BRITISH TELECOMMUNICATIONS PLC

R100 Scottish Isles Telecommunications Project

Technical Appendix F - Fishing Activity Study - Orkney

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DOCUMENT RELEASE FORM

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R100 Scottish Isles Telecommunications Project

Technical Appendix F - Fishing Activity Study - Orkney

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GLOSSARY

AIS
Automatic Identification System

BAP
Biodiversity Action Plan

BMH
Beach Manhole

BT
British Telecommunications plc

cm
Centimetre

DTS
Desk Top Study

EU
European Union

FAS
Fishing Activity Study

FLMAP
Fisheries Liaison Mitigation Action Plan

FLO
Fisheries Liaison Officer

FPO
Fish Producers Organisation

ICES
International Council for the Exploration of the Sea

IUCN
International Union for Conservation of Nature

NM
Nautical Mile

m
Metre

MarLIN
Marine Life Information Network

MEA
Marine Environmental Appraisal

mm
Millimetre

MMO
Marine Management Organisation

MS
Marine Scotland

NMPi
National Marine Planning Interactive Tool

NtM
Notice to Mariners

PMF
Priority Marine Feature (Scotland)

R100 Project Area
Orkney, Shetland and Inner Hebrides

TAC
Total Allowable Catch

VMS
Vessel Monitoring System

1. INTRODUCTION

1.1 Project overview

The marine elements of the R100 Project are to install sixteen telecommunication cables to extend superfast broadband (30Mbps+) coverage across Shetland, Orkney, and the Inner Hebrides. These new cables will form part of the Scottish Government's 'Reaching 100%' (R100) programme contracted to BT Plc. The sixteen cables are across three geographical regions: Orkney, Shetland and the Inner Hebrides, as follows:

- Orkney – Seven routes
- Shetland – Five routes
- Inner Hebrides – Four routes

This Fishing Activity Study (FAS) has been drafted to support the Marine Environmental Appraisal (MEA) for the Orkney geographical area. A full project description for installation of the R100 cable corridors is provided in Section 2 of the MEA Report, Document Reference (P2308_R5391).

1.2 Scope and objectives

This report focuses on the fishing activity within the Orkney Island geographical area (Figure 1-1, Drawing reference: P2308-FISH-001_OR_B).

The purpose of this report is to review fishing activity within the Orkney geographical area and identify the relative importance of the geographical area to the fishing industry. It has been informed by a review of the latest publicly available fisheries data and literature for the geographical area.

A separate Fisheries Liaison Mitigation Action Plan (FLMAP) has been prepared which details the potential impacts of the proposed R100 Project on fisheries and provides a mitigation plan. The FLMAP also includes an overview of the fisheries liaison and consultation that has been undertaken. A full list of consulted fish producer organisations (FPO's) is provided in the FLMAP (Appendix F to the MEA).

The findings of this Fishing Activity Study (FAS) and the FLMAP have been used to inform Section 6 of the MEA Report – The Human Environment.

1.3 Orkney Geographical Area

The UK Government take International Council for the Exploration of the Sea (ICES) scientific advice on fisheries management. ICES gather data across the UK Continental Shelf and divide the area into ICES areas. The ICES areas are subdivided into ICES statistical rectangles. Each ICES rectangle is used for statistical purposes and is '30 min latitude by 1 degree longitude' in size (approximately 30 nautical miles by 30 nautical miles). The Orkney geographical area falls within four ICES rectangles, as shown in Figure 1-1 (Drawing reference: P2308-FISH-001_OR_B). Table 1-1 provides a breakdown for the ICES rectangles crossed for each proposed cable corridor in the Orkney geographical area. Comparison of the statistics for each rectangle provides a spatial picture of the differences in species caught and fish landings for each rectangle.

Figure 1-1 Orkney Geographical Area Cable Corridors and ICES Rectangle (P2308-FISH-001_OR_B)

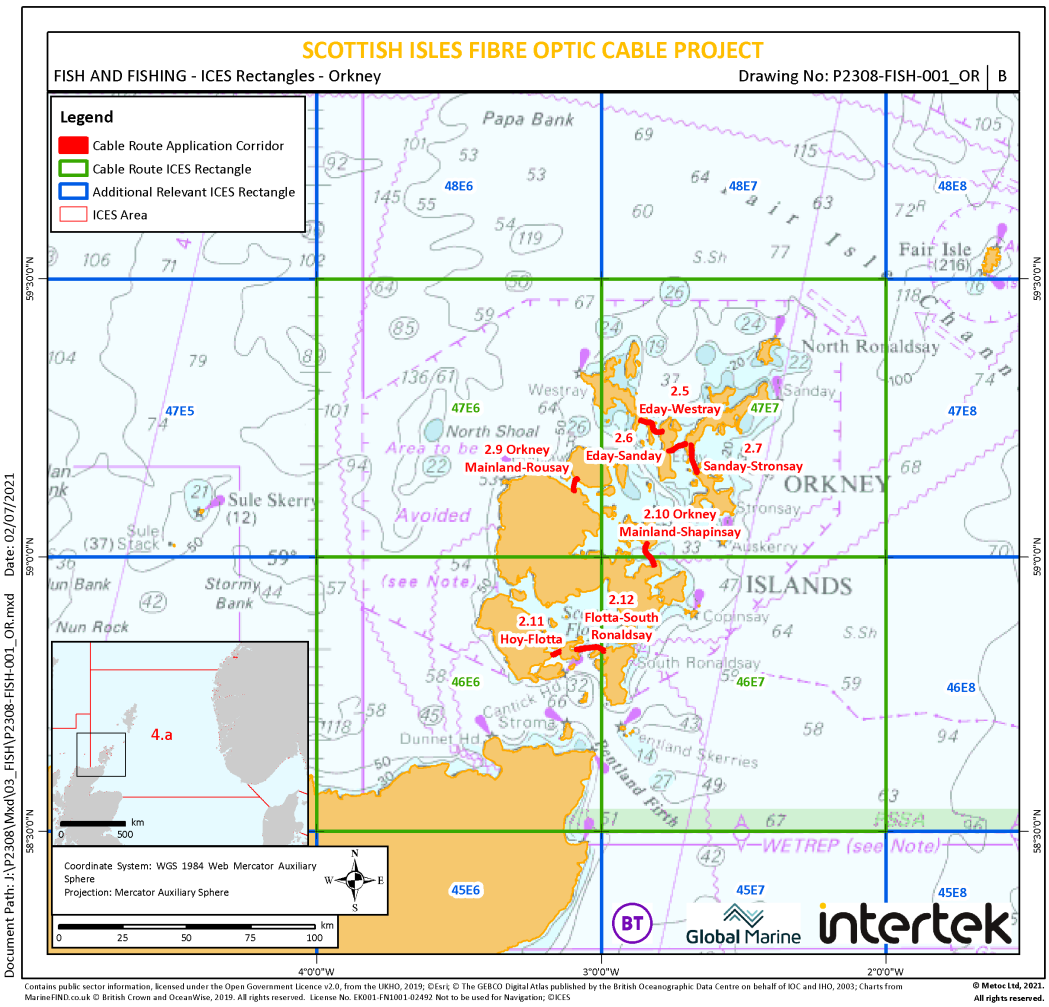


Table 1-1 Summary of ICES Rectangles in relation to Orkney geographical area

Orkney Cable Corridors	ICES Area	ICES rectangle			
		46E6	46E7	47E6	47E7
2.5 Eday-Westray	IVa				✓
2.6 Eday-Sanday	IVa				✓
2.7 Sanday-Stronsay	IVa				✓
2.9 Orkney Mainland-Rousay	IVa			✓	
2.10 Orkney Mainland-Shapinsay	IVa		✓		✓
2.11 Hoy-Flotta	IVa	✓			
2.12 Flotta-South Ronaldsay	IVa	✓	✓		

2. DATA SOURCES

This report presents the latest fisheries information gathered as part of a desktop geographical study to provide relevant details of the fishing methods and fisheries activity that takes place in the vicinity of the R100 Project. The most recently available and / or most relevant (at the time of writing) data sources have been used throughout this report. The primary sources of information used to inform the description of the fisheries activities are as follows:

Statistics on the Scottish fleets

- Scottish Sea Fisheries Statistics 2019 (Scottish Government 2020).
- 2019 UK Sea Fisheries Statistics (Marine Management Organisation, MMO 2020a).
- Inshore Fisheries Management Plan Orkney (Orkney Sustainable Fisheries Ltd 2016).

Mapping tools for Scotland

- National Marine Planning Interactive (NMPi) tool (Marine Scotland 2021).

GIS data set

- 2019 Fishing Vessel Density (EMODnet 2020).
- 2017 Fishing – tonnage, effort, and value maps for UK vessels over 15 m (MMO 2020b).
- 2009 - 2013 amalgamated Vessel Monitoring system (VMS) intensity layers (Marine Scotland 2016).

Consultation with fisheries stakeholders as part of the FLMAP (Seagard 2021) has been incorporated into the FAS and is referenced where applicable.

The most important target species presented in Section 4 were identified through the Inshore Fisheries Management Plan (Orkney Sustainable Fisheries Ltd 2016).

The main fishing methods and gear types presented in Section 4 were also identified through analysis of the statistics and landings data (Scottish Government 2020, MMO 2020a). Descriptions of the fishing gear and methods were based on British Seafishing (2020), Seafish (2019) and Galbraith & Rice (2004).

Where possible this data set has been supplemented by information from consultation with the appropriate fish producer organisations (FPOs). Additional data resources are referenced throughout this report.

