Source: MMO, 2023a)



2.3.5. Temporal Variation in Landings

The MMO data show that, between 2012-2022, the sum of landed weight varied annually across the Commercial Fisheries Study Area, and within the separate ICES rectangles (Figure 2.3.15). The lowest overall landings were during 2020, whereas 2021 had the highest overall landings. Landings value remained relatively analogous over the study period, with an exception in 2021.

Lowest landings recorded were 30 tonnes landed from 38F0 in 2015, with the highest landings being 15,994 tonnes from 37F0 in 2021 (Figure 2.3.15); the sum of landed value varied from the lowest recorded figure of £314,745 from 38F1 in 2016, to the highest recorded figures of £14,551,042 from 36F0 in 2022 (Figure 2.3.16).

Figure 2.3.15: Annual trends in sum of landings weight for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)

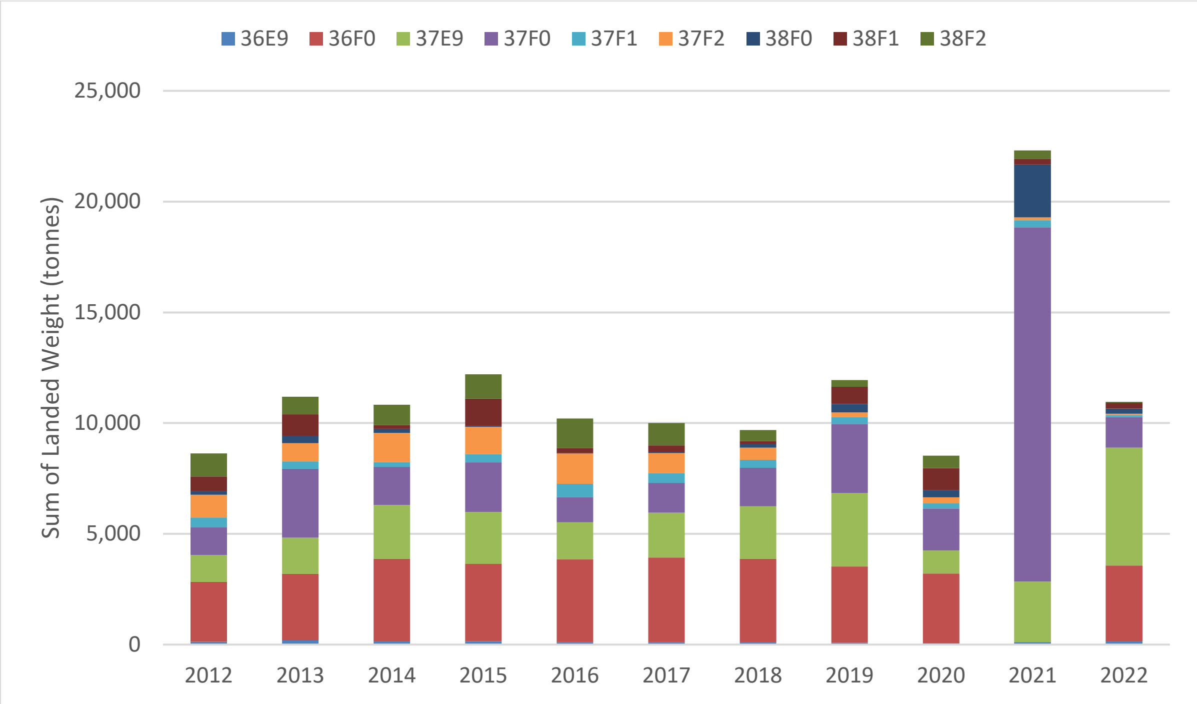
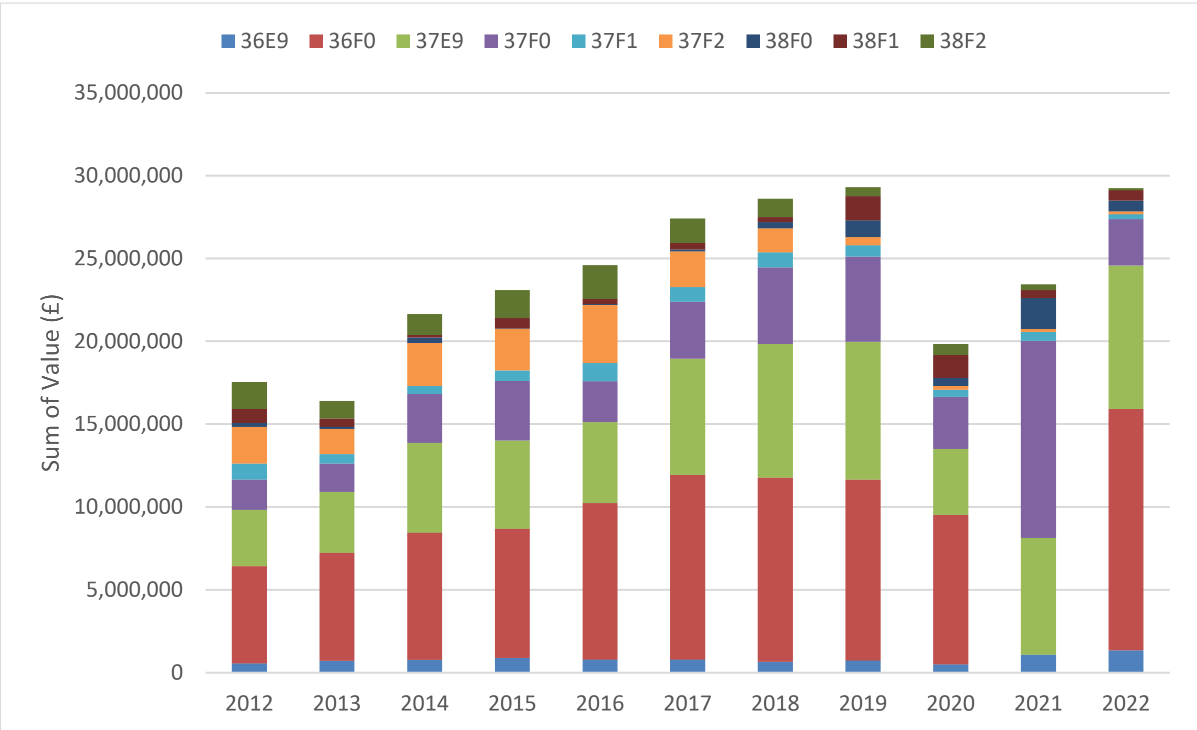


Figure 2.3.16: Annual trends in sum of landings value for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)



Across all ICES Rectangles, the seasonal (intra-annual) range in landed weight and value (2012-2022) varied, with a gradual increase in landings from March to a peak in September, and a decrease in landings towards December. Landed weight across the 10 year period varied from 3,585 tonnes in February to 40, 089 tonnes in September (Figure 2.3.17). The landed values followed a similar trend, ranging from £ 8,240,234 in February to £ 46,870,567 in September (Figure 2.3.18).

With respect to individual rectangles, 36F0, 37E9 and 37F0 make up a large proportion of the intra-annual landings by weight during most months. ICES Rectangles 36F0 and 37F0 follow a similar trend to the overall pattern, with peak landings occurring in September. Comparatively, landings from 38F1 and 38F2 peak around May/June, with very little fishing occurring in these areas throughout October to April.

Figure 2.3.17: Variability in total landings weight for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) by month (UK vessels) (Source: MMO, 2023a)

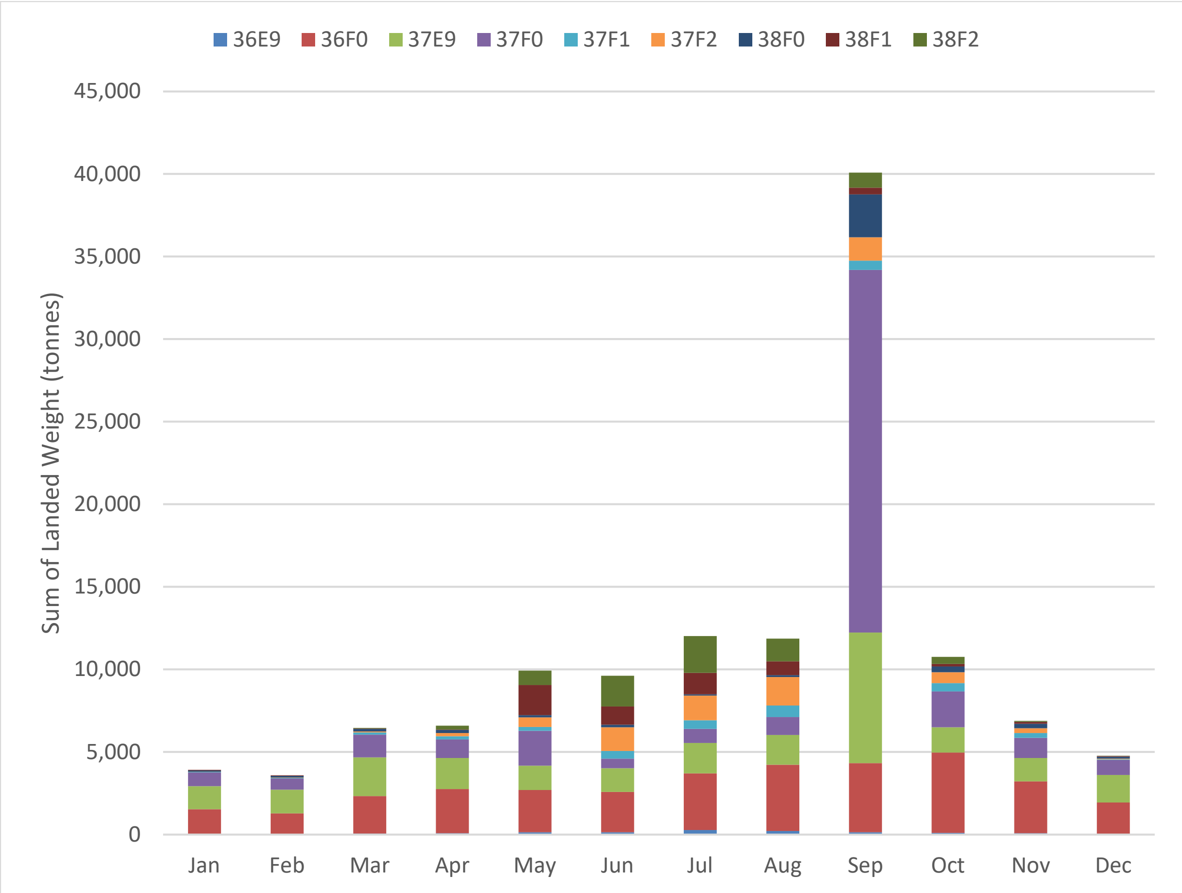
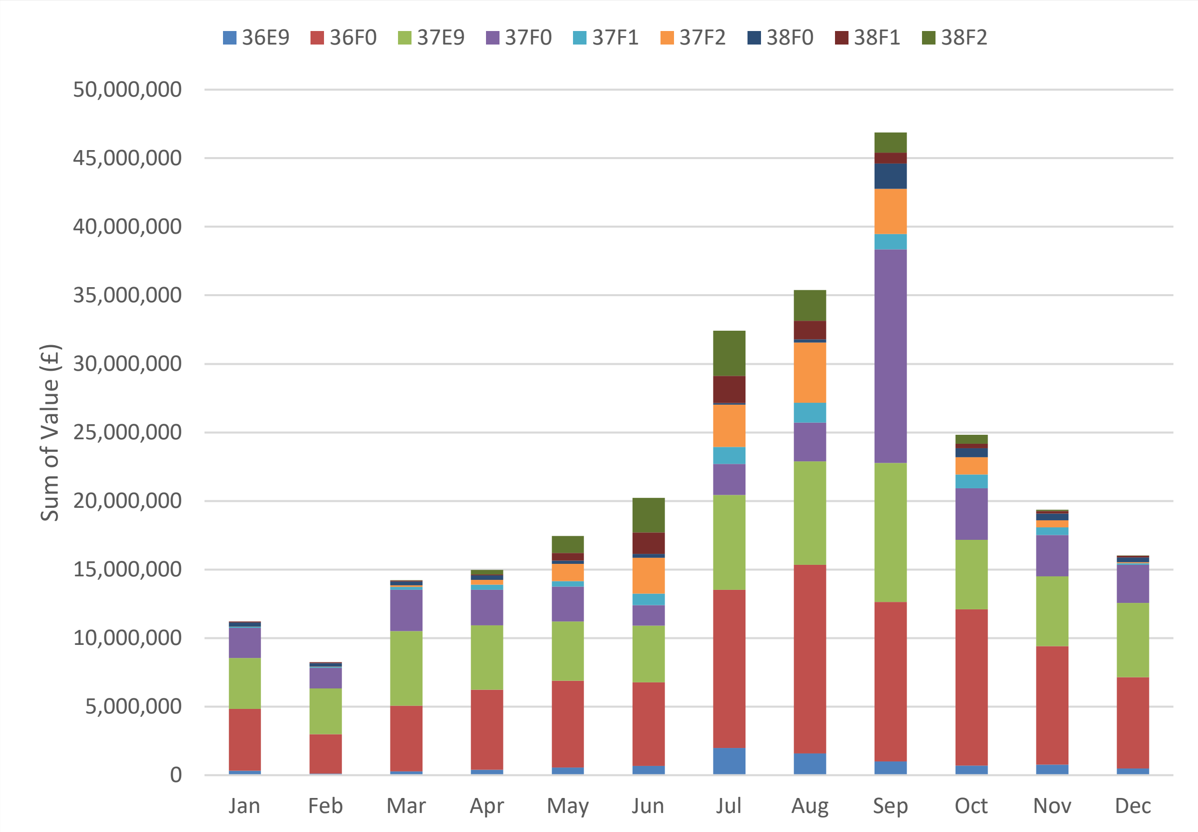
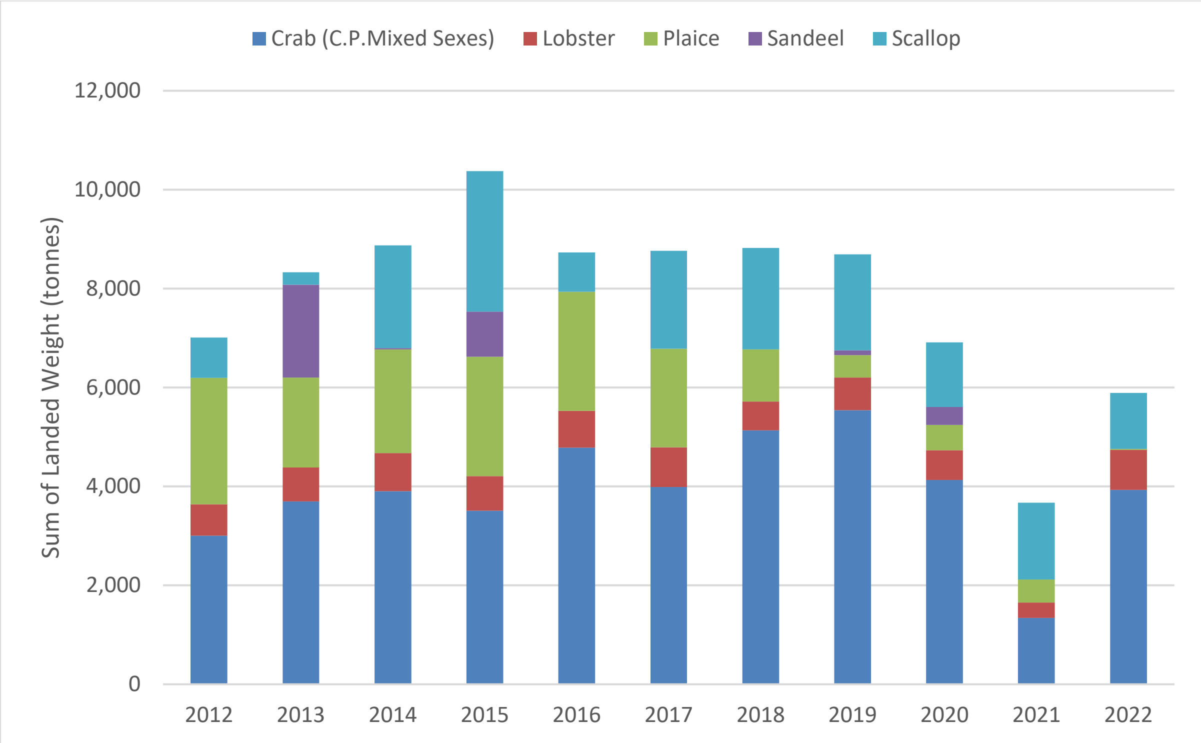


Figure 2.3.18: Variability in total landings value for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) by month (UK vessels) (Source: MMO, 2023a)



The species data were analysed further, to identify notable trends in the temporal variation of the top five most commercially important species from the Commercial Fisheries Study Area. Overall, brown crab (C.P. mixed sexes) and plaice made up the dominant two species, in terms of landed weight, across all years and ICES rectangles, and hence account for the most variation between years (Figure 2.3.19). Brown crab appeared to be of particular importance in terms of landed weight during 2019, despite 2015 exhibiting the greatest weight recorded overall. This, however, is a likely contribution of the highest landed weight of scallop and second highest landed weight of plaice recorded during 2015. Landings of brown crab increased throughout 2012-2020 within the Commercial Fisheries Study Area, and later decreased between 2021 and 2022. Lobster and scallop fisheries remained largely consistent throughout the time frame, compared with plaice and sandeel, which became less dominant in the area.

Figure 2.3.19: Annual trends in top five species by sum of landings weight for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)



Landings of brown crab increase throughout the year, until they peak in autumn, and decrease again during the winter (Figure 2.3.20). The most important months for landings of brown crab (C.P. mixed sexes) during 2012-2022, were September and October, where landed weights ranged between 7,363 to 6,042 tonnes. Lowest landings of brown crab were between February. The landed weight of brown crab has generally increased since 2012, most notably during the July to December period, where landings across these months ranged from 77 tonnes in 2021, to 986 tonnes in 2019.

Landings of plaice increase from the spring, peak during the summer, and decrease during the autumn (Figure 2.3.21). Plaice landings, in terms of weight, were most prominent during June to September inclusive, with a landed weight range across these months of 2,214 to 3,957 tonnes. Lowest landings of plaice were between December and March. Landed weight of plaice showed relatively consistent seasonal trends across the 2012-2022 period, with slightly elevated landings exhibited between 2016 to 2018.

The landed weight of scallops was most prominent during March to April, where total landings during these months reached 2,867 and 3,375 tonnes, respectively, for the period 2012-2022 (Figure 2.3.22). Throughout May to February, the landed weight of scallop showed similar seasonal trends, varying around 1,000 tonnes. Landed weight of scallop was notably higher during 2015, where maximum landed weights of 2,843 tonnes were recorded. Similarly high landed weights persisted from 2015 into 2019.

Landings of lobster increase slowly from the spring, until they peak in the summer, and decrease again during the winter (Figure 2.3.23). Lobster landings, in terms of weight, were most prominent during July to September, with a landed weight range across these months of 1,028 to 1,587 tonnes. Minimum landings of 110 tonnes occurred in February, with relatively consistent interannual landings by weight recorded during 2012-2022.

Landings of sandeel were recorded for the months May and June, with some years with no sandeel landings by UK vessels due to lack of quota. The fishery is seasonal typically operating from April to August depending on quota, yet they still contributed to a significant proportion of the landed weight of the top five most commercially important species across the ten year period. Landings were significantly higher in May (2,906 tonnes) than June (376 tonnes) (Figure 2.3.24), likely due to a reduced quota being largely used up in May.

Figure 2.3.20: Seasonality of landed weight (tonnes) of brown crab (C.P. mixed sexes) for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)

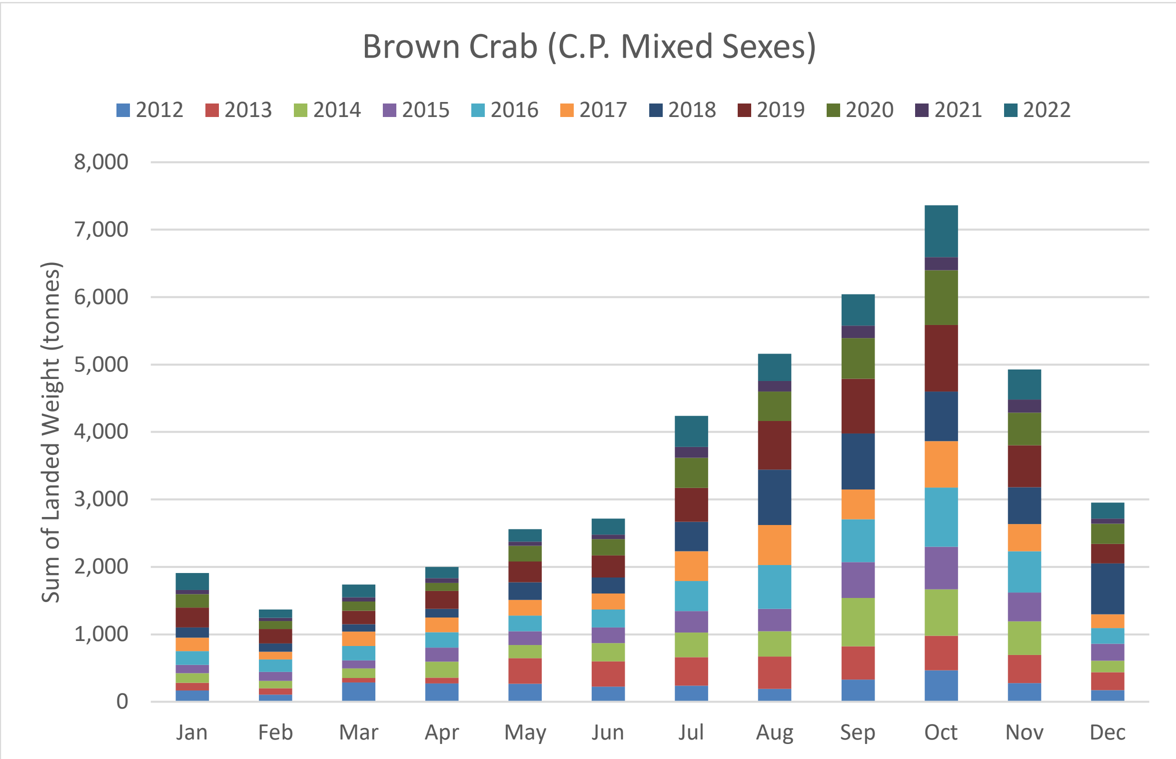


Figure 2.3.21: Seasonality of landed weight (tonnes) of plaice for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)

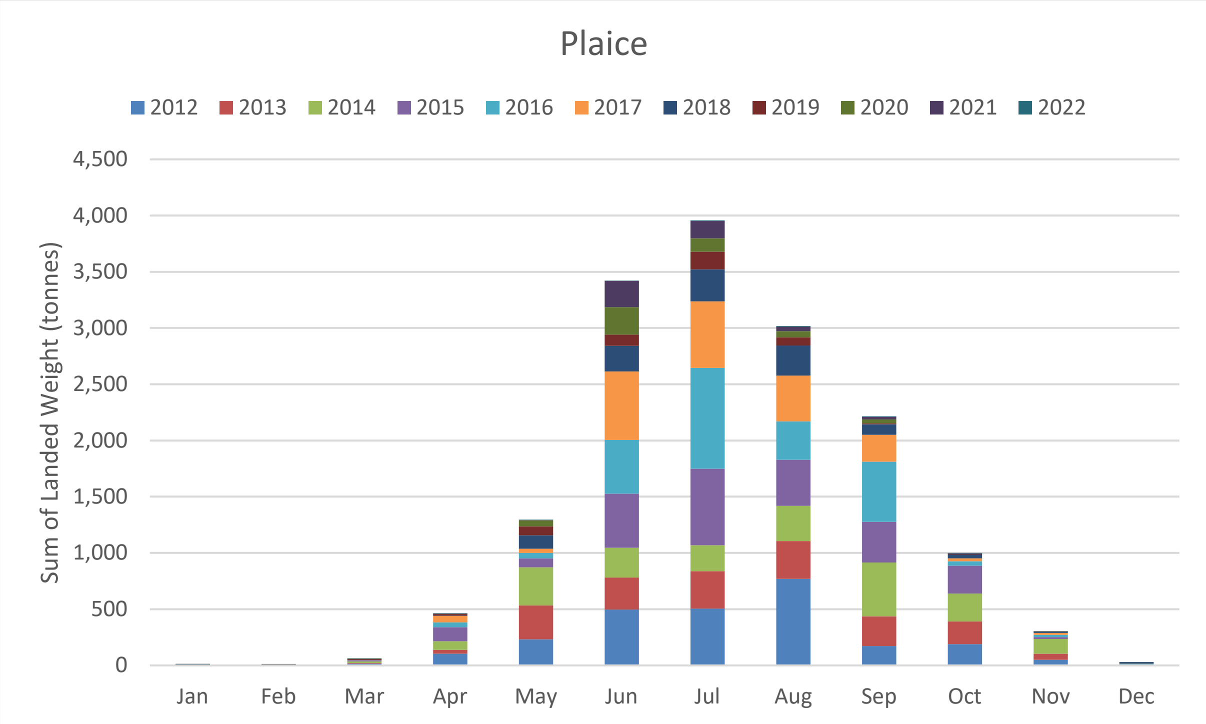


Figure 2.3.22: Seasonality of landed weight (tonnes) of scallop for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)

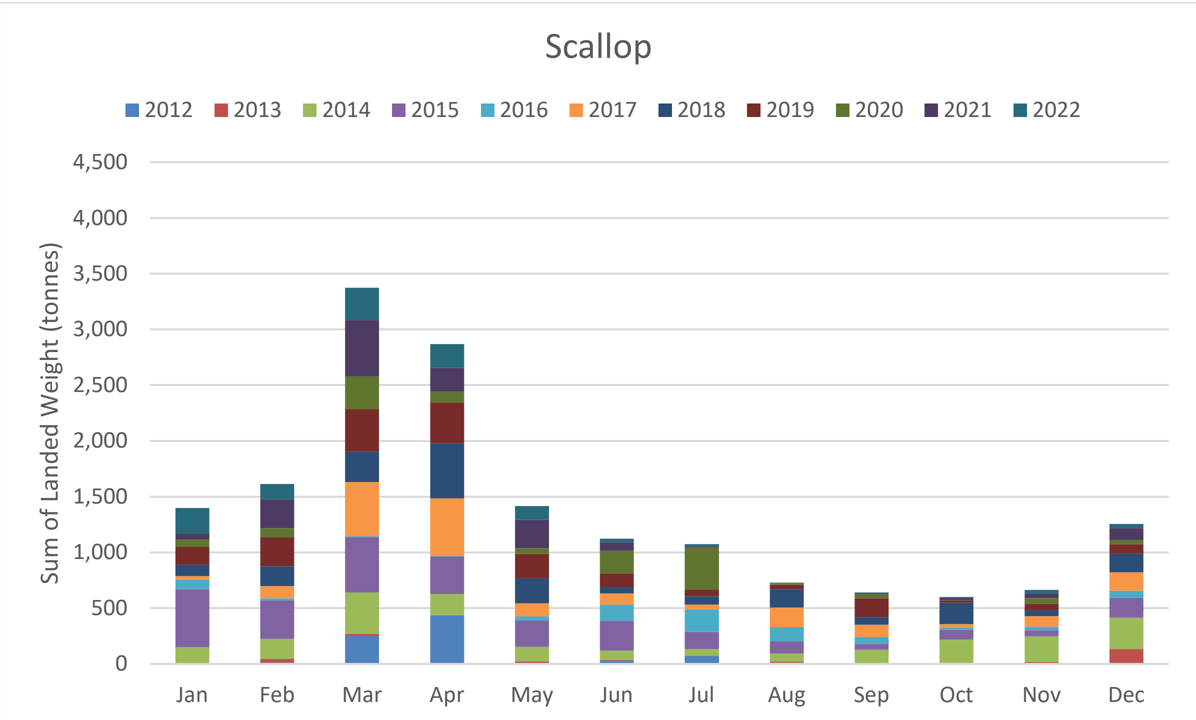


Figure 2.3.23: Seasonality of landed weight (tonnes) of lobster for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)

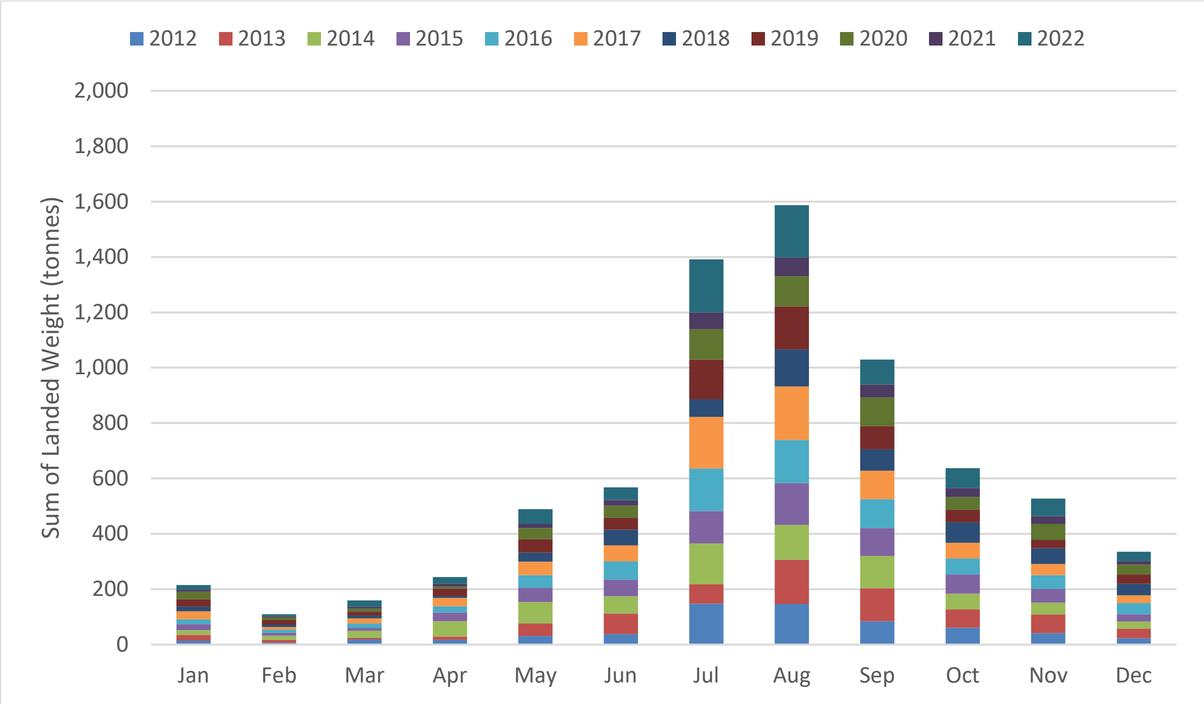
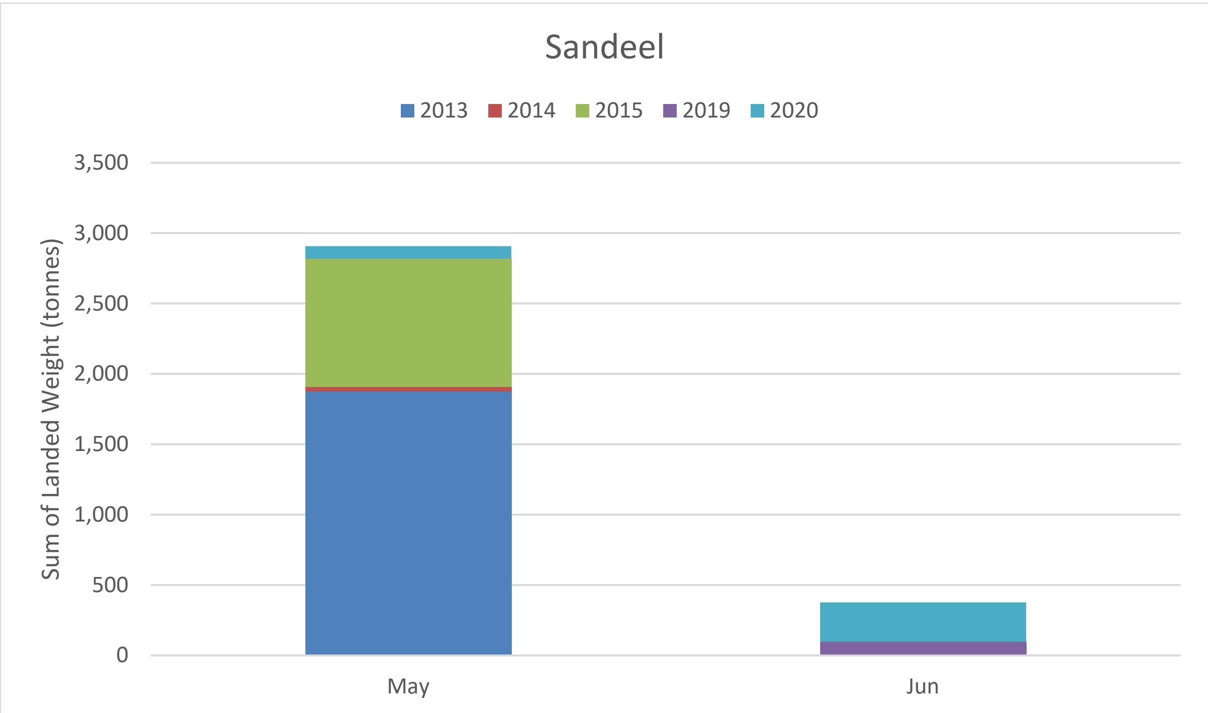


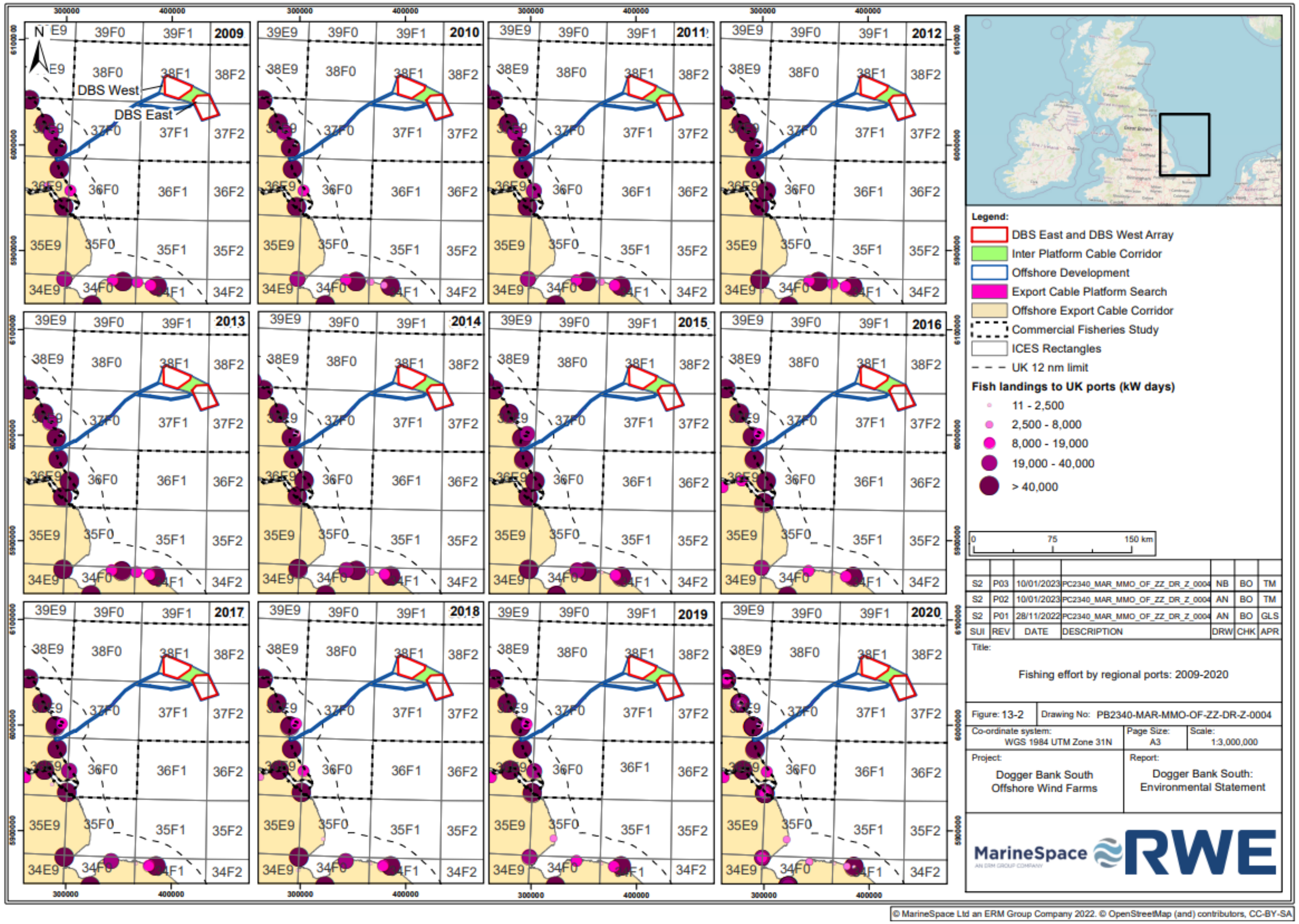
Figure 2.3.24: Seasonality of landed weight (tonnes) of sandeel for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2012-2022) (UK vessels) (Source: MMO, 2023a)



2.4. Port Landings

Figure 13-2 shows fishing effort (kW/day), in relation to key regional ports in England, between 2009-2020 (MMO, 2022b). Fishing effort was generally consistent through 2009-2020, with overall high fishing effort (> 40,000 kW/day) across the majority of ports within the Commercial Fisheries Study Area. Landings by port are discussed in more detail below.

Figure 13-2: Fishing effort (kW/day) by regional ports (all UK vessels) 2009-2020 (Source: MMO, 2023b)



Landings data, compiled by the MMO (MMO, 2023c), were reviewed for the period January 2012 to December 2022, and filtered to show landings into English ports closest to the DBS Array Areas. The landings dataset provides summaries of fishing activity for both UK commercial fishing vessels landing into the UK and abroad, as well as foreign registered commercial fishing vessels landing into the UK, that are deemed to have been fishing within a specified calendar year. It should be noted that these data do not indicate where the landings were caught, so do not provide an accurate representation of landings solely from the Commercial Fisheries Study Area.

The ports used in this analysis were Grimsby, Scarborough, Bridlington, Hornsea and Whitby, as they were identified as ports within the Commercial Fisheries Study Area with relatively high fishing effort (Figure 13- 2), and where fisheries stakeholders have indicated these as their home ports. Data were sorted by port and filtered to analyse details within different vessel size classes, species group, and nationality of vessels. The data were further sorted to analyse the top 10 most important commercial species, as these accounted for greater than 90% of the total landed weight and value into each port. This enabled a more detailed analysis of fishing activity from ports most likely to be affected by the Projects. Annual landed weights by species group, and the top five shellfish species, were also analysed for each of the respective ports.

English vessels accounted for the majority of landed weights across the ports assessed; Scottish vessels also made notable contributions to landed weights at Grimsby, Scarborough, and Whitby (Figure 2.4.2). Total landings ranged from 34,189 tonnes in Grimsby to 216 tonnes in Hornsea. Non-UK vessel landings were highest at the port of Grimsby, accounting for approximately 15% of total landings, which included landings from Danish, Russian, Dutch, French, Spanish, Belize, and Belgian vessels.

A summary of the vessel lists at each port is provided in Table 2.4.1 (MMO, 2023d). Table 2.4.1 shows that ≤10 m vessels make up the majority of vessels with a home port of Scarborough, Hornsea or Whitby, whereas there are almost equal numbers of ≤10 m and >10 m vessels which have a home port of Grimsby or Bridlington. In general, most vessels held a shellfish licence, with the highest number of shellfish licences from vessels with a home port of Bridlington, and the lowest number of shellfish licences from vessels with a home port of Hornsea. In total, only four scallop licences were recorded, these were all held by >10 m vessels with a home port of Scarborough.

Figure 2.4.1: Landed weight by vessel nationality into Bridlington, Grimsby, Hornsea, Scarborough and Whitby ports (2012-2022) (Source: MMO, 2023c)

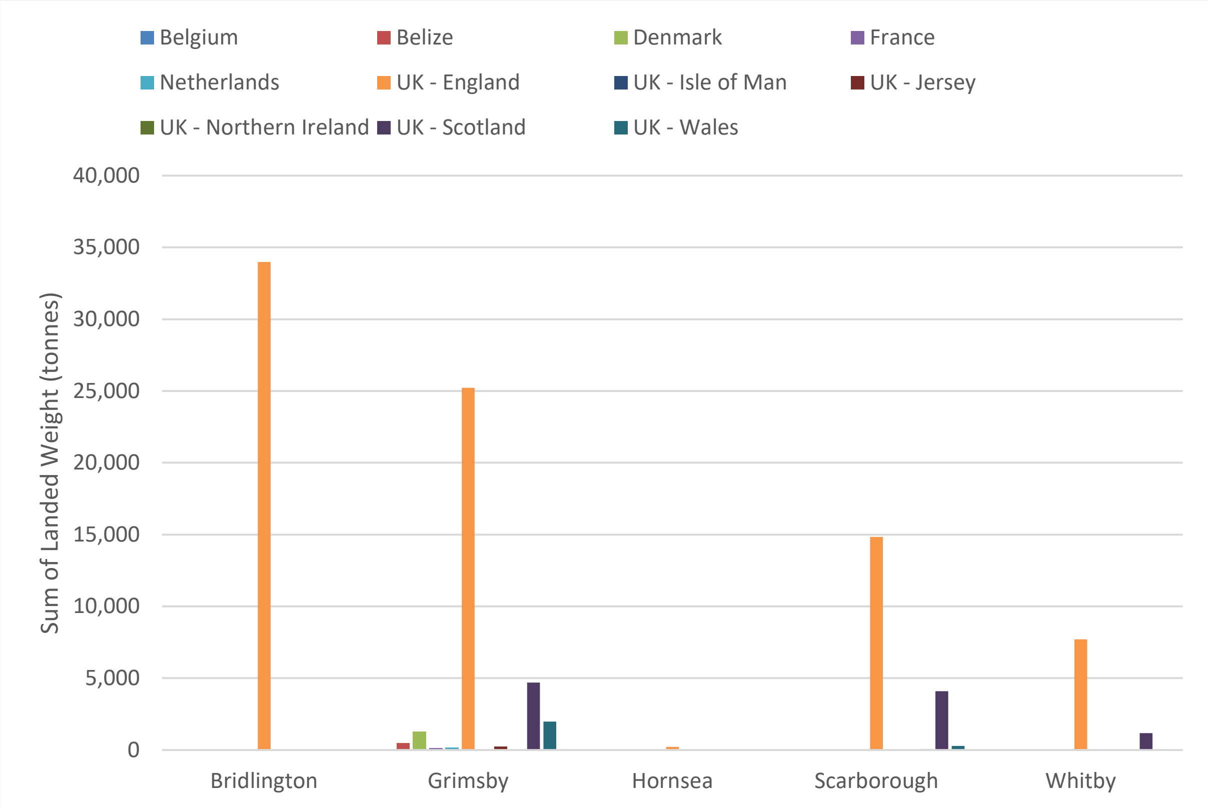


Table 2.4.1: Summary of the vessel lists at Grimsby, Scarborough, Whitby, Bridlington and Hornsea ports, as of October 2023 (Source: MMO, 2023d)

Port	Vessel Size Class (m)	Total No. Vessels	No. of Shellfish Licences	No. Scallop Licences
Grimsby	≤10	11	8	0
	>10	10	6	0
Scarborough	≤10	23	23	0
	>10	6	2	4
Whitby	≤10	27	27	0
	>10	7	5	0
Bridlington	≤10	19	19	0
	>10	20	19	0
Hornsea	≤10	7	7	0
	>10	0	0	0

2.4.1. Bridlington

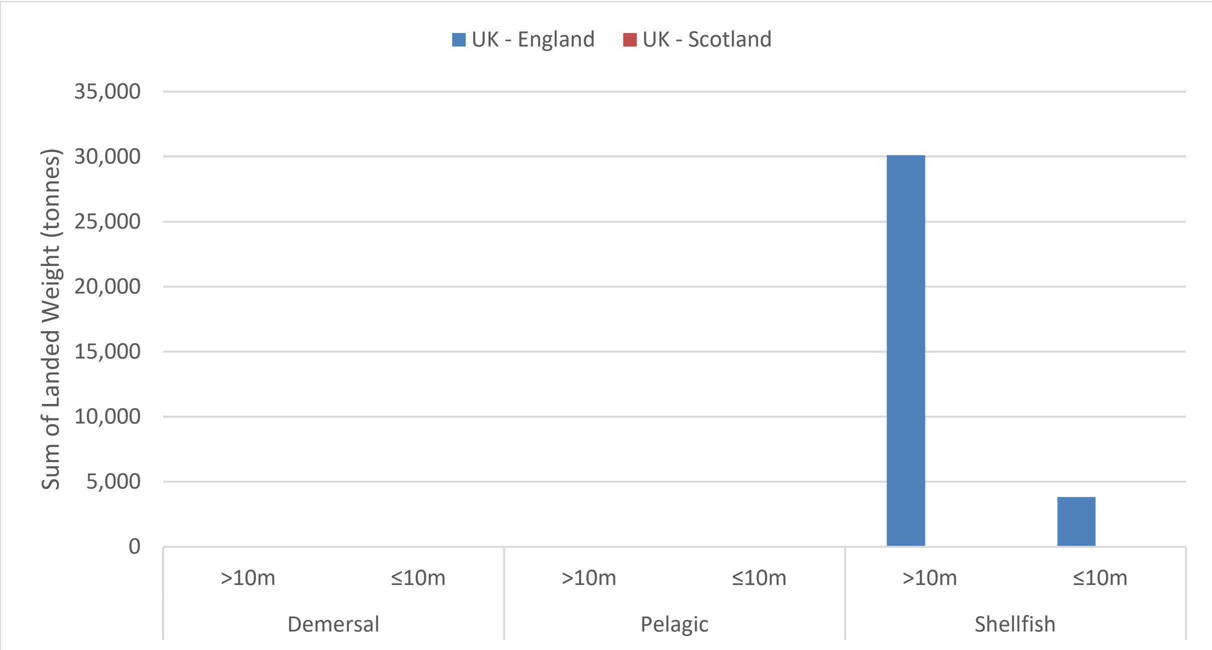
Only English and Scottish[3] registered vessels were recorded as making landings into Bridlington during 2012-2022 (Figure 2.4.3). English vessels dominated the total landed weight of shellfish species across both vessel size classes, totalling 33,925 tonnes. Demersal and pelagic species groups did not play a significant role in terms of total landed weights at the port of Bridlington, with total weights recorded of 61 and 0.68 tonnes across the vessel size classes for demersal and pelagic groups, respectively.

A total of 43 species were landed into Bridlington during 2012-2022, of which crab (C.P. mixed sexes) accounted for the majority of the total landed weight, at 23,682 tonnes (Figure 2.4.4). In terms of value, lobster was the key species landed, with a total value of £ 56,111,724. Crab (C.P. mixed sexes) and whelk also made up notable contributions towards the total landed value of species at Bridlington.

Landings of shellfish into Bridlington were largely over 33,000 tonnes throughout 2012-2022, ranging between 2,372 tonnes and 3,551 tonnes in 2022 and 2019, respectively (Figure 2.4.5 and Figure 2.4.6). Landings of demersal species were below 61 tonnes throughout the study period. The top five species, which accounted for over 95% of the total shellfish landings into Bridlington port, were brown crab (C.P. mixed sexes), whelk, lobster, velvet crab (swim) and scallop (Figure 2.4.6). Of these, brown crab (C.P. mixed sexes) made up the majority of shellfish landings throughout 2012-2022. Whelk and lobster also made notable consistent contributions to the total shellfish landings at Bridlington.

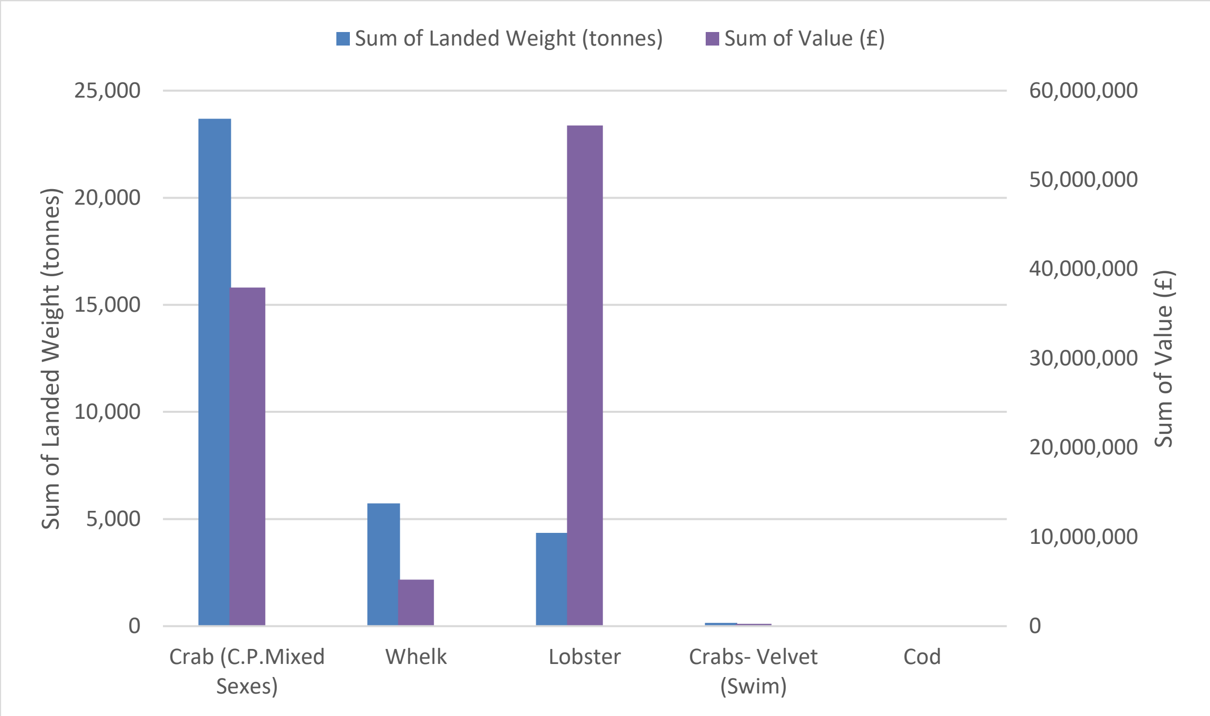
[3] These were mostly local vessels that were registered to Scottish ports due to quota entitlements; many of these vessels have re-registered as English.

Figure 2.4.2: Total landings (tonnes) into Bridlington port (2012-2022) displayed by species group and vessel length (Source: MMO, 2022c) [4]



[4] Due to such small landings of demersal (60.8 tonnes) and pelagic (0.68 tonnes) species, they are not represented in Figure 2.4.3.

Figure 2.4.3: Total weight (tonnes) and value of landings into Bridlington port (2012-2022) of the top 5 commercially important species classes (Source: MMO, 2023c) [5]



[5] Landed weights and value of cod is less than 15 tonnes and £27,000, and therefore too small to be represented in Figure 2.4.4.

Figure 2.4.4: Annual landed weights of species groups recorded at Bridlington port (2012-2022) (Source: MMO, 2023c)

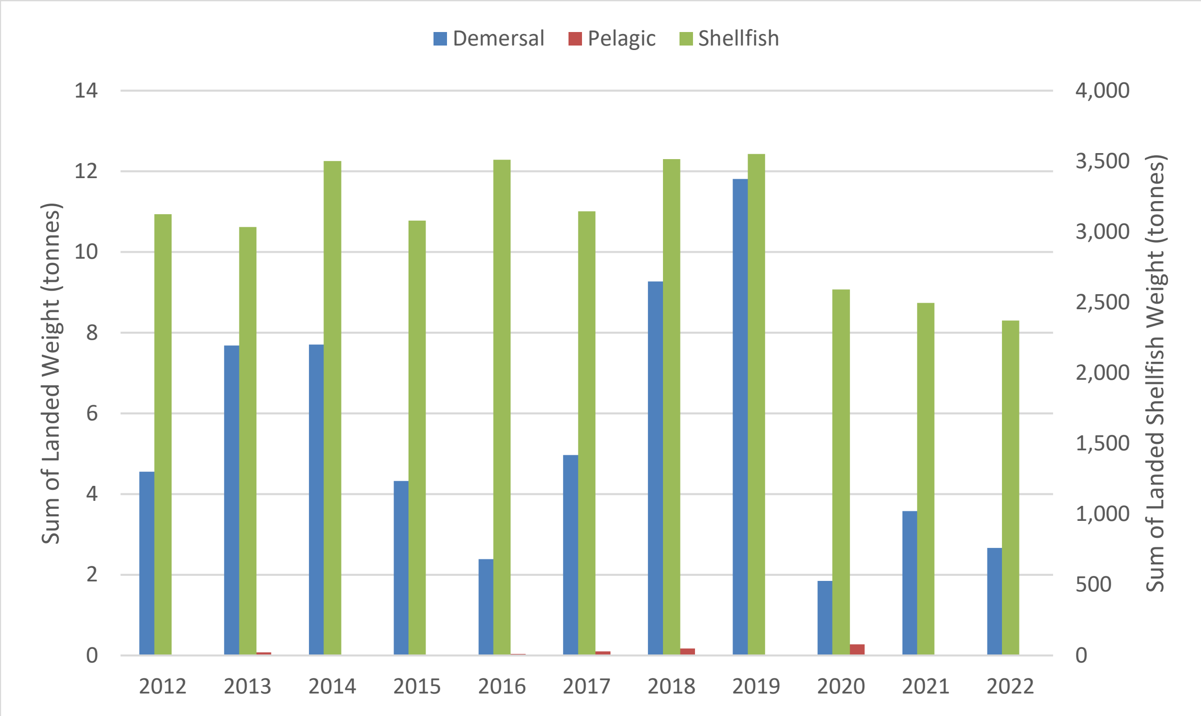
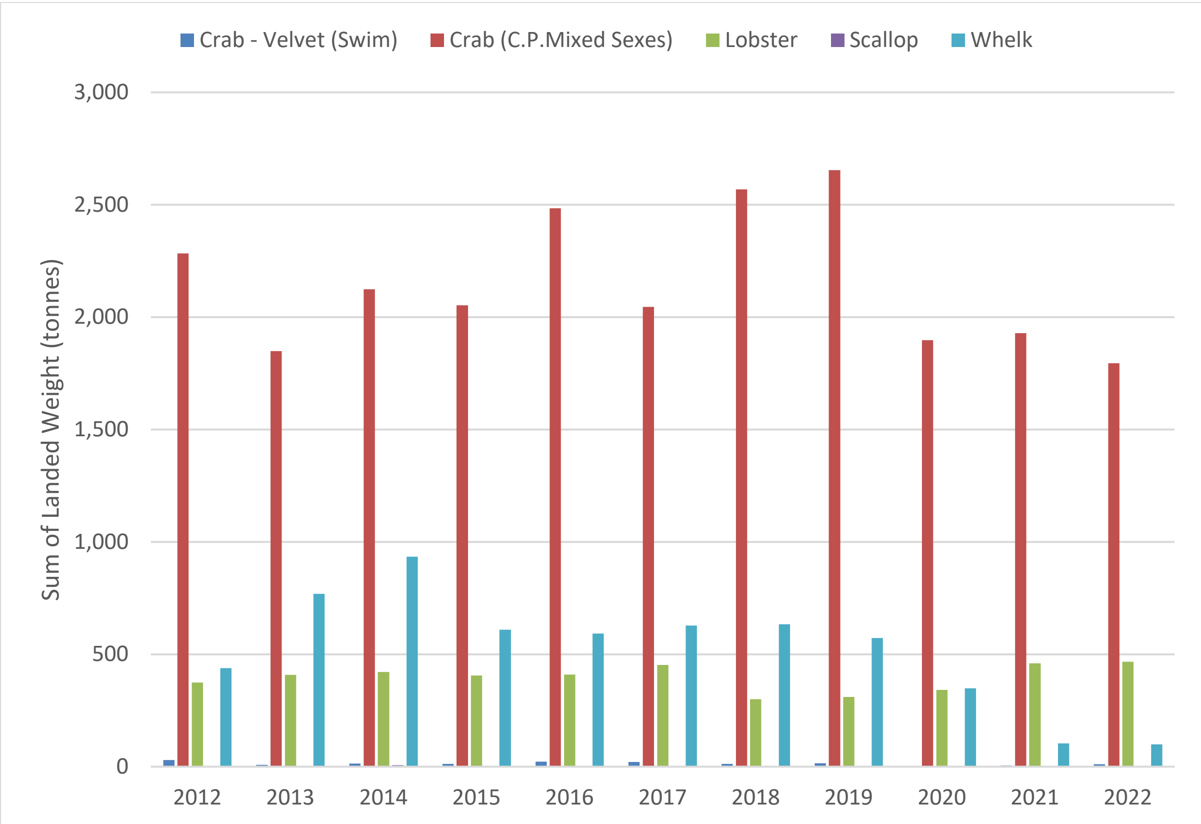


Figure 2.4.5: Annual landed weight of the top 5 shellfish species landed into Bridlington port (2012-2022) (Source: MMO, 2022c)



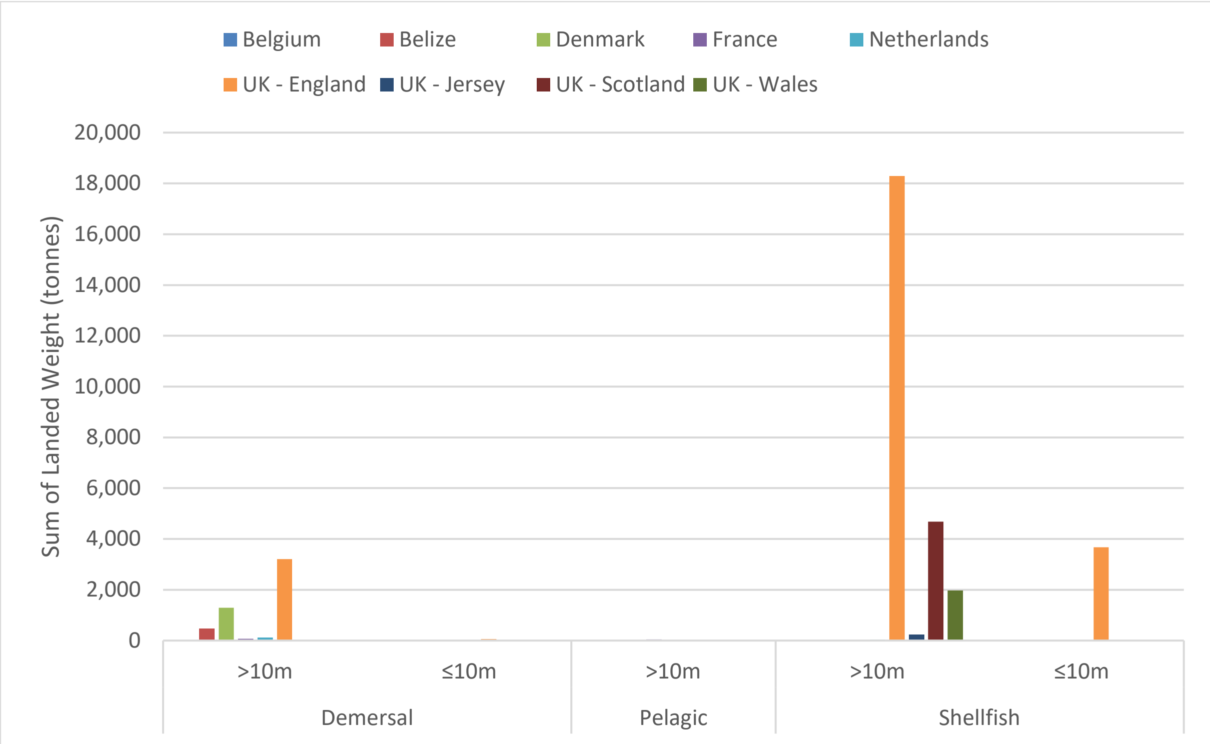
2.4.2. Grimsby

Vessels >10 m were dominant, in terms of landed weight, at the port of Grimsby. Shellfish was the key species group landed, with total landed weights of 28,896 tonnes during 2012-2022 (Figure 2.4.7). English vessels landed the majority of shellfish and demersal species into Grimsby, with Scottish and Welsh vessels >10 m also making notable contributions to landings of shellfish; and Danish and Belize vessels >10 m contributing towards landings of demersal species. Vessels <10 m from England also landed shellfish catches, but total landed weights between 2012-2022 were significantly less than those of larger vessels, at 3,731 tonnes compared to 21,497 tonnes. For both vessel size categories, the pelagic species group was the least dominant by landed weights.

A total of 66 species was landed into Grimsby port during 2012-2022. The top five species, in terms of landed weights, were brown crab (C.P. mixed sexes), cod, whelk, plaice and scallop (Figure 2.4.8). The landed weights of these ranged from 21,356 to 1,375 tonnes. In terms of value, brown crab (C.P. mixed sexes) was the key species landed, with a total value of £ 36,714,672. Lobster and cod also made notable contributions towards the total landed value of species at Grimsby.

Landings of shellfish into Grimsby increased from 971 tonnes in 2012, to just under 4,500 tonnes in 2020 (Figure 2.4.9), this later decreased to 1,446 tonnes in 2022. In contrast, landings of demersal species have decreased from just under 1,316 tonnes in 2012, to less than one tonnes in 2022. The top five species, which accounted for over 95% of the total shellfish landings into Grimsby port, were brown crab (C.P. mixed sexes), whelk, scallop, lobster and *Nephrops* (Figure 2.4.10). Of these, brown crab (C.P. mixed sexes) made up the majority of landings and was responsible for the overall increasing trend in shellfish landings throughout 2012-2022.

Figure 2.4.6: Total landings (tonnes) into Grimsby port (2012-2022) displayed by species group, vessel length and nationality (Source: MMO, 2023c) [6]



[6] Due to such small landings of pelagic species (55.7 tonnes), they are not represented in Figure 2.4.7.

Figure 2.4.7: Total weight (tonnes) and value of landings into Grimsby port (2012-2022) of the top 5 commercially important species classes (Source: MMO, 2023c)

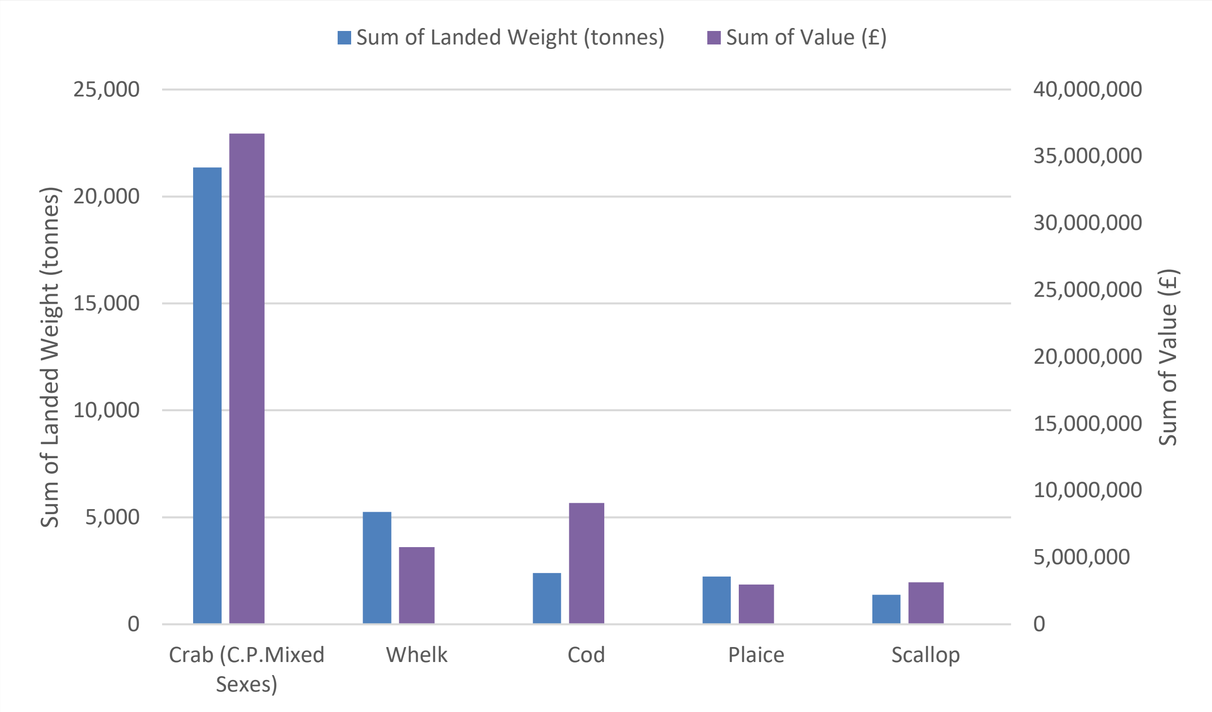


Figure 2.4.8: Annual landed weights of species groups recorded at Grimsby port (2012-2022) (Source: MMO, 2023c)

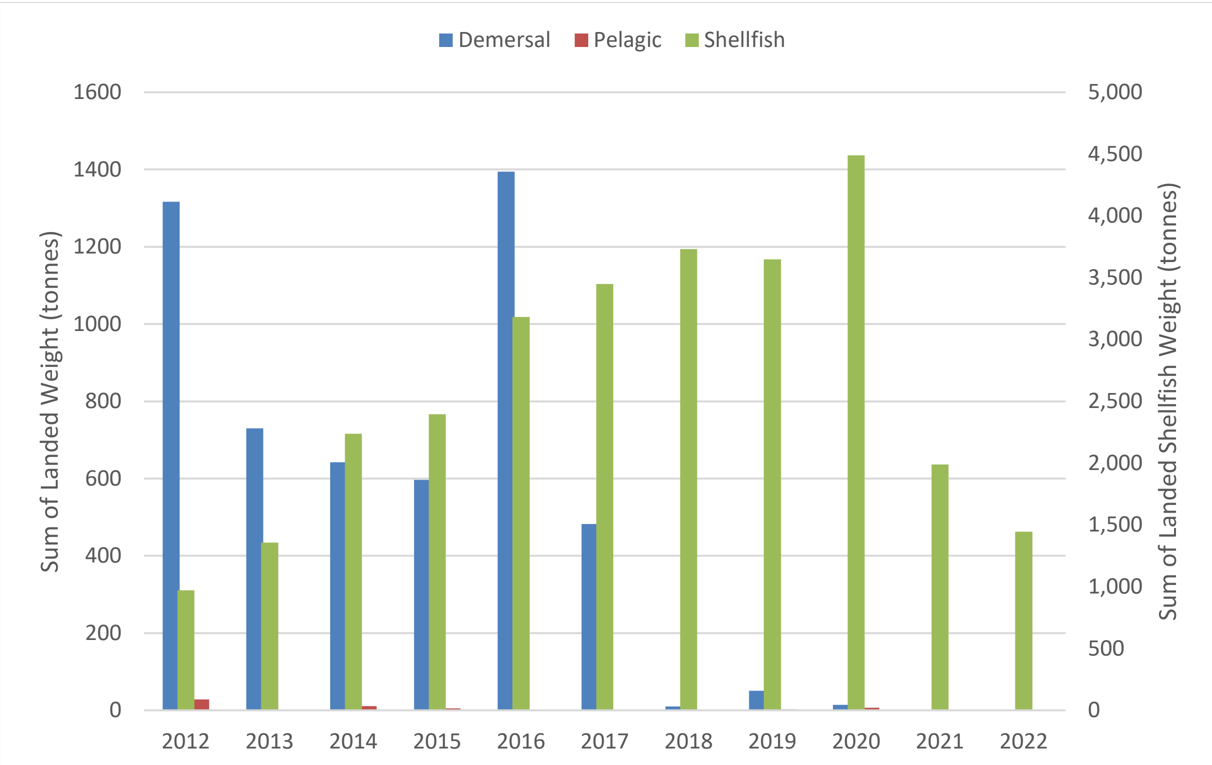
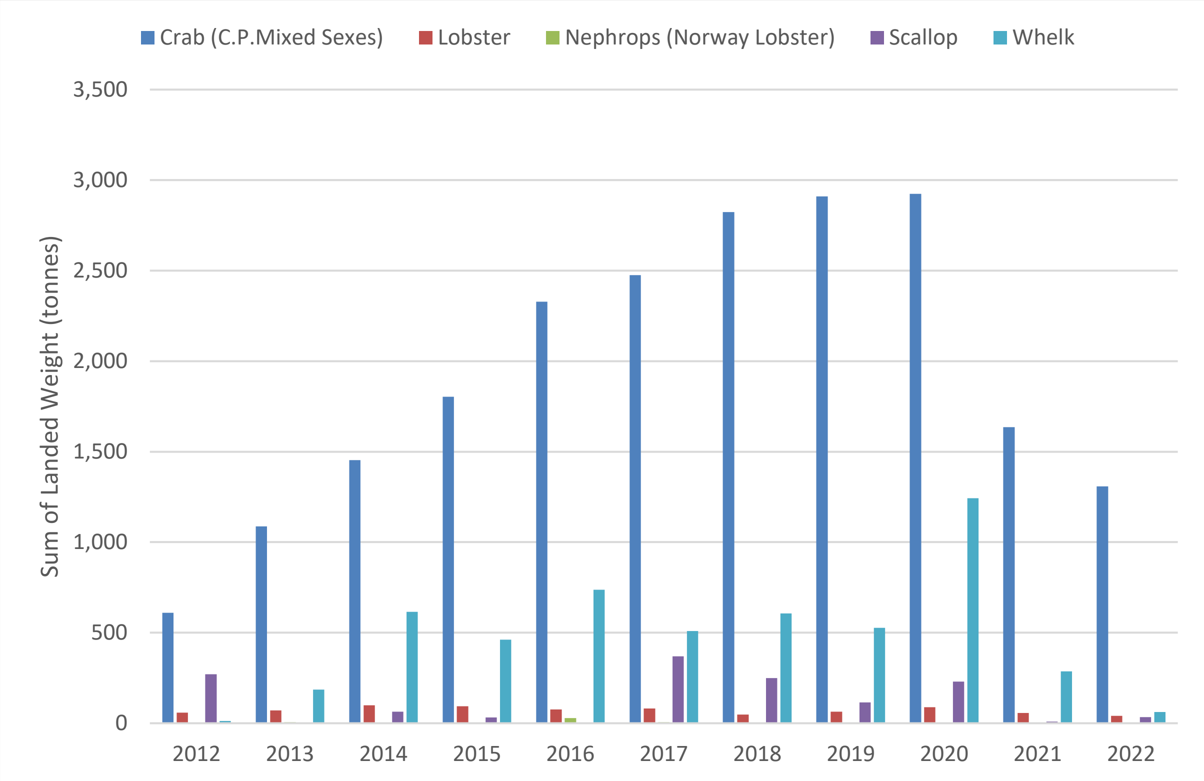


Figure 2.4.9: Annual landed weight of the top 5 shellfish species landed into Grimsby port (2012-2022) (Source: MMO, 2023c)



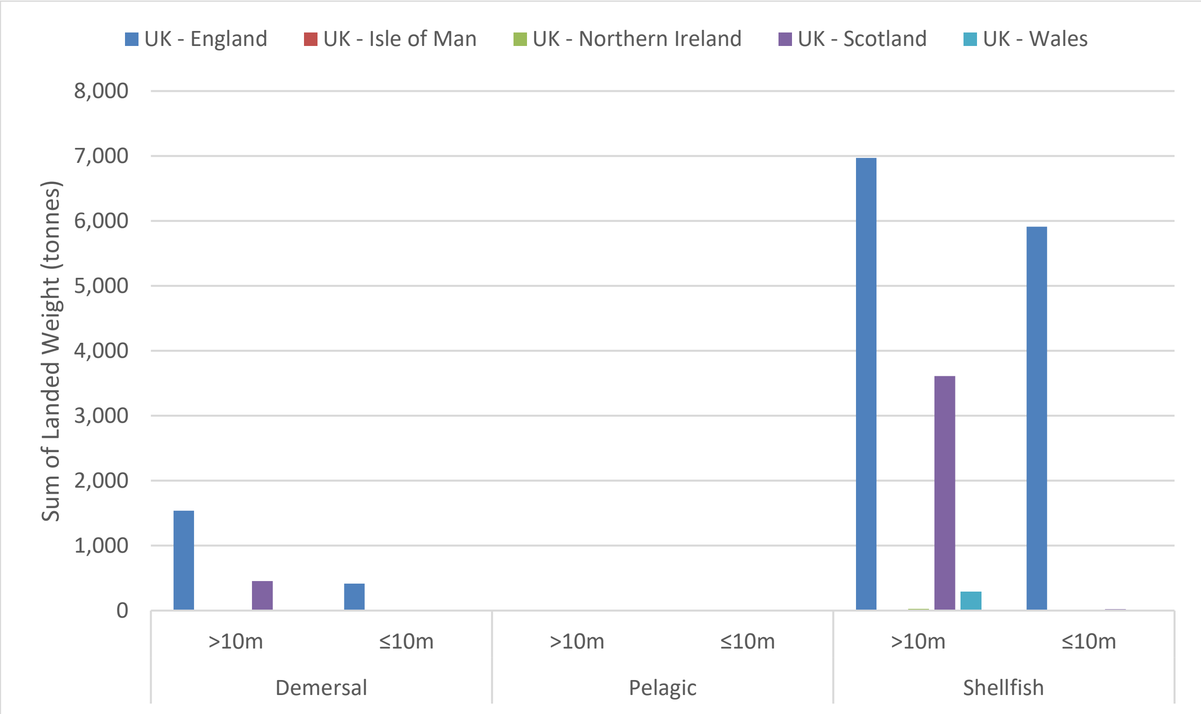
2.4.3. Scarborough

Vessels >10 m were dominant across demersal and shellfish groups at the port of Scarborough (Figure 2.4.11). The key species group was shellfish, with a total landed weight of 16,837 tonnes recorded between 2012-2022. English vessels, and Scottish >10 m vessels, landed the majority of shellfish into Scarborough, with some Welsh >10 m vessels also landing shellfish species. Demersal species were also landed into Scarborough, with English and Scottish vessels, again, dominating the landings.

A total of 66 species was landed into Scarborough, during 2012-2022. Scallop was the key species in terms of landed weight (Figure 2.4.12), accounting for 7,645 tonnes, and lobster was the key species in terms of landed value, at £18,680,820. Brown crab (C.P. mixes sexes) and *Nephrops* also made notable contributions to total landed weights, and values of species landed.

Landings of shellfish into Scarborough showed an increasing trend between 2012 to 2015, where maximum landings of 1,194 tonnes were recorded (Figure 2.4.13). Between 2015-2019 shellfish landings plateaued at approximately 2,000 tonnes and have recently declined to 1,111 tonnes in 2022. Landings of demersal species have been steadily decreasing, from 465 tonnes in 2012 to less than seven tonnes in 2022. The top five species, which accounted for over 95% of the total shellfish landings into Scarborough, were scallop, brown crab (C.P. mixed sexes), *Nephrops*, lobster and whelk (Figure 2.4.14). Of these, scallop, and brown crab (C.P. mixed sexes) made up the majority of shellfish landings throughout 2012-2022. Over 2,000 tonnes of scallop were landed in 2015, significantly higher than any other year, which is likely responsible for the maximum landed weight of total shellfish species recorded that year.

Figure 2.4.10: Total landings (tonnes) into Scarborough port (2012-2022) displayed by species group and vessel length (Source: MMO, 2023c) [7]



[7] Due to such small landings of pelagic species (3.87 tonnes), they are not represented in Figure 2.4.11.

Figure 2.4.11: Total weight (tonnes) and value of landings into Scarborough port (2012-2022) of the top 5 commercially important species classes (Source: MMO, 2023c)

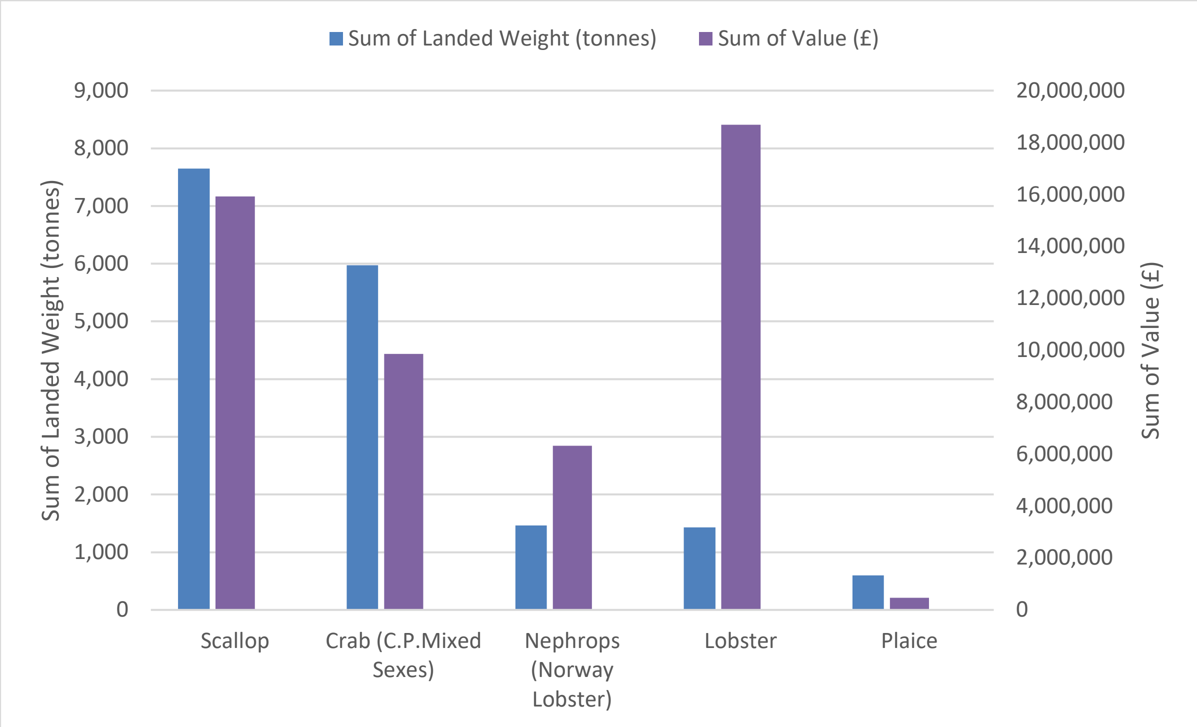


Figure 2.4.12: Annual landed weights of species groups recorded at Scarborough port (2012-2022) (Source: MMO, 2023c)

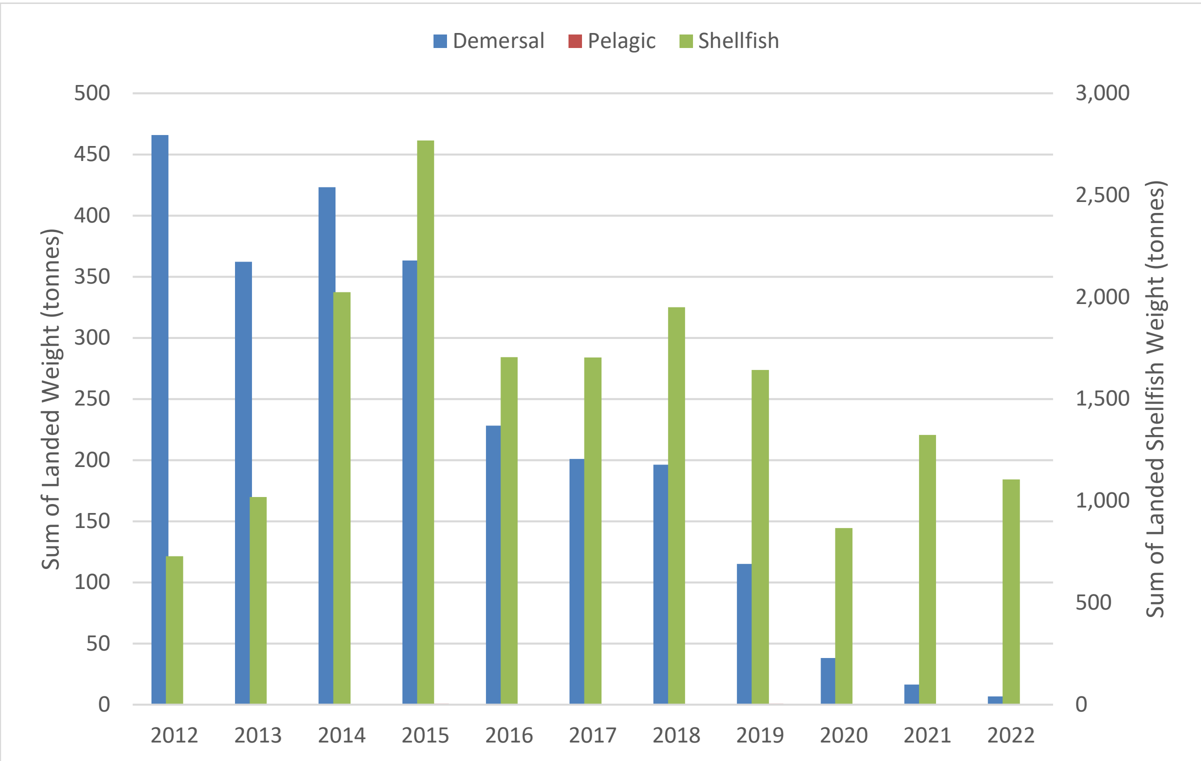
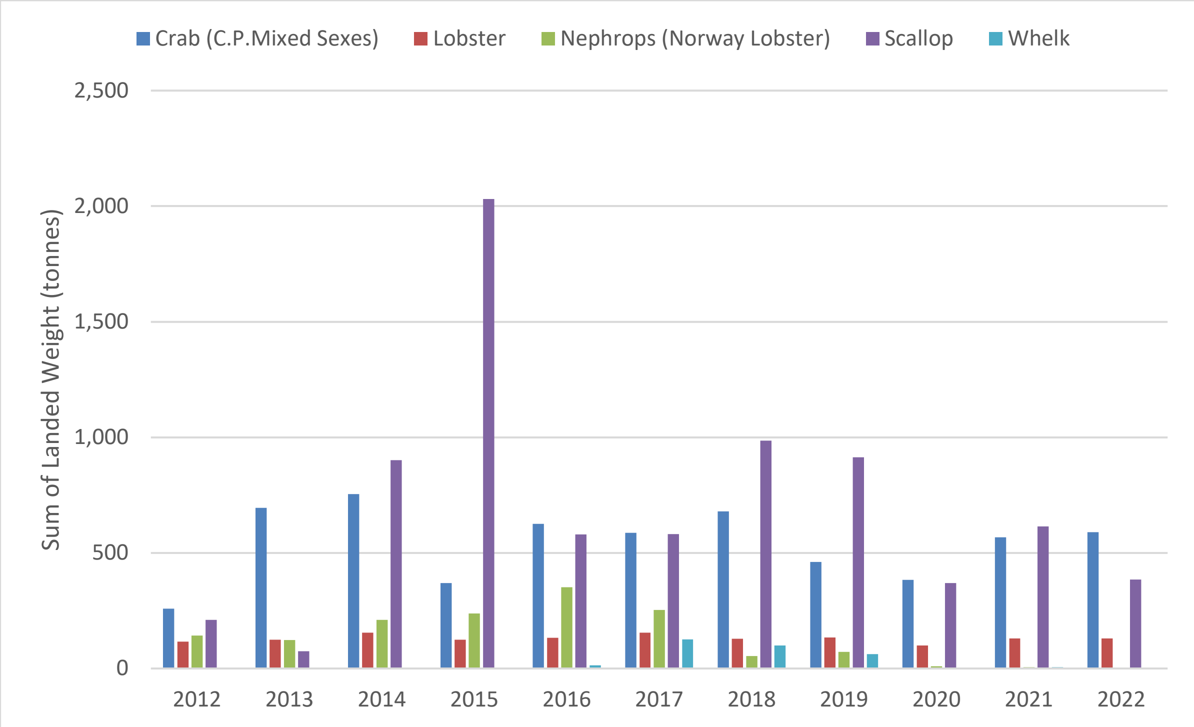


Figure 2.4.13: Annual landed weight of the top 5 shellfish species landed into Scarborough port (2012-2022) (Source: MMO, 2023c)



2.4.4. Whitby

Once again, shellfish was the key species group, in terms of landed weights, at the port of Whitby during 2012-2022 (Figure 2.4.15). English vessels across both size classes made dominant contributions towards these landings (7,713 tonnes), with Scottish vessels >10 m also accounting for a notable amount of the landed weight (1,173 tonnes). Demersal landings were dominated by English and Scottish vessels >10 m, while pelagic species groups did not play a significant role in terms of total landed weights at the port of Whitby.