3. SCOTTISH FISHING FLEETS

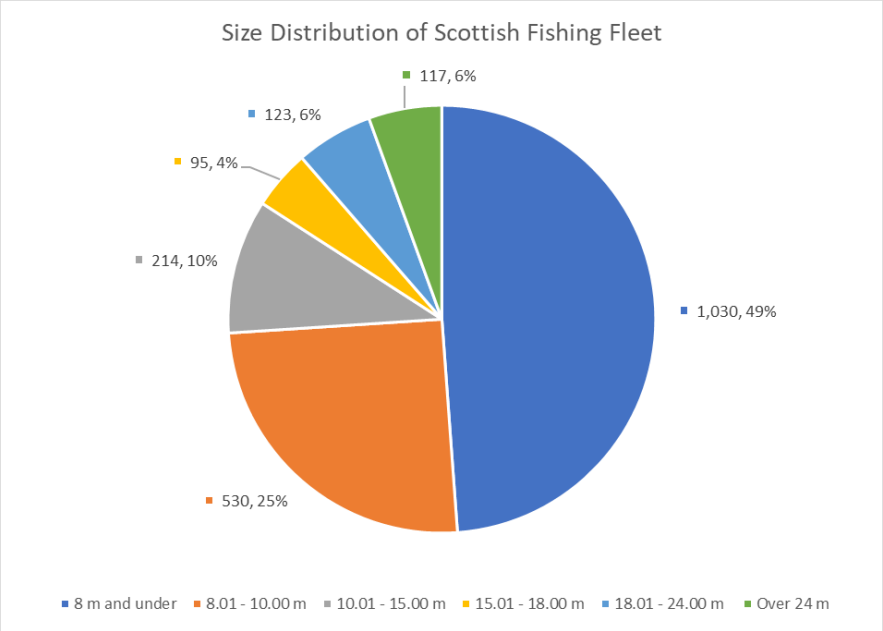
3.1 Fleet size and composition

3.1.1 Scotland

The total number of active fishing vessels registered in the United Kingdom in 2019 was 5,911 (MMO 2020a). It should be noted that more recent data is published than 2019 but does not include data split by type, only by length, therefore the previous year data provides a reflection of the Scottish fleet by type and length.

The Scottish fleet consists of 2,109 vessels (36 % of the total UK vessels) and is predominantly made up of vessels under 10 m in length. The breakdown of vessels by length is shown in Figure 3-1 below:

Figure 3-1 Size Distribution of Scottish Fishing Fleet



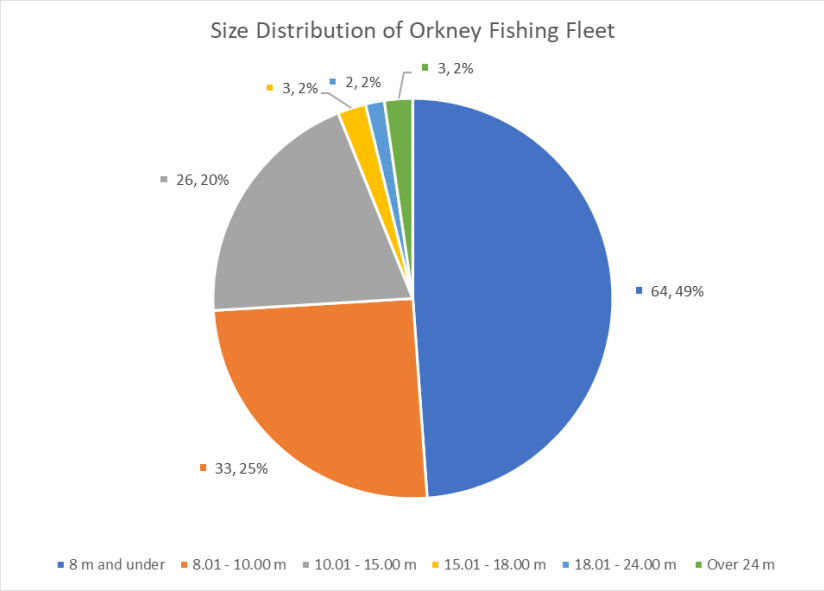
Source: MMO (2020)

The size distribution of fishing vessels has a significant impact on the interpretation of recorded fishing activity and landings data. Only vessels over 10 m in length are required to record their landing data, and only vessels over 15m in length are required to have Automatic Identification System (AIS) equipment to record their position. These two factors mean that it is likely that there is an under-representation of fishing activity in the available statistics and spatial patterns due to the large percentage of vessels that fall under 10 m (74 %) and 15 m (84 %). The Inshore Fisheries Management Plan Orkney (Orkney Sustainable Fisheries Ltd 2016) has been used to inform the report in addition to fisheries consultation to identify the gaps and a reflection of the fishing activity within the Orkney geographical area.

3.2 Fishing ports

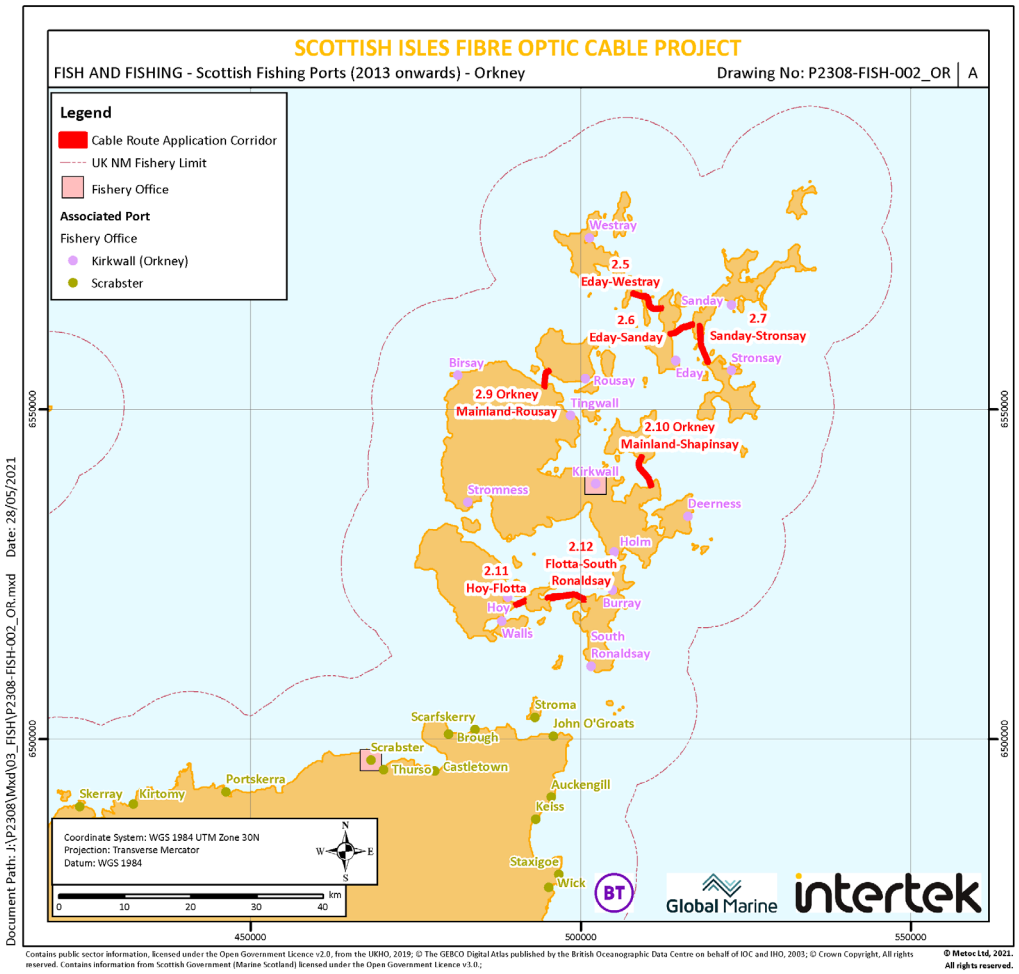
In Scotland, there are a total of 148 fishing ports divided over 18 districts. The fishing ports in the Orkney geographical area are all associated with the Orkney District with the Fishery Office located in Kirkwall. The distribution of the size of vessels registered in Orkney district is shown in Figure 3-2. Of these, 64% are under 10m and 94% are under 15m in length. This shows that the vessels registered in Orkney are representative of the Scottish Fleet as a whole. Figure 3-3 (Drawing reference: P2308-FISH-002_OR) provides the location of the Orkney fishing ports in relation to the proposed cable corridors.

Figure 3-2 Size Distribution of Orkney Fishing Fleet



Source: MMO (2020)

Figure 3-3 Scottish Fishing Ports (2013 onwards) – Orkney (P2308-FISH-002_OR)



4. TARGET SPECIES AND FISHING METHODS

4.1 Introduction

The following section provides the details of the target species and fishing methods used in the Orkney geographical area. Fishing techniques used within the geographical area include potting, dredging, diving and aquaculture. The spatial distribution of fishing vessels within the MMO statistical data indicate that larger vessels likely to be engaged in pelagic fish catches are recorded in the region. However, these vessels are predominantly located and active further offshore and outside of the R100 Project area, therefore they are less likely to come into contact with the cables and these methods have not been described here.

4.2 Target species

The proposed cable installation within the Orkney geographical area will be within the inshore fisheries area (within 6NM of the coast). Table 4-1 provides an overview of the key inshore fisheries markets in the Orkney geographical area, with weight and value information for 2014 (Orkney Sustainable Fisheries Ltd 2016). In addition to these key inshore target species which are dominated by static gear, there may also be mobile shell fishing for species such as nephrops, demersal fisheries, hand lined mackerel and fish processing activities. Nephrops are a high value catch and are fished using mobile gear in the Orkney geographical area, which occurs further offshore.