A total of 62 species was landed into Whitby during 2012-2022. The top three species in terms of landed weights were brown crab (C.P. mixed sexes), scallop and lobster (Figure 2.4.16). The landed weights of these three species ranged from 3,877 to 1,037 tonnes. In terms of value, lobster was the key species landed, with a total value of £12,964,012. Scallop and brown crab (C.P. mixed sexes) also made up notable contributions towards the total landed value of species at Whitby.

Landings of shellfish into Whitby showed an increasing trend between 2012 to 2014, when maximum landings of 1,465 tonnes were recorded (Figure 2.4.17). Between 2016-2019, shellfish landings plateaued at approximately 600-800 tonnes, and have recently declined to less than 125 tonnes in 2022. Landings of demersal species have decreased, from 370 tonnes in 2012 to less than one tonnes since 2022. The top five species, which accounted for over 95% of the total shellfish landings into Whitby, were brown crab (C.P. mixed sexes), scallop, lobster, *Nephrops* and velvet crab (swim) (Figure 2.4.18). Of these, scallop, and brown crab (C.P. mixed sexes) made up the majority of shellfish landings throughout 2012-2022. Particularly high landings of scallop were recorded in 2014 and 2015, while record landings of brown crab (C.P. mixed sexes) were recorded in 2013.

Figure 2.4.14: Total landings (tonnes) into Whitby port (2012-2022) displayed by species group and vessel length (Source: MMO, 2023c) [8]

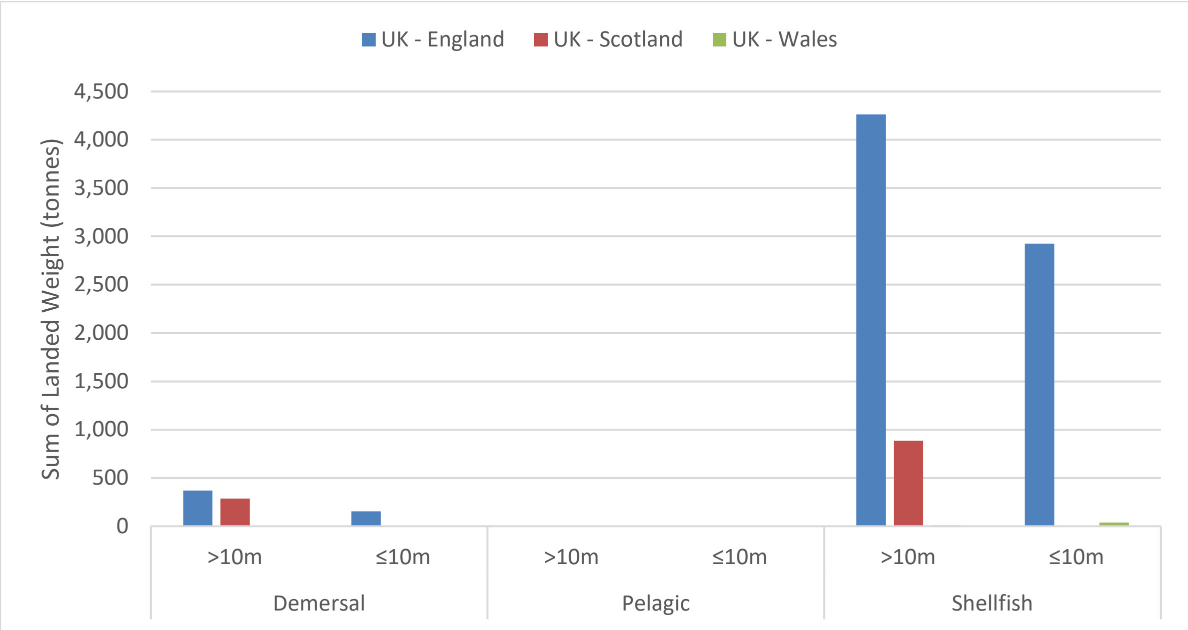
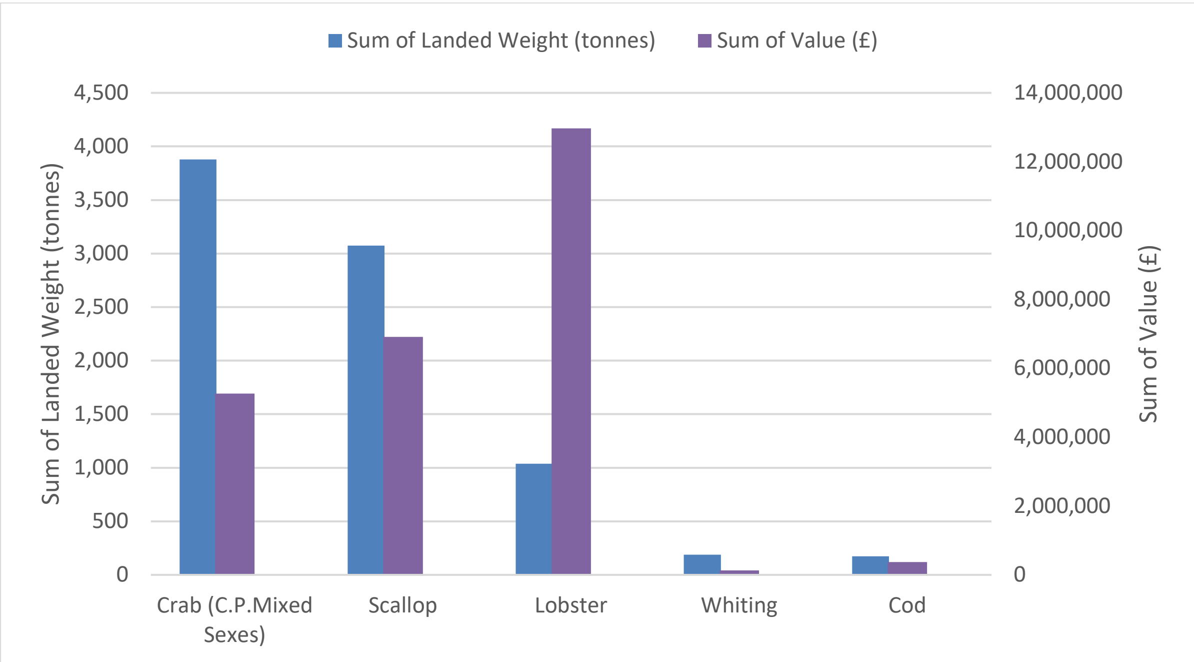


Figure 2.4.15: Total weight (tonnes) and value of landings into Whitby port (2012-2022) of the top 15 commercially important species classes (Source: MMO, 2023c)



[8] Due to such small landings of pelagic species (5.42 tonnes), they are not represented in Figure 2.4.15.

Figure 2.4.16: Annual landed weights of species groups recorded at Whitby port (2012-2022) (Source: MMO, 2023c)

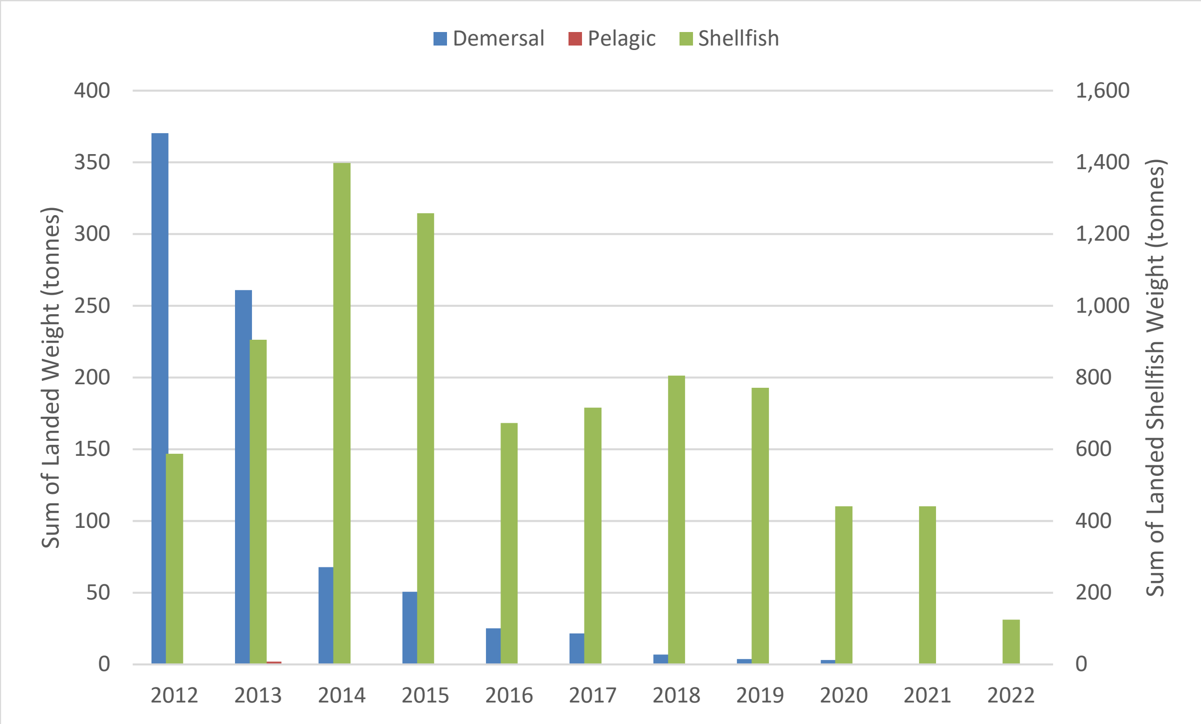
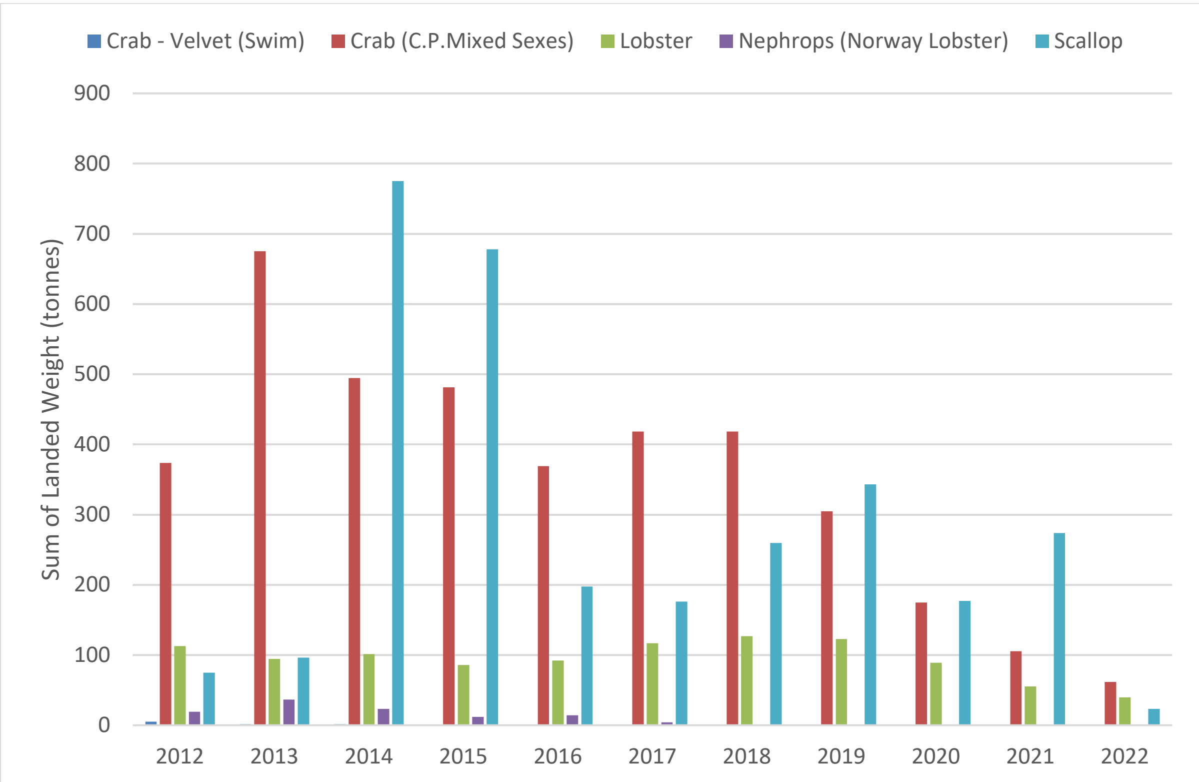


Figure 2.4.17: Annual landed weight of the top 5 shellfish species landed into Whitby port (2012-2022) (Source: MMO, 2023c)



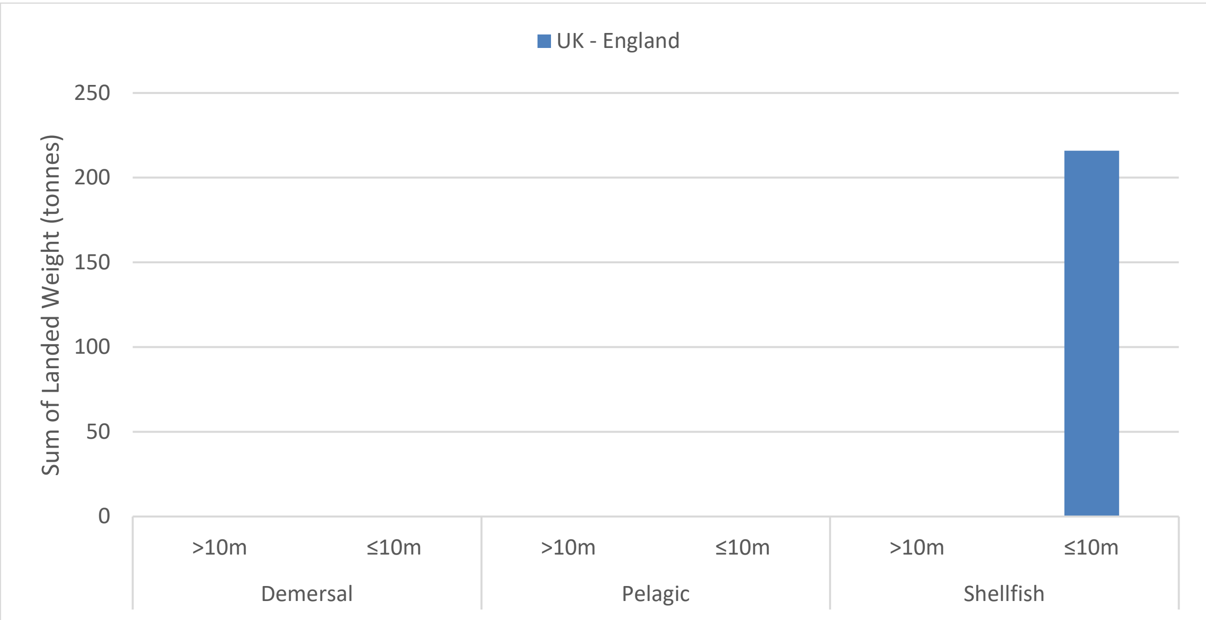
2.4.5. Hornsea

All recorded landings at Hornsea are from registered vessels <10 m in length (Figure 2.4.19). Vessels are launched from a beach which restricts the size of vessel which is able to operate from this port. Shellfish species accounted for the majority of these landings, totalling 216 tonnes. Demersal and pelagic species groups did not play a significant role in terms of total landed weights at the port of Hornsea, with total weights recorded of 0.22 tonnes and 0 tonnes for demersal and pelagic groups, respectively.

A total of five species was landed into Hornsea during 2012-2022, of which brown crab (C.P. mixed sexes) and lobster accounted for the majority of the total landed weight, at 67 tonnes and 147 tonnes, respectively (Figure 2.4.20). In terms of value, lobster was the key species landed, with a total value of £2,311,640.

Landings of demersal species were below 0.25 tonnes throughout the study period (Figure 2.4.21). Only 4 shellfish species were landed into Hornsea, these were velvet crab (swim), brown crab (C.P. mixed sexes), green crab *Carcinus maenas* and lobster (Figure 2.4.22). Of these, brown crab (C.P. mixed sexes) and lobster made up the majority of shellfish landings throughout 2012-2022.

Figure 2.4.18: Total landings (tonnes) into Hornsea port (2012-2022) displayed by species group and vessel length (Source: MMO, 2022c) [9]



[9] Due to such small landings of demersal species (0.22 tonnes), they are not represented in Figure 2.4.21.

Figure 2.4.19: Total weight (tonnes) and value of landings into Hornsea port (2012-2022) of the top 5 commercially important species classes (Source: MMO, 2023c)

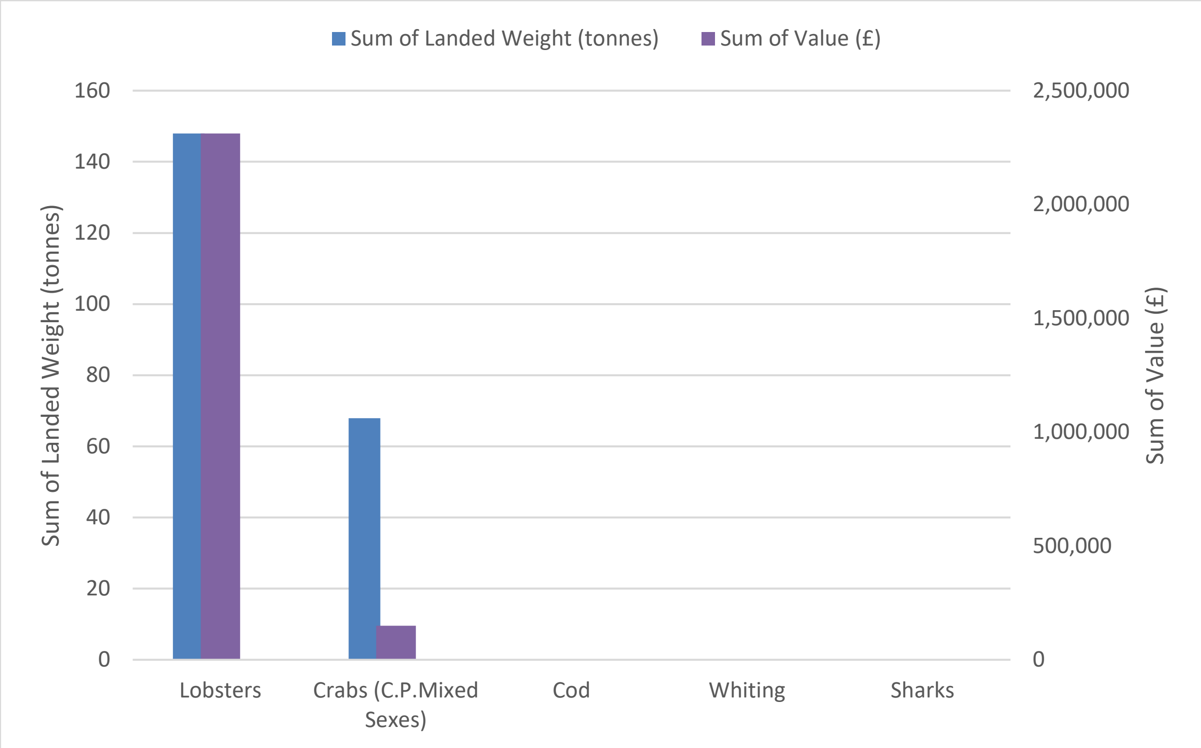


Figure 2.4.20: Annual landed weights of species groups recorded at Hornsea port (2012-2022) (Source: MMO, 2023c)

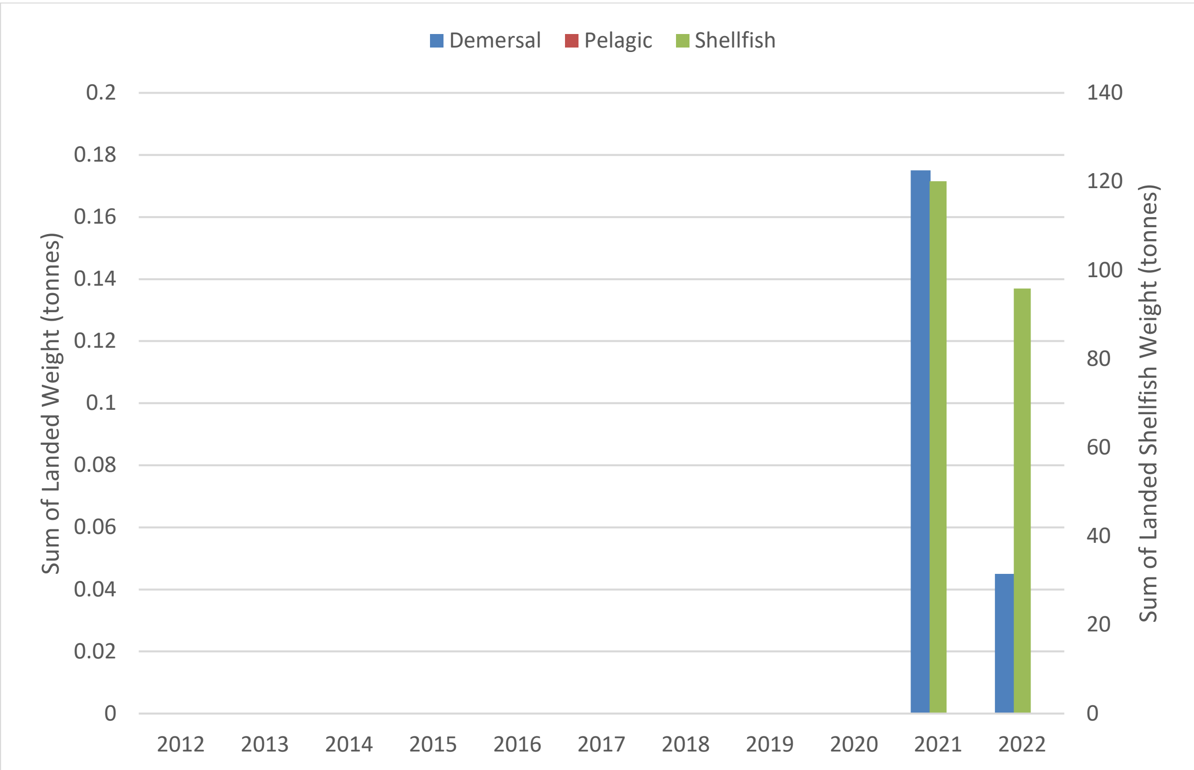
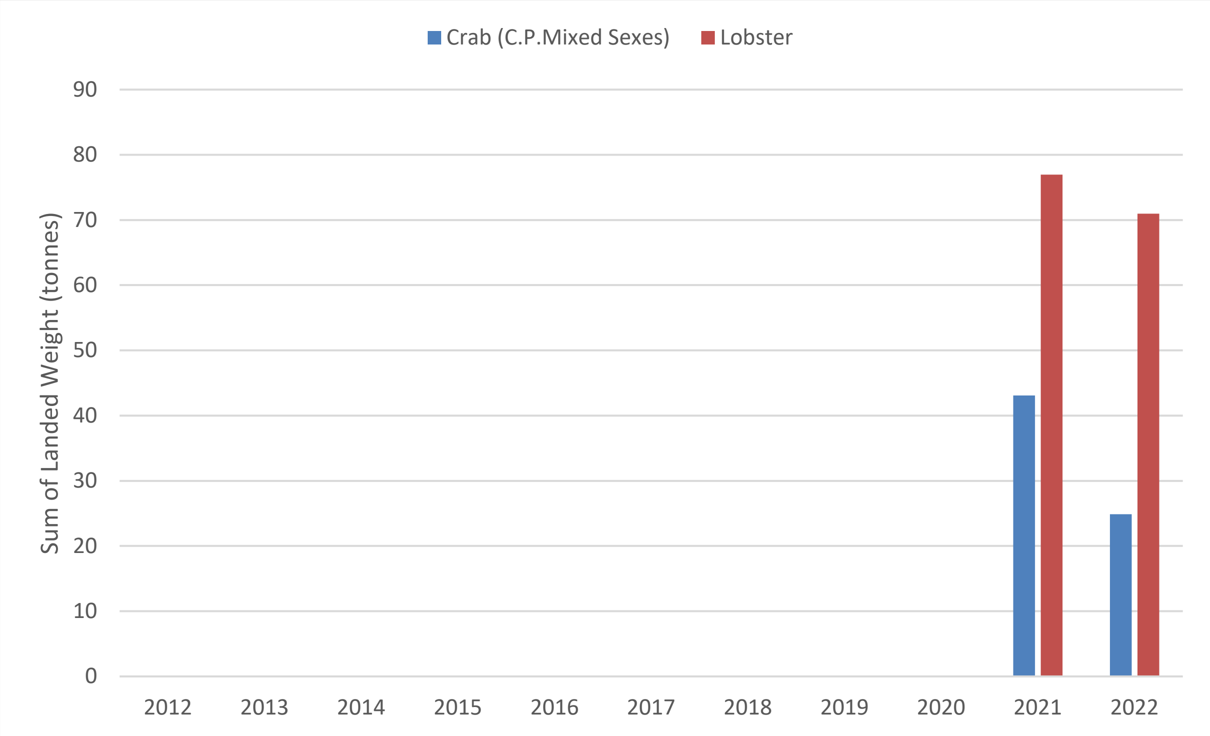


Figure 2.4.21: Annual landed weight of shellfish species landed into Hornsea port (2012-2022) (Source: MMO, 2023c)



2.5. Non-UK Vessels - EU Scientific, Technical and Economic Committee for Fisheries Landings Data

Data on other EU fishing activity in and around the Projects have been obtained from the website of the EU Scientific, Technical and Economic Committee for Fisheries (STECF) (STECF, 2017). These data have been provided by EU Member States, following the 2017 Fisheries Dependent Information data call, to support fishing effort regime evaluations. The data describe the total landed weight in tonnes, and the effective fishing effort in hours fished, by species and by nation per year. Data regarding the seasonality of fishing (recorded by annual quarter) and gear types used were also provided. The data (STECF, 2017) from 2006 to 2016 were filtered to show landings and effort data for the top six non-UK nationalities that made the greatest contributions towards these values within the Commercial Fisheries Study Area. These nationalities were Denmark, the Netherlands, Germany, Sweden, France, and Belgium. More recent data has been requested and was not available during the writing of the report.

These non-UK data are not in a format that allows direct comparison with the data provided by the MMO, but they do provide a good overview of fishing activity and trends in this region. It is noted that changes in fishing activity from non-UK vessels are likely over the next few years, due to the new EU/UK trade agreement, as discussed in section 4.

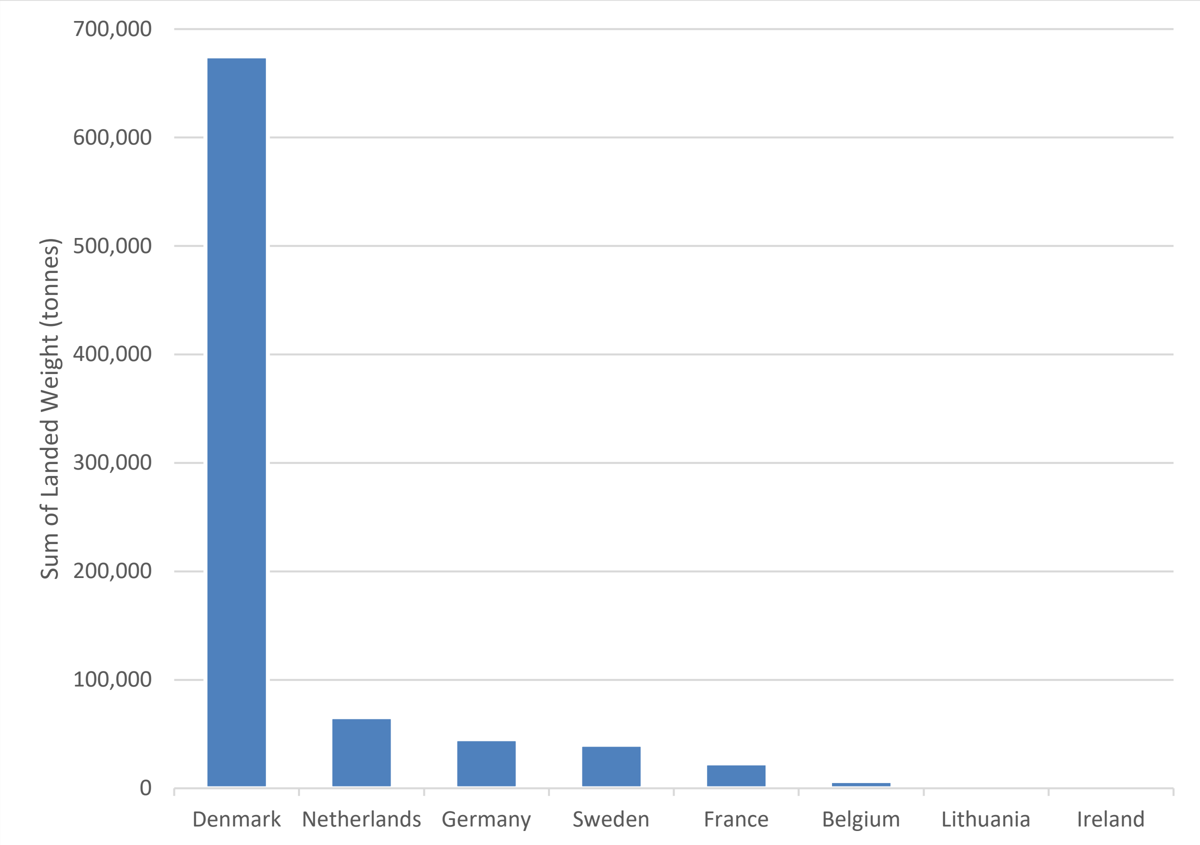
2.5.1. Vessel Nationality and Vessel Size Class

Figure 2.5.1 shows the total landings within the Commercial Fisheries Study Area across all vessel nationalities. Danish vessels account for the majority of landings in terms of weight, at

674,868 tonnes. Dutch, German, and Swedish vessels account for similar contributions to the total landings, ranging between 40,109 to 65,593 tonnes. French and Belgian vessels also made landings within the Commercial Fisheries Study Area.

Non-UK vessels from Denmark, the Netherlands, Germany, Sweden, France, Belgium, Lithuania, and Ireland were active across the Commercial Fisheries Study Area. A total of 855,935 tonnes was caught by the non-UK fleet between 2006 to 2016, with vessels from Denmark, the Netherlands, Germany, Sweden, France, and Belgium accounting for 89% of the total landed weight. Analyses of landings from Lithuania and Ireland have not been included in the rest of the report, as landings were very low between 2006 to 2016 (430 and 23.39 tonnes, respectively).

Figure 2.5.1: Sum of Landings for all vessel nationalities, across ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (2006-2016) (Source: STECF, 2017)



The majority of landings by non-UK vessels were recorded in ICES rectangle 38F2, where 49,215 tonnes were landed between 2006 to 2016 (Figure 2.5.10). Overall, Denmark landed the highest total weight (674,869 tonnes) and accounted for the majority of landings within ICES rectangles 36F0, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (Figure 2.5.4 to Figure 2.5.10). French vessels landed the highest total weights within ICES Rectangles 36E9 and 37E9, at 19.9 tonnes and 523 tonnes respectively (Figure 2.5.2 and Figure 2.5.3), and made notable contributions to landings within 36F0 and 37F0. Dutch vessels accounted for the second highest total landings (65,593 tonnes) and made significant contributions to landed weights within 37E9, 37F0, 38F0 and 38F2 (Figure 2.5.3, Figure 2.5.5, Figure 2.5.8 and Figure 2.5.10).

Figure 2.5.2: Sum of landings weight (tonnes) within ICES Rectangle 36E9, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

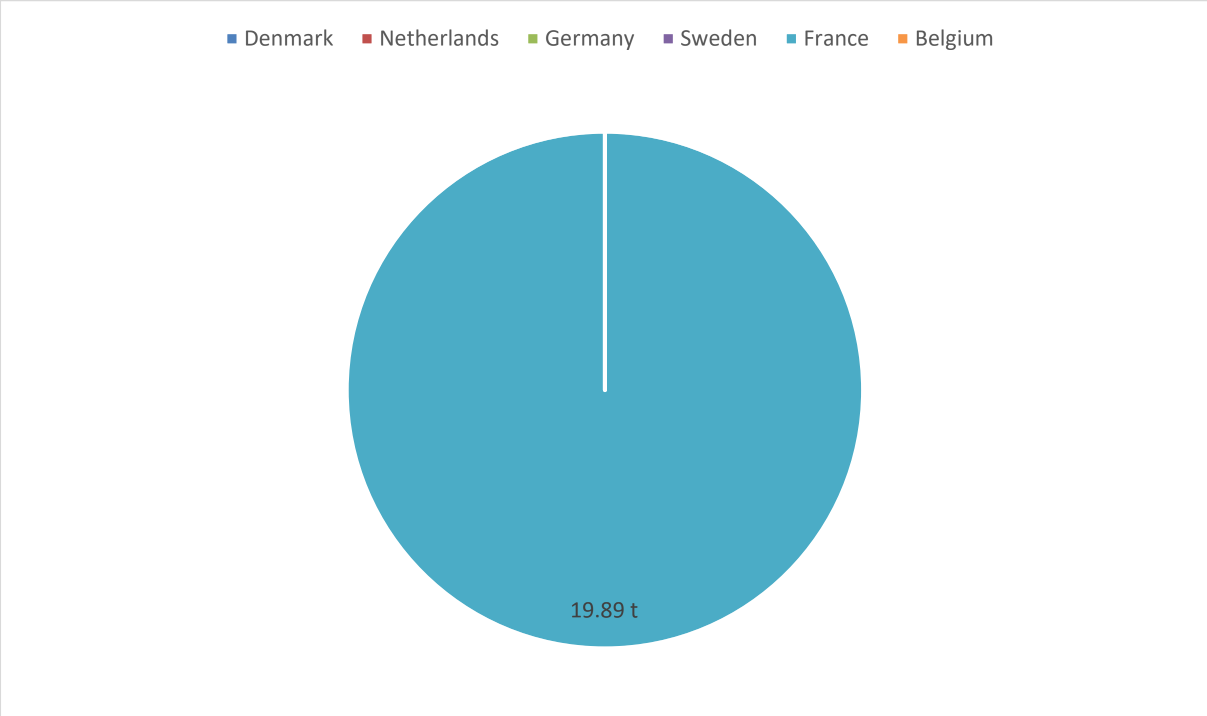


Figure 2.5.3: Sum of landings weight (tonnes) within ICES Rectangle 37E9, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

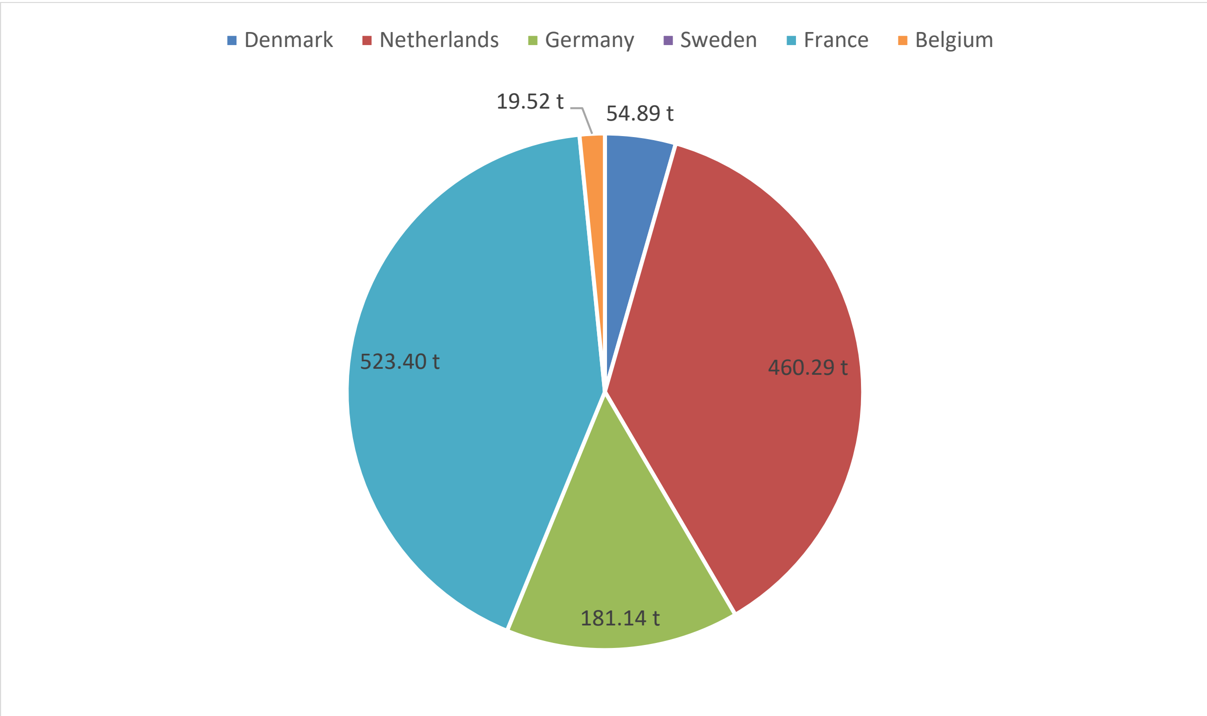


Figure 2.5.4: Sum of landings weight (tonnes) within ICES Rectangle 36F0, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

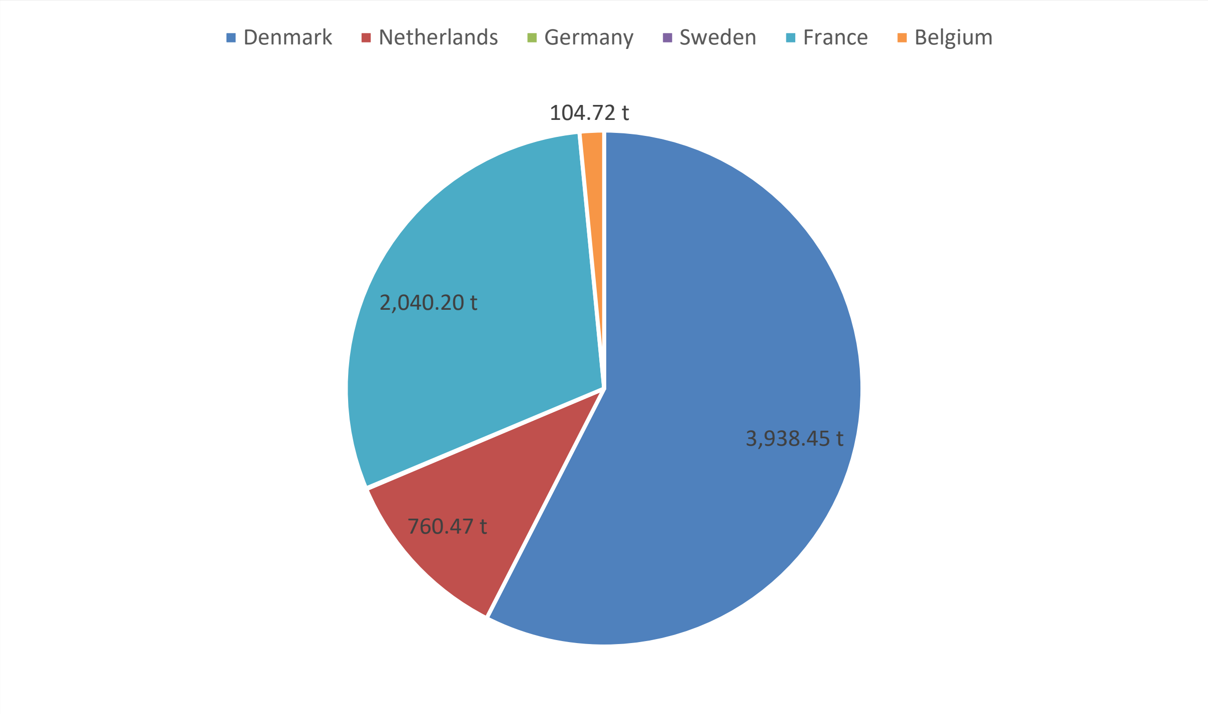


Figure 2.5.5: Sum of landings weight (tonnes) within ICES Rectangle 37F0, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