Table 4-1 Target species within the Orkney inshore area (2014)

Target species	Total Weight Landed (tonnes)	Total Sale Value (£)	Fishing Method
Brown crab (*Cancer pagurus)*	2810	£3,754,000	Pots and creels
European lobster (*Homarus gammarus*)	146	£1,468,000	Pots and creels
Velvet swimming crab (*Necora puber*)	490	£1,277,000	Pots and creels
Green crab (*Carcinus maenas*)	117	£78,000	Pots and creels
Scallops (*Pectinidae*)	254	£686,000	Dredging and diving

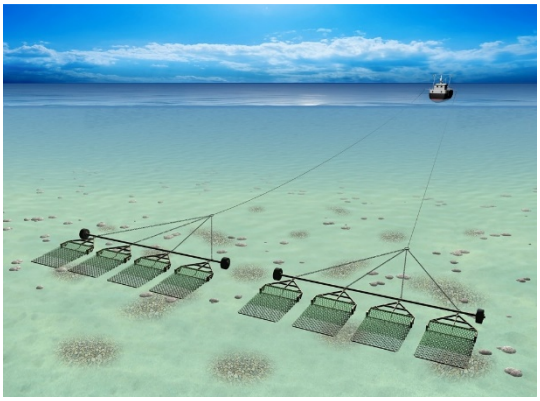
4.3 Scallop dredging

Dredging is a fishing method by which metal dredgers are towed across the seabed to collect shellfish and bivalves. Each dredge consists of a rigid triangular steel frame and a tooth bar, behind which a mat of linked steel rings is secured (Figure 4-1). As scallops usually lie buried in sand and fine gravel, they are raked out by the teeth and swept into a collecting bag. Hydraulic dredgers also exist which spray jets of water onto the shellfish to dislodge them from their location. Large vessels can drag as many as twenty cages behind them (Figure 4-2).

Figure 4-1 Photo of four dredges

Source: Seafish (2019)

Figure 4-2 Schematic showing dredges towed behind a vessel

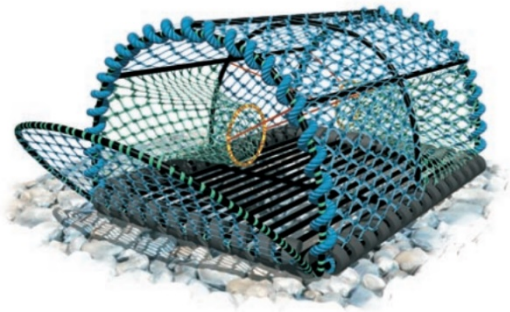


Source: Seafish (2019)

4.4 Pot fisheries

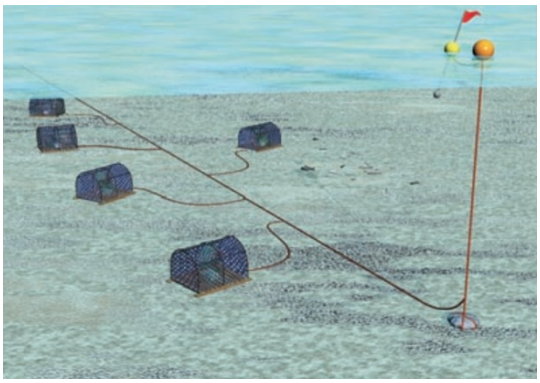
Pots and creels, static traps made of metal or wood and rope (Figure 4-3), are used to target active scavenging crustaceans such as brown crab, velvet swimming crab, European lobster and *Nephrops*. Their design lets crabs, lobsters and *Nephrops* enter the pot to take the bait, after which they cannot escape. The pots and creels are baited with dead fish and lowered to the seabed on ropes, usually about a dozen at a time. A buoy is used to mark the location (Figure 4-4), with fishermen returning to retrieve their catch after a day or two (British Sea Fishing 2020).

Figure 4-3 Traditional 'D' shaped creel



Source: Galbraith & Rice (2004)

Figure 4-4 Creels attached to a buoy



Source: Galbraith & Rice (2004)

4.5 Diving

Diving for scallops involves collecting scallops by hand from the seabed. Although this method requires much more effort and quantities landed through diving are considerably lower than through dredging, scallops are landed in pristine condition so are more valuable. Dive-caught scallops are generally regarded as more sustainable than traditionally caught scallops. However, as divers can get to areas where vessels cannot, there are concerns that dive fishing has impacts on the stock by collecting from potential sources of spawning.

4.6 Aquaculture

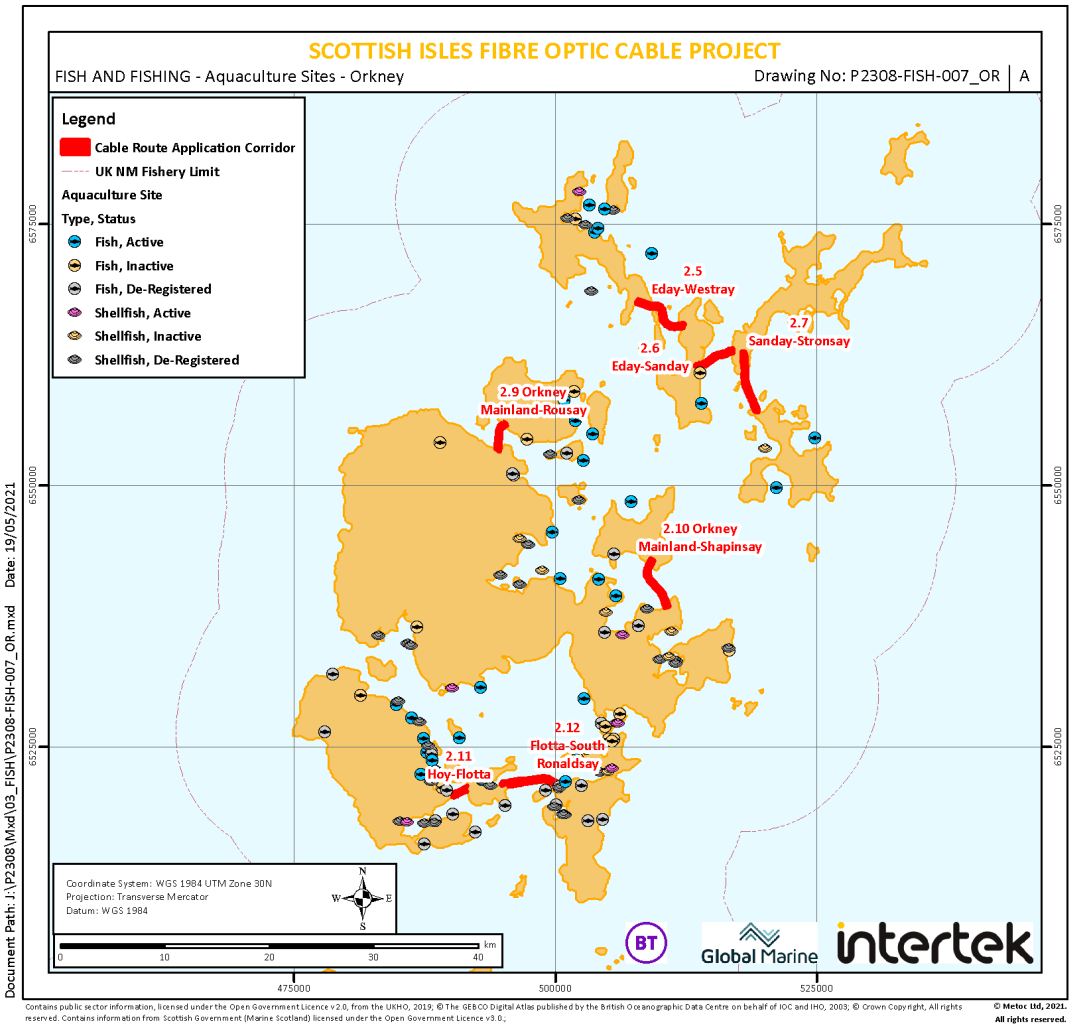
Within the Orkney geographical area, aquaculture is an important contribution to the local and regional economy (Figure 4-5, Drawing Reference: P2308-Fish-007OR). Aquaculture is permitted out to 3 nautical miles (NM) within the Orkney geographical region. Aquaculture includes farming of finfish and shellfish species. Of the seven cable corridors within the Orkney geographical area six of the cable corridors avoid aquaculture sites entirely. One closed fish aquaculture site (Dam of Hoxa) is located within Cable Corridor 2.12 Flotta-South Ronaldsay. There are a number of active aquaculture sites for finfish and shellfish located within 5km of the cable corridors as identified within Table 4-2. Of these the closest is the inactive Kirk Tang site which is 197m from cable corridor 2.6 Eday-Sanday (Marine Scotland 2021).

Table 4-2 Summary of ICES Rectangles in relation to Orkney geographical area

Orkney Cable Corridors	Aquaculture Sites within 5km of cable corridor
2.5 Eday-Westray	One active finfish aquaculture site: Skelwick Skerry and two inactive or de-registered sites: Bay of Tuqoy and Kirk Taing
2.6 Eday-Sanday	One active aquaculture site: Noust Geo and one inactive site: Kirk Taing
2.7 Sanday-Stronsay	One active aquaculture site: Noust Geo and two inactive: Kirk Taing and St Catherine's Bay
2.9 Orkney Mainland-Rousay	Two inactive aquaculture sites: Whelkmulli Bay and Pump Ashore Site
2.10 Orkney Mainland-Shapinsay	Two active aquaculture sites: Carness Bay and Meil Bay, two inactive shellfish sites Mirkady Beach and Deer Sound, and two de-registered sites: Yinstay Skerris and Elwick Bay
2.11 Hoy-Flotta	Five active aquaculture sites: South Cove, Pegal Bay, Fara West, Millburn and North Bay West. Eleven inactive or de-registered sites: Rysa Sound, Rysa Little, Ore Bay, Myre Bay, Kirkhope, Longhope, Stranger Head, Point of Cletts, Mill Bay, North Bay, Panhope Bay
2.12 Flotta-South Ronaldsay	Two active aquaculture sites: Hunda and Loster Rock. Eight inactive or de-registered sites: Dam of Hoxa, Panhope, Stranger Head, Hunda Sound, Echnaloch Bay, Site 1, Water Sound and St Margarets Hope

Source: Marine Scotland (2021)

Figure 4-5 Aquaculture Sites within the Orkney Geographical area (P2308-Fish-007_OR)



5. SPATIAL FISHING PATTERNS

5.1 Introduction

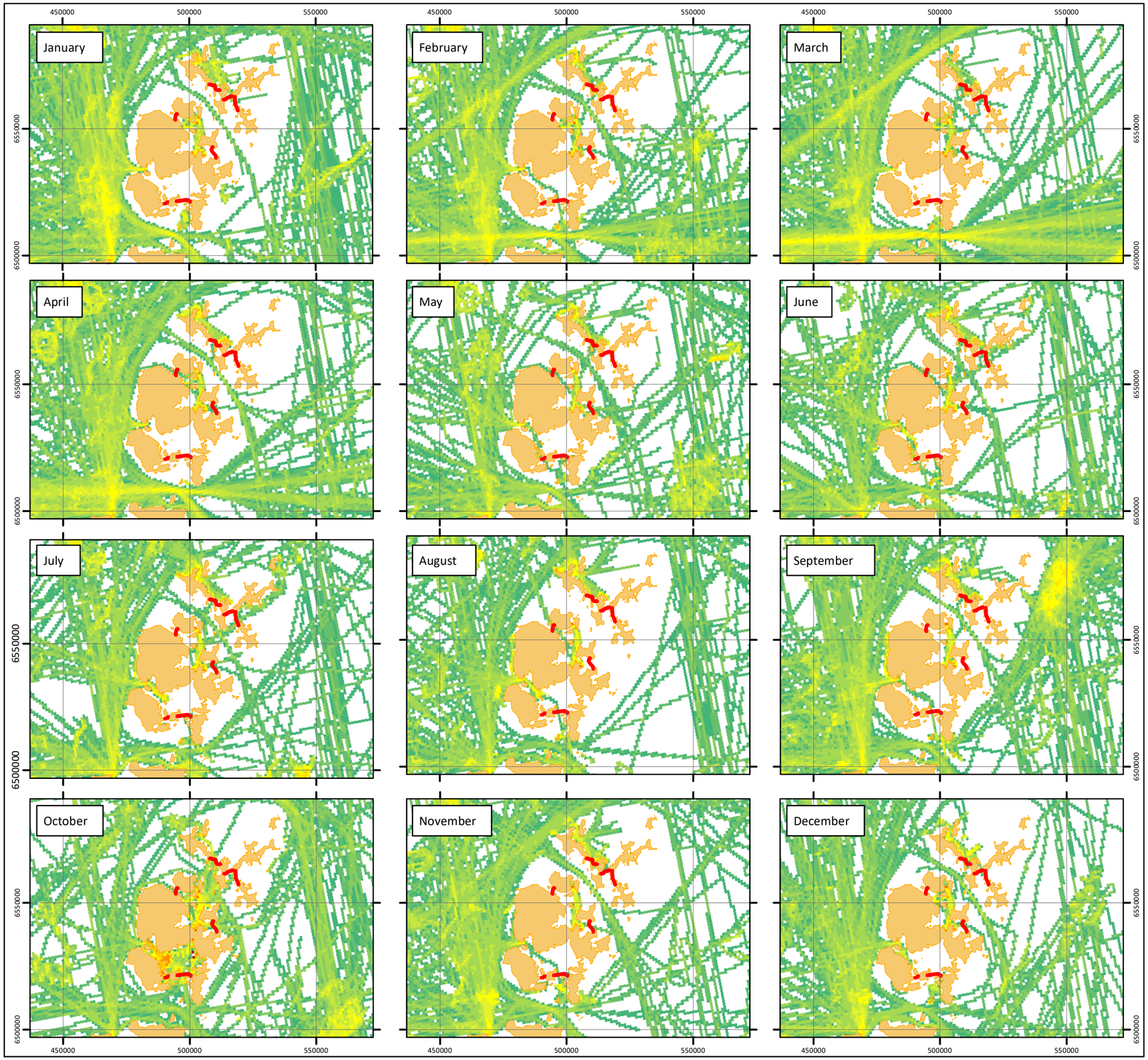
This section summarises the spatial patterns of fishing activity. Vessel Monitoring System (VMS) data is provided through the use of AIS equipment for all vessels over 15 m in length. Whilst this can show a good representation of the larger scale fishing efforts from larger vessels, it cannot be used to infer the patterns of smaller, particularly inshore fishing vessels.

5.2 Vessel density

Figure 5-1 (Drawing reference: P2308-SHIP-001_OR) shows the monthly vessel density of fishing vessels over 15 m in length in relation to the eight proposed cable corridors. Monthly AIS vessel density is moderate – high off the West and South coast of Orkney all year round with particularly busy traffic through the Pentland Firth to the south of Orkney between February and April (EMODnet 2020 and Marine Scotland 2016). In September, AIS fishing vessel density increases off the north-east coast of Orkney.

5.3 Fisheries

Figure 5-2 (Drawing reference: P2308-FISH-006_OR) shows the amalgamated VMS fishing intensity for targeted species for the period 2009-2013 (EMODnet 2020 and Marine Scotland 2016). This reinforces the provided summary of key species being shellfish such as crab, European lobster, and scallops. Whilst the VMS intensity data shows that demersal and pelagic fishing with vessels over 15 m is present within the same ICES rectangles as the proposed cable corridors, it is more concentrated on the waters outside the Orkney islands as opposed to inshore waters.



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

AIS VESSEL DENSITY
Monthly Vessel Density
Fishing Vessels - Orkney

Drawing No: P2308-SHIP-001_OR | **A**

Legend

Cable Route Application Corridor

2019 Vessel Density

Vessel Hours (per km²)

- 0
- < 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 20
- 20 - 50
- 50 - 100
- 100 - 200
- 200 - 500
- > 500

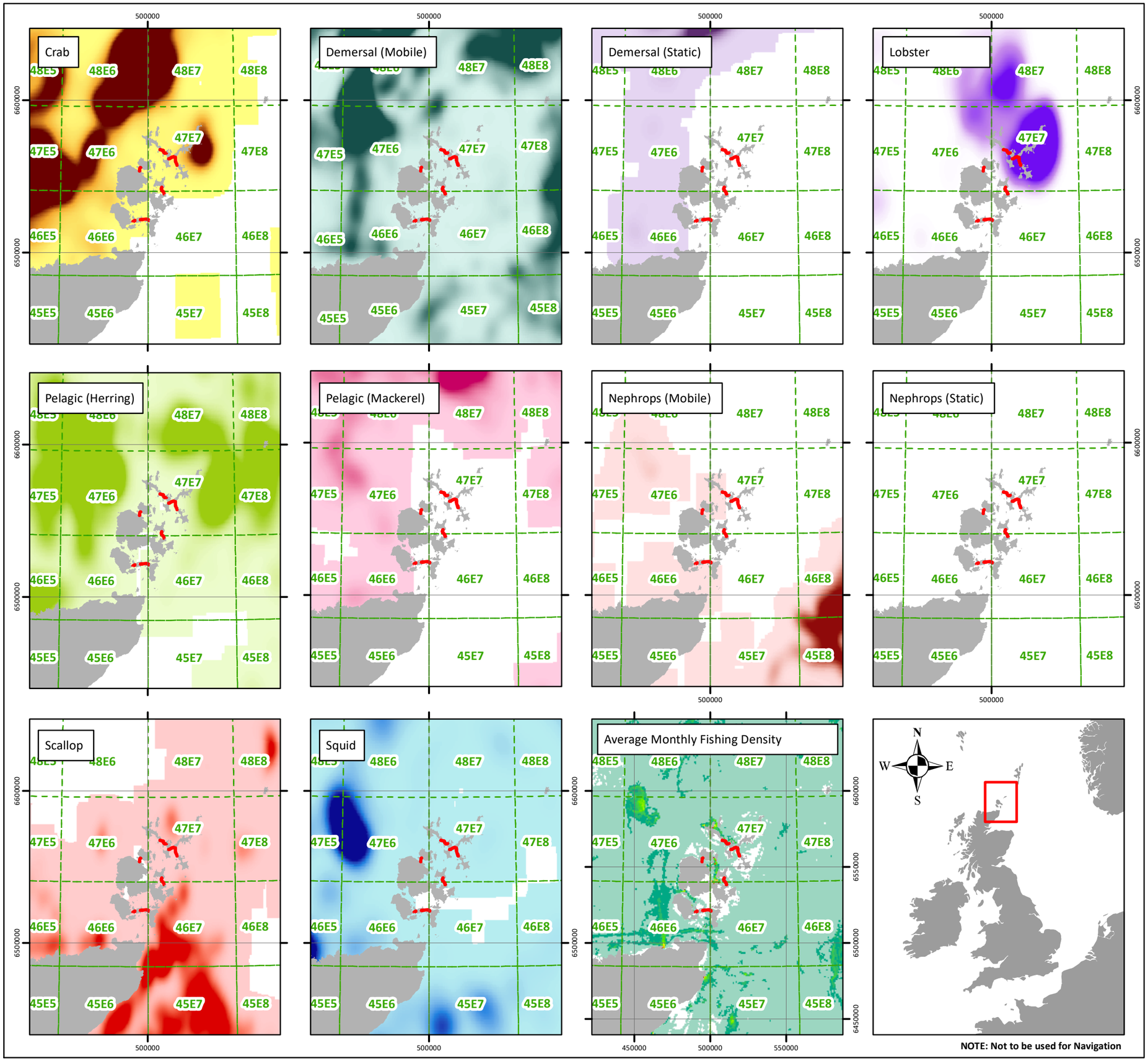
N W E S

NOTE: Not to be used for Navigation

Date	17 June 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	EMODnet; GEBCO; ESRI; MarineFind
File Reference	J:\P2308\Mxd\04_SHIP\ P2308-SHIP-001_OR.mxd
Created By	Chris Dawe
Reviewed By	Abigale Nelson
Approved By	Paula Daglish