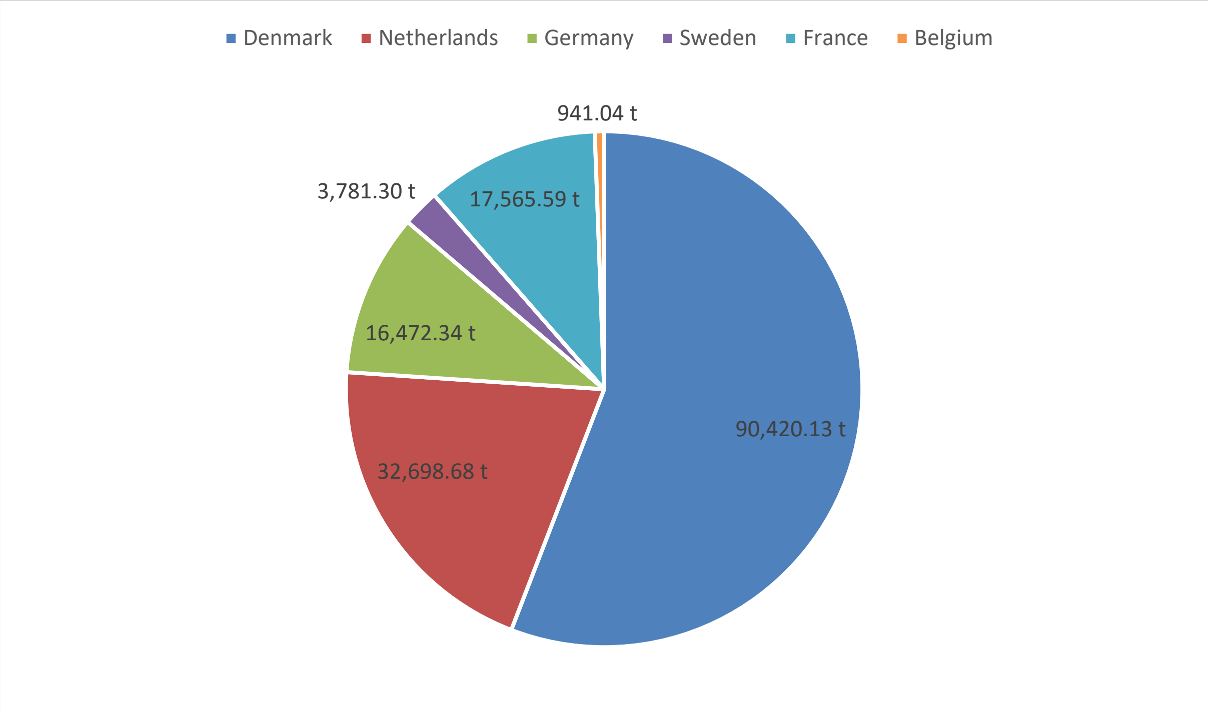


Figure 2.5.6: Sum of landings weight (tonnes) within ICES Rectangle 37F1, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

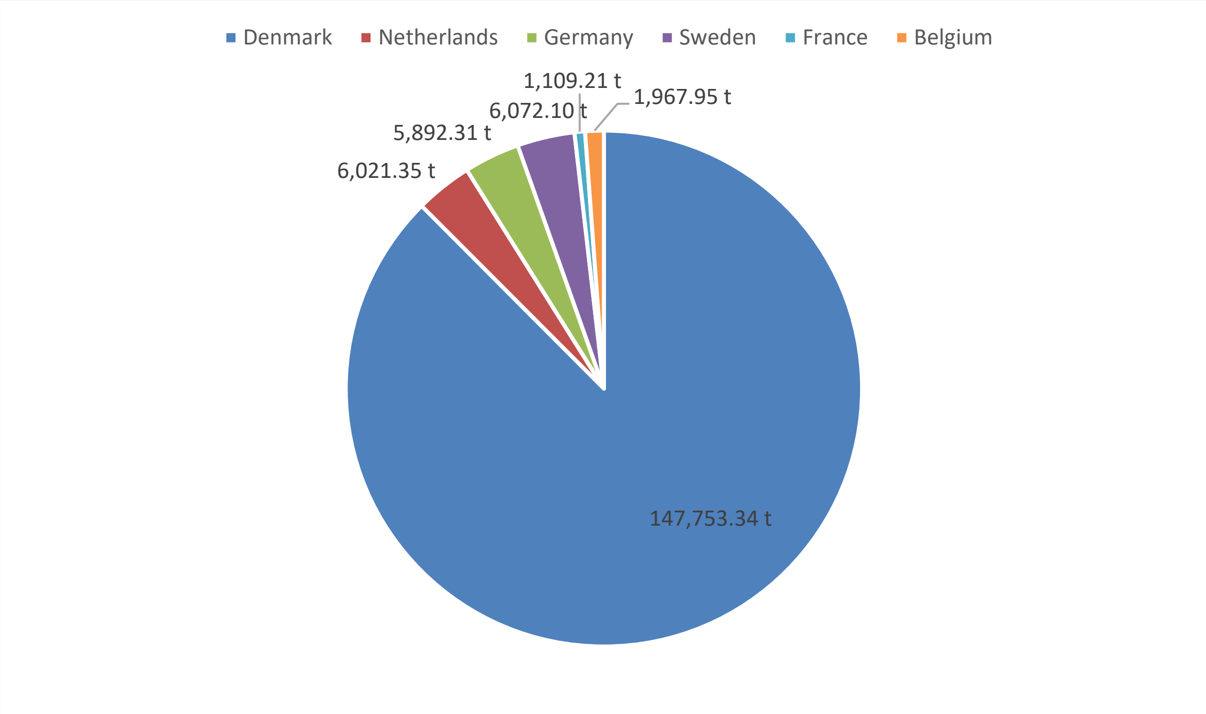


Figure 2.5.7: Sum of landings weight (tonnes) within ICES Rectangle 37F2, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

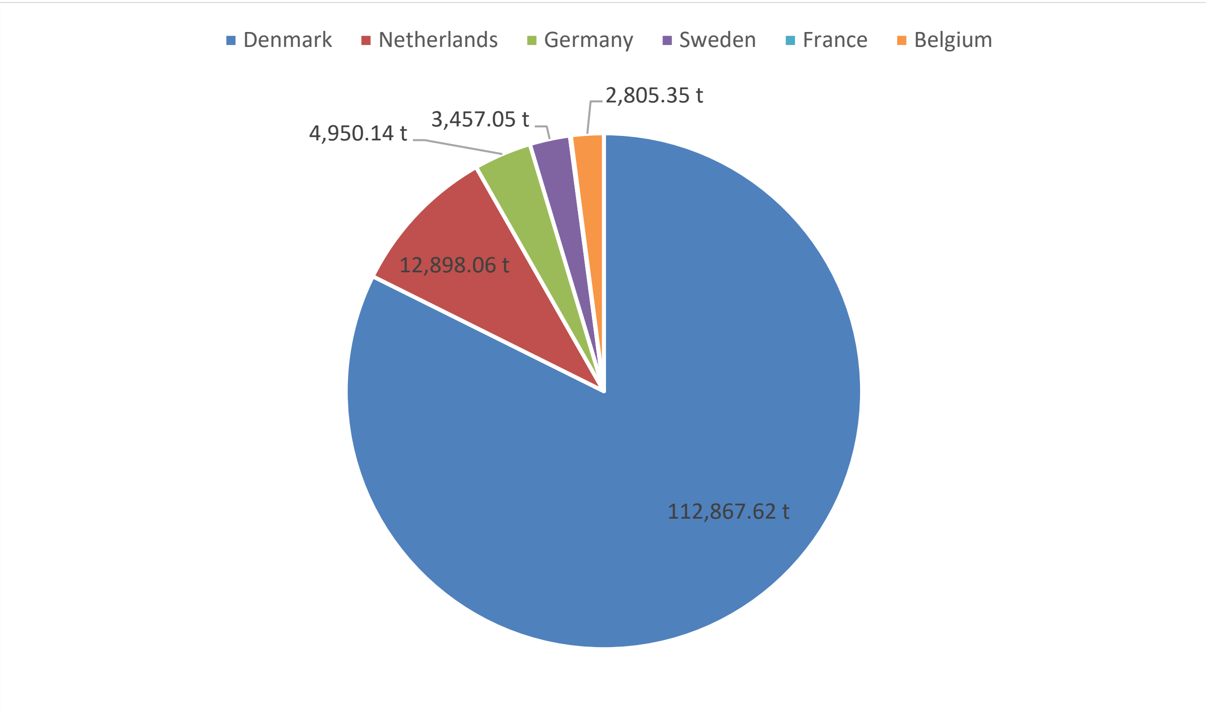


Figure 2.5.8: Sum of landings weight (tonnes) within ICES Rectangle 38F0, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

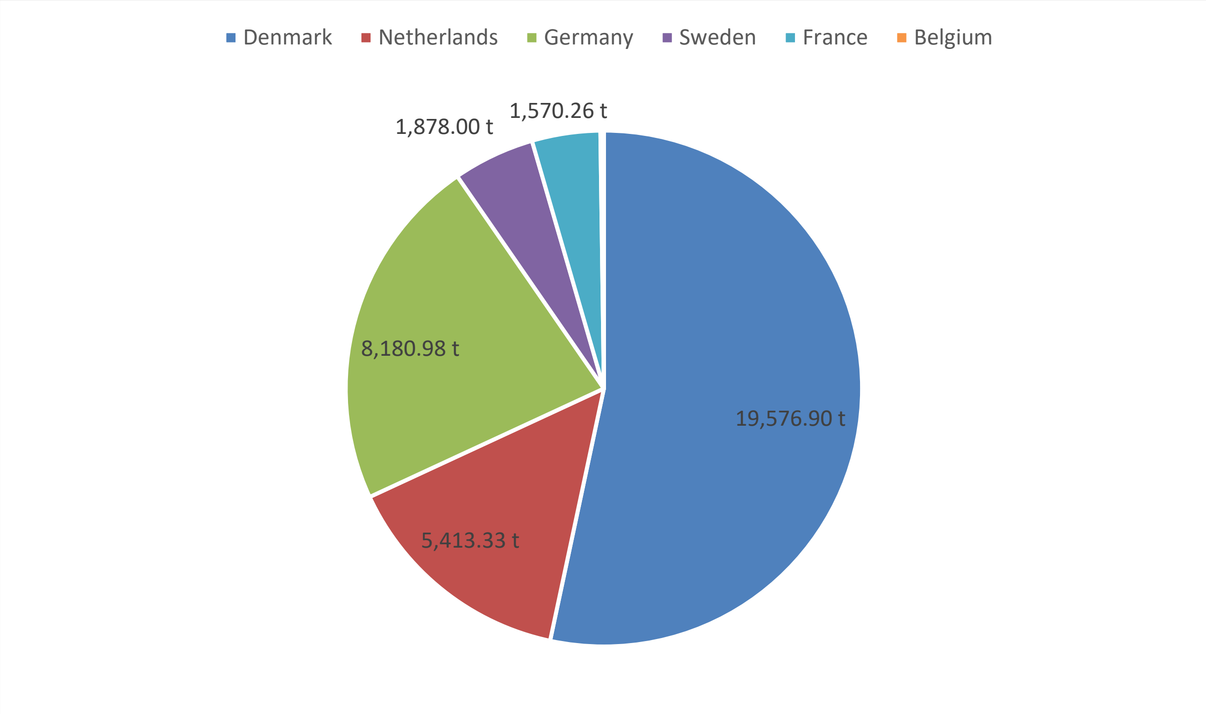


Figure 2.5.9: Sum of landings weight (tonnes) within ICES Rectangle 38F1, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)

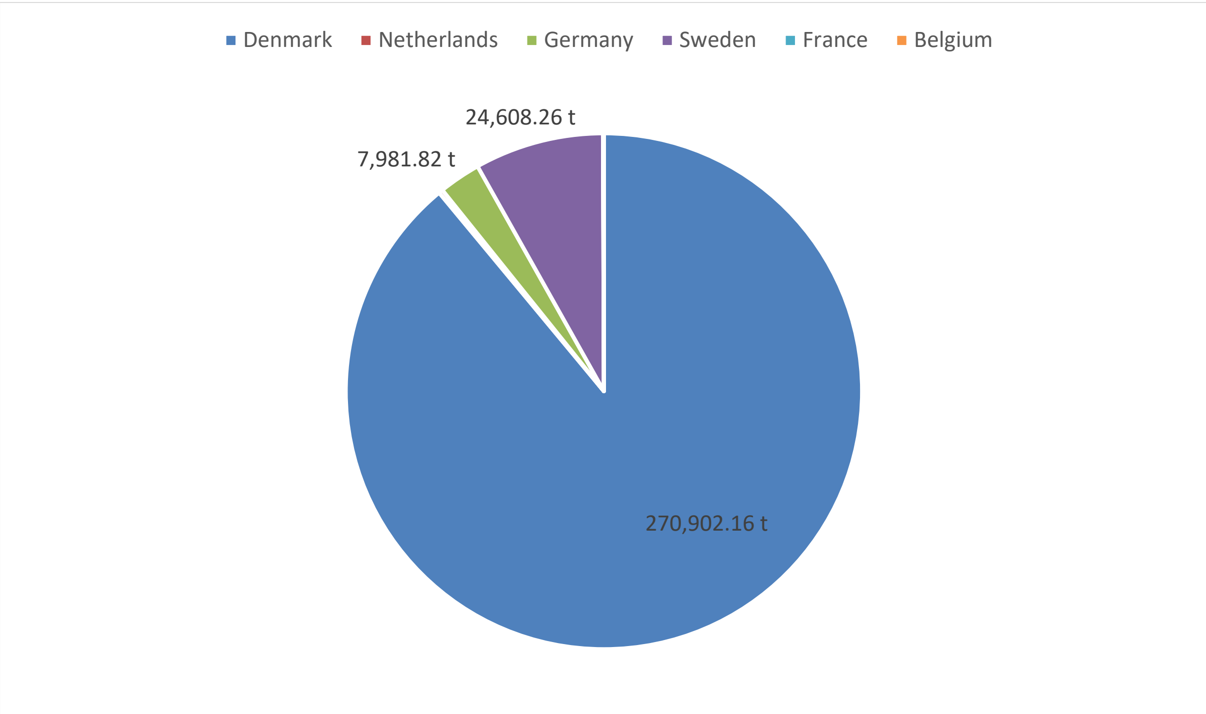
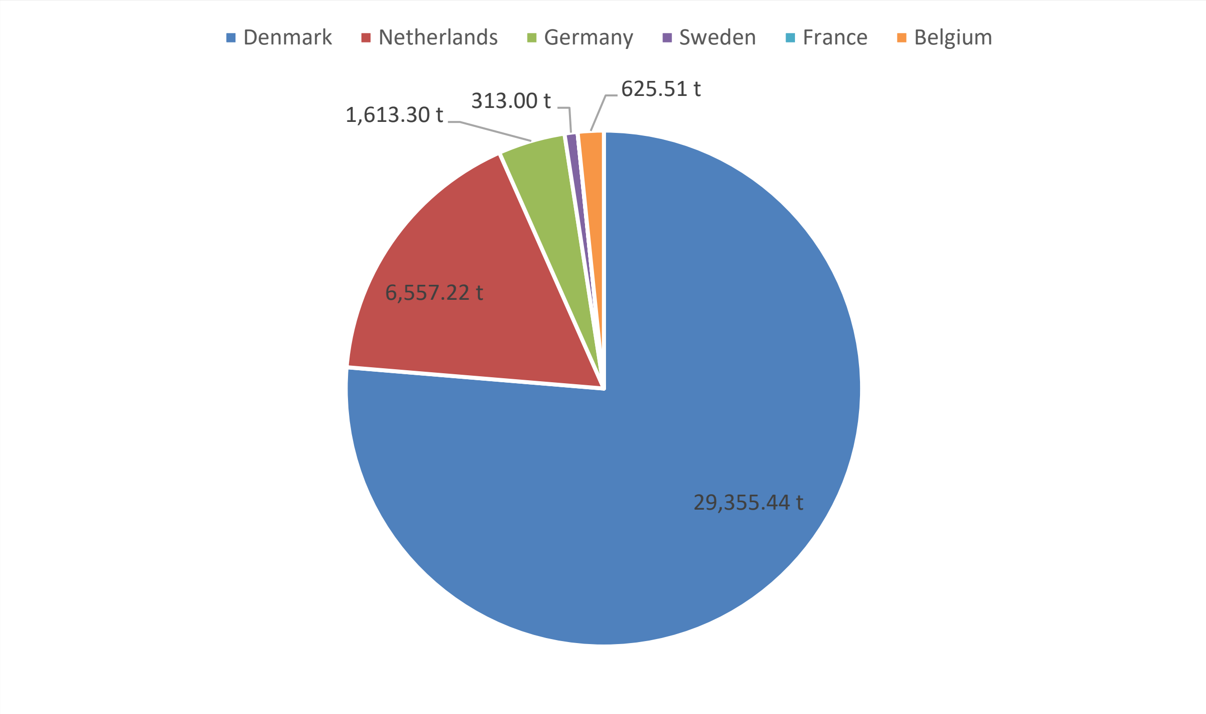


Figure 2.5.10: Sum of landings weight (tonnes) within ICES Rectangle 38F2, across 2006-2016 (non-UK vessels) (Source: STECF, 2017)



Data assessed in this study were categorised into three classes, dependent on the length of the fishing vessel (≤10 m, 10-15 m and >15 m). Data were interrogated to determine the size of vessels active in the region by each non-UK country. The largest proportion of vessels was from the >15 m class, of which Danish vessels made up the majority of landed weights across each ICES rectangle (Figure 2.5.11 and Figure 2.5.12). Vessels ≤10 m and 10-15 m were the least active across the Commercial Fisheries Study Area, as would be expected.

Figure 2.5.11: Sum of landed weight (tonnes) for non-UK vessels <15 m (2006-2016) (Source: STECF, 2017)

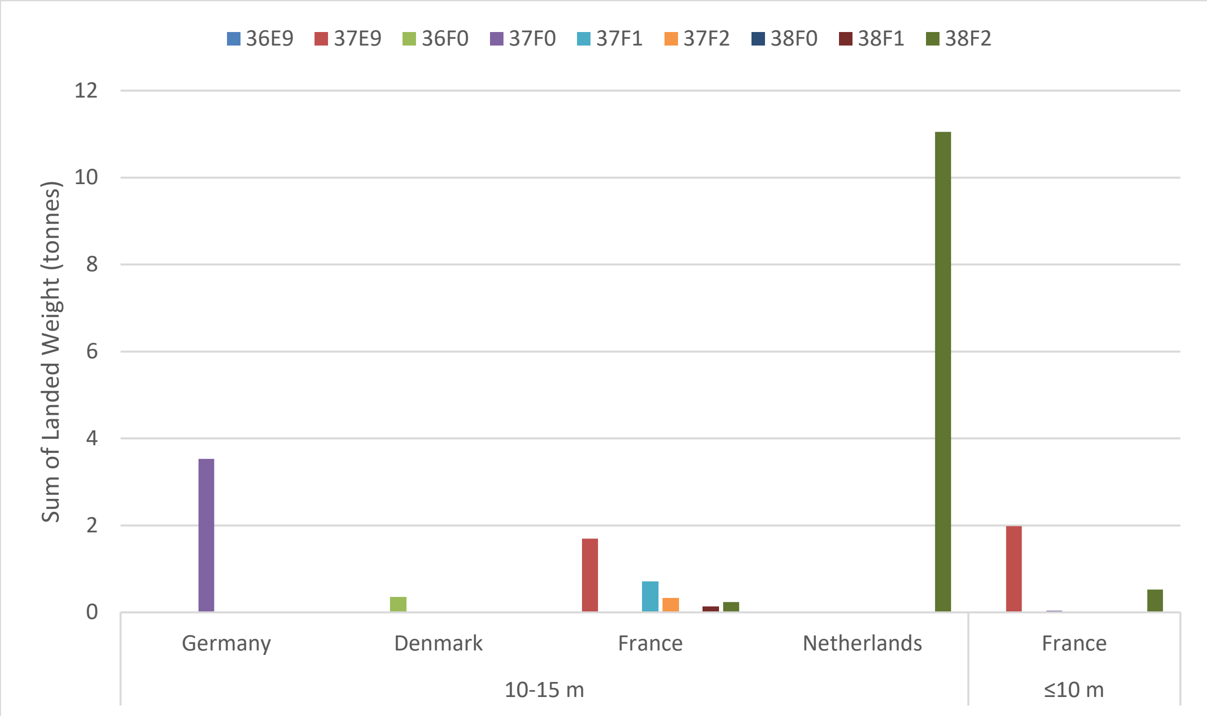
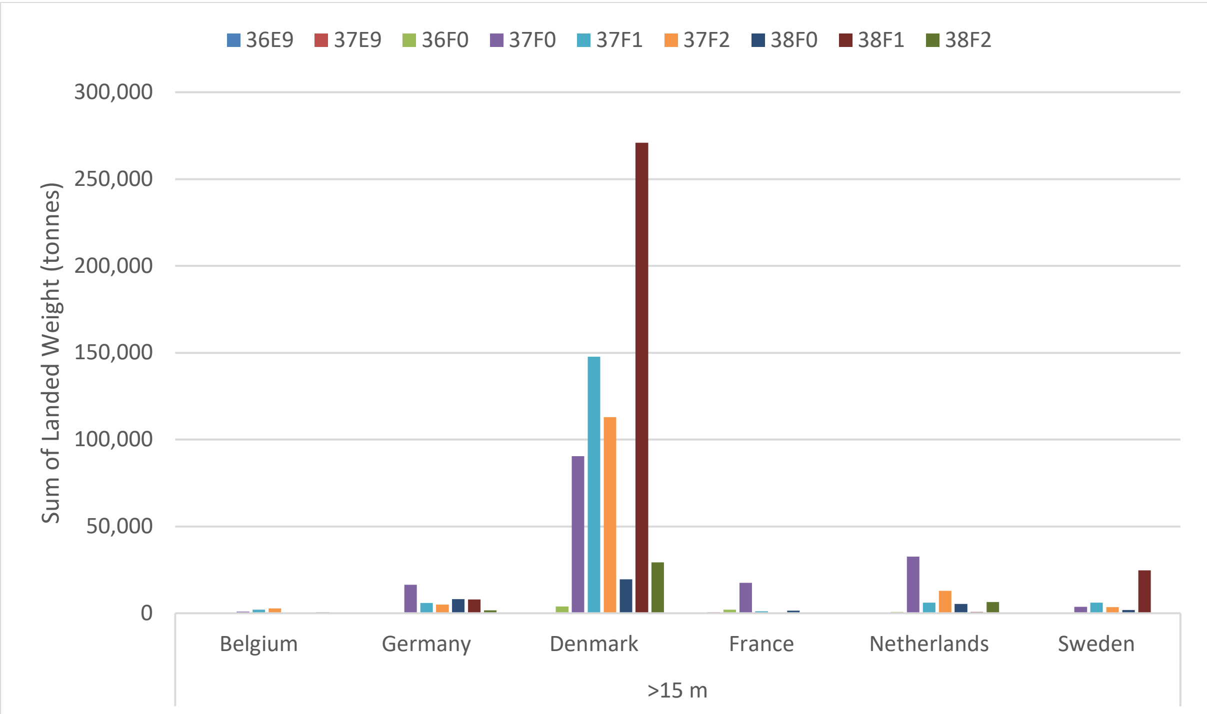


Figure 2.5.12: Sum of landed weight (tonnes) for non-UK vessels >15 m (2006-2016) (Source: STECF, 2017)



2.5.2. Landings by Gear Type

The STECF data interrogated in this study provide information on the fishing gear used by fleets operating in the region. The data showed that nine identifiable gear types were recorded as being used to target fish stocks, specifically:

- Beam trawls;
- Bottom trawls/seines;
- Gill nets;
- Otter trawls;
- Pelagic trawls;
- Demersal seines;
- Pelagic seines;
- Pots; and
- Trammel nets.

Of these nine types of gear, the majority of landings from the Commercial Fisheries Study Area were recorded as having been caught by vessels utilising otter trawls and pelagic trawls; this is in contrast with UK vessels, which predominately used pots and traps, see section 2.3.2. Further investigation regarding the species caught by non-UK vessels is presented in section 2.6.3. Notably, ICES rectangle 38F1 recorded the highest landed weight by otter trawling, and ICES rectangle 37F0 recorded the highest landed weight by pelagic trawling.

Figure 2.5.13 illustrates that Danish fleets used a wide variety of gear types in the Commercial Fisheries Study Area, with otter and pelagic trawls dominating the landings with weights of 525,333 and 131,615 tonnes respectively. ICES rectangles 37F0, 37F1, 37F2 and 38F1 were of particular importance for these fishing methods.

Dutch vessels utilised the most diverse array of gear types (Figure 2.5.14). Pelagic trawling dominated the total landings at 40,036 tonnes, of which 31,538 tonnes were landed from 37F0, whilst beam trawls and bottom trawls/seines were favoured across 37F1, 37F2 and 38F2.

Similarly, pelagic trawls accounted for the highest landed weights from the German fleet (28,464 tonnes), where ICES rectangle 37F0 again played an important role for landings (Figure 2.5.15). Otter trawls were also an important gear type utilised by the German fleet and accounted for 13,283 tonnes of the total landed weight, a notable amount of which was from 38F1 (5,770 tonnes).

Like the German fleet, Swedish vessels favoured otter trawling within ICES rectangle 38F1, which accounted for 60% of their total landed weights (Figure 2.5.16). Pelagic trawl and pelagic seine were also used by Swedish vessels within the Commercial Fisheries Study Area.

Figure 2.5.17 illustrates that the majority of landed weight by French vessels occurred within 37F0, by pelagic and bottom trawls/seines. Otter trawls, pots and trammel nets were also used by French vessels within the Commercial Fisheries Study Area.

The data indicate that Belgian vessels exclusively utilised beams trawls and bottom trawls/seines across all of the ICES rectangles (Figure 2.5.18). This would suggest that the Belgian fleet is targeting demersal species. Both Belgian and Dutch beam trawls are known to use wing-type beam trawl in the region, which is lighter than standard beam trawls (Barnfield *et al*., 2022). Beam trawls are known to catch a wide variety of bottom dwelling fish which would result in a varied catch containing flatfish, gadoids, and cartilaginous species.

Figure 2.5.13: Total landings (tonnes) from Danish vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)

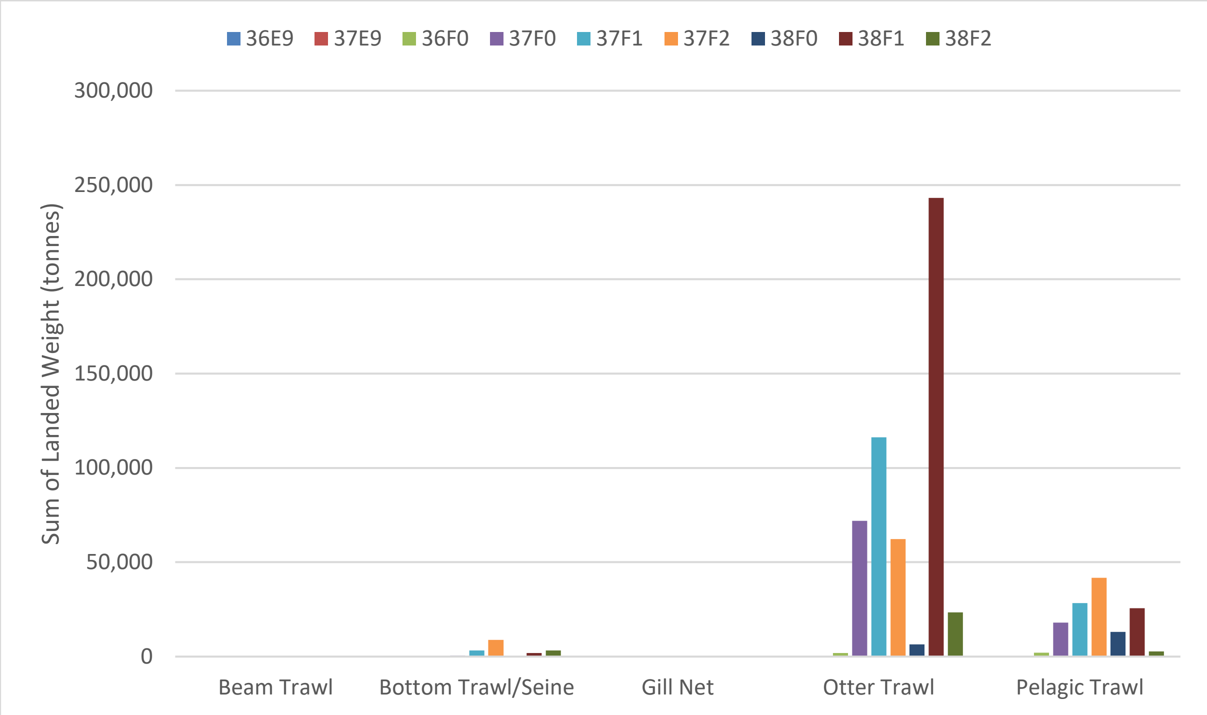


Figure 2.5.14: Total landings (tonnes) from Dutch vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)

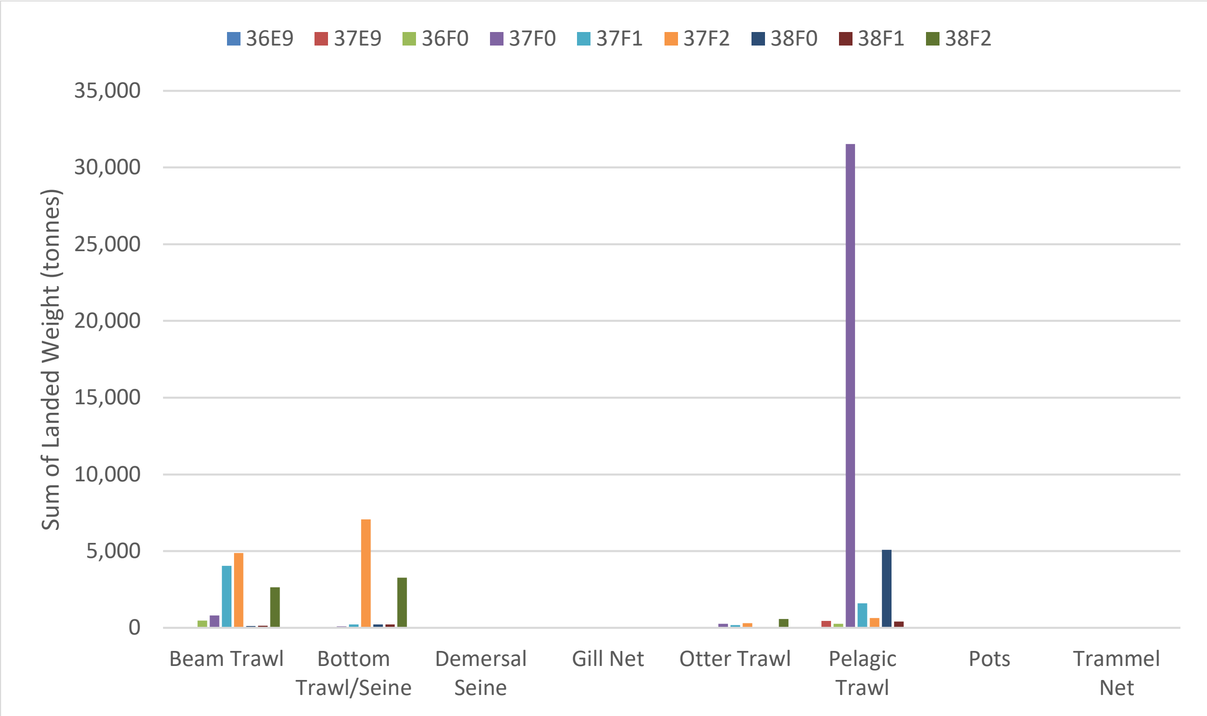


Figure 2.5.15: Total landings (tonnes) from German vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)

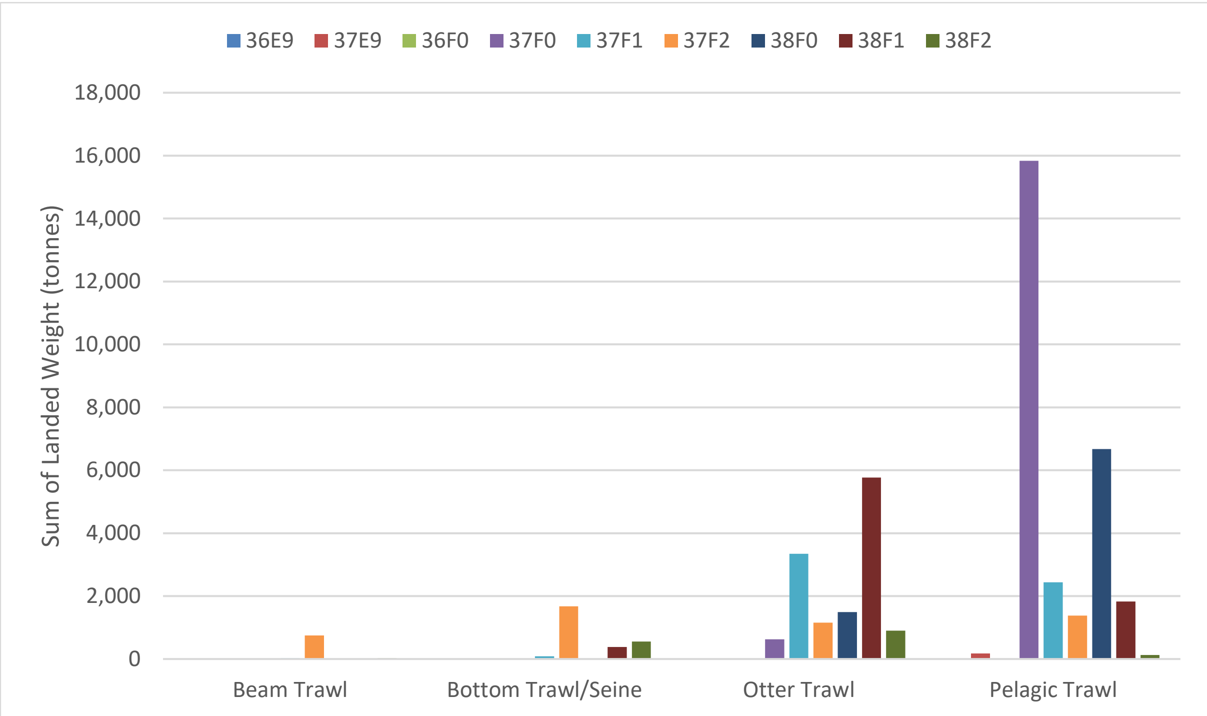


Figure 2.5.16: Total landings (tonnes) from Swedish vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)

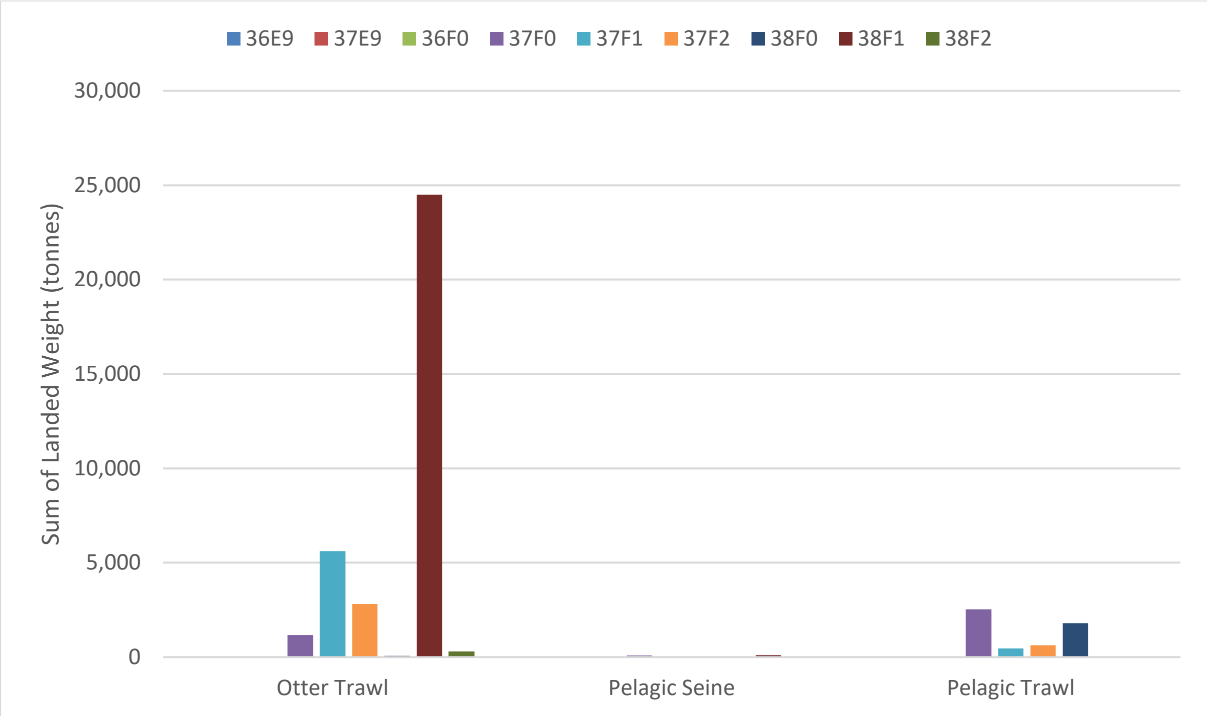


Figure 2.5.17: Total landings (tonnes) from French vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)

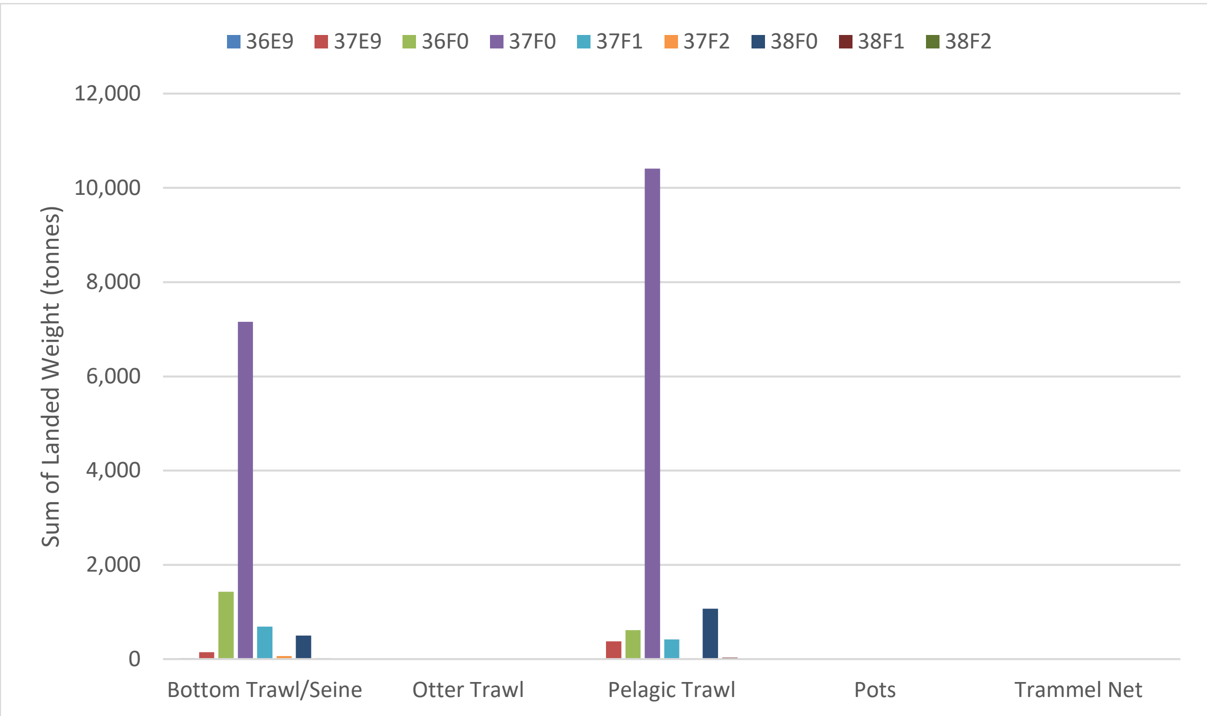
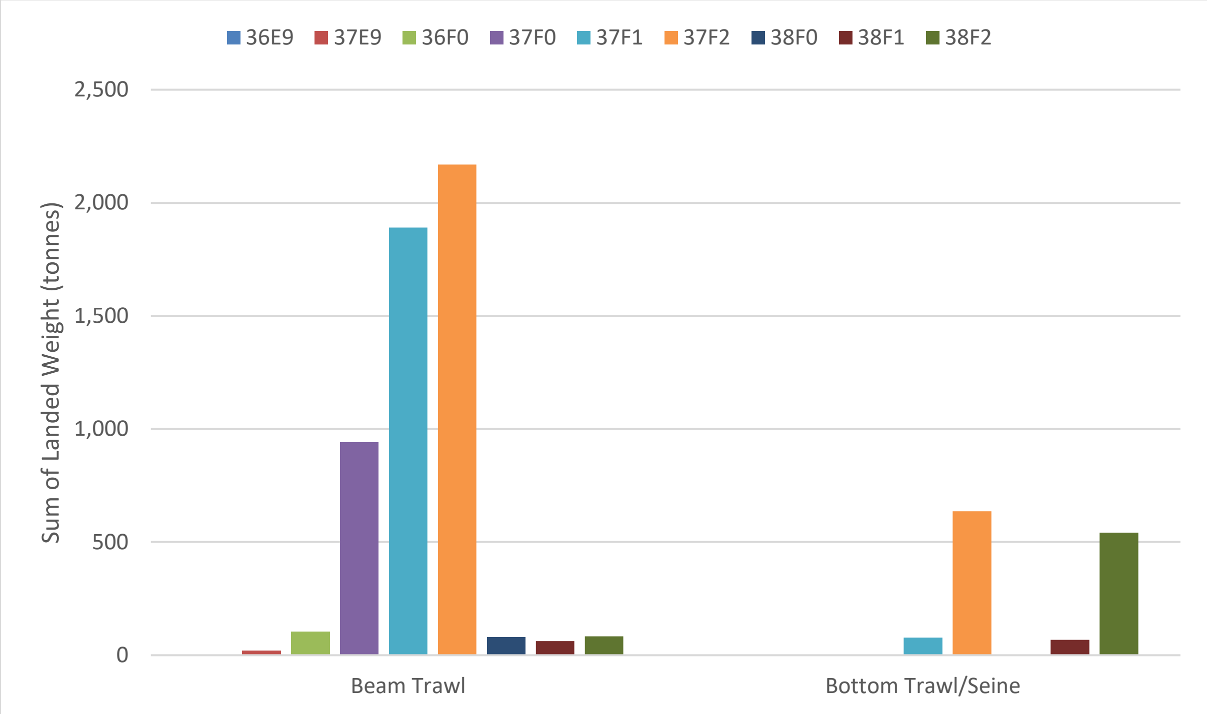


Figure 2.5.18: Total landings (tonnes) from Belgium vessels based on gear type in ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, across 2006-2016 (Source: STECF, 2017)



2.5.3. Landings Weight by Species

A total of 52 species were landed by Danish vessels during 2006 to 2016 (Figure 2.5.19). The top five species (sandeel, sprat, herring, plaice and whiting) constituted approximately 99% of the total Danish tonnage landed from the region between 2006 to 2016. Data from Danish vessels show that the fleet's main targets were demersal sandeel species from ICES rectangle 38F1.

A total of 55 species were landed by Dutch vessels during 2006 to 2016 (Figure 2.5.20). The top 15 species constituted approximately 99% of the total Dutch catch landed between 2006 to 2016. The top five species (herring, plaice, Dover sole, *Nephrops* and sandeel) constituted approximately 91% of the total Dutch tonnage landed from the region. Data from Dutch vessels show that the fleet's main targets were pelagic herring species, from ICES rectangle 37F0.

A total of 44 species were landed by German vessels during 2006 to 2016 (Figure 2.5.21). The top 15 species constituted approximately 99% of the total German catch landed between 2006 to 2016. The top five species (herring, sandeel, plaice, sprat and *Nephrops*) constituted approximately 98% of the total German tonnage landed. Data from German vessels show that the fleet's main targets were pelagic herring species, from ICES rectangles 37F0 and 38F2, and demersal sandeel species from 37F1 and 38F1.

Landings from Swedish vessels showed the least variety of species caught, with a total of 10 species landed during 2006 to 2016 (Figure 2.5.22Figure 2.5.20). The top three species (sandeel, herring and sprat) constituted approximately 99% of the total Swedish tonnage landed from the region. Data from Swedish vessels show that the fleet's main targets were demersal sandeel species from ICES rectangle 38F1.

Landings from French vessels showed the greatest variety, with a total of 85 species landed during 2006 to 2016 (Figure 2.5.23). The top 15 species constituted approximately 99% of the total French catch landed between 2006 to 2016. The top five species (herring, whiting, mackerel *Scomber scombrus*, haddock and cod) constituted approximately 97% of the total French tonnage landed from the region. Data from French vessels show that the fleet's main targets were primarily pelagic species from ICES rectangle 37F0, and demersal whiting species.

A total of 57 species were landed by Belgian vessels during 2006 to 2016 (Figure 2.5.24). The top 15 species constituted approximately 98% of the total Belgian catch landed between 2006 to 2016. The top five species (plaice, common sole, cod, *Nephrops* and lemon sole) constituted approximately 83% of the total Belgian tonnage landed from the region. Data from Belgian vessels show that the fleet's main targets were demersal plaice species from ICES rectangles 37F1 and 37F2.

Figure 2.5.19: Total landings (tonnes) from Danish vessels within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)

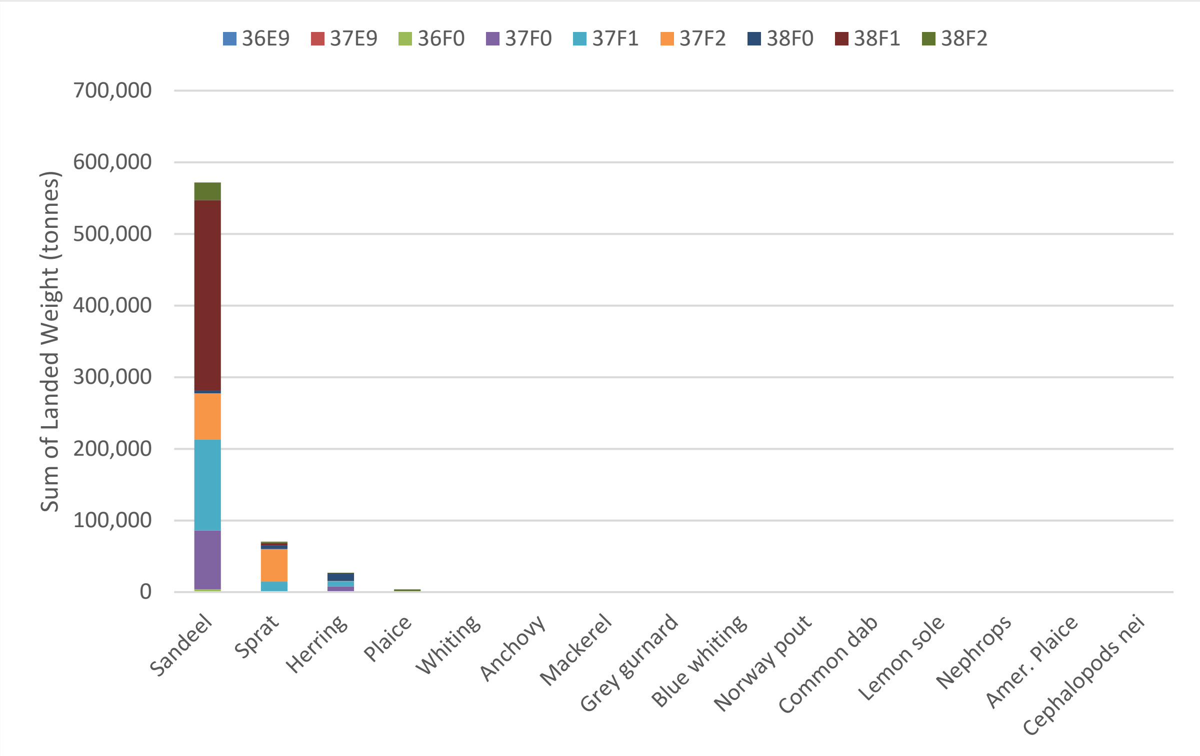


Figure 2.5.20: Total landings (tonnes) from Dutch vessels within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)

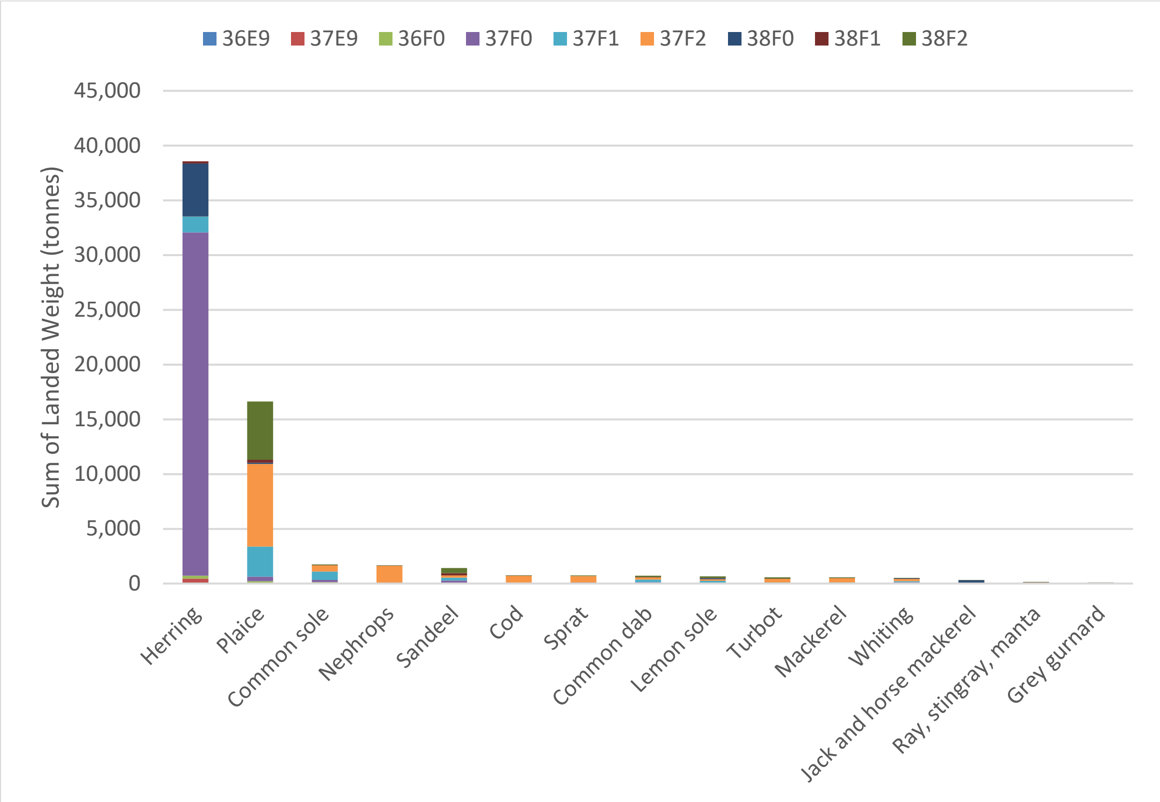


Figure 2.5.21: Total landings (tonnes) from German vessels within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)

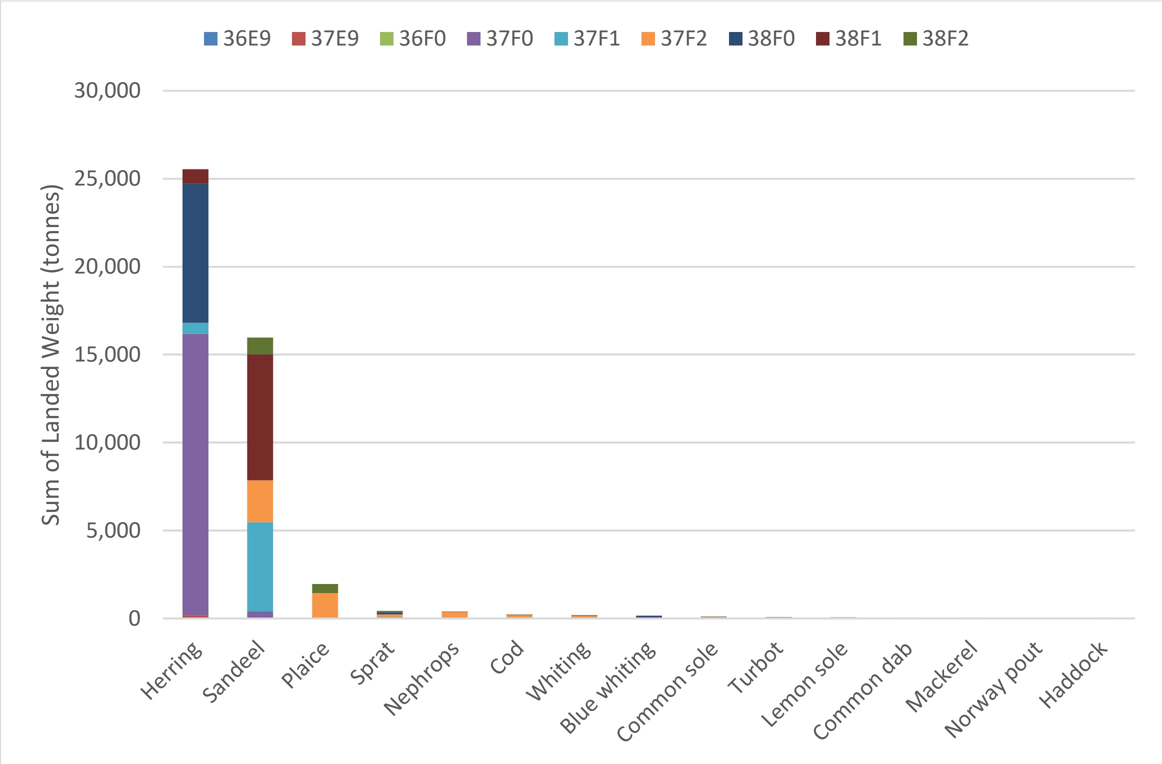


Figure 2.5.22: Total landings (tonnes) from Swedish vessels within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)

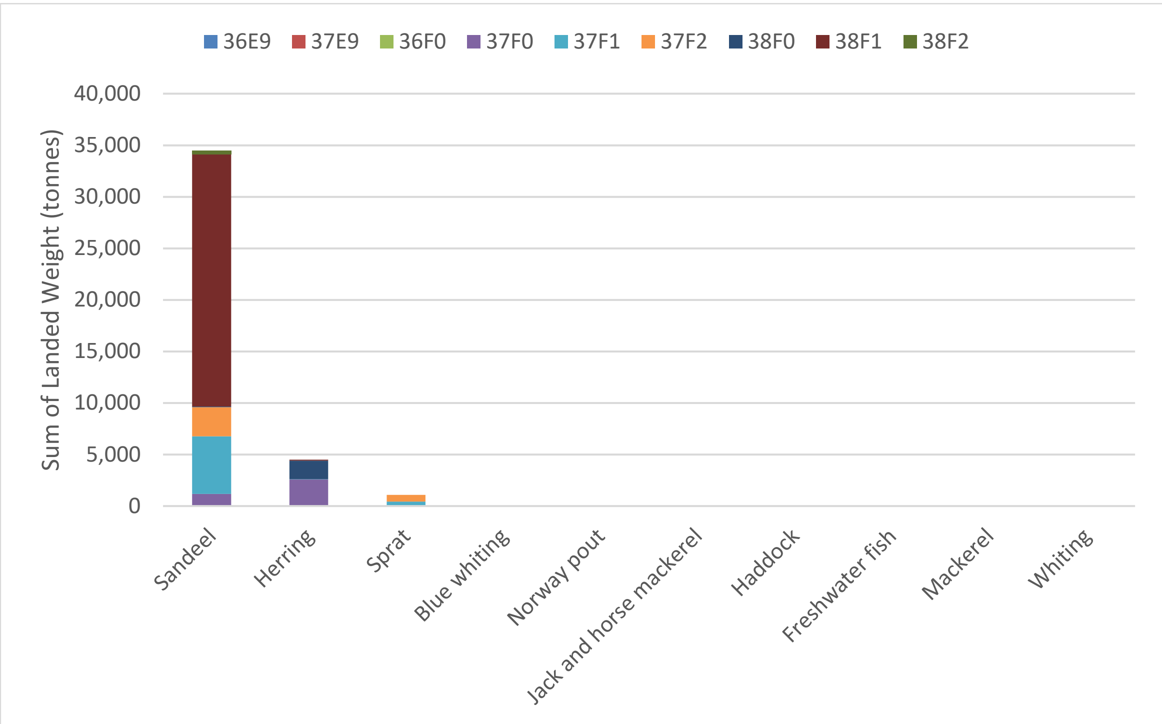


Figure 2.5.23: Total landings (tonnes) from French vessels within ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)

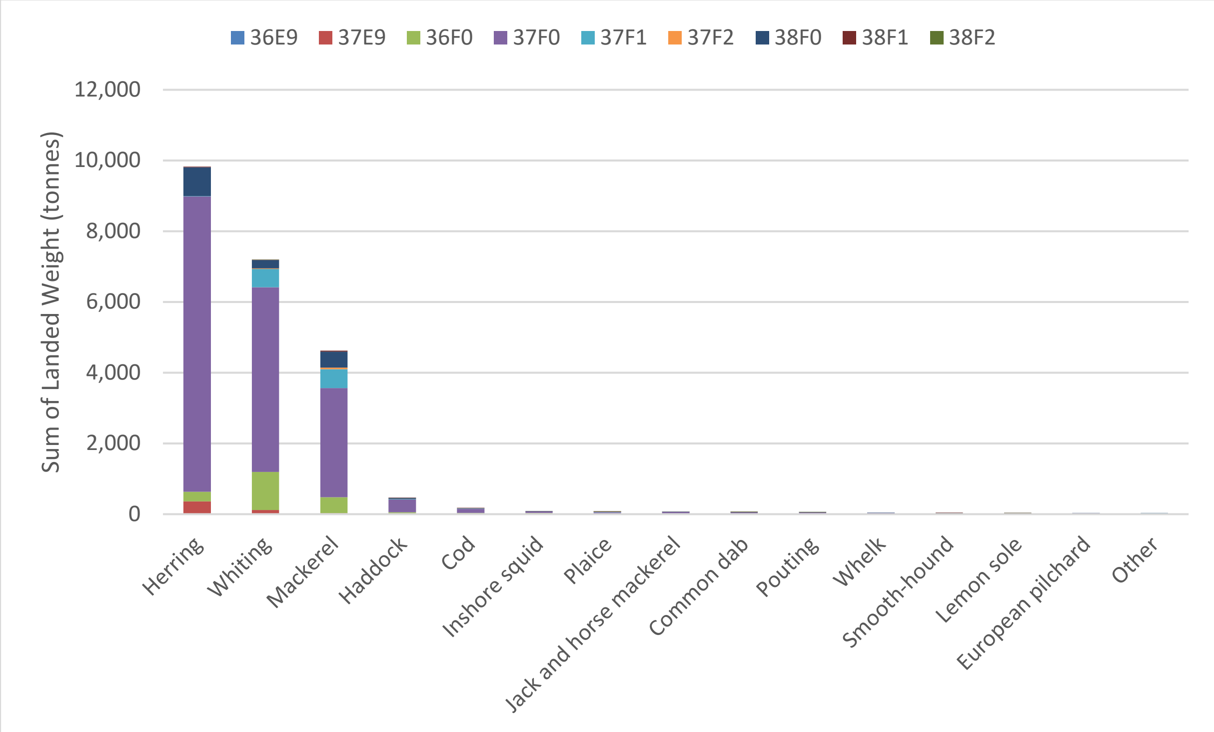
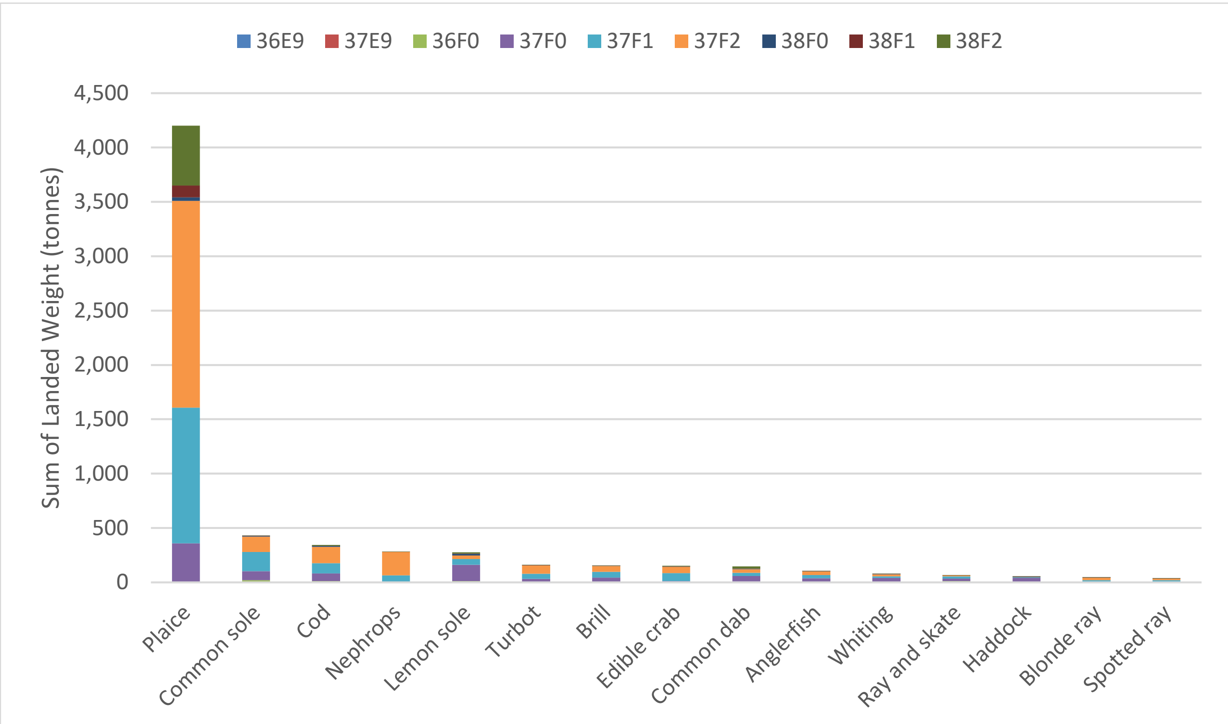


Figure 2.5.24: Total landings (tonnes) from Belgium vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2, displayed by species (Source: STECF, 2017)



2.5.4. Temporal Variation in Landings Weight

Between 2006 to 2016, landed weight caught by Danish vessels across the Commercial Fisheries Study Area gradually decreased, with a maximum of 122,410 tonnes in 2009, to a minimum of 5,055 tonnes in 2016 (Figure 2.5.25) This fishery is highly dependent on quotas set annually, which can vary widely. The array sits within North Sea Sandeel management area 1r.

Between 2006 to 2016, landed weight caught by Dutch vessels across the Commercial Fisheries Study Area was highest for the years 2013 to 2016. Landings varied from a minimum of 1,526 tonnes in 2008, to a maximum of 22,888 tonnes in 2013 (Figure 2.5.26).

Between 2006 to 2016, landed weight caught by German vessels across the Commercial Fisheries Study Area fluctuated, from a minimum of 926 tonnes in 2015, to a maximum of 12,300 tonnes in 2013 (Figure 2.5.27). The year 2006 also recorded notably high landed weights, at 10,884 tonnes.

Between 2006 to 2016, landed weight caught by Swedish vessels across the Commercial Fisheries Study Area varied from a minimum of 387 tonnes in 2016, to a maximum of 12,010 tonnes in 2006 (Figure 2.5.28). Landings from ICES rectangle 38F1 made significant contributions to the total annual landed weight.

Between 2006 to 2016, landed weight caught by French vessels across the Commercial Fisheries Study Area varied from a minimum of 1,053 tonnes in 2009, to a maximum of 3,799 tonnes in 2014 (Figure 2.5.29). Total landed weights remained relatively consistent from 2011 to 2016, with landings from ICES rectangle 37F0 making the most significant annual contributions.

Between 2006 to 2016, landed weight caught by Belgian vessels across the Commercial Fisheries Study Area varied from a minimum of 400 tonnes in 2006, to a maximum of 842 tonnes in 2011 (Figure 2.5.30). Total landed weights were relatively consistent throughout the monitoring period, with the majority of landed weights occurring from ICES rectangles 37F1 and 37F2.

Figure 2.5.25: Total landings (tonnes) from Danish vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2

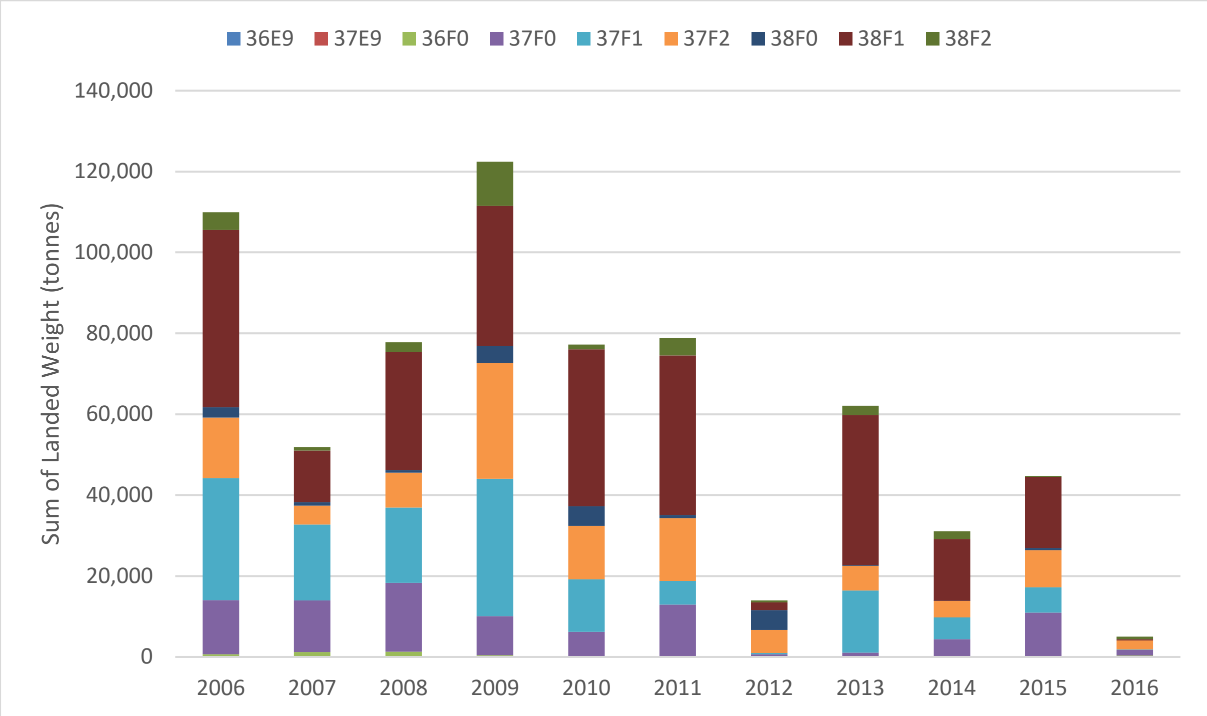


Figure 2.5.26: Total landings (tonnes) from Dutch vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2

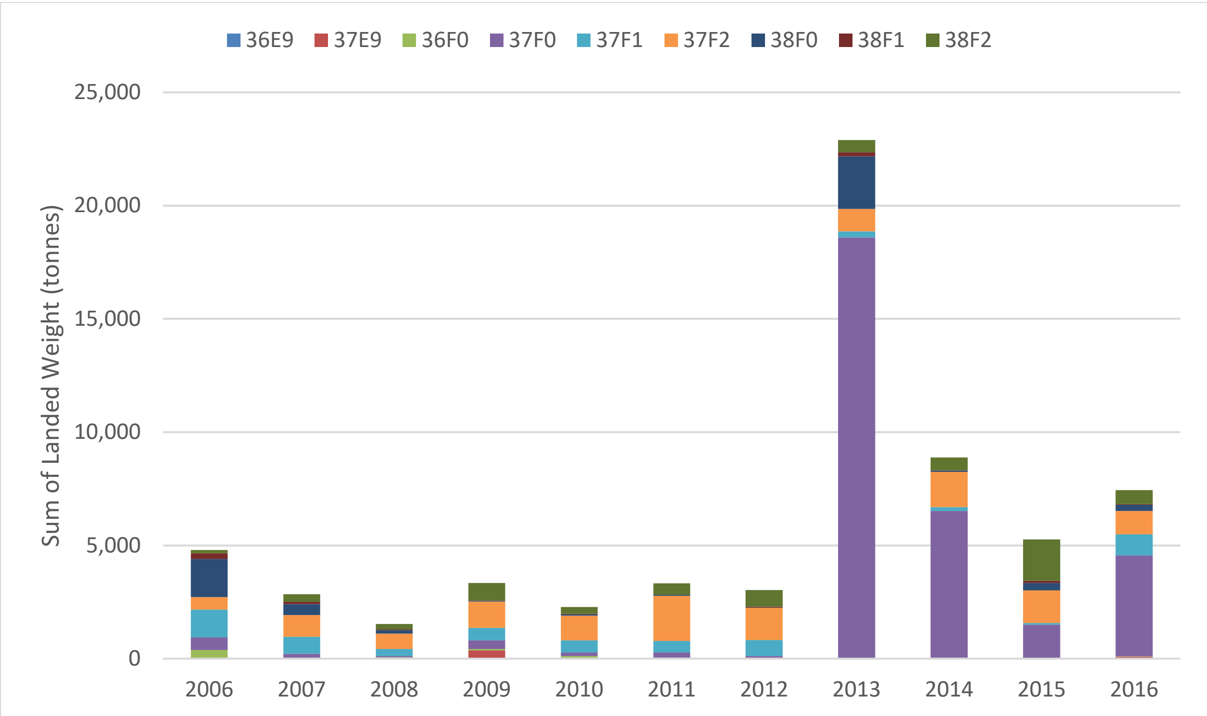


Figure 2.5.27: Total landings (tonnes) from German vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2

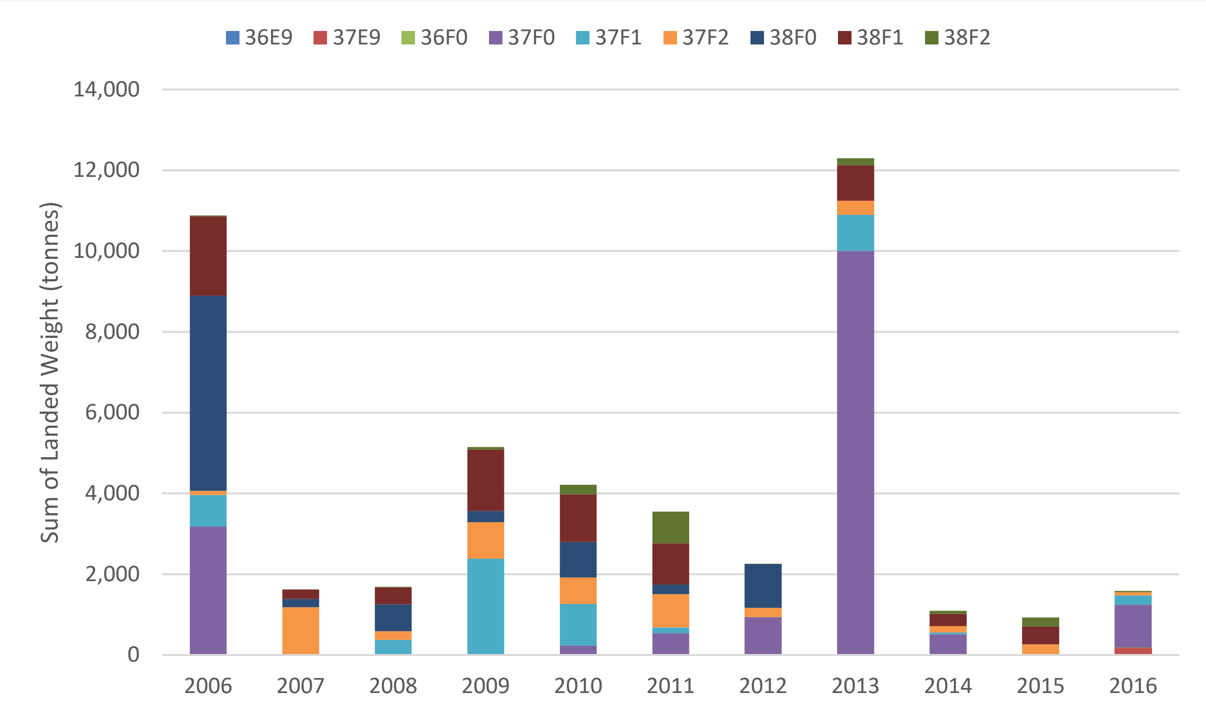


Figure 2.5.28: Total landings (tonnes) from Swedish vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2

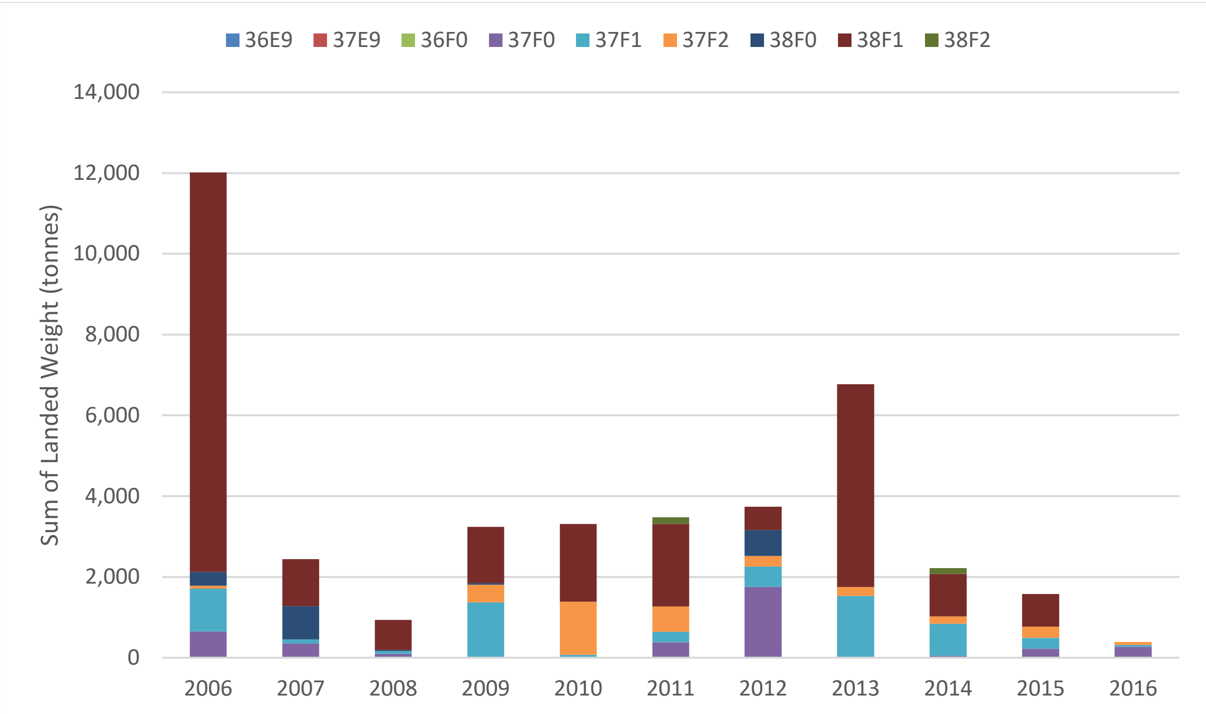


Figure 2.5.29: Total landings (tonnes) from French vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2

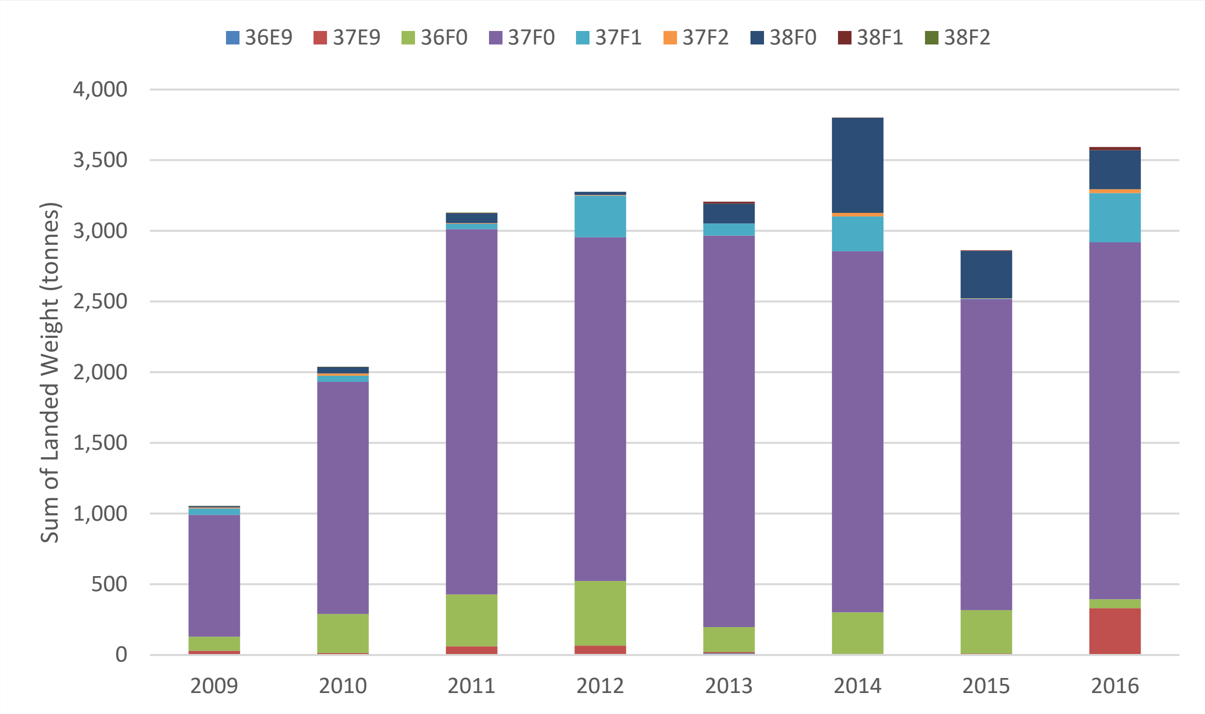
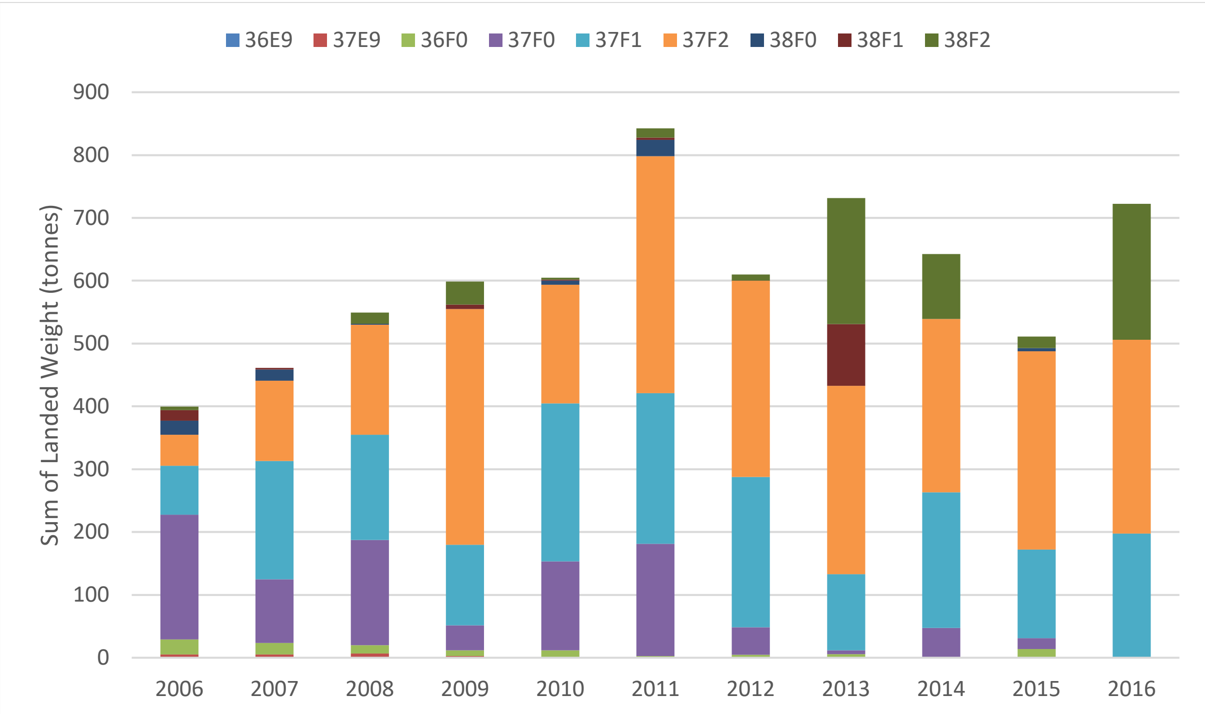


Figure 2.5.30: Total landings (tonnes) from Belgium vessels within ICES Rectangle 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2



The STECF species data were analysed further, allowing a closer look at the temporal variation of the top 15 most commercially important species for non-UK vessels. Overall, sandeel, herring and sprat were the dominant species caught, in terms of landed weight across all years and ICES rectangles

(Figure 2.5.31). Sandeel appeared to be of particular importance throughout the study period, with over 600,000 tonnes landed. Landed weight of herring was largest in 2013 at 34,112 tonnes.