BT Global Marine intertek

0 20 40 60 80 km



NOTE: Not to be used for Navigation

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

FISH AND FISHING
Average Fishing Intensity (Hours) 2009-2013
Orkney

Drawing No: P2308-FISH-006_OR | **A**

Legend

- Cable Route Application Corridor
- ICES Rectangle

Monthly Average Fishing Vessel Intensity (2019)

Vessel Hours per km² (log scale)
High : 100
Low : 0

Amalgamated VMS Intensity
2009 - 2013 - by Species

Crab
High : 0.96
Low : 0

Pelagic - Herring
High : 0.73
Low : 0

Scallop
High : 0.81
Low : 0

Demersal mobile
High : 0.47
Low : 0

Pelagic - Mackerel
High : 1.69
Low : 0

Squid
High : 5.33
Low : 0

Demersal static
High : 1.19
Low : 0

Nephrops mobile
High : 0.62
Low : 0

Lobster
High : 2.22
Low : 0

Nephrops static
High : 19.86
Low : 0

Date	19 May 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	UKHO; GEBCO; MS: EMODnet; Esri
File Reference	J:\P2308\Mxd\03_FISH\ P2308-FISH-006_OR.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Paula Daglish

BT Global Marine intertek

0 30 60 90 120 km

6. FISH LANDINGS DATA

6.1 Scottish sea fisheries statistics

6.1.1 Landing Data

Landing tonnage and their respective value provide a good indication of the importance of commercial fishing in an area. The proposed cables in Orkney are located within ICES rectangles 46E6, 46E7, 47E6 and 47E7.

The Scottish Sea Fisheries Statistics have been used for the most recently available 5 years data (2015 – 2019). The average annual value of fish and shellfish landed per ICES rectangle during this period for the specified rectangles was approximately £5.7 million, with 46E6 having the lowest average of £3.7 million and 46E7 the highest average of £8.9 million. The average annual tonnage was 5,209 tonnes (Marine Scotland 2020) with the same pattern showing 46E6 having the lowest average of 2,963 tonnes and 47E7 the highest average of 11,075 tonnes. The overall catch data is sub-divided into fisheries targeting bottom living or demersal fish (including cod, haddock, monkfish and ling); mid-water and surface or pelagic fish (including mackerel and herring); and shellfish (including nephrops, edible crab, velvet swim crab, lobster and squid), with information available at species level within each group.

6.1.2 Species Type

Tables 6-1 to Table 6-4 summarise the annual catch value and species type per ICES rectangle for each fisheries type over the past 5 years within the Orkney geographical area.

ICES rectangle 46E6 is located to the southwest of Orkney and encompasses two of the proposed Cable Corridors: 2.11 Hoy – Flotta and 2.12 Flotta-South Ronaldsay. The statistical data in Table 6-1 indicate that rectangle 46E6 is important for shellfish both by quantity and value over the period considered. Demersal species are highly valuable, but the catch is variable across the years. It should be noted that the 46E6 rectangle encompasses waters to the southwest of Orkney where the pelagic fishing is likely to take place. Pelagic fisheries are not a key component of Orkney inshore waters where the cables are located (Orkney Sustainable Fisheries Ltd 2016).

Table 6-1 Annual catch quantity and value per species type for ICES rectangle 46E6

Year	Quantity (tonnes)				Price (£)			
	Demersal	Pelagic	Shellfish	Total	Demersal	Pelagic	Shellfish	Total
Average	**854**	**1,054**	**1,054**	**2,962**	**£1,319,945**	**£371,143**	**£2,036,769**	**£3,727,857**
2015	1,388	15	1,030	**2,433**	£2,159,456	£9,800	£1,998,835	**£4,168,091**
2016	700	386	630	**1,716**	£884,655	£124,361	£1,146,883	**£2,155,899**
2017	824	2,869	935	**4,628**	£1,369,599	£972,137	£1,668,942	**£4,010,678**
2018	166	1,985	1,469	**3,620**	£231,955	£738,659	£2,712,997	**£3,683,611**
2019	1,195	15	1,208	**2,418**	£1,954,059	£10,760	£2,656,191	**£4,621,010**

Source: Scottish Government (2020)

ICES rectangle 46E7 is located to the southeast of Orkney and encompasses two of the proposed cable corridors: 2.10 Orkney Mainland – Shapinsay and 2.12 Flotta-South Ronaldsay. The statistical data in Table 6-2 indicate that rectangle 46E7 is also of key importance to the shell fishermen by value over the period considered. However, as this rectangle encompasses offshore waters, the quantity of pelagic fish caught is the greatest fish landed by quantity. Pelagic fisheries are not a key component of Orkney inshore waters where the cables are located (Orkney Sustainable Fisheries Ltd 2016). Demersal species are highly valuable, but the catch is variable across the years.

Table 6-2 Annual catch quantity and value per species type for ICES rectangle 46E7

Year	Quantity (tonnes)				Price (£)			
	Demersal	Pelagic	Shellfish	Total	Demersal	Pelagic	Shellfish	Total
Average	**680**	**2,590**	**956**	**4,226**	**£1,159,873**	**£1,623,297**	**£2,120,771**	**£4,903,941**
2015	273	1	562	**836**	£354,959	£752	£1,182,916	**£1,538,627**
2016	1,246	3,230	1,173	**5,649**	£2,403,167	£1,927,795	£2,123,938	**£6,454,900**
2017	295	9,702	1,416	**11,413**	£397,171	£6,169,597	£2,918,608	**£9,485,376**
2018	909	15	1,102	**2,026**	£1,664,072	£17,089	£3,050,716	**£4,731,877**
2019	677	1	527	**1,205**	£979,994	£1,250	£1,327,675	**£2,308,919**

Source: Scottish Government (2020)

ICES rectangle 47E6 is located to the northwest of Orkney and encompasses one proposed Cable Corridor: Route 2.9 Orkney Mainland-Rousay. The statistical data in Table 6-3 indicate that rectangle 47E6 is highly important for demersal fishing both by weight and by value over the period considered. Catches of demersal species are variable across the years considered. Shellfish is also important and of slightly less value on average than demersal, although is more consistent in quantity landed and value. The pelagic fishery component is relatively low within this ICES rectangle.

Table 6-3 Annual catch quantity and value per species type for ICES rectangle 46E6

Year	Quantity (tonnes)				Price (£)			
	Demersal	Pelagic	Shellfish	Total	Demersal	Pelagic	Shellfish	Total
Average	**1,314**	**370**	**887**	**2,571**	**£2,591,234**	**£292,089**	**£2,238,041**	**£5,121,364**
2015	1,573	614	725	**2,912**	£3,615,787	£513,284	£1,397,301	**£5,526,372**
2016	149	665	1,625	**2,439**	£274,049	£295,527	£3,693,369	**£4,262,945**
2017	1,688	7	1,031	**2,726**	£2,752,432	£9,041	£3,088,598	**£5,850,071**
2018	932	0	521	**1,453**	£1,241,771	£415	£1,763,526	**£3,005,712**
2019	2,228	565	534	**3,327**	£5,072,130	£642,176	£1,247,413	**£6,961,719**

Source: Scottish Government (2020)

ICES rectangle 47E7 is located to the northeast of Orkney and encompasses four proposed Cable Corridors: Route 2.5 Eday – Westray, 2.6 Eday – Sanday, 2.7 Sanday – Stronsay and 2.10 Orkney Mainland - Shapinsay. Of the four ICES rectangles within the Orkney geographical area, 47E7 is the most important by value due to the pelagic fishery and shellfish. The statistical data in Table 6-4 indicate effort in pelagic fishing for 2016 - 2018 was very low and demersal and shellfish species may have been targeted instead as the quantity of these increased for the same years. Shellfish are a stable and important component by value and more important than the other three ICES rectangles within the Orkney geographical area. Catches of demersal species are variable across the years considered and of least importance by value within this ICES rectangle but still more important than the ICES rectangles to the south or Orkney.

Table 6-4 Annual catch quantity and value per species type for ICES rectangle 47E7

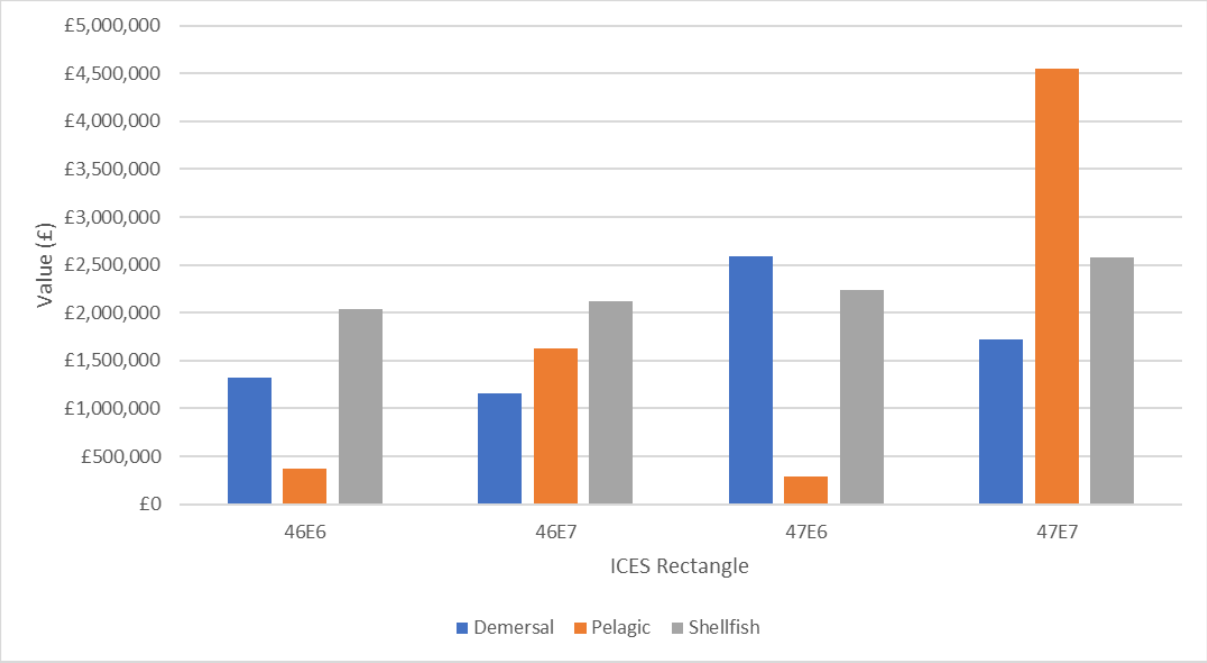
Year	Quantity (tonnes)				Price (£)			
	Demersal	Pelagic	Shellfish	Total	Demersal	Pelagic	Shellfish	Total
Average	**843**	**9,309**	**922**	**11,074**	**£1,722,010**	**£4,546,277**	**£2,582,535**	**£8,850,822**
2015	440	22,286	1,380	**24,106**	£887,348	£8,783,267	£3,785,046	**£13,455,661**
2016	1,001	2	967	**1,970**	£2,025,750	£3,230	£3,115,195	**£5,144,175**
2017	980	1	700	**1,681**	£1,228,299	£1,399	£1,981,449	**£3,211,147**
2018	1,582	12	552	**2,146**	£3,908,470	£18,941	£1,195,443	**£5,122,854**
2019	212	24,247	1,013	**25,472**	£560,185	£13,924,547	£2,835,543	**£17,320,275**

Source: Scottish Government (2020)

The data within the tables above is summarised in Figure 6-1 and Figure 6-2 below. The figures provide an overview of the value and quantity of landings by fisheries within the ICES rectangles relevant to the Orkney geographical area. The graphs highlight the importance of Shellfish to the region particularly within ICES rectangles 46E6 and 46E7, however demersal species are more important in terms of value within ICES rectangle 47E6.

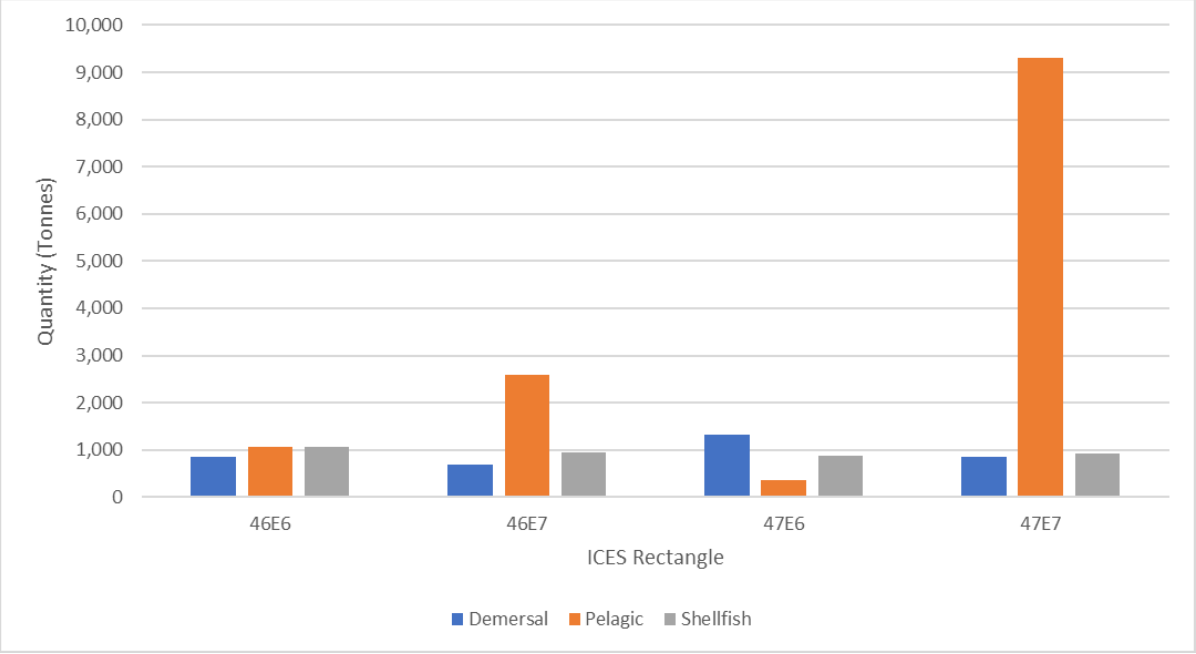
Pelagic fishing is shown to be more prevalent in ICES rectangles 46E7 and 47E7, particularly in 47E7, however closer analysis of the temporal data shows that this average is not representative of every year. For each of the ICES rectangles, in terms of both quantity and value, the pelagic fishing statistics show that there is either very little or comparatively large amounts of fishing each year. This is particularly visible in 47E7 where 2015 and 2019 recorded landings of over 20,000 tonnes but between 2016-2018 a total of only 15 tonnes was recorded.

Figure 6-1 Annual average value (2015 – 2019) by species type within the Orkney geographical area



Source: Scottish Government (2020)

Figure 6-2 Annual average quantity (2015 – 2019) by species type within the Orkney geographical area

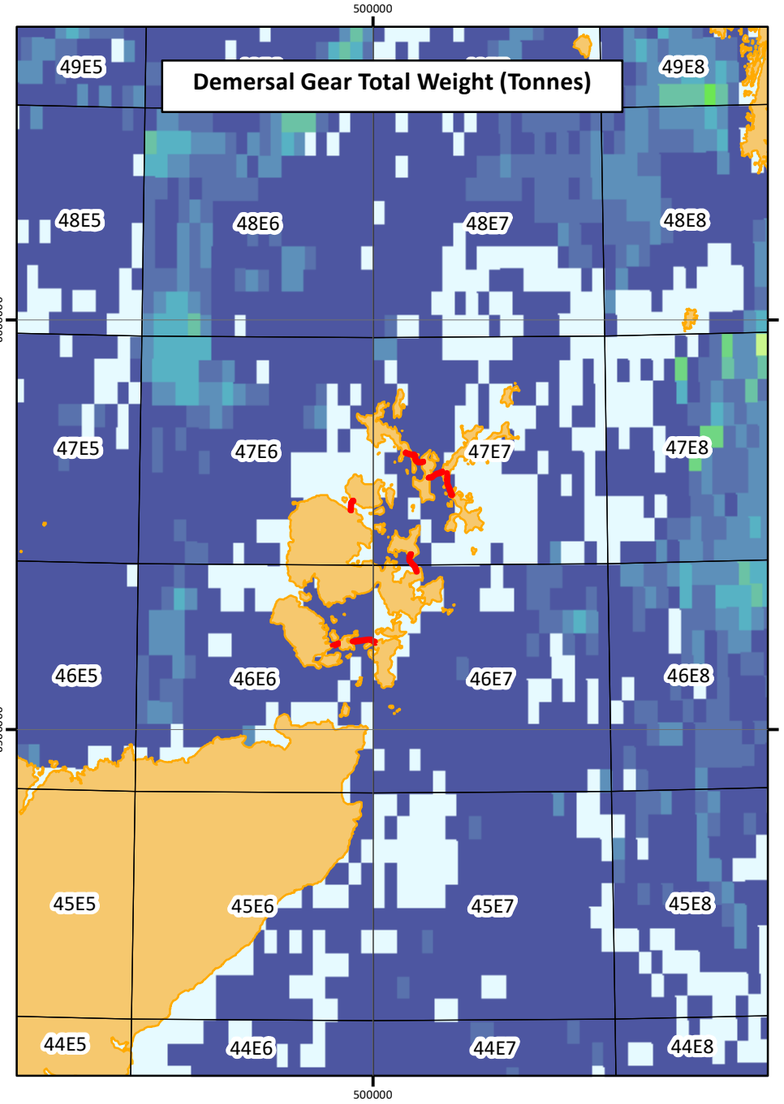


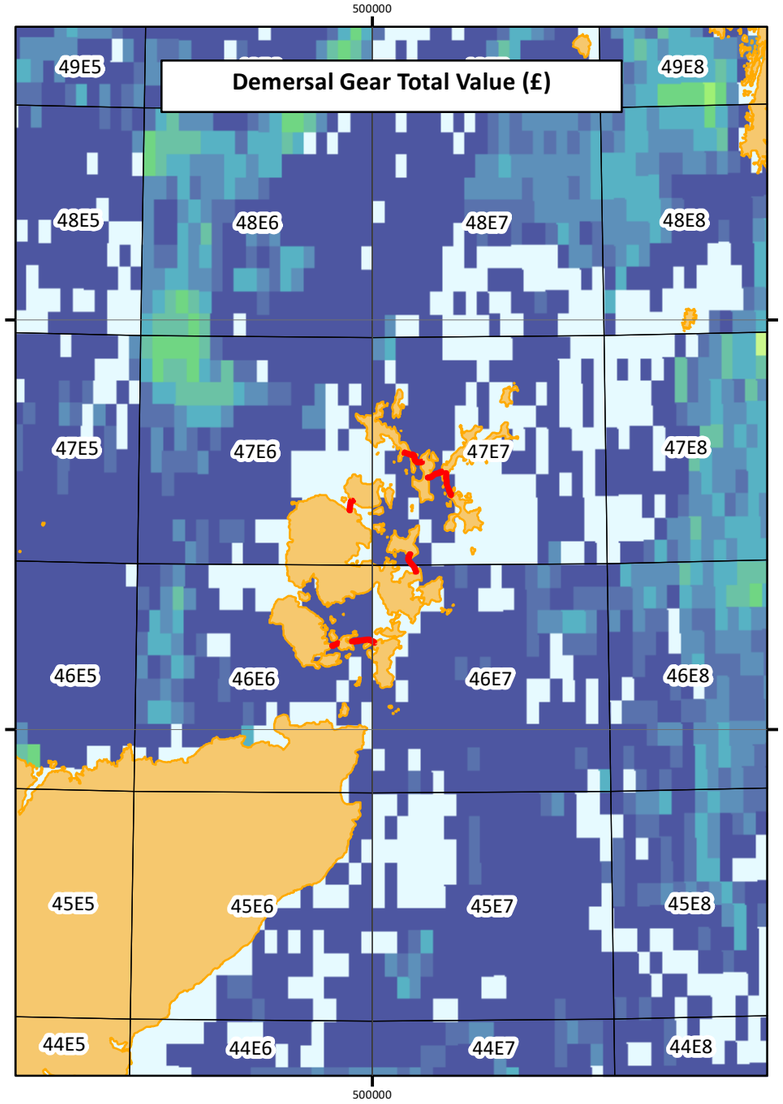
Source: Scottish Government (2020)