Figure 2.5.31: Annual trends in top 15 species by total landings (weight) from all non-UK vessels (2006-2016) for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (Source: STECF, 2017)

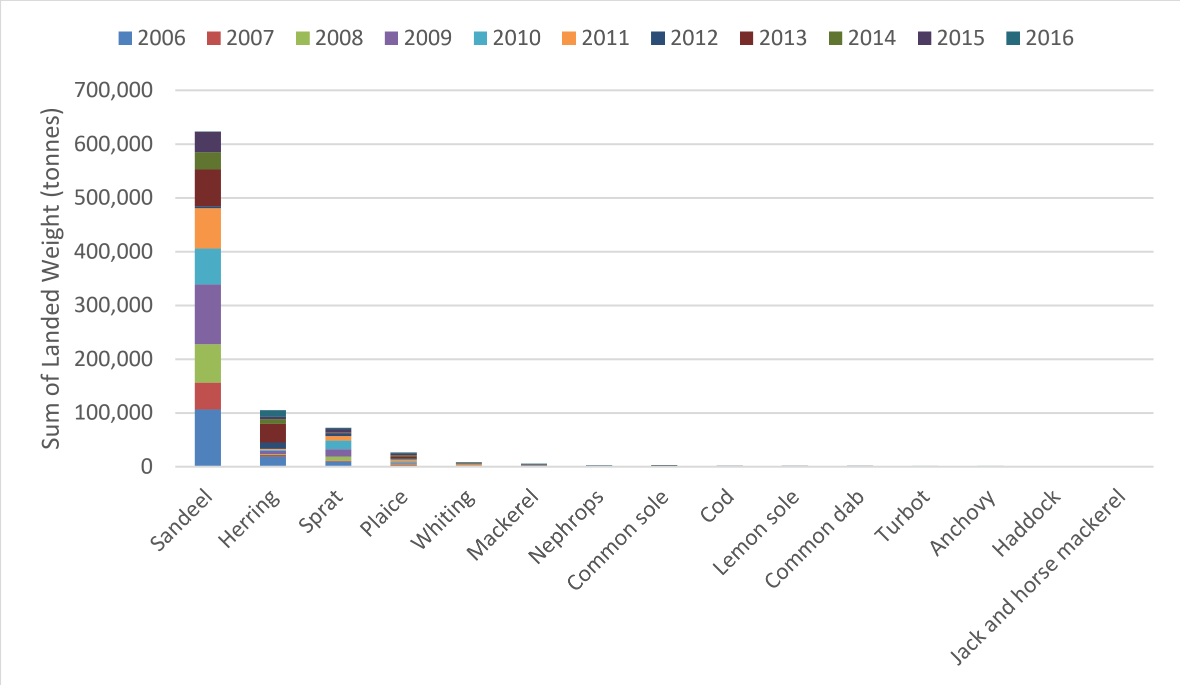
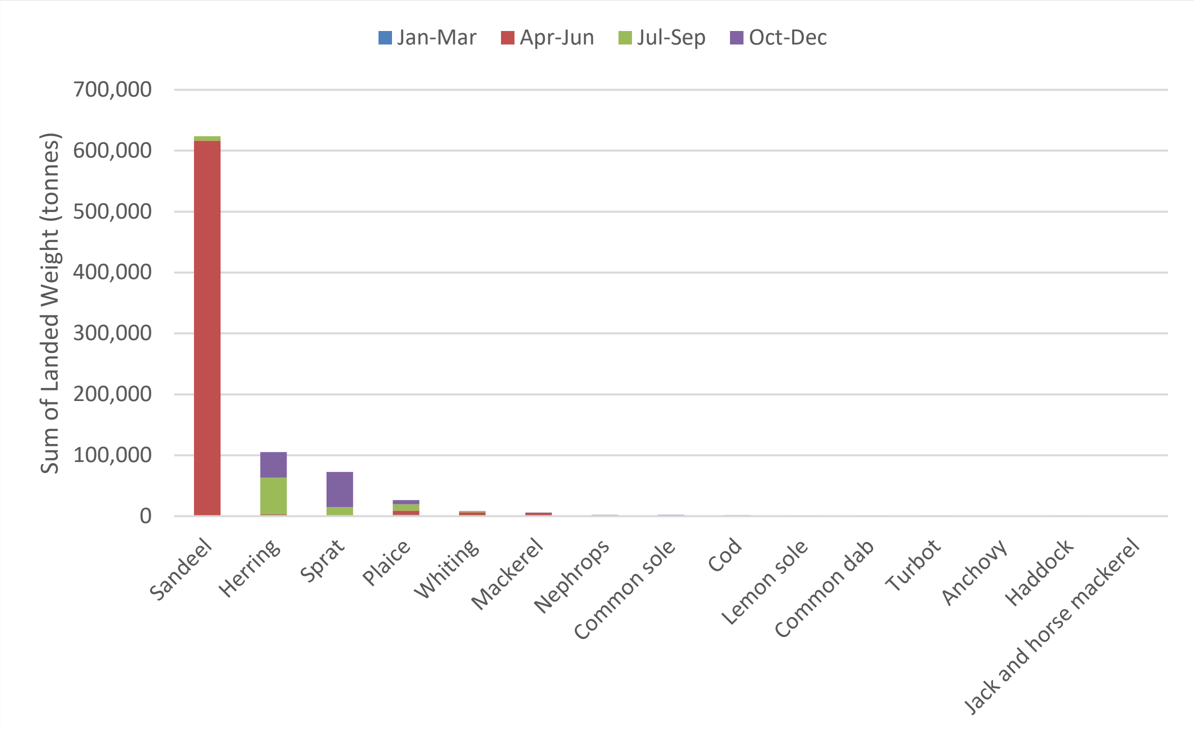


Figure 2.5.32 shows the seasonality for the top 15 species by landed weight from non-UK vessels across the region. The landings data illustrate that April-June was the most productive period of the year in terms of landings of sandeel. January-March was the least productive period, as minimal landed weights of all species were recorded during this time (Figure 2.5.32). Herring landings were most common throughout July-December, whilst sprat showed a seasonal peak during October-December.

Figure 2.5.32: Seasonal trends in top 15 species by total landings (weight) from non-UK vessels (2006-2016) for ICES Rectangles 36E9, 36F0, 37E9, 37F0, 37F1, 37F2, 38F0, 38F1 and 38F2 (Source: STECF, 2017)



2.6. Vessel Monitoring Systems and Landings Data Combined

Since 2000, all EU fishing vessels ≥ 24 m in length have been required, by European law, to indicate their position once every two hours via the Vessel Monitoring System (VMS). The requirement for VMS has subsequently been amended several times to include increasingly smaller vessels (2004: fishing vessels ≥ 18 m, 2005: fishing vessels ≥ 15 m). Since 2012, all EU vessels ≥ 12 m in length have been required to operate VMS. To ensure the activity of smaller vessels is captured, data from Cefas have been analysed (section 2.7), in addition to site-specific surveys (section 3) and information from fisheries stakeholders (section 3.3).

Data that represent UK vessels were collated by the MMO (MMO 2021a); this dataset only captures data for vessels ≥ 15 m. For this assessment, data have been analysed to be as consistent as possible with other data used throughout this report, and the most recent available dataset was used (2009-2020). More recent data have not been released by the MMO, to date. The MMO data can be split by ICES rectangle and sub-rectangle. Data have been categorised into aggregated gear groups, and positional data have been extracted from GPS-derived VMS data. Effort was provided in kilowatt hour (kWh), which has been calculated by multiplying the time associated with each VMS report (in hours), by the engine power of the vessel concerned at the time of the activity. Also included in the GIS data layers are the quantity (tonnes) of live weight of fish landed with gear type, and value (sterling).

Data that represent vessels of all nationalities were collated by ICES, as part of the OSPAR special request (ICES, 2021), to produce updated spatial data layers on fishing intensity/pressure within

Regions II and III of the OSPAR maritime area (ICES, 2021). It must be noted that the aim of the data request was to identify pressure by gear type for surface and sub-surface abrasion, so data were only collected from mobile bottom contacting gear types. ICES collated VMS and logbook data from ≥ 12 m vessels 2012 to 2017. It is noted that VMS data from certain countries were not supplied, introducing a bias in pressure of areas fished by those countries, however the countries identified in section 2.5.1 as active in the region all submitted data.

2.6.1. UK Vessels (MMO Data)

Figure 2.6.1 and Figure 2.6.3 illustrate annual plots of total hours fished by UK vessels ≥ 15 m, across the region, using both passive (also referred to as static) and mobile gears between 2009-2020, split by ICES Rectangle (MMO, 2021a). Figure 2.6.2 and Figure 2.6.4 illustrate annual plots of value of landings from UK vessels ≥ 15 m across the region using passive and mobile gears, respectively, between 2009-2020, split by ICES Rectangles (MMO, 2021a).

Use of static gear by UK vessels ≥ 15 m was generally located southwest of the DBS array area during 2009-2020 (Figure 2.6.1 and Figure 2.6.2), however, static gear activity covered a progressively greater geographical area across 2009-2020. Static gear activity overlapped with the Offshore Export Cable Corridor during most years and overlapped with DBS West during 2019 and 2020. Fishing intensity also increased throughout the study period, which is partly due to increases in vessel sizes; for example, during 2009-2012 the highest total hours fished (≥15 m UK vessels) by passive gears per ICES subrectangle was in the range of 2,400-4,800 hours, whereas during 2020 there were ICES subrectangles within 36F0 where the total hours was over 11,000 hours. The majority of fishing hours were spent in ICES rectangles 36F0 and 36F1, which do not overlap with the DBS Array Areas or Offshore Export Cable Corridor. Consultation feedback has indicated that the static gear activity, observed in recent years within the DBS Array Areas, is solely due to potting, predominantly targeting shellfish. It is likely that there is an under-representation of static gear activity, particularly in the inshore areas where many vessels <15 m in length tend to fish, as the VMS data do not capture vessels in this length class. To supplement this dataset, data on inshore fishing from Cefas are presented in section 2.7, and information from site specific surveys and consultation is presented in section 3.

Use of mobile gear by UK vessels ≥ 15 m was generally focused southeast of the DBS Array Areas, and within inshore areas (Figure 2.6.3 and Figure 2.6.4). In contrast to static gear activity, the spatial extent of mobile gear activity generally decreased throughout 2009-2020, however intensity of mobile gear activity appeared to increase within the 12 nm of the Commercial Fisheries Study Area over the time period. For example, from 2014 onwards, there were discrete areas of mobile fishing where the total hours fished (≥15 m UK vessels) per ICES subrectangle was greater than 11,000 hours and up to approximately 25,600 hours. Mobile gear activity overlapped with the Offshore Export Cable Corridor across all years, particularly in the area around the 12 nm. Generally, there was no mobile gear activity by UK vessels ≥ 15 m within the middle section of the Offshore Export Cable Corridor; there was a low level (0-600 hours (≥15 m UK vessels) per ICES rectangle) of mobile gear effort within the offshore parts of the Offshore Export Cable Corridor, particularly within ICES rectangle 37F1. Figure 2.6.3 and Figure 2.6.4 indicate that, generally, only the eastern half of the DBS West array area was fished by mobile gear vessels, but at relatively low levels (generally 0-600 hours), whereas the DBS East array area was fished at moderate levels by mobile gear vessels.

Figure 2.6.1: Total hours fished for passive gears (all UK vessels ≥15 m) 2009-2020 (Source: MMO, 2021a)

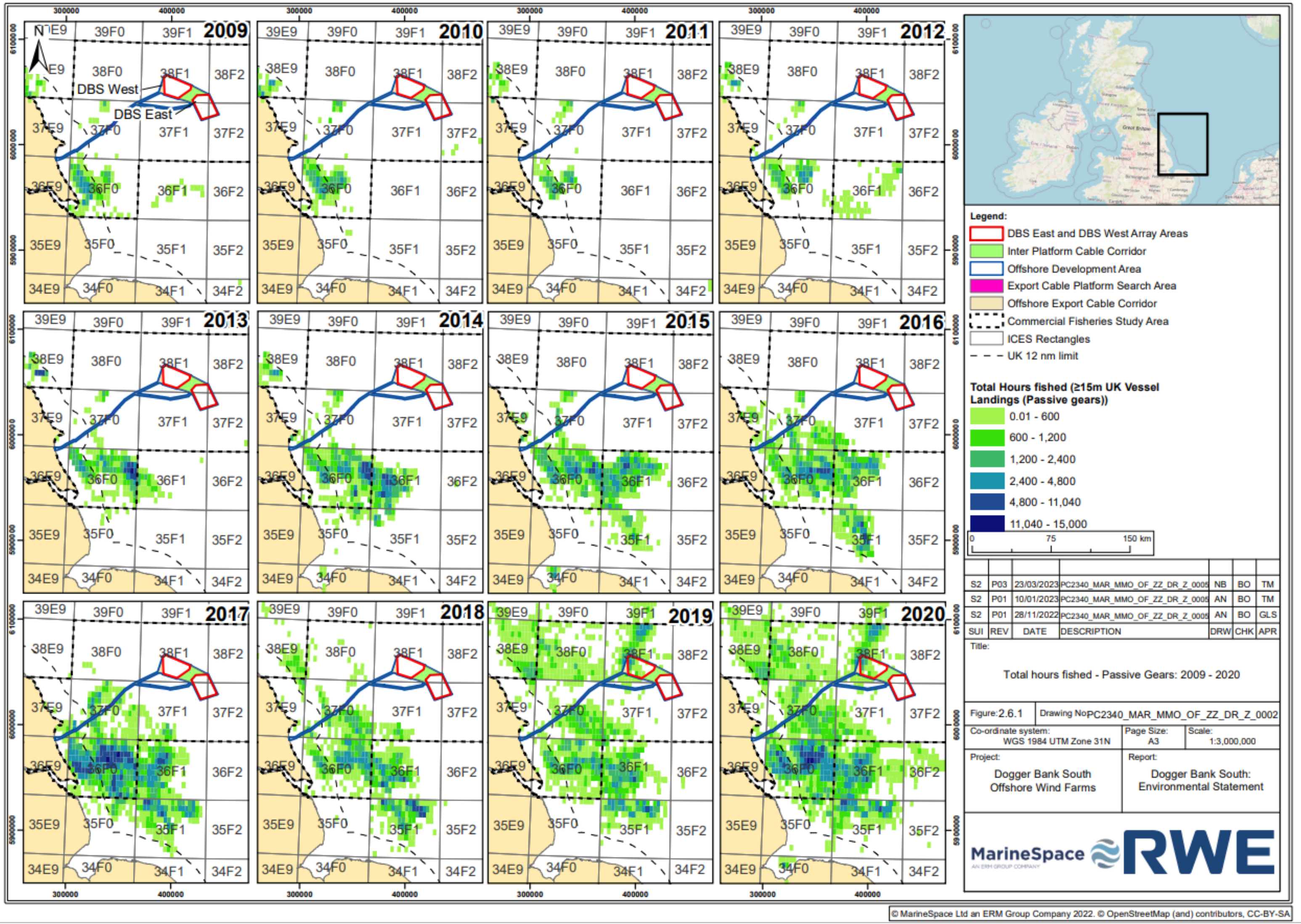


Figure 2.6.2: Annual value of landings for all passive gears (all UK vessels ≥15 m) 2009-2020 (Source: MMO, 2021a)

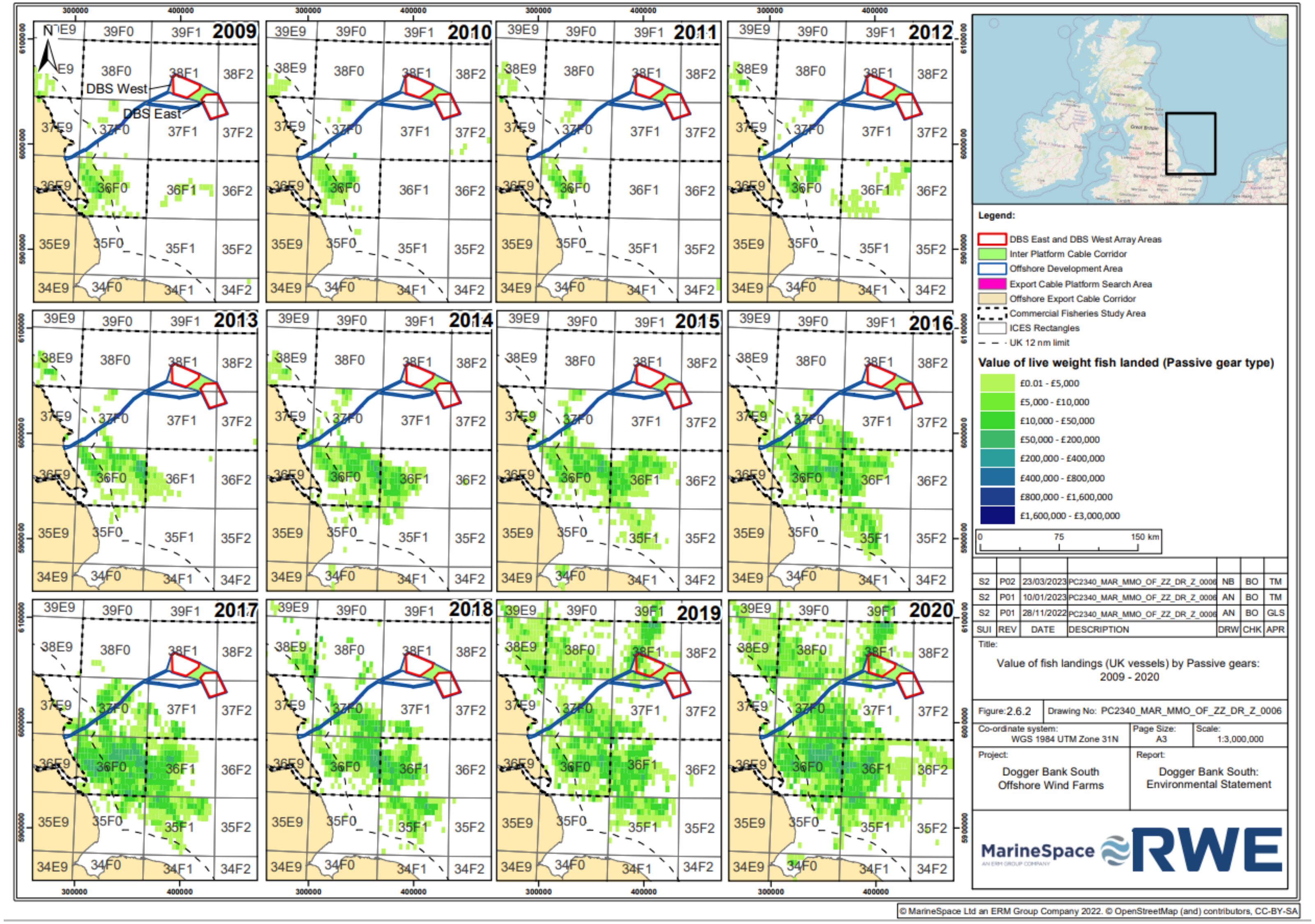


Figure 2.6.3: Total hours fished for mobile gears (all UK vessels ≥15 m) 2009-2020 (Source: MMO, 2021a)

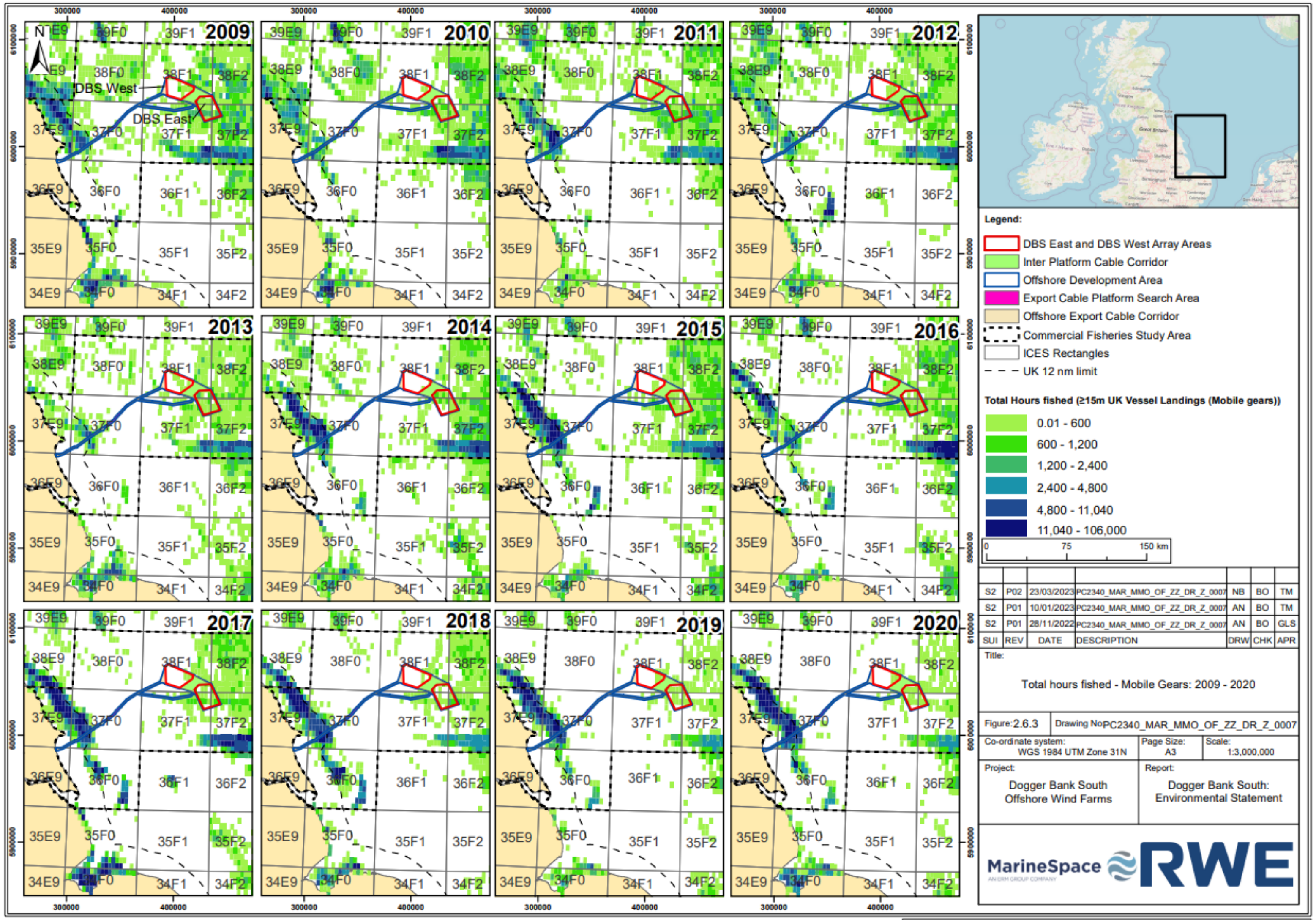
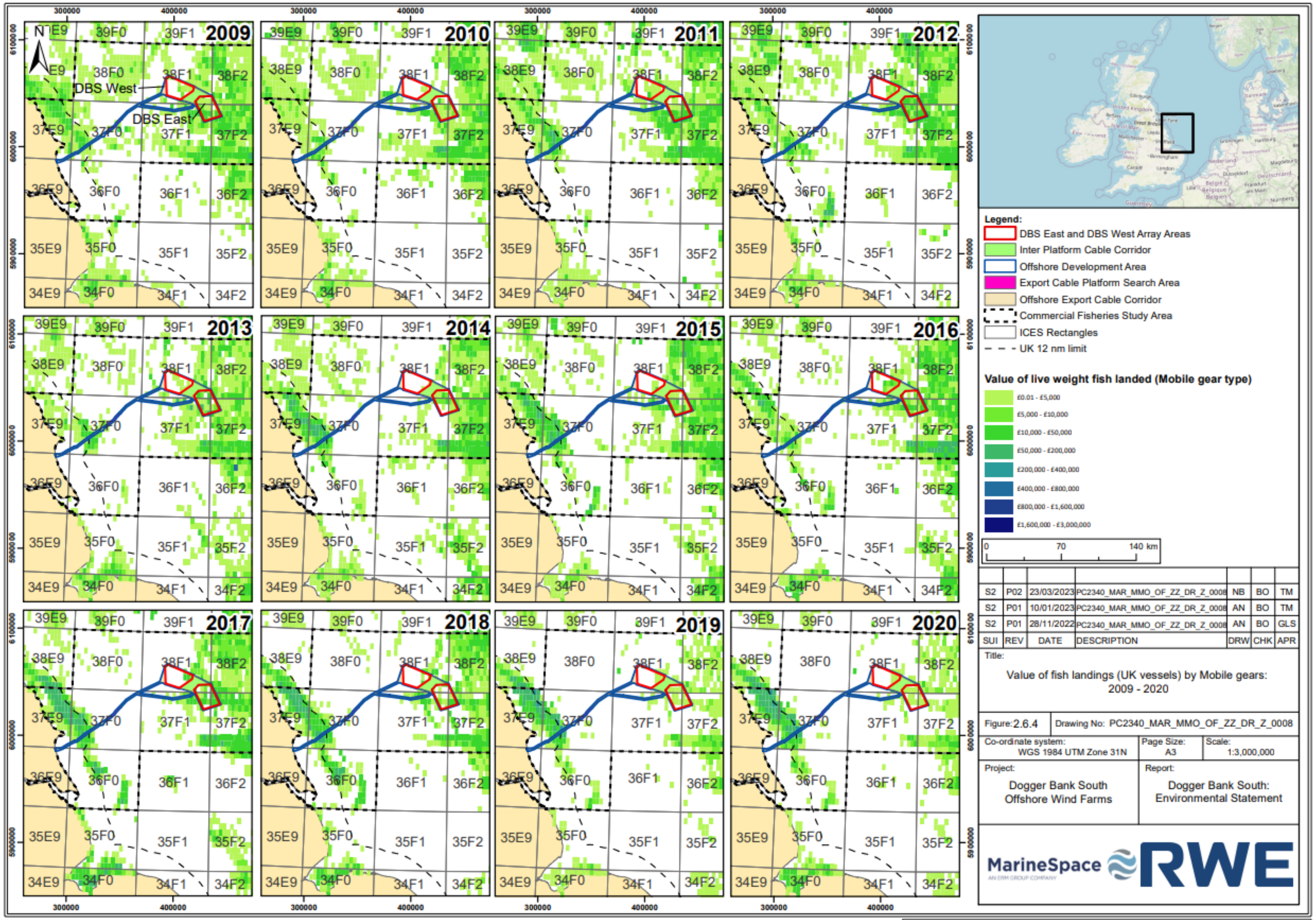


Figure 2.6.4: Annual value of landings for all mobile gears (all UK vessels ≥15 m) 2009-2020 (Source: MMO, 2021a)



2.6.2. UK and Non-UK Vessels (ICES Data)

Figure 2.6.5 illustrates fishing effort by vessels > 12 m using mobile bottom trawling gear, from UK and EU vessels between 2009-2020 (ICES, 2021). Figure 2.6.6 illustrates landed value (€) by vessels > 12 m using mobile bottom trawling gear, from UK and EU vessels between 2009-2020 (ICES, 2021). Across the Offshore Export Cable Corridor, fishing effort was generally highest around the 12 nm limit. Fishing efforts in the central part of the Offshore Export Cable Corridor have decreased in spatial extent and intensity; during 2009-2012, fishing effort was generally between approximately 0-24,000 kwh per ICES subrectangle in the central part of the Offshore Export Cable Corridor, whereas from 2015 there has been larger areas with lower fishing efforts of around 0-6,000 kwh. During 2009-2020, highest fishing efforts (>96,000 kwh) were generally focussed in two areas, towards the southeast of the Commercial Fisheries Study Area, and inside of the 12 nm limit; high efforts (>96,000 kwh) were also observed south of the Commercial Fisheries Study Area. Within the DBS array area, fishing efforts were generally highest (ranging mostly between 12,000-48,000 kwh) in the eastern half of DBS East, with little to no activity within the western part of DBS West. However, there was an exception during 2020, where high fishing effort (>48,000 kwh) was observed within a discrete area within the southwest part of the DBS West array area; this is likely due to a large increase in scallop dredging after a lucrative scallop stock was found.

Figure 2.6.5: Total fishing effort (kWh) for UK and EU vessels > 12 m using bottom trawls (2009-2020) (Source: ICES, 2021)

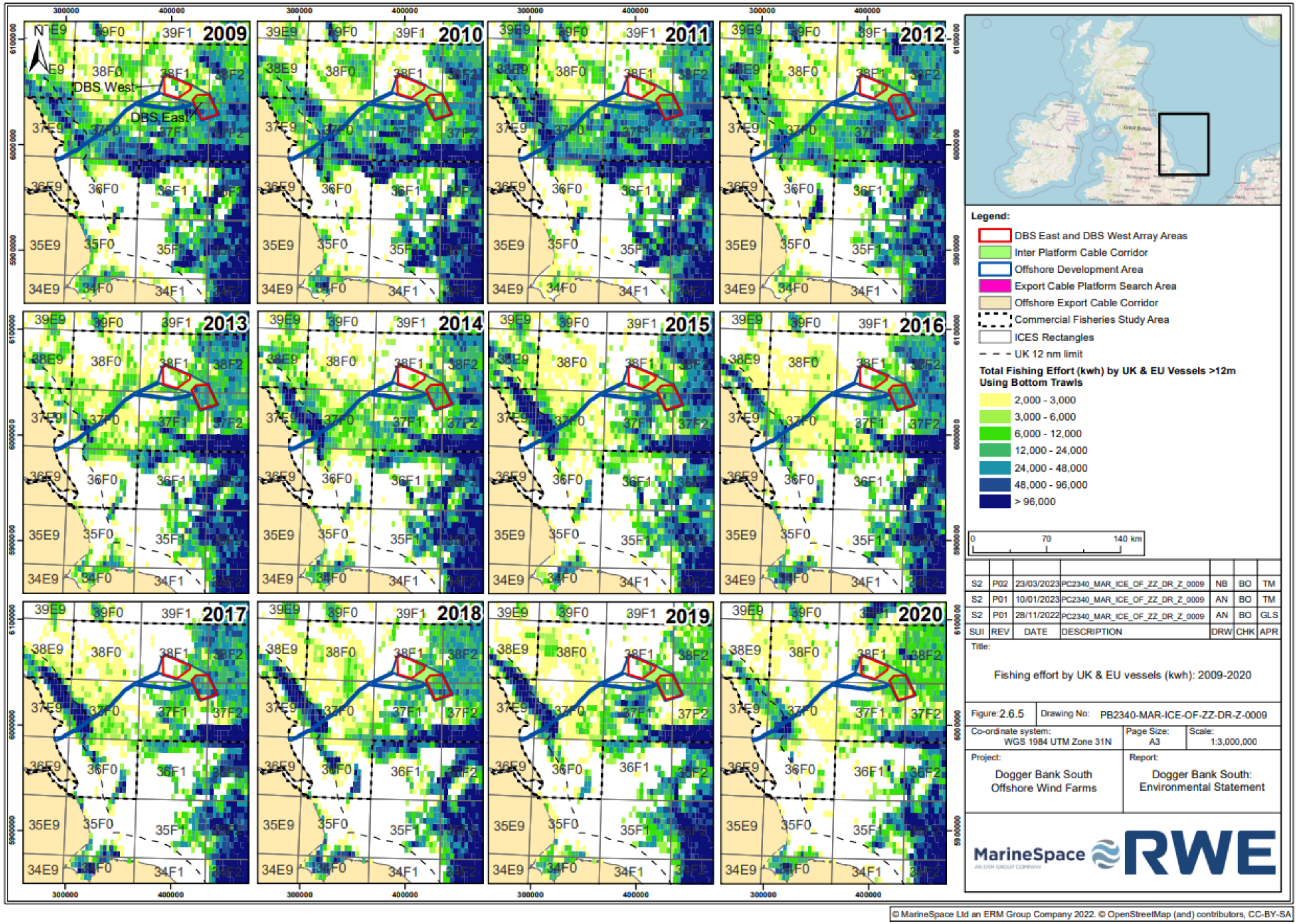
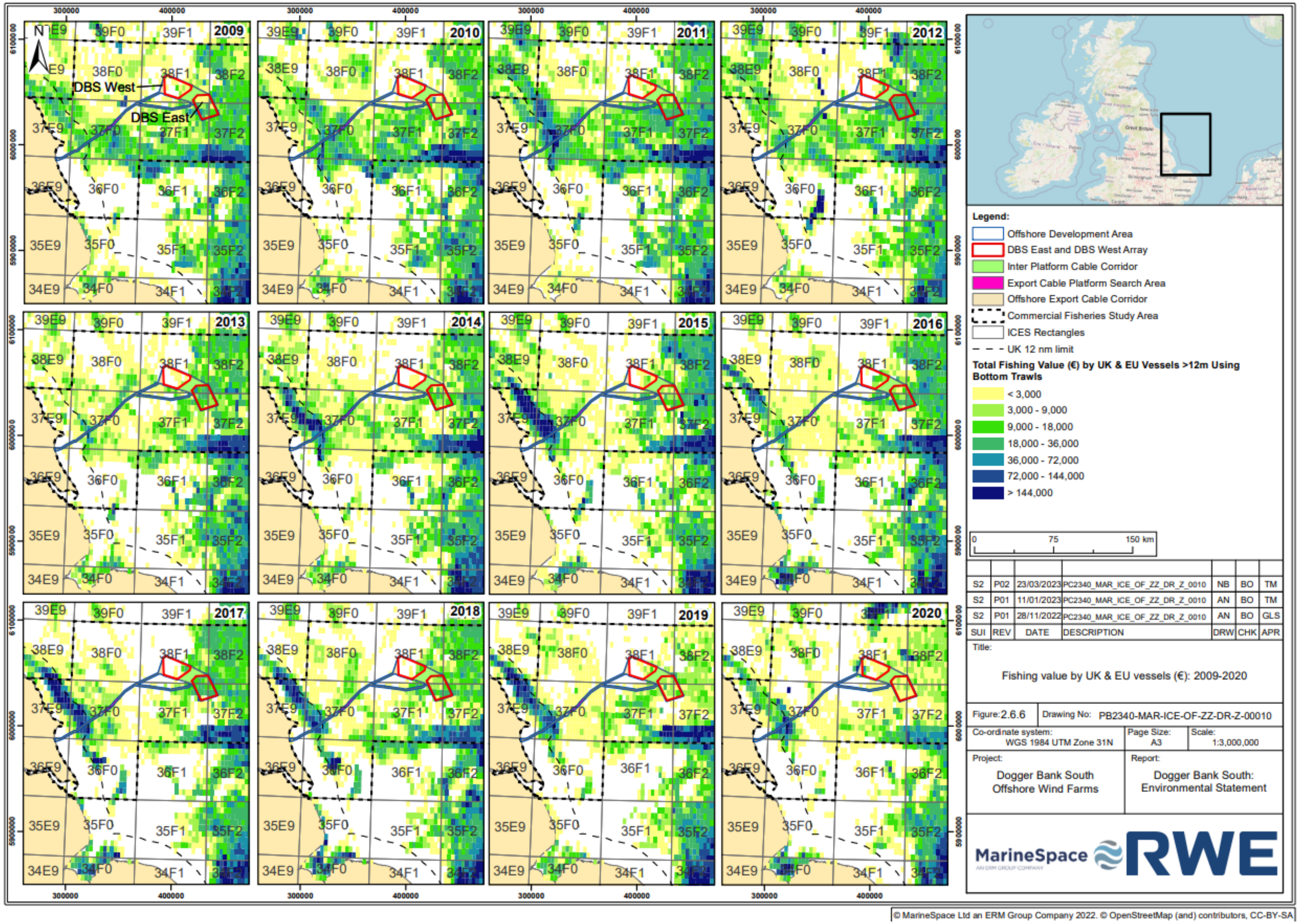


Figure 2.6.6: Total value of landings (€) for UK and EU vessels > 12 m using bottom trawls (2009-2020) (Source: ICES, 2021)



2.6.3. Gear Type (ICES and MMO Data)

ICES fishing effort (UK and non-UK vessels) was further separated by gear type and illustrated by ICES sub-rectangle (2009-2017), using the most recently available data.

Beam trawl activity was relatively high (areas of >100,000 kwh per ICES subrectangle) in the southeast of the Commercial Fisheries Study Area and further south (Figure 2.6.7). There was limited overlap of beam trawl activity with the DBS Array Areas and Offshore Export Cable Corridor. Beam trawl activity generally decreased in spatial extent within the Commercial Fisheries Study Area across 2009-2017.

Bottom otter trawl activity overlapped with both DBS Array Areas and the Offshore Export Cable Corridor (Figure 2.6.8); activity was generally consistently higher north of the DBS Array Areas and southeast of the DBS Array Areas in discrete areas. Activity within the DBS Array Areas varied across the time period, with a consistently larger spatial extent within DBS East than DBS West; fishing effort fluctuated, with no fishing effort in parts of the Array Areas, in contrast to areas of fishing effort >100,000 kwh per ICES subrectangle. Further interrogation of the data showed that within the DBS Array Areas, otter trawl activity was mostly for cod or plaice. Otter trawl for sprat or sandeel overlapped the Offshore Export Cable Corridor at approximately 30-40km offshore; this activity was also observed east of the DBS Array Areas.

Fishing activity by demersal seine vessels was relatively low effort (generally <10,000 kwh) and minimal in spatial extent in the Commercial Fisheries Study Area (Figure 2.6.9). Demersal seine vessels were mostly active in the northeast part of the Commercial Fisheries Study Area, which overlapped with the DBS Array Areas during most years. There was also a discrete area of demersal seine activity around the 12 nm limit, which overlapped with the Offshore Export Cable Corridor, and which increased in spatial extent between 2009-2017. Further interrogation of the data showed that the area of demersal seine activity in the northwest part of the Commercial Fisheries Study Area was predominantly Danish seine vessels which catch plaice and cod; there was also activity by Scottish seine vessels, which catch cod, haddock, and flatfish, but the spatial extent of these vessels was more limited. The data indicate that the demersal seine activity in the region of the 12 nm limit was predominantly by Scottish seine vessels.

Dredges were active at moderate to high levels within the inshore parts (generally within the 12 nm limit but outside of the 6nm limit, unless one of the four licenced by NEIFCA dredge operators) of the Commercial Fisheries Study Area, notably off Flamborough Head, and with an overlap of the Offshore Export Cable Corridor (Figure 2.6.10); areas of >100,000 kwh per ICES subrectangle were observed within the 12 nm limit. No dredge activity overlapped with the DBS Array Areas between 2009-2017. It should be noted that in 2020 a lucrative scallop stock was found, so dredging occurred within the DBS Array Areas; however, a temporary closure for scallop fishing was introduced within the Dogger Bank SAC in April 2021, and this closure became permanent when the byelaw was enacted from 13 June 2022.

Figure 2.6.7: Total fishing effort (kWh) for UK and EU vessels > 12 m using beam trawls (2009-2017) (Source: ICES, 2021)

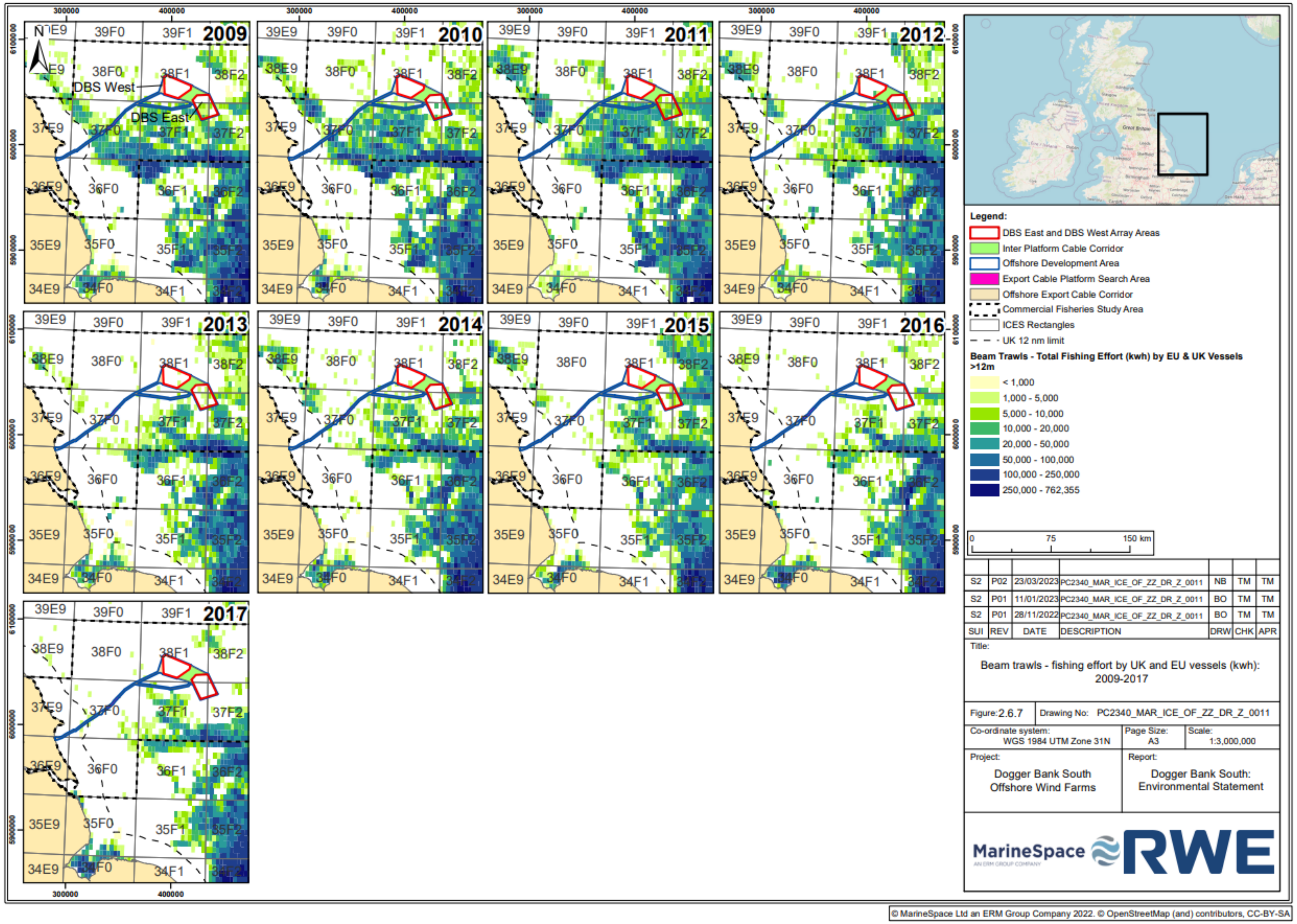


Figure 2.6.8: Total fishing effort (kWh) for UK and EU vessels > 12 m using bottom otter trawls (2009-2017) (Source: ICES, 2021)

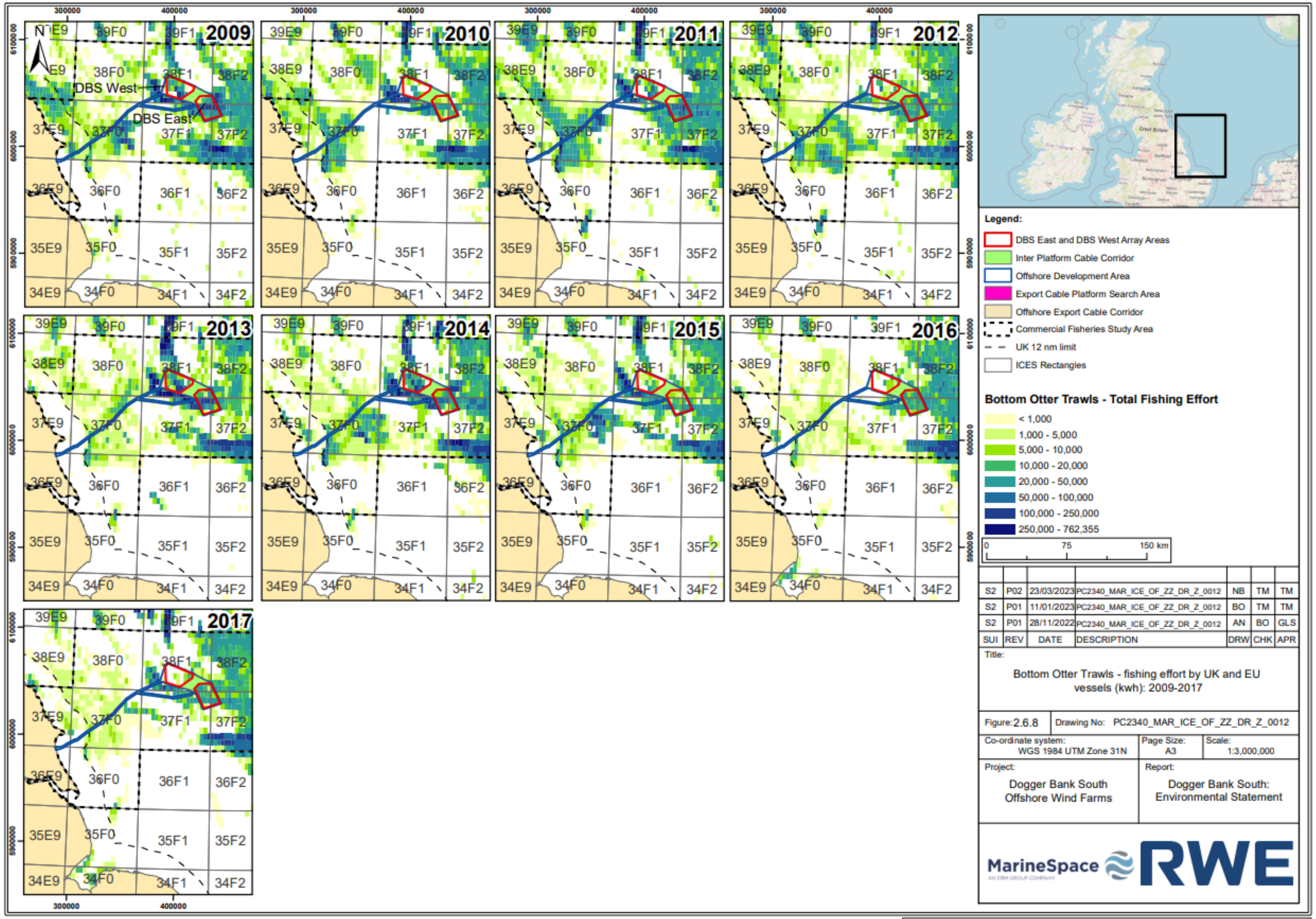


Figure 2.6.9: Total fishing effort (kWh) for UK and EU vessels > 12 m using demersal seines (2009-2017) (Source: ICES, 2021)