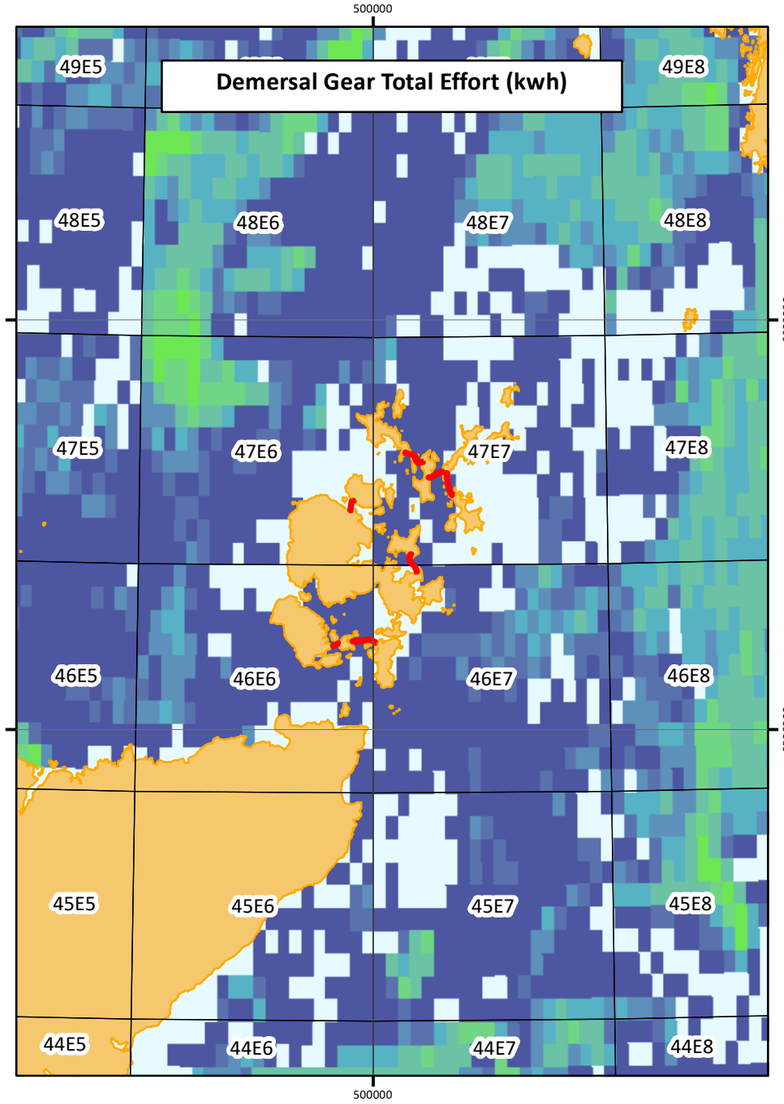
6.2 Spatial patterns of species type for vessels over 15 m

Figure 6-8 (Drawing reference: P2308-FISH-003_OR), Figure 6-9 (Drawing reference: P2308-FISH-004_OR) and Figure 6-10 (Drawing reference: P2308-FISH-005_OR) show the spatial patterns of fishing activities within the Orkney geographical area per gear type in terms of weight, value, and fishing effort, at a resolution of ICES sub-rectangles (20x10 per ICES rectangle). This allows for a refinement in viewing where fishing activity is taking place relating to specific species type. The most recent data published by the MMO with this level of spatial resolution is for 2017 (MMO 2020b). As with other spatial datasets, this information is collected for only vessels with AIS equipment and is limited to vessels over 15 m in length and as such does not represent the spatial patterns of smaller fishing vessels.

Based on the figures below, demersal fishing effort is high, particularly in waters offshore to the east, north-east, and north-west of Orkney within ICES rectangles 46E8 and 47E8, 48E7, and 47E6, respectively. Pelagic fishing effort within the Orkney geographical area is generally low, however there are areas of higher activity further offshore to the east, north-east, and north-west of Orkney within ICES rectangles 47E8, 48E7, 48E5, respectively. Passive fishing effort (static gear, pots and creels) is generally low apart from two key areas of high activity in offshore waters to the north of Orkney within ICES rectangles 48E6 and 48E7 and coastal waters to the south of Orkney within ICES rectangles 46E6 and 46E7.







SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT | **FISH AND FISHING - Fishing Activity for ≥ 15m UK Vessels 2017 by ICES Sub Rectangle (Demersal Gears) - Orkney** | Drawing No: P2308-FISH-003_OR | A

Legend

- Cable Route Application Corridor
- ICES Rectangle

Total Weight (Tonnes)	Total Value (£ Sterling)	Total Fishing Effort (kilowatt/hours)
> 0 - 10 (Tonnes)	> £0 - £10,000	> 0 - 2,500 (kilowatt/hours)
> 10 - 20	> £10,000 - £20,000	> 2,500 - 5,000
> 20 - 40	> £20,000 - £40,000	> 5,000 - 10,000
> 40 - 80	> £40,000 - £80,000	> 10,000 - 20,000
> 80 - 160	> £80,000 - £160,000	> 20,000 - 40,000
> 160 - 320	> £160,000 - £320,000	> 40,000 - 80,000
> 320 - 640	> £320,000 - £640,000	> 80,000 - 160,000
> 640 - 1,280	> £640,000 - £1.28 million	> 160,000 - 320,000
> 1,280 - 2,560	> £1.28 - £2.56 million	> 320,000 - 640,000
> 2,560 (Tonnes)	> £2.56 million	> 640,000 (kilowatt/hours)

NOTE: Not to be used for Navigation

Date	19 May 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; UKHO; MMO; OSOD; ICES; ESRI;
File Reference	J:\P2308\Mxd\03_FISH\ P2308-FISH-003_OR.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Nick Archibald

BT Global Marine intertek

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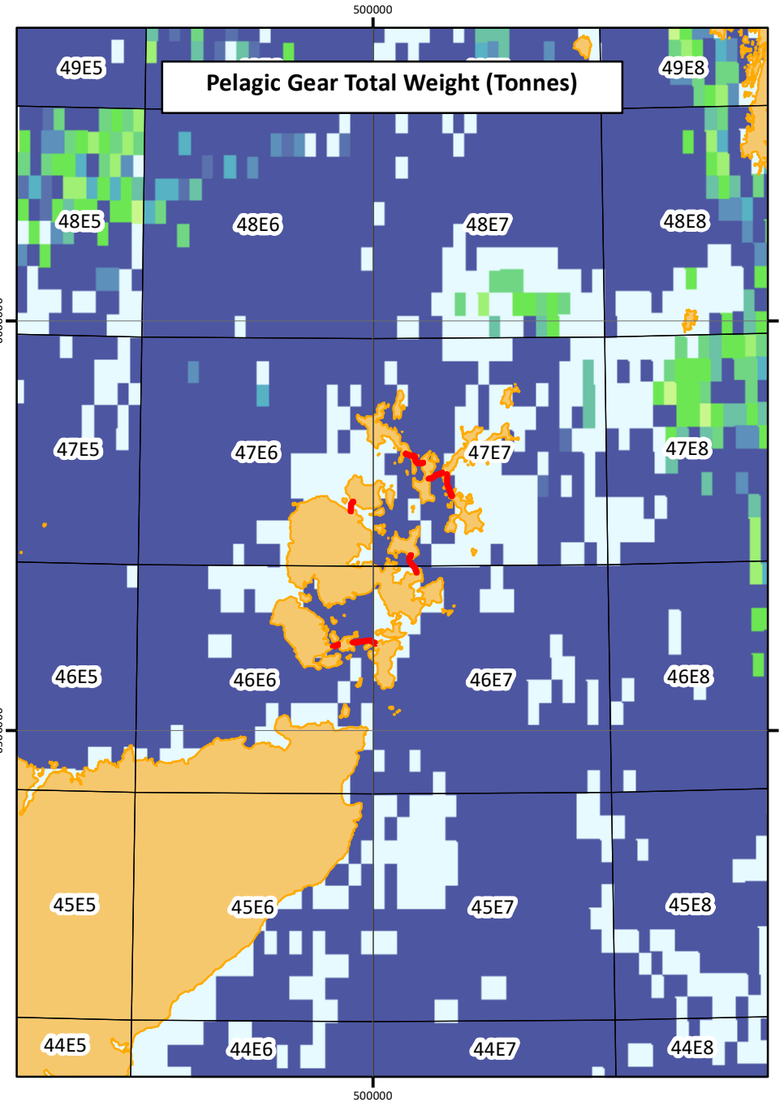