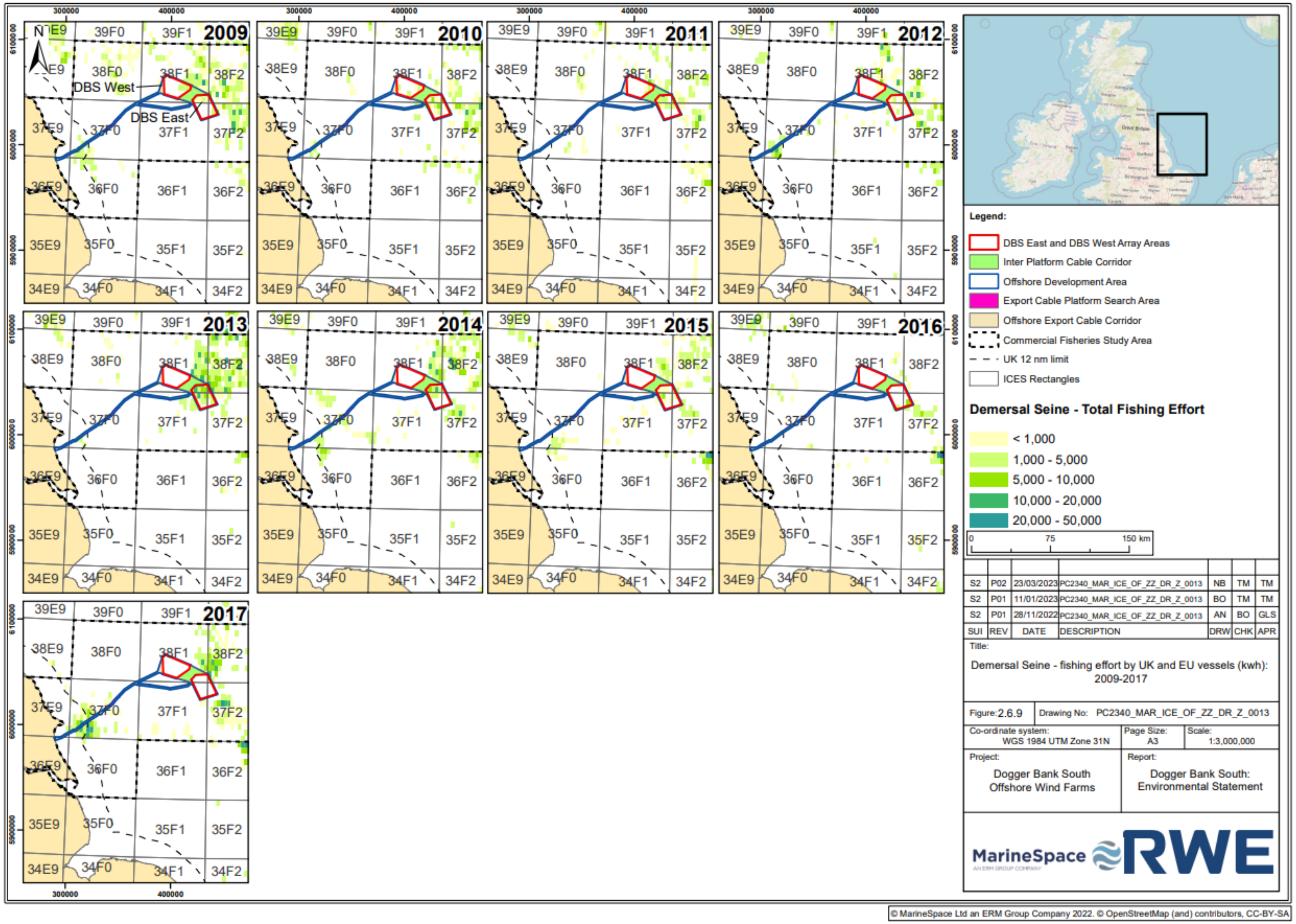
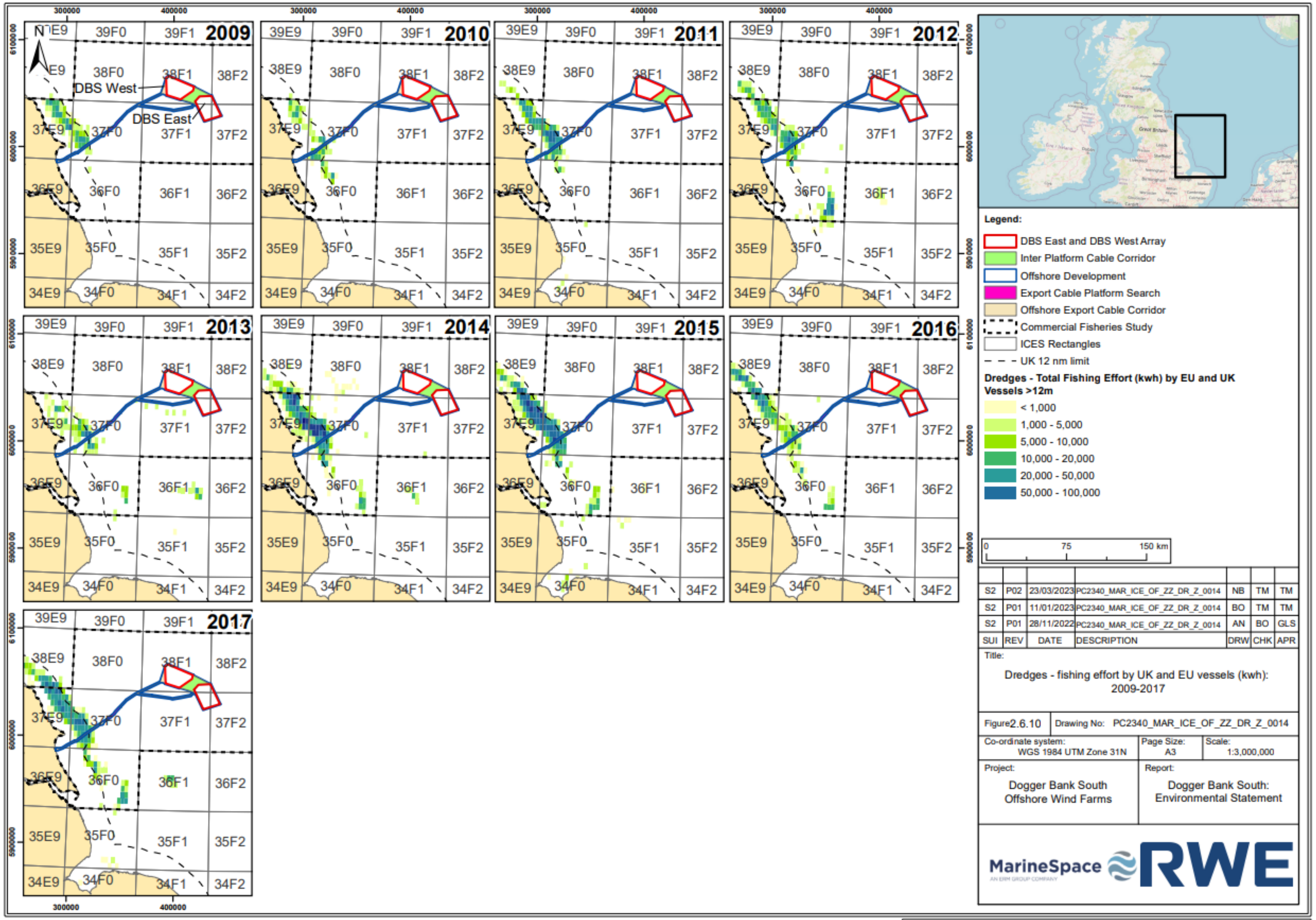


Figure 2.6.10: Total fishing effort (kWh) for UK and EU vessels > 12 m using dredges (2009-2017) (Source: ICES, 2021)



2.7. Relative Intensity of Inshore Fishing (Cefas)

Cefas undertook a study between 2010 to 2012 to provide an improved understanding of inshore fisheries activity (vessels <15 m), with input from the Inshore Fisheries and Conservation Authorities, Welsh Government, and the MMO. The dataset is based on sightings and surveillance effort and the various limitations of the data are outlined in section 2.2.1. The maps are purely indicative in nature but have been used to supplement the VMS data which do not capture smaller fishing vessels. The indicative fishing activity illustrated, has been cross-referenced with knowledge of the local fleets, based on feedback from consultation with local fishing operators, which is summarised in section 3.3 and site specific survey data (section 3).

Figure 2.7.1 and Figure 2.7.2 illustrate the indicative inshore fishing areas using static and mobile gears used by ≥15 m UK vessels, within the Commercial Fisheries Study Area. Highest intensities of inshore static fishing were located within the 6 nm limit, and intersected with the Offshore Export Cable Corridor (Figure 2.7.1); these data generally align with information collected from site -specific surveys and fisheries consultation (section 3). Within the Commercial Fisheries Study Area, inshore mobile fishing intensity was mostly focused to the northwest of the Offshore Export Cable Corridor, within the 12 nm limit. However, there were discrete areas of mobile gear activity identified, which overlapped with the Offshore Export Cable Corridor, particularly beyond the 12 nm limit (Figure 2.7.2).

Figure 2.7.1: Estimated relative fishing intensity of UK static gear vessels in the Commercial Fisheries Study Area (Source: Cefas, 2014)

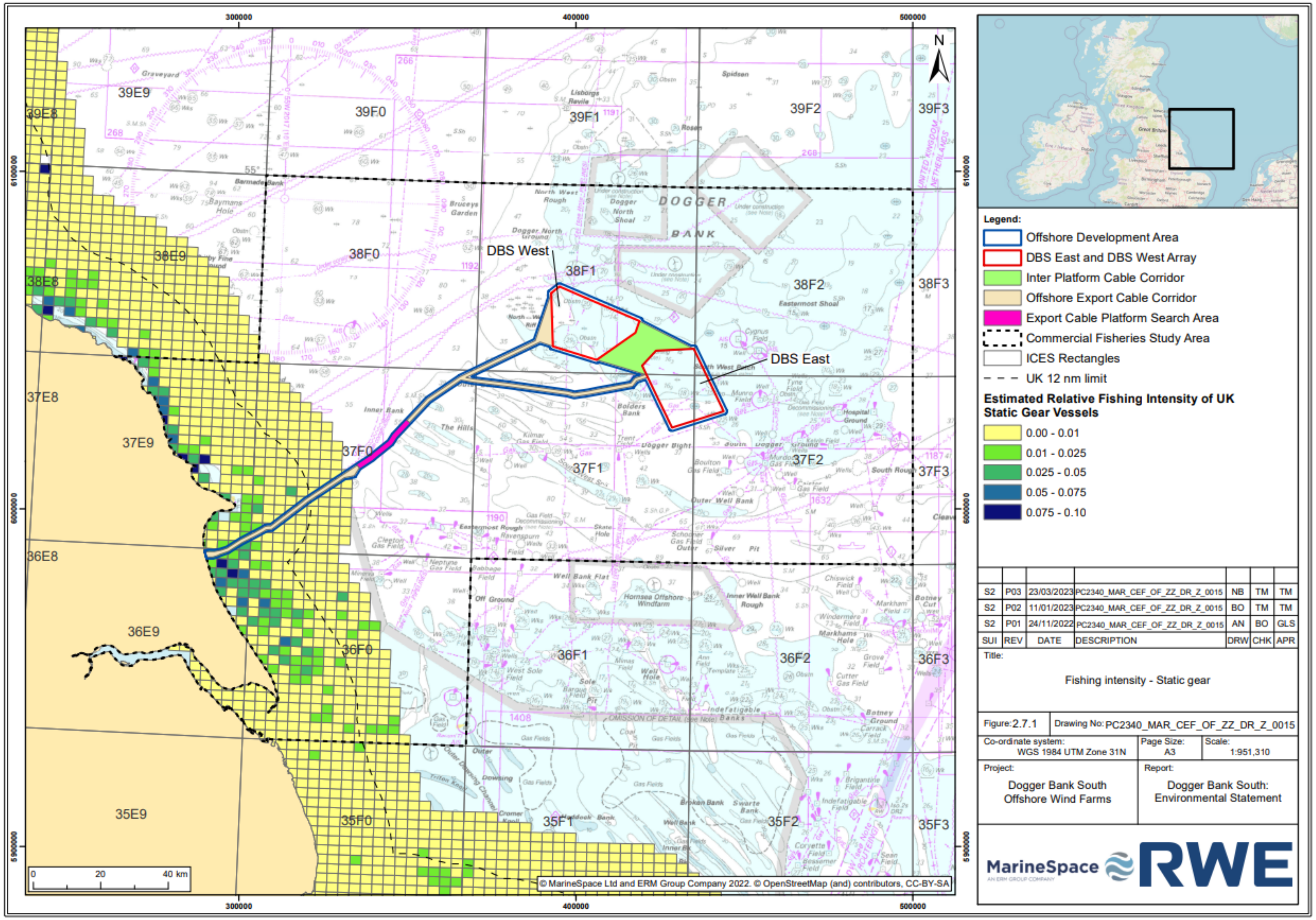
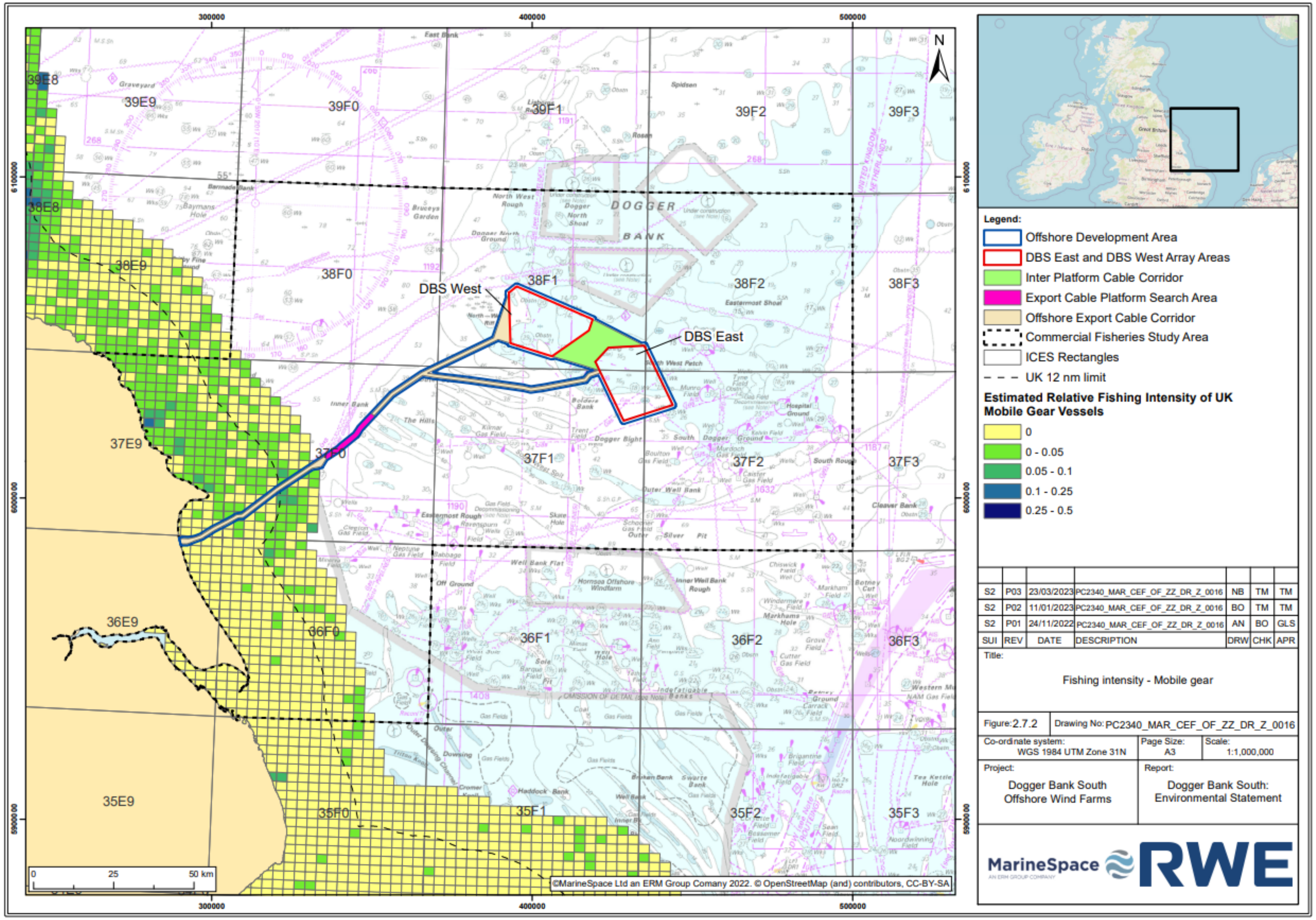


Figure 2.7.2: Estimated relative fishing intensity of UK mobile gear vessels in the Commercial Fisheries Study Area (Source: Cefas, 2014)



3. Site-specific Surveys

To complement the official commercial fisheries landings and activity data, information from site -specific surveys has been described to provide additional information on commercial fishing activity in the Commercial Fisheries Study Area.

3.1. Scouting Surveys and Gear Observations

Scouting surveys and gear observations were undertaken within both the DBS Array Areas and Offshore Export Cable Corridor. As discussed in section 2.2.2, locations of SMBs have not been displayed within this report, due to the commercial sensitivities and potential duplications of points; polygons have been produced to identify areas of relative SMB intensity, as displayed in Figure 3.1.1 and Figure 3.1.2. The polygons have been clipped to the DBS Array Areas and offshore export cable, however, the descriptions in this section regarding SMBs include the Project areas plus the buffer areas summarised in Table 2.2.2.

Mobile vessels active in the area were recorded, however only a limited number of mobile fishing vessels were recorded transiting through the survey area and were none observed actively fishing in the DBS area.

Figure 3.1.1 indicates that static gear was only observed within the western half of the DBS West array area; no static gear was observed within the DBS East array area. The northwest corner of the DBS West array area had the highest relative intensity of static gear identified through scouting surveys and gear observations during 2022.

During the scouting surveys of the DBS Array Areas in Spring and Summer, pots were identified as belonging to three vessels based out of Bridlington, Grimsby, and Brixham. Higher numbers of pots were observed during the summer surveys than the spring surveys, with numbers decreasing during the winter survey. This was expected, as fishers generally work further offshore during the summer, when the weather is more settled. In addition, there is generally a greater abundance of brown crab on these grounds during later summer and autumn.

These data align with the MMO VMS data for passive vessels from 2019 and 2020 (see Figure 2.6.1 and Figure 2.6.2), which shows that static gear vessels were active across the majority of the DBS West array area, apart from the northeast part, and that intensity was highest in the northwest part. This also aligns with feedback from targeted fisheries consultation; fisheries stakeholders have confirmed that there has been an increase in static gear activity within the DBS West array area and that this is generally reflected in the MMO data.

Figure 3.1.2 indicates that static gear intensity was highest within the Offshore Export Cable Corridor inside of the 6 nm limit, as identified through scouting surveys and gear observations during 2022. Within the 6 nm limit, static gear intensity was high except for an area between 2-4.5 nm. For the majority of the area between 6-12 nm, no static gear was observed. Beyond the 12 nm limit, there were limited discrete areas of medium to low intensity of static gear identified within the Offshore Export Cable Corridor, at approximately 22 nm, 33 nm, 44 nm, and 60 nm offshore.

During the scouting surveys of the Offshore Export Cable Corridors, a large proportion of the pots were identified as belonging to potting vessels registered from the Holderness coast in Bridlington and several from Hornsea; approximately 60% of these vessels were ≤10 m in length. The pots observed further offshore were identified as belonging to the larger vessels (11-15 m).

The areas of relative static gear intensity from the 2022 scouting surveys and gear observations generally align with the Cefas inshore fishing data, which show higher intensity within the 6 nm limit. The MMO VMS data for passive vessels from 2019 and 2020 indicate a greater spatial extent of static gear activity along the Offshore Export Cable Corridor, than was observed from the scouting surveys and gear observations. This could be attributed to the limited time period of the scouting surveys and gear observations. Feedback from fisheries stakeholders also supports these findings of inshore static gear activity.

Figure 3.1.1: Areas of static gear observed within the offshore areas during 2022

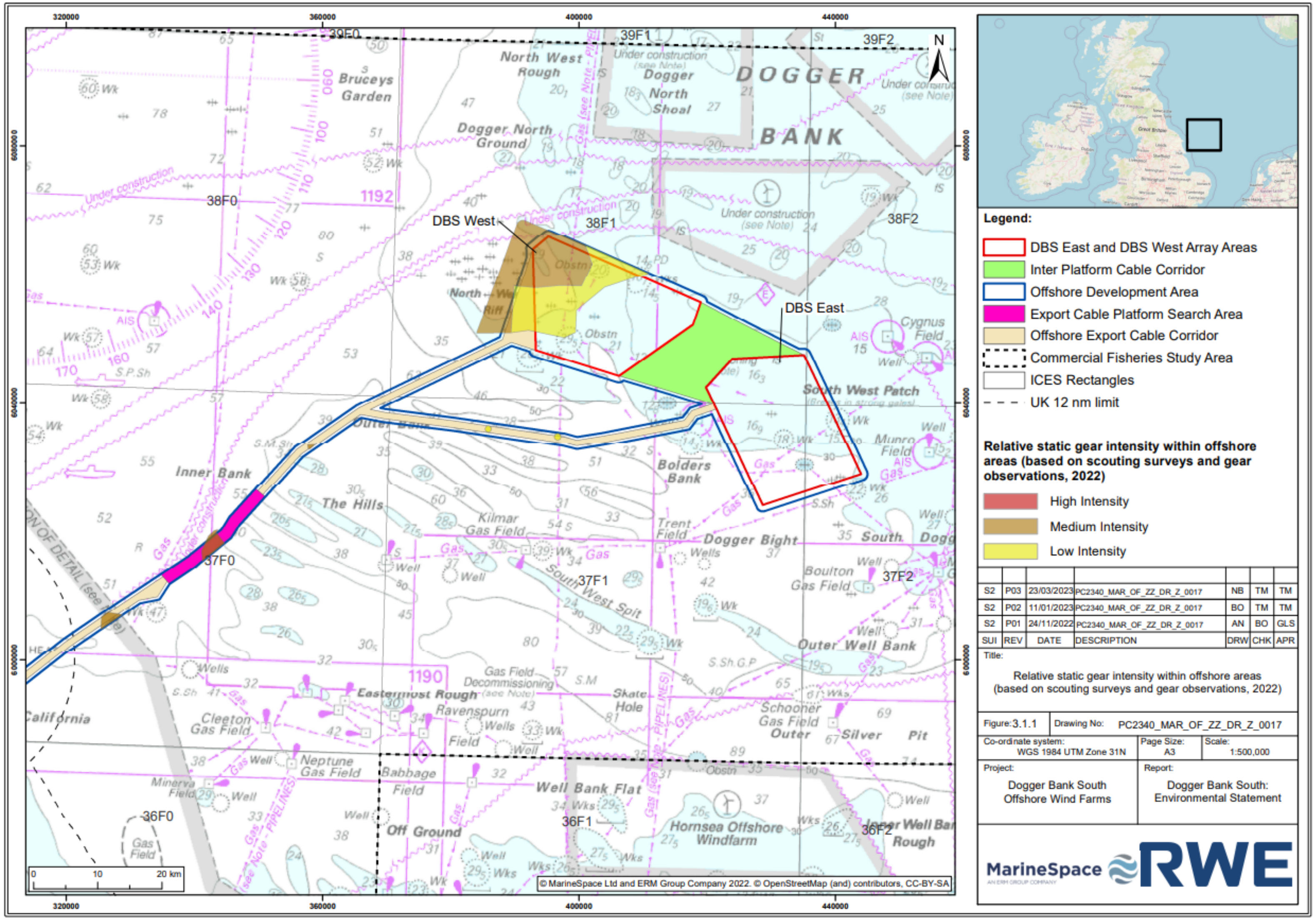
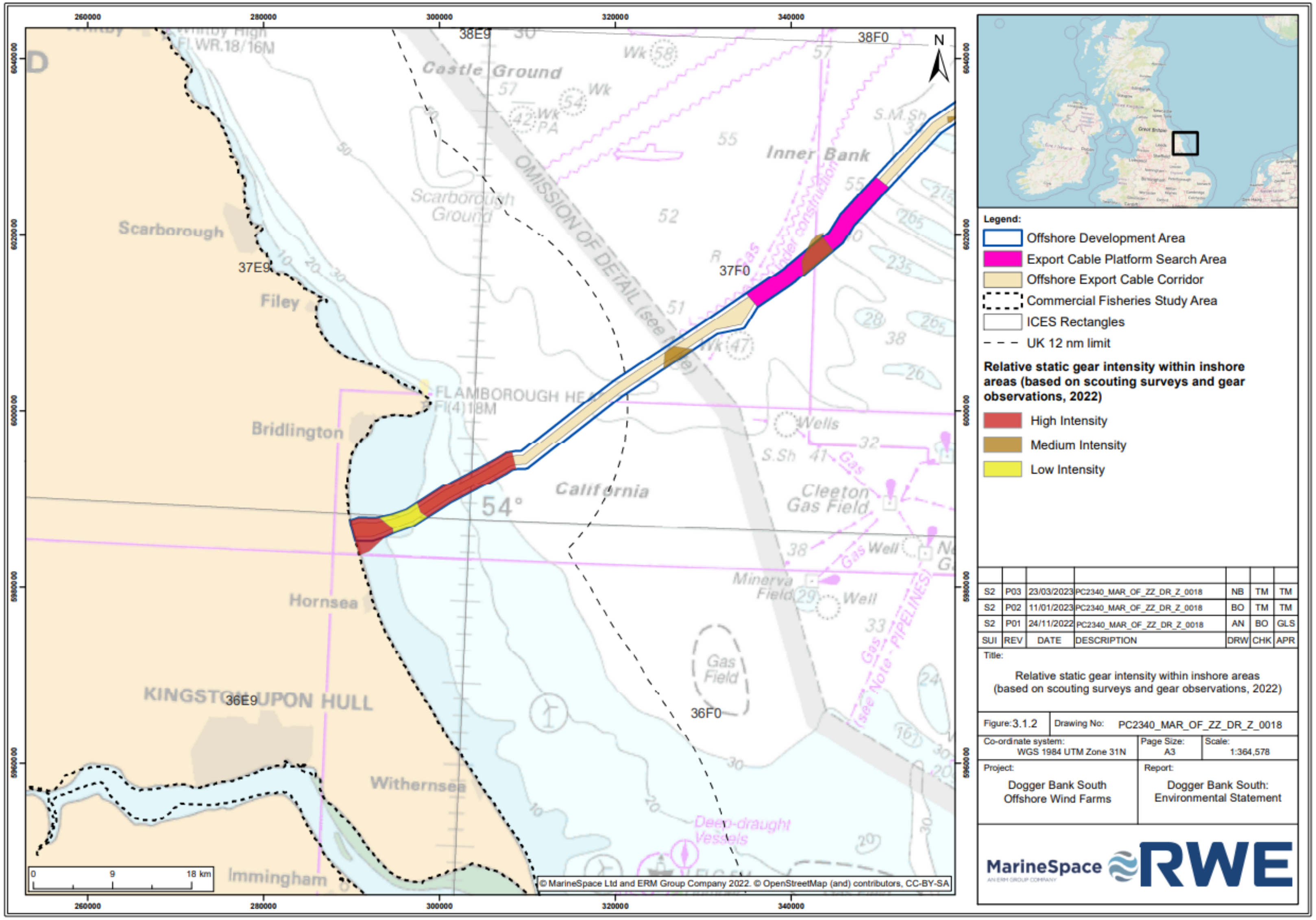


Figure 3.1.2: Areas of static gear observed within the inshore areas during 2022



3.1.1. Vessel Traffic Surveys Winter 2022

During the winter vessel traffic survey, seven fishing vessels were identified from the AIS data, two of which were observed transiting through the DBS East array area, and another which was observed transiting through the DBS West array area. Figure 3.2.1 shows that the remaining fishing vessels were transiting through the surrounding region; no fishing vessels were recorded as fishing during the survey. Of the ten vessels identified, the only UK fishing vessel identified was a large (>20 m) crabbing vessel, and the remainder were non-UK, large, vessels (>50 m), being trawlers from France, Germany, Lithuania, Poland, and Russia. The radar data collected during the winter vessel traffic survey did not record any fishing vessels.

Additional vessel traffic surveys were also undertaken along the Export Cable Route (ECR) and platform area of search during winter 2022.

3.1.2. Summer 2022

During the summer vessel traffic survey, ten fishing vessels were identified from the AIS data, three of which were in the DBS East array area, and one in the DBS West array area. Of these, three have been identified as UK fishing vessels that provide guard vessel services on offshore projects, two were UK static gear vessels that were identified by the scouting surveys as having SMBs in the DBS Array Areas, and the remaining five were non -UK trawlers from France and Germany.

Figure 3.2.2 shows that the majority of fishing vessels identified were transiting through the DBS Array Areas and the surrounding region. There were vessel tracks observed north of the DBS Array Areas from a static gear vessel, which appeared to be the vessel laying gear in a north-northeast/south-southwest direction.

The radar data collected during the summer vessel traffic survey showed most vessels transiting, through the DBS East array area, in a north-northeast/south-southwest direction; and through the DBS West array area in an east/west direction. It appeared that one fishing vessel was actively fishing within the northwest corner of the DBS West array area.

Additional vessel traffic surveys were also undertaken along the Export Cable Route (ECR) and platform area of search during summer 2022.

3.1.3. Autumn 2022

During the autumn vessel traffic survey, ten fishing vessels were identified from the AIS data, one of which was observed transiting through both DBS Array Areas, and another which was observed in both DBS Array Areas and was likely acting as a guard vessel on a nearby project. Figure 3.2.3 shows that the remaining fishing vessels were transiting through the DBS Array Areas and the surrounding region. Of the ten vessels, the only UK fishing vessel identified was observed as providing guard vessel services and the remainder were non-UK vessels, the majority of which were large (>50 m) trawlers; the non-UK vessels were from Denmark, Iceland, France, Netherlands, and Sweden.

The radar data collected during the autumn vessel traffic survey showed two vessels transiting through the DBS West array area.

Figure 3.1.3: Fishing Vessel Track Data, Winter 2022: 13-31 January 2022 and 02-13 February 2022

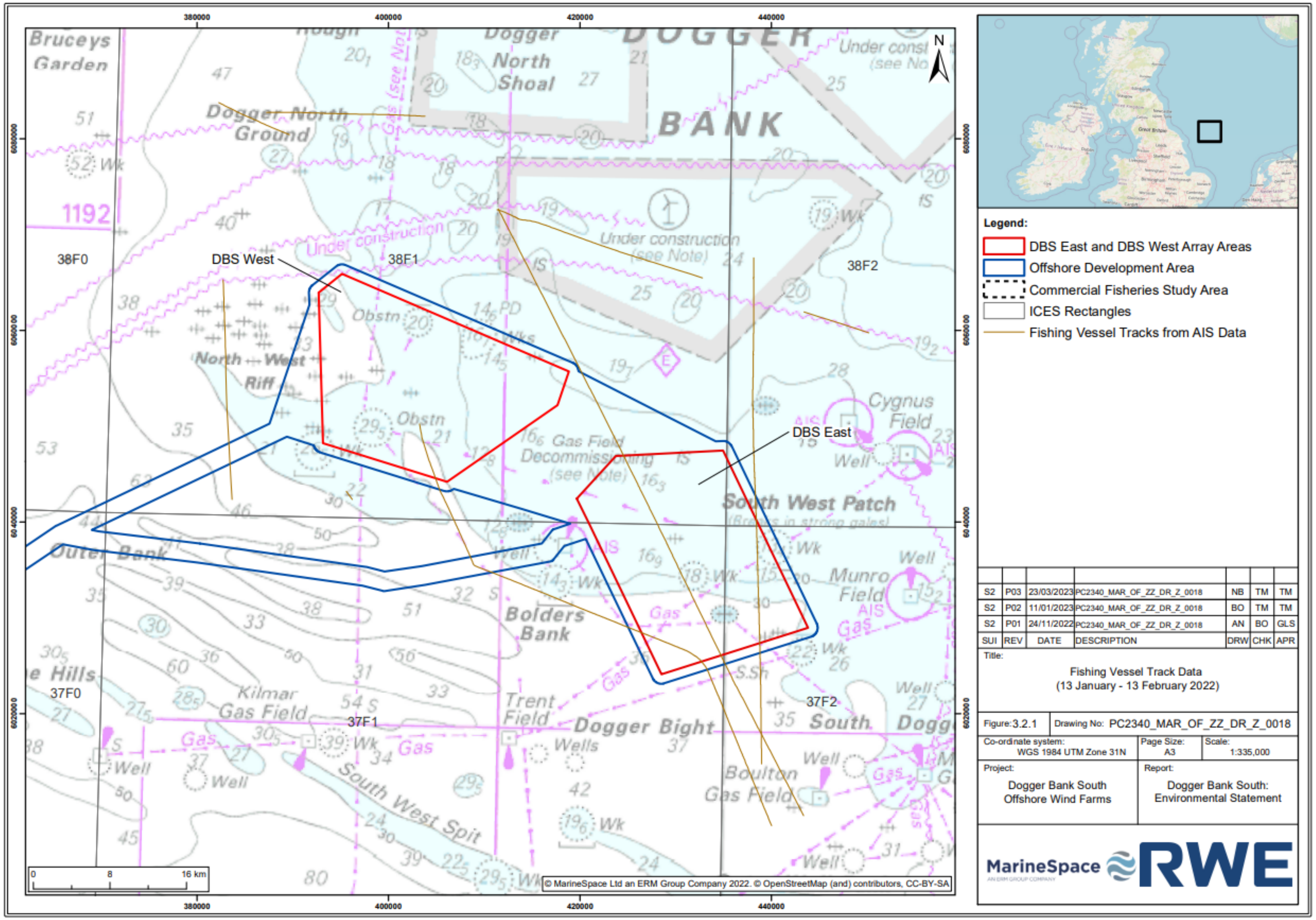
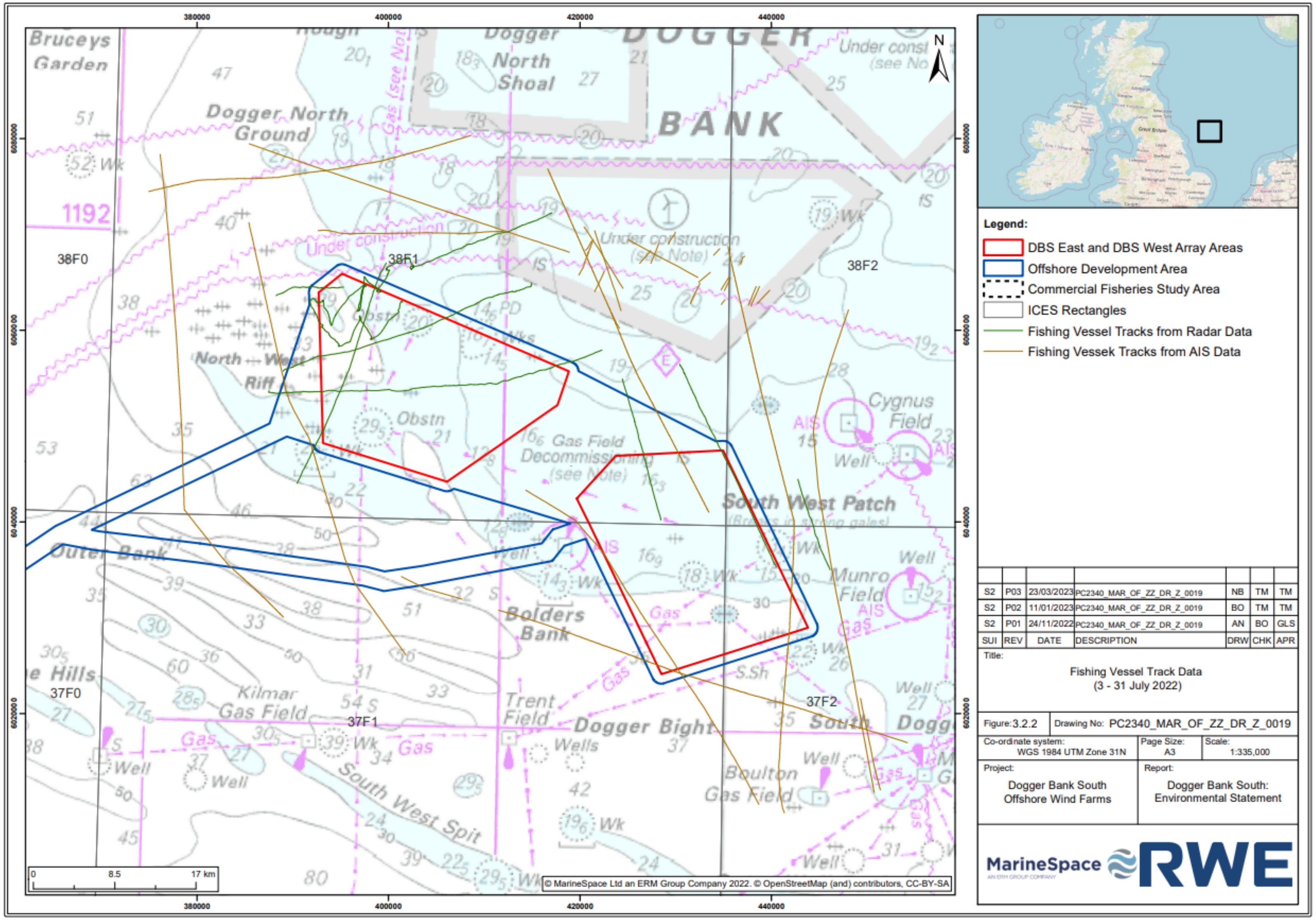


Figure 3.1.4: Fishing Vessel Track Data, Summer 2022: 03-31 July 2022



SUI	REV	DATE	DESCRIPTION	DRW	CHK	APR
S2	P03	23/03/2023	PC2340_MAR_OF_ZZ_DR_Z_0019	NB	TM	TM
S2	P02	11/01/2023	PC2340_MAR_OF_ZZ_DR_Z_0019	BO	TM	TM
S2	P01	24/11/2022	PC2340_MAR_OF_ZZ_DR_Z_0019	AN	BO	GLS

Figure 3.1.5: Fishing Vessel Track Data, Autumn 2022: 16 October-13 November 2022

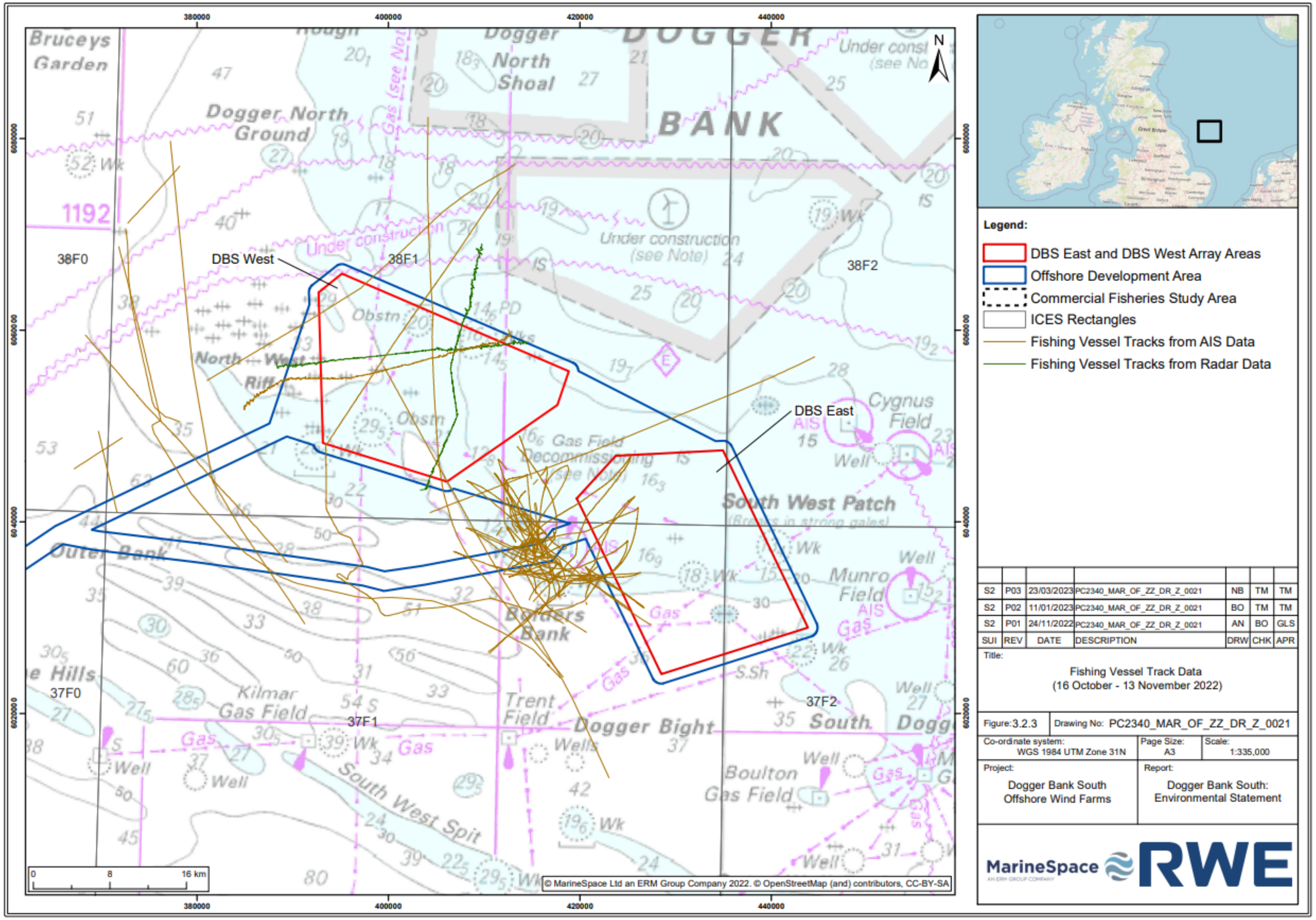
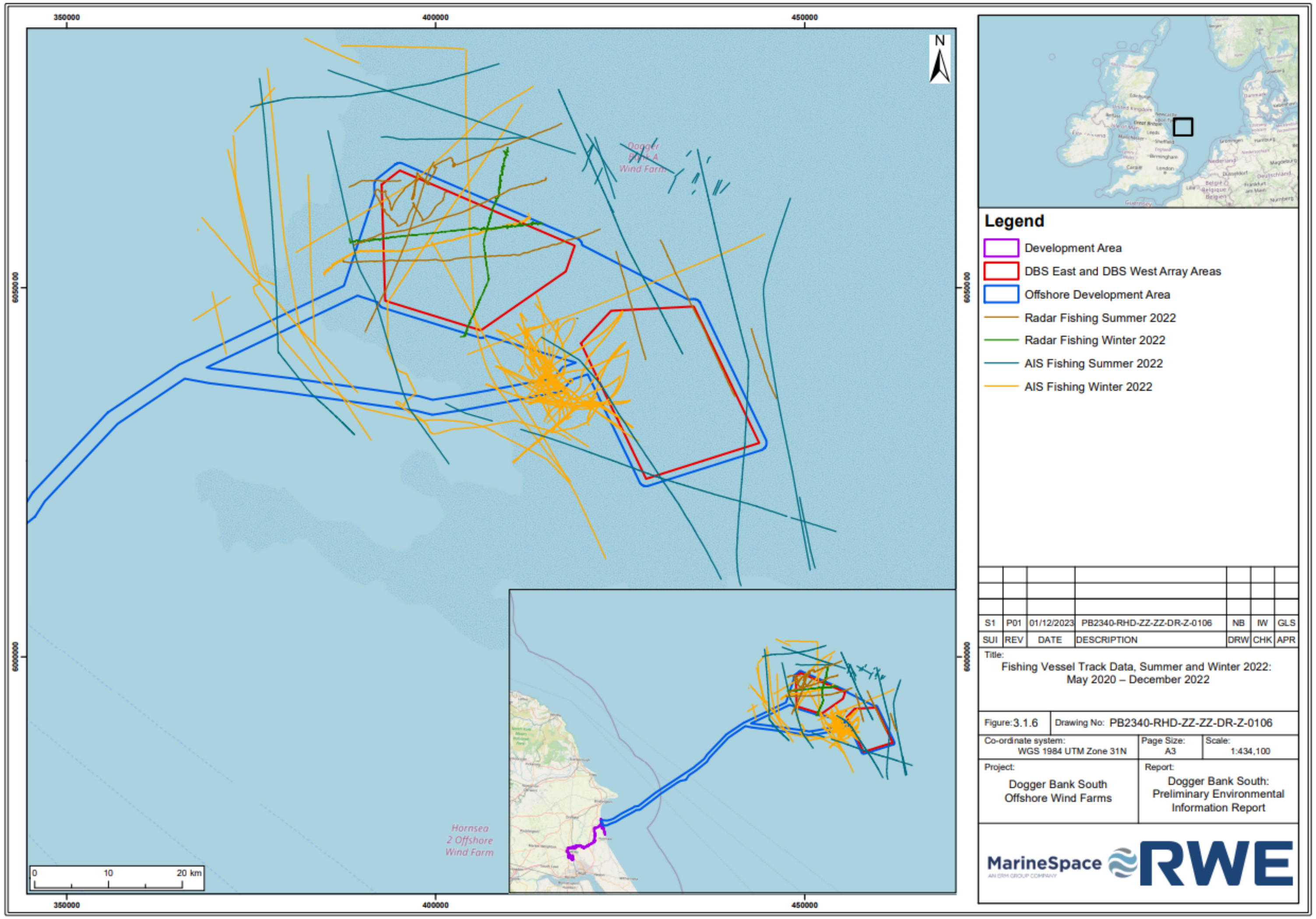


Figure 3.1.6 Fishing Vessel Track Data, Summer and Winter 2022: May 2020 – December 2022



3.2. Consultation Feedback

A summary of the key consultation meetings to date and which commercial fisheries stakeholders attended has been outlined in section 2.2.3. The outputs of these consultations are provided in Table 3.3.1 and **Volume 7, Appendix 13.1 Commercial Fisheries Consultation Responses (application ref: 7.13.13.1)** explains how the comments will be addressed.