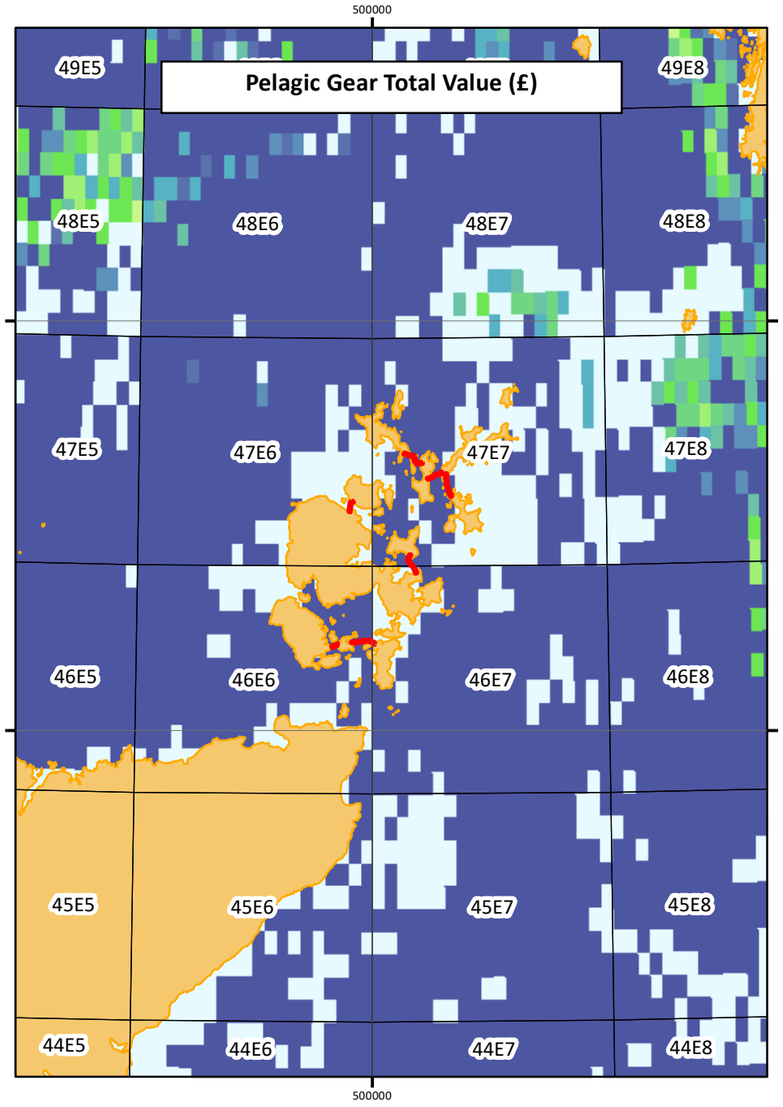

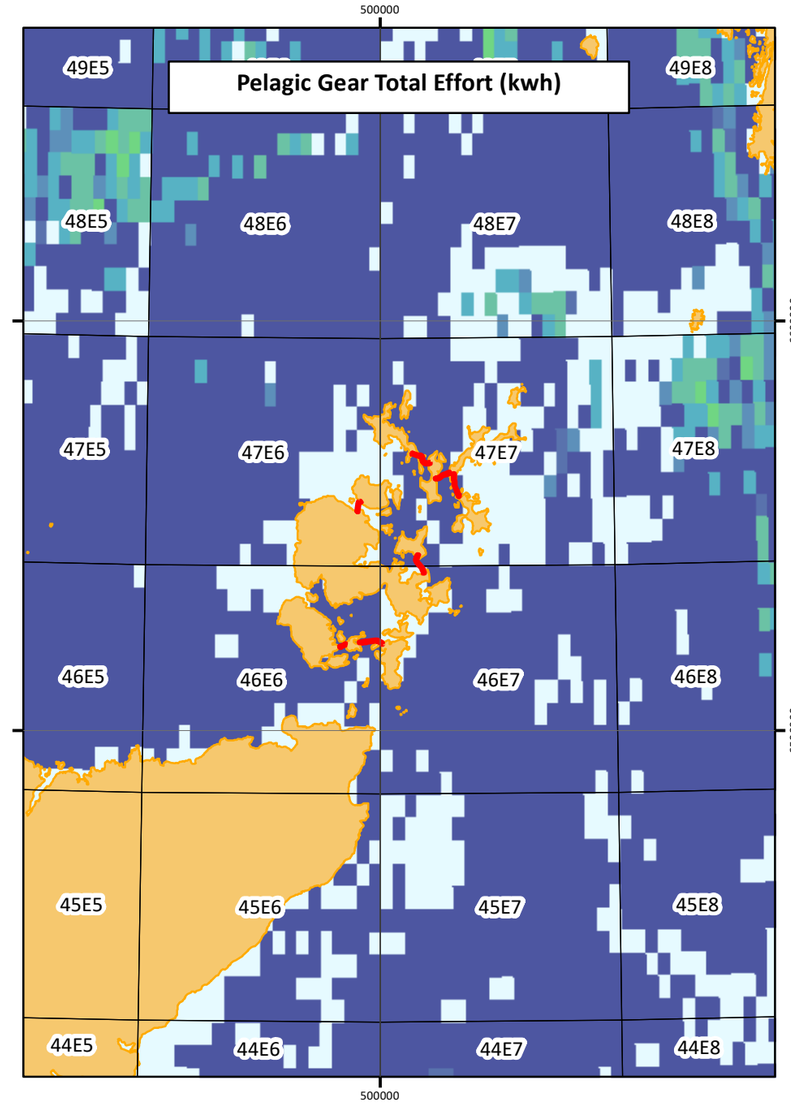

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT **FISH AND FISHING - Fishing Activity for ≥ 15m UK Vessels 2017 by ICES Sub Rectangle (Pelagic Gears) - Orkney** Drawing No: P2308-FISH-004_OR | A

Legend

Cable Route Application Corridor

ICES Rectangle

Total Weight (Tonnes)	Total Value (£ Sterling)	Total Fishing Effort (kilowatt/hours)
> 0 - 10 (Tonnes)	> £0 - £10,000	> 0 - 2,500 (kilowatt/hours)
> 10 - 20	> £10,000 - £20,000	> 2,500 - 5,000
> 20 - 40	> £20,000 - £40,000	> 5,000 - 10,000
> 40 - 80	> £40,000 - £80,000	> 10,000 - 20,000
> 80 - 160	> £80,000 - £160,000	> 20,000 - 40,000
> 160 - 320	> £160,000 - £320,000	> 40,000 - 80,000
> 320 - 640	> £320,000 - £640,000	> 80,000 - 160,000
> 640 - 1,280	> £640,000 - £1.28 million	> 160,000 - 320,000
> 1,280 - 2,560	> £1.28 - £2.56 million	> 320,000 - 640,000
> 2,560 (Tonnes)	> £2.56 million	> 640,000 (kilowatt/hours)

NOTE: Not to be used for Navigation

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Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; UKHO; MMO; OSOD; ICES; ESRI;
File Reference	J:\P2308\Mxd\03_FISH\ P2308-FISH-004_OR.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Nick Archibald

BT Global Marine intertek

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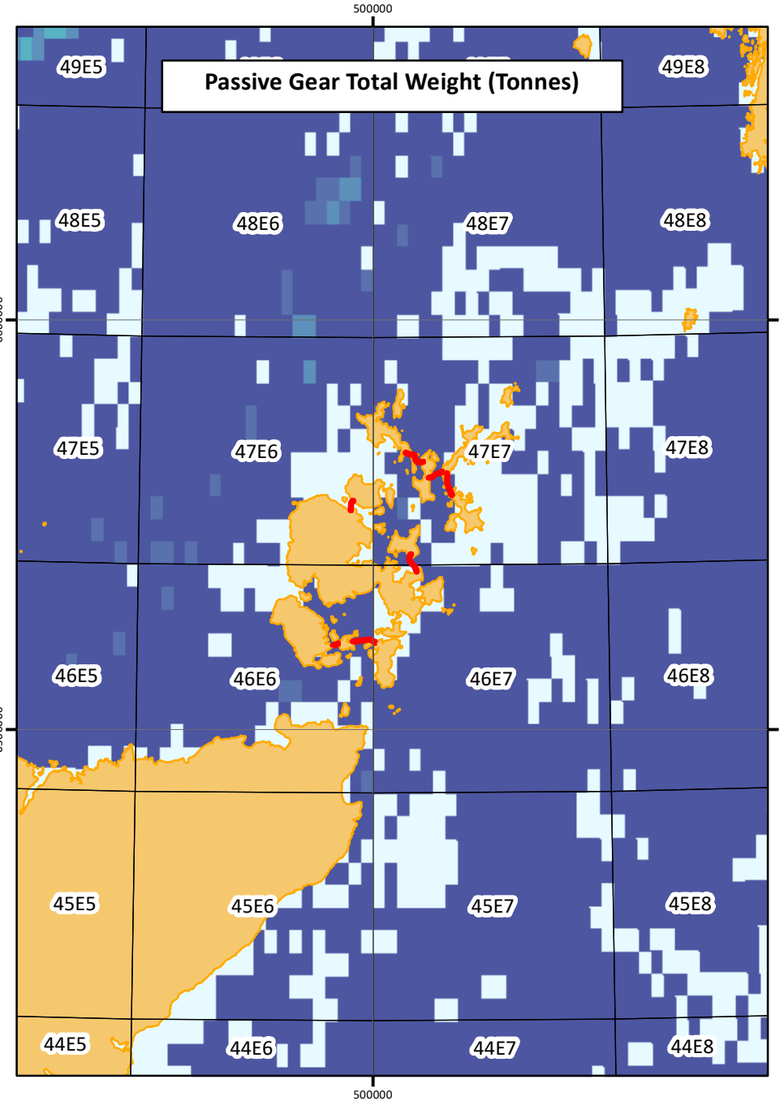