Shapefiles of the North Sea sandeel fishing grounds were provided by fisheries stakeholders during consultation. Mapping of the Danish sandeel grounds indicates that there are discrete sandeel fishing grounds within the DBS Array Areas and offshore part of the Offshore Export Cable Corridor (Figure 3.3.1 and Figure 3.2.2). Mapping of the German sandeel grounds indicates that there are discrete sandeel fishing grounds in four notable areas, (Figure 3.2.3):

1. Overlapping the Offshore Export Cable Corridor,
2. South of the Offshore Export Cable Corridor,
3. South of DBS West and overlapping into DBS East, and
4. North east of DBS East Array Area.

VMS data of the Dutch beam trawling fleet has also been provided for 2018-2022. Figure 3.2.4 highlights highest fishing efforts to occur south of the DBS Array Areas.

Table 3.3.1: Consultation responses

Date	Stakeholder	Comment
30/03/2022	CFWG meeting	Concerns regarding coexistence – located on the slopes of Dogger Bank, where there are important sandeel fishing grounds. Concerns regarding coexistence with the fisheries in the region, particularly the sandeel fishery. Noted that some fishing vessels would not fish within a wind farm array area
02/09/2022	The Planning Inspectorate (Scoping Opinion)	Increased steaming times to alternative fishing grounds for vessels that would otherwise fish in the Proposed Development area (operation). The Scoping Report states that the magnitude of this impact is deemed negligible as the effect will be temporary and localised. The Scoping Report does not explain why operational effects are anticipated to be temporary, however the Inspectorate agrees that due to the nature and the low sensitivity of fishing vessels taking account of their large operational range, a detailed assessment in the ES is not likely to be required. However, the ES should characterise the operational effects on commercial fisheries including increased steaming times and provide the evidence used to determine that significant effects are unlikely.
		Assumptions and limitations: The Scoping Report acknowledges assumptions and limitations with the quantitative data sets used to inform the Scoping Report and expected to inform the ES. Paragraph 373 notes that smaller vessels are excluded from the analysis of Vessel Monitoring System data which only captures vessels over 12m in length, and that datasets from 2020 and 2021 will be affected by COVID-19. It is proposed that in order to support these existing data sets, consultation will be held with fisheries stakeholders to provide further insight into specific fishing grounds and activity of vessels in the area.
		Assumptions and limitations: Data across a time period of at least 4 years prior to 2020 will be collated to avoid the impacts of Coronavirus (COVID-19).
		Assumptions and limitations: The ES should clearly state the limitations associated with any data used. Efforts should be taken to agree the data sources with relevant consultation bodies and outcomes should be evidenced within the ES.
		INNS: The ES should assess the potential for the introduction of hard substrate and vessel movements to facilitate the spread of INNS (e.g., via ballast water, biofouling, introduction of artificial structures and through accidents and spillages), and the

Date	Stakeholder	Comment
		potential for impacts upon commercial fisheries where significant effects are likely to occur.
23/11/2022	Andy Wheeler Consulting (Holderness Fisher Representative)	Fishing activity – inshore static gear vessels active in the area 0 – 9nm. Targeting brown crab and lobster. Several vessels also targeting whelk. Targeting coarse gravelly seabed for lobster. Fishing activity is all year with highest activity through May – September, including within the Offshore Export Cable Corridor. Not aware of any longlining. Represents mostly 9 – 12m static gear vessels which fish 150 – 200 days per year; the majority use pots, with some using nets. Fishing is usually only over one day with typical steaming distances of 4 – 8nm.
		Static gear data – static gear activity represented in MMO VMS data aligns with their understanding of general fishing patterns. Confirmed that they are not aware of any additional datasets.
		Future changes to fishing activity – increased fishing activity as a result of 'Brexit'; Highly Protected Marine Area (HPMA) on the Holderness coast may result in fishers moving north into the Offshore Export Cable Corridor; bp carbon capture surveys to the east of DBS may also increase fishing pressure; management measures affecting fishing activity.
		Potential interactions with the Projects – main concerns related to the Offshore Export Cable Corridor (cable burial and rock protection).
		Scour protection could diversify fishing within the array area, reducing pressure on stocks.
23/11/2022	Independent fisher (Bridlington static gear)	Fishing activity – static gear activity represented in MMO VMS data aligns with their understanding of general fishing patterns. Increasing static gear activity within the DBS West array area since 2020. Static gear activity across the Offshore Export Cable Corridor occurs later in the year, partly to minimise interactions with the Danish and Dutch sandeel and herring fishery in the area. Static gear is generally laid in a north-east to south-west orientation inside 6nm, and an east to west orientation between 6 – 12nm; within the array area gear is shot in all directions.

Date	Stakeholder	Comment
		Array layout – turbine spacing is not a major concern. Providing the turbines are in a line or pattern, this fisher will be able to continue fishing. Fishing within offshore wind farms is seen as an additional safety measure for their crew.
		Dogger Bank Special Area of Conservation (SAC) Byelaw – mobile gear vessels have been displaced into other areas, with herring and sandeel now being targeted on the banks to the south of the DBS Array Areas. Positive for static gear due to lack of conflict with mobile gear vessels.
24/11/2022	HFIG	Conclusions drawn from limited evidence – conclusions of the PEIR should acknowledge limited datasets.
		Cumulative impacts – should consider effect on fish stocks and long-term availability.
		Fishing activity – represents 34 vessels (6 – 15m in length). Mostly static gear activity, with several fixed netters (beach and boat); not aware of any longlining. Targeting shellfish, e.g., brown crab and lobster; whelk is mainly landed as a bycatch. Fishing occurs all year around. Members are mainly based in Bridlington, but also across Hornsea, Withernsea, and Flamborough.
		Static gear data – static gear activity represented in MMO VMS data aligns with their understanding of general fishing patterns; noted that inshore fishing is likely to be underrepresented.
		Potential interactions with the Projects – main concerns related to the Offshore Export Cable Corridor (cable burial and rock protection).
		Landings data – reduction in lobster landings by a third in 2018, due to a change in legislation which banned the landing of egg bearing females.
		Dogger Bank SAC Byelaw – mobile gear vessels have been displaced into other areas, notably closer inshore which has caused increase pressure, and could result in conflict between gear types. Static gear has shifted north from Grimsby. Larger static

Date	Stakeholder	Comment
		gear vessels (with up to 250 pots) from further afield have started fishing the Dogger Bank.
24/11/2022	Independent fisher (intertidal netter)	Fishing activity – Skipsea Lane End and Far Grange. Nets are 150 yards, with three anchors approximately every 12 yards. Fishing activity between October and August, with no fishing in September. Catches include sea trout during March to August and sea bass, sole, mullet, skate, and thornback ray all year.
24/11/2022	Independent fisher (Bridlington static gear)	Fishing activity – target brown crab and lobster on patches of stone and hard clay, whereas whelk is targeted on soft, muddy grounds; male brown crabs are more abundant further offshore. Fishes all year, but September to December is most profitable.
		Static gear data – static gear activity represented in MMO VMS data aligns with their understanding of general fishing patterns; but noted that there is also static gear further north, to the west of the DBS Array Areas.
		Array layout – wider spacing of turbines is preferable. Fishes within operational sites (e.g., Triton Knoll), but not during inclement weather. Turbine spacing at Triton Knoll is considered the minimum safe to fish.
		Potential interactions with the Projects – construction vessels will need to work exclusively within closed fishing areas (including area for turning circles), otherwise risks gear snagging.
		Dogger Bank SAC Byelaw – benefit to static gear fishers, as there is no longer potential for conflicts with mobile gear.
9/12/2022	SPFPO	Fishing activity – targeting mainly herring, sprat, and sandeel (depending on quota). Sandeel season is generally from April to around late June. Herring are targeted following the completion of the sandeel fishery through to the end of the summer. Mackerel targeted in October, and anchovies targeted October to December. Vessels are generally between 41 – 64m in length. Sprat and herring fishery uses pelagic gear types; these fisheries follow fish movements and are unpredictable.

Date	Stakeholder	Comment
		The sandeel fishery uses bottom contacting gears and is very predictable, as follows the same tracks every year. Quota and allocations vary year to year, which affects fishing activity in the area. Pelagic (midwater trawls) target the 'Hills' for sandeel and herring. Nets are approximately 1.5km in length and can weigh over 100 tonnes when full; maximum spread of netting is 180 – 200m.
		Concerns on fish stocks – Concerns regarding impacts of Electromagnetic Fields (EMF) and underwater noise on fish stocks, particularly herring. Dogger Bank is an important area for juvenile and young herring; stakeholders highlighted concerns that the Projects could cause reductions in the herring stock.
		Concerns regarding competition for space – as a result of loss of habitats and fishing grounds.
		Array layout – providing there is 1.5nm (2.8km) spacing of turbines and correct orientation of turbines a regular pattern, pelagic fishing may continue within wind farm arrays. However, some fishers will not fish within wind farm arrays. Layout of turbines in straight lines will increase potential for co-existence. As the sandeel fishing grounds are well established, co-existence could be achieved by avoiding placing turbines on sandeel grounds.
		Lack of data for pelagic fish – assessments are limited by the lack of information on pelagic fish.
		Dogger Bank SAC Byelaw – sandeel fishery is now prohibited from the area.
13/12/2022	CNPMEM	Fishing activity – principal fishing grounds for French fishers (operating out of Boulogne-sur-Mer) are located from Flamborough Head to Hornsea and Grimsby, with Silver Pits one of the key grounds. Overlap of fishing activity with the Offshore Export Cable Corridor, but not with the Array Areas. Main activity for Boulogne-sur-Mer vessels is demersal otter trawling, with vessels ranging in size from 19 – 24m; vessels may also use semi-pelagic trawls to catch both mackerel and whiting. French pelagic vessels also targeting herring on the 'Hills'.

Date	Stakeholder	Comment
		Whiting season is generally between April and June.
		Dogger Bank SAC Byelaw – vessels are no long-er able to fish within this area.
		Future fishing activity – considerable uncertainty regarding future access to UK waters for French fishers.
14/12/2022	Rederscentrale	Fishing activity – most members are beam trawlers, but some use otter trawls in the region. Principal species are Dover sole and plaice, with bycatch of turbot and brill. Also catch blonde ray, spotted ray and thornback ray. Overlap of fishing activity with the Offshore Export Cable Corridor.
		Potential interactions with the Projects – main concerns related to the Offshore Export Cable Corridor (cable burial and rock protection).
		Dogger Bank SAC Byelaw – vessels are no longer able to fish within this area.
06/01/2023	CFWG meeting	Dogger Bank SAC Byelaw – noted that this has affected fishing activity in the area.
		Marine traffic surveys – comment that the time of year may affect which fishing vessels are active in the area.
		Location of potential offshore platforms along the export cable corridor – query whether an opportunity will arise for fisheries stakeholders to discuss the area identified for the location in relation to fishing grounds.
		Guard vessels – query by a German fishing industry representative asking whether there would be any opportunities for fishing vessels to provide guard vessel services.
11/01/2023	SWFPA	Fishing activity – vessels using scallop dredges (Newhaven style) to target king scallop outside of the 12nm limit. These vessels only fish for king scallop all year round. Within the Commercial Fisheries Study Area, dredging for scallops is mostly focused east of Flamborough head, outside the

Date	Stakeholder	Comment
		12nm, which overlaps with the Offshore Export Cable Corridor.
		Penetration depth of gear – approximately 6 – 8 inches but noting that in areas which are towed repeatedly the penetration depth will become deeper.
		Width of towed gear – Eighteen Newhaven style scallop dredges per side. Each tow bar is approximately 18m in length.
		Potential interactions with the Projects – main concerns related to the Offshore Export Cable Corridor (cable burial).
		Dogger Bank SAC Byelaw – vessels are not able to fish within this area. Observed that other fishing vessels have been displaced to the English Channel, north east Scotland and east of Flamborough Head outside of the 12nm.
11/07/2023	CFWG meeting	Query whether experimental fishing methods being tested e.g. potting for scallops will be assessed for.
		Environmental Impact Assessment – Query regarding rationale for assessment, have other issues (e.g. Brexit) should be accounted for.
		Sandeel – Raised that Danish vessels reported it would not be possible to fish for sandeels or use pelagic trawls where these wind farms are located. Query if sandeel fishermen fish to the west of the DBS array site / Dogger Bank SAC?
		Other species – Query as to what pelagic species are targeted to the west of the array area / over the export cable corridor

Figure 3.2.1: Danish Sandeel Fishing Grounds (2018)

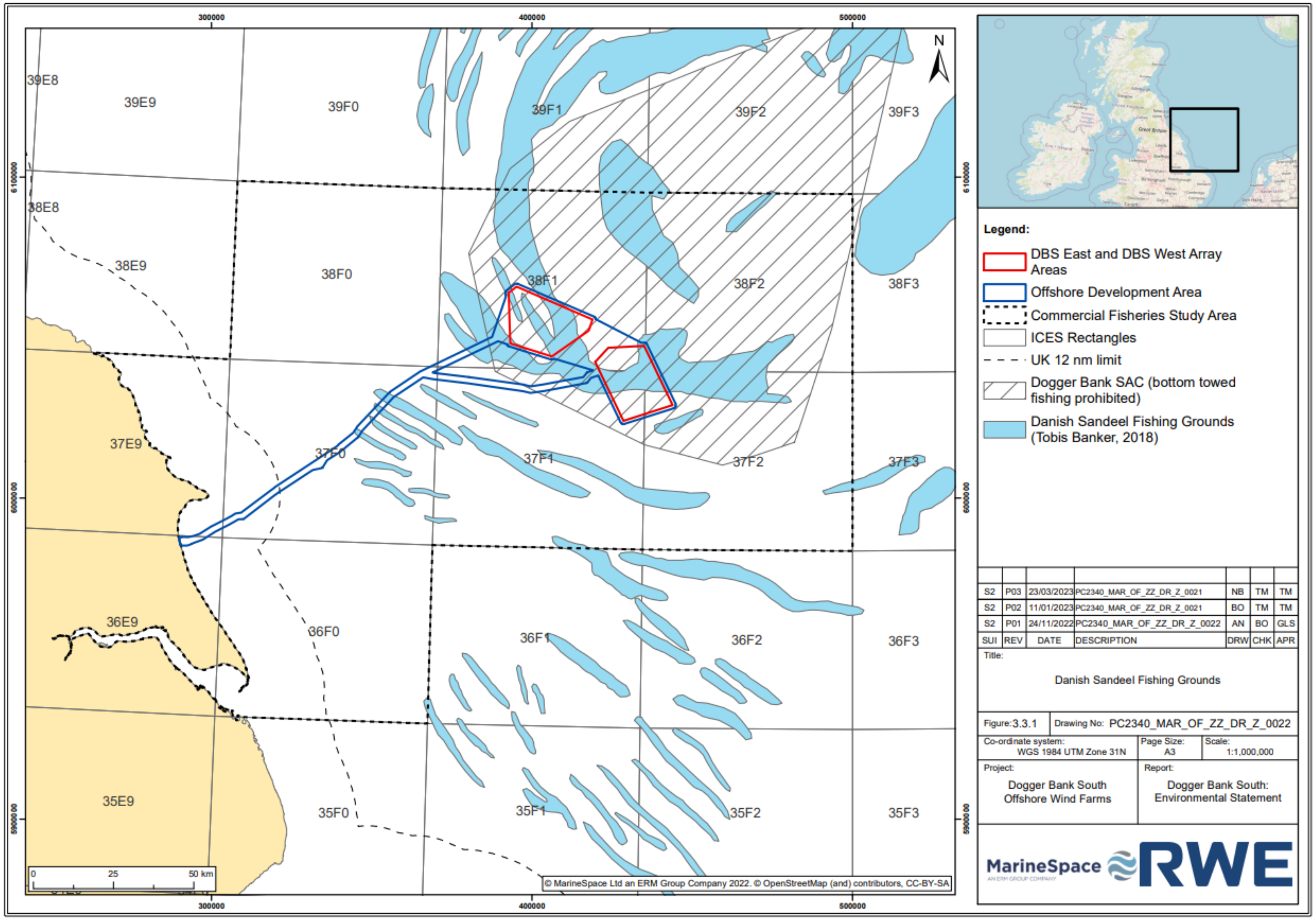


Figure 3.2.2 Danish Sandeel Landed Catch (kg) (2018-2022)

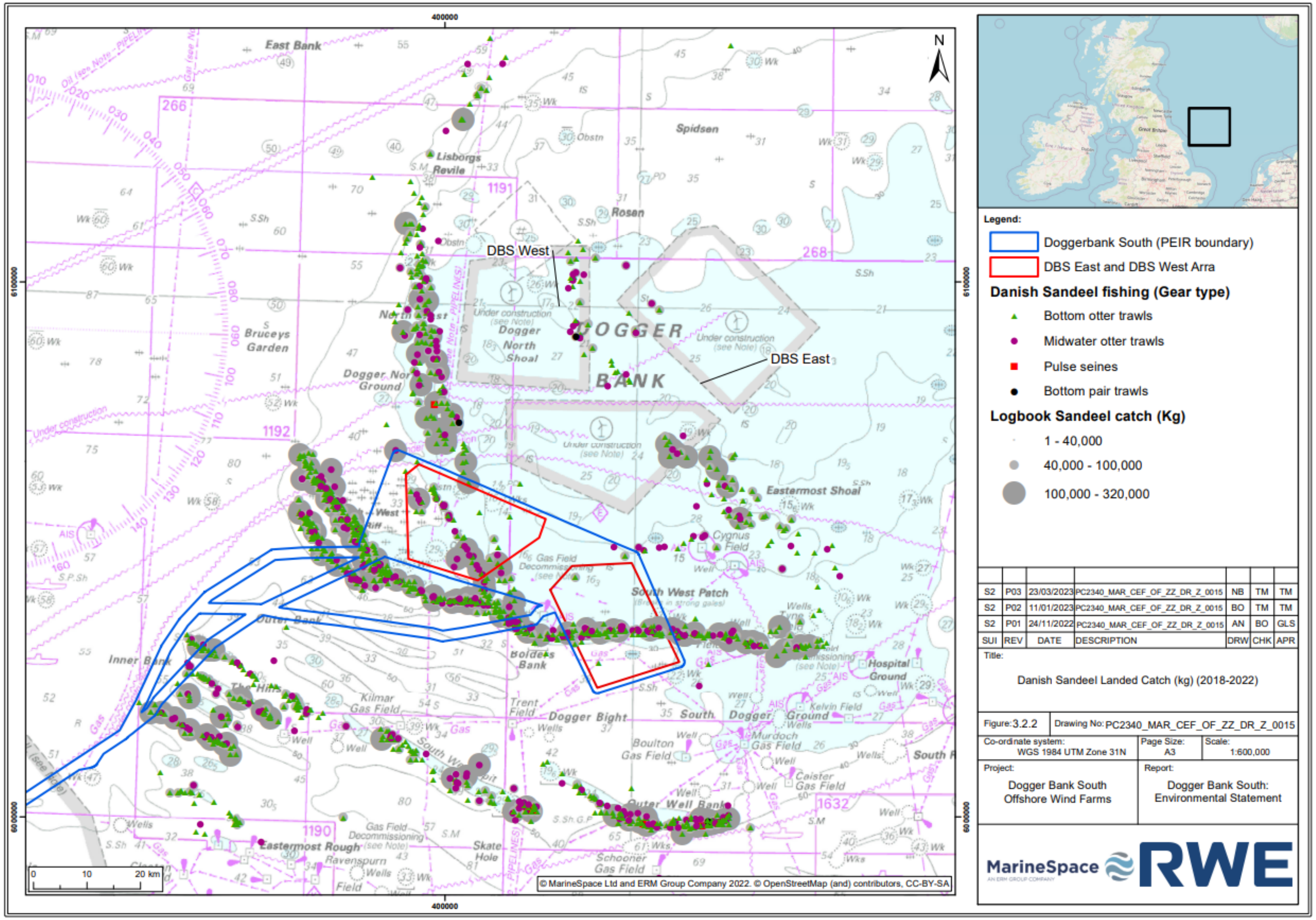


Figure 3.2.3 German Sandeel Landed Catch (kg) (2018-2021)

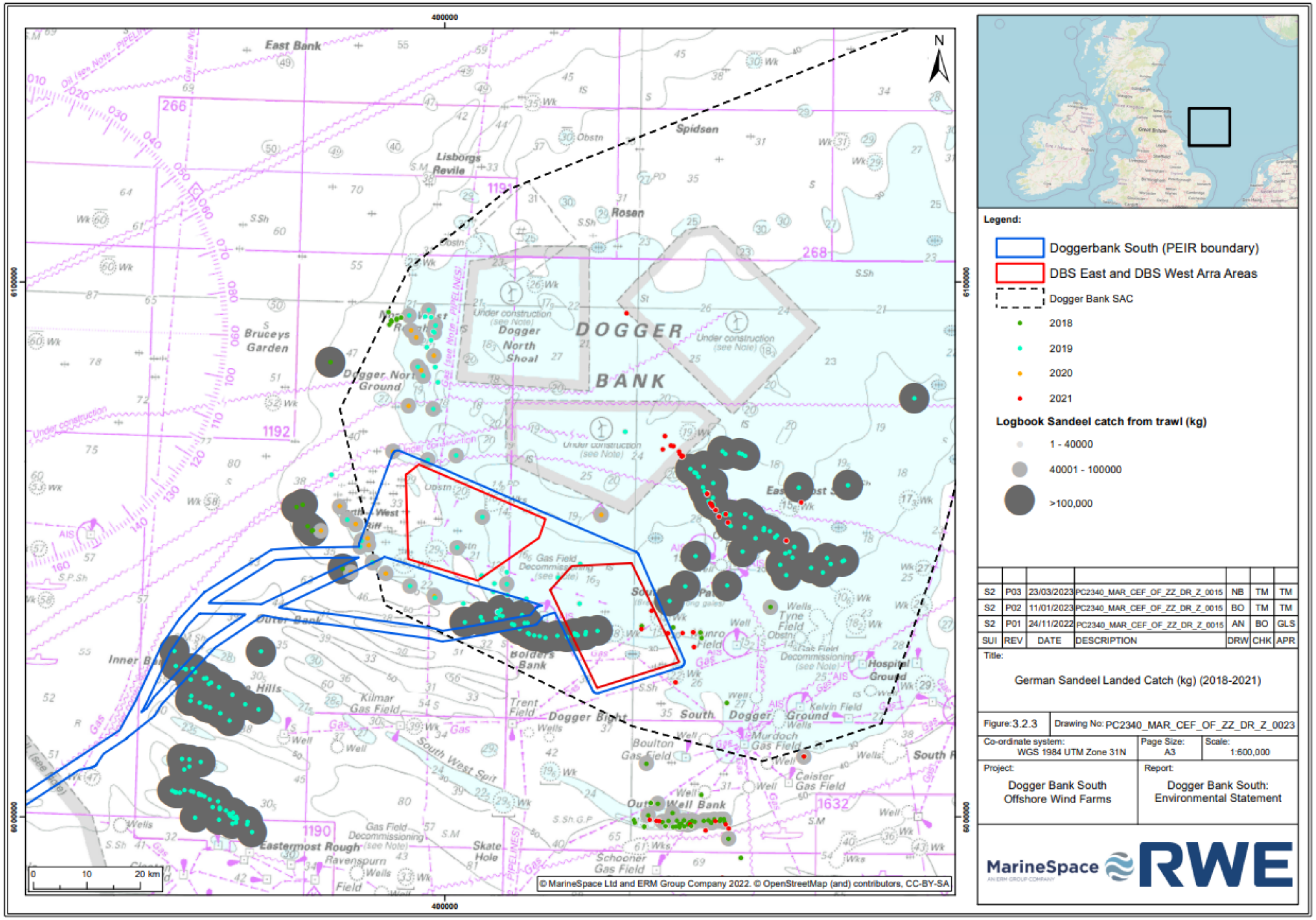
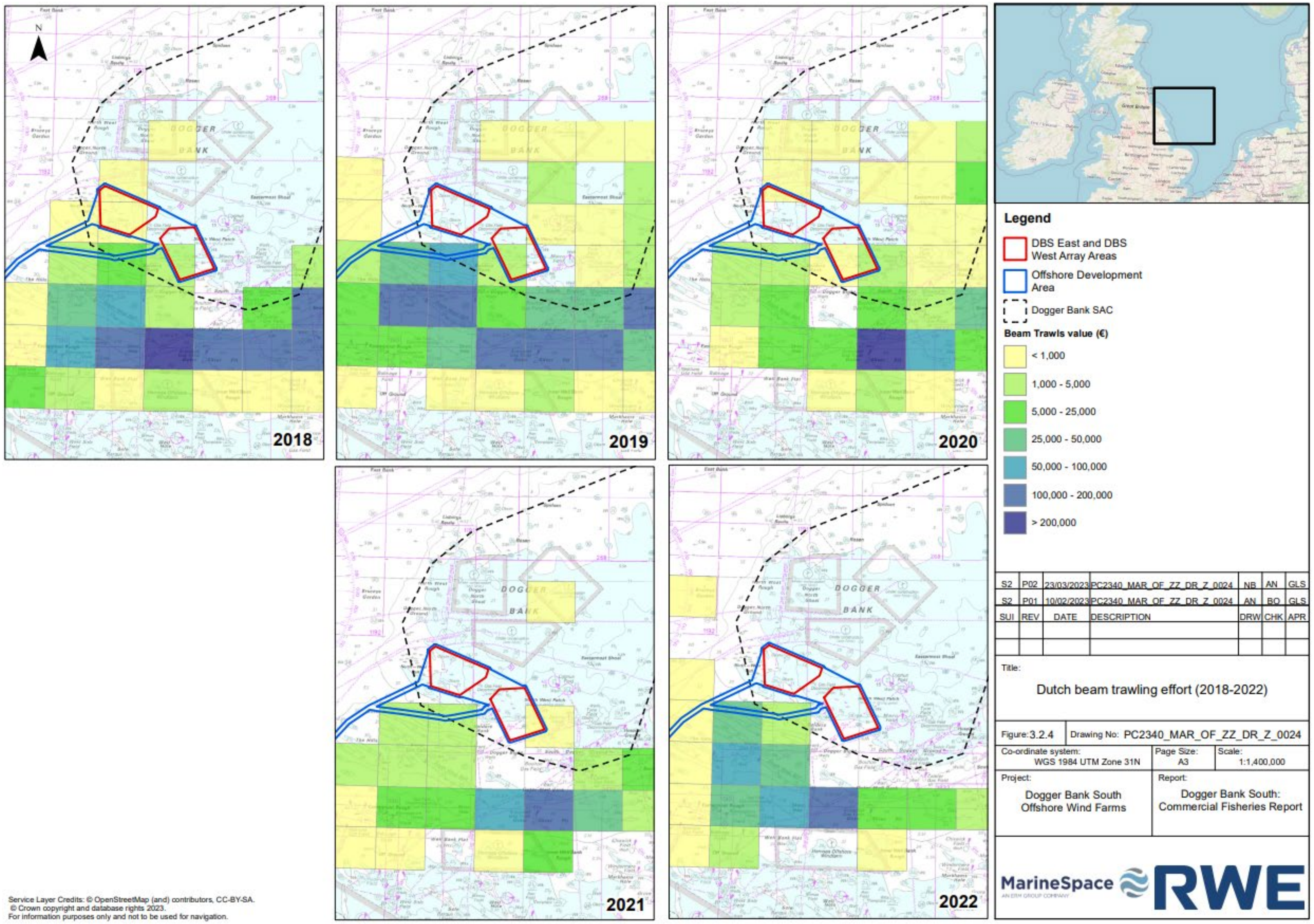


Figure 3.2.4 Dutch beam trawling effort (2018-2022)



4. Future Baseline

The baseline environment for commercial fisheries is constantly evolving, as the fishing industry is dynamic, with frequent and sometime unpredictable changes which affect activity, such as changes in fish abundance and distribution, climatic conditions, management regulations and fuel costs (DECC, 2016).

The most significant change to fisheries in the Commercial Fisheries Study Area is the Dogger Bank SAC byelaw, which was introduced in June 2022, and which prohibits bottom towed fishing (including trawls, seines, dredges, or similar gear) across the whole of the Dogger Bank SAC and a buffer zone. This area overlaps with the entirety of the DBS Array Areas. The byelaw will be reviewed every five years, or sooner if significant new information is received, regarding the impact of fisheries on the SAC. For example, during formal consultation, consultees noted that the sandeel fishery has started utilising pelagic trawl doors which have no/limited contact with the seabed, so the impacts on the SAC are reduced. The MMO has welcomed any evidence to prove that semi-pelagic gears do not cause impacts that would undermine the conservation objectives of the SAC.

As a result of the byelaw, a large proportion of the commercial fishing vessels operating within the DBS Array Areas are now prohibited from fishing there. Therefore, the future baseline, particularly within the DBS array area, will be significantly different than is shown in the official datasets up to 2021. With reduced mobile gear fishing within the DBS Array Areas, more static gear vessels will be able to move into these areas as a result of reduced conflict. The official datasets have indicated that, prior to 2020, there has already been an increase in static gear activity within the Commercial Fisheries Study Area, including within the DBS West array area. Site-specific surveys during 2022 have confirmed sightings of potting gear within the western part of the DBS West array area. This static gear activity is likely to increase in spatial extent, duration, and intensity as a result of the byelaw, as indicated by fisheries stakeholders.

As mobile gear vessels will be displaced from the Dogger Bank area, there is likely to be increased pressure on fishing grounds outside of the Dogger Bank SAC byelaw area, which could include areas of the Offshore Export Cable Corridor. Fisheries stakeholders have indicated that, since the implementation of the byelaw in June 2022, vessels targeting herring and sandeel have shifted south of the DBS Array Areas, and beam trawl vessels have moved further south.

Static gear adaptations and developments to technology could also result in changes to the baseline for fishing activity. For example, recent research has shown that scallops can be caught in illuminated crustacean pots (Enever *et al.,* 2022), which would be permissible under the Dogger Bank SAC byelaw.

Within the Commercial Fisheries Study Area, the impacts of Brexit on the commercial fisheries baseline are uncertain. Fisheries within UK waters were managed through the European Union (EU) Common Fisheries Policy (CFP), prior to the withdrawal of the UK in 2021. Under the new EU-UK Trade and Cooperation Agreement, there is a 5-year transition period, whereby 25% of the EU quota for British waters will be transferred to the UK fishing fleet, phased across the five years until 2025. As a result, the UK will receive higher quota shares for some stocks, as outlined in Table 3.3.1, for species within the North Sea. However, a large proportion of landings within the Commercial Fisheries Study Area are from non-quota shellfish species, so will not be affected by the quota changes. Quota allocations for 2026, and beyond, are likely to be the same as for 2025; and access to EU/UK waters will be subject to annual negotiations.

Table 3.3.1: Quota share changes by 2026 for the UK, for species within the North Sea (ABPmer, 2021)

Stock	2020 UK share of EU quota	2026 UK share of EU/UK quota or TAC	UK quota absolute increase
Herring	24.09%	69.20%	11
Norway Pout	0%	25%	25%
Saithe	16.73%	26%	9%
Sandeel	2.06%	3.20%	1%
Sole	4.28%	17%	13%
Hake	17.97%	20.80%	3%
Cod	46.92%	57%	10%
Anglerfish	81.37%	89.52%	8%
Whiting	66.92%	73.53%	7%
Mackerel	5.33%	6.60%	1%
Lemon sole and witch	61.09%	66.00%	5%
Turbot and brill	15.45%	20.00%	5%
Ling	76.96%	80.00%	3%
Skates and rays	64.77%	69.00%	4%
Sprat	3.79%	3.82%	0%
Megrims	96.20%	96.26%	0%
Nephrops	86.62%	86.62%	0%
Northern Prawn	22.00%	22.01%	0%
Tusk	40.64%	40.54%	0%
Great Silver Smelt	43.33%	43.10%	0%
Blue ling	28.13%	26.81%	0%
Haddock	84.17%	84.17%	0%
Plaice	28.46%	36.62%	-6%

The Onshore Converter Station Fisheries Statement (DEFRA *et al.,* 2022) outlines that Fisheries Management Plans (FMPs) will be produced between 2022-2024, to set out policies which ensure the sustainability of UK fish stocks; measures could include changes to regulations, statutory instruments, technical measures, or voluntary agreements. Outcomes of the FMPs could result in a change to the commercial fisheries baseline; however, these are not currently known.

Other pressures on the fishing industry, such as rising fuel costs or potential designations of marine protected areas could affect the commercial fisheries baseline. The impact of the Covid-19 pandemic may not yet be seen in the official datasets (most recent two years of data are not currently available), but there could be changes within the fishing industry due to adapting to, and recovering from, the pandemic. Restricted access to other MPAs and offshore developments in the region could also affect the fisheries baseline within the Commercial Fisheries Study Area.

5. Summary

A description of baseline fishing activity in the region of the Projects has been undertaken, via a review of official landings and fishing activity data, feedback from fisheries stakeholders and site-specific surveys. Within the Commercial Fisheries Study Area, key commercial fishing fleets were identified, as summarised in Table 3.3.1 and Table 3.3.2.

A large proportion of the UK fishing activity consisted of pot and trap vessels targeting brown crab, lobster and whelk (Table 3.3.1); activity of these vessels overlapped with the inshore parts of the offshore cable corridor at relatively high levels, and overlapped with the western part of DBS West. Demersal trawl/seine vessels, and beam trawl vessels, were active within the eastern part of the Commercial Fisheries Study Area, overlapping with DBS East and the eastern part of DBS West. Scallop dredge vessels showed moderate levels of activity, within the 12 nm limit, of the northern part of the Commercial Fisheries Study Area, which overlapped with the Offshore Export Cable Corridor, particularly in the area around the 12 nm limit. Otter trawl vessels were predominantly active within ICES rectangle 37F0 and 38F2, and caught a range of species, including herring and plaice.

Table 3.3.1: Summary of UK fishing activity in the Commercial Fisheries Study Area

Key Fishing method	Summary within Commercial Fisheries Study Area
Beam trawl	**Key species:** plaice and sole **Vessel size:** >10 m vessels
Demersal trawl/seine	**Key species:** cod, herring, *Nephrops*, plaice, sandeel, sole, turbot and whiting **Vessel size:** >10 m vessels
Dredge	**Key species:** scallop **Vessel size:** Mostly >10 m vessels
Intertidal netters	**Key species:** sea trout, sea bass, sole, mullet, skate, and thornback ray **Vessel size:** n/a
Otter trawl	**Key species:** herring, *Nephrops*, plaice, sandeel, scallop, sprat, and turbot **Vessel size:** Mostly >10 m vessels, although the majority of otter trawlers targeting scallop were <10 m
Static gear inshore	**Key species:** brown crab, lobster, and whelk **Vessel size:** <10m vessels active inshore
Static gear offshore	**Key species:** brown crab, lobster, and whelk **Vessel size:** >10m vessels operating further offshore, with increasing spatial extent

Non-UK fishing activity within the Commercial Fisheries Study Area consisted of predominantly otter trawl vessels targeting herring and sandeel and, to a lesser extent, pelagic trawl vessels catching mostly herring, sprat and sandeel types (Table 3.3.2). Otter trawl activity overlapped with the DBS Array Areas and the offshore cable corridor but was generally higher north and southeast of the DBS Array Areas in discrete patches. Pelagic trawl vessels were active across the Commercial Fisheries Study Area, with highest landings from ICES rectangle 37F0. Beam and bottom trawl vessels were also active, but landings were significantly lower by these gear types; beam trawl activity was relatively high in the southeast of the Commercial Fisheries Study Area and there was limited overlap with the DBS Array Areas and Offshore Export Cable Corridor.

Table 3.3.2: Summary of non-UK fishing activity in the Commercial Fisheries Study Area

Key Fishing method	Summary within Commercial Fisheries Study Area
Beam trawl	**Key species:** plaice and sole **Nationalities:** Belgian, Dutch, and German
Bottom trawl/seine	**Key species:** cod, mackerel, *Nephrops*, plaice, sandeel, sprat and whiting **Nationalities:** Belgium, Danish, Dutch, French and German
Pelagic trawl	**Key species:** herring, mackerel, sprat, sandeel and whiting **Nationalities:** Danish, Dutch, French, German and Swedish
Otter trawl	**Key species:** herring and sandeel **Nationalities:** Danish, Dutch German and Sweden

As a result of Brexit and the Dogger Bank SAC byelaw, there are likely to be changes to the baseline over the coming years. For example, static gear activity, particularly within the offshore areas of the Commercial Fisheries Study Area and the DBS Array Areas, is likely to increase in spatial extent, duration, and intensity as a result of the byelaw.

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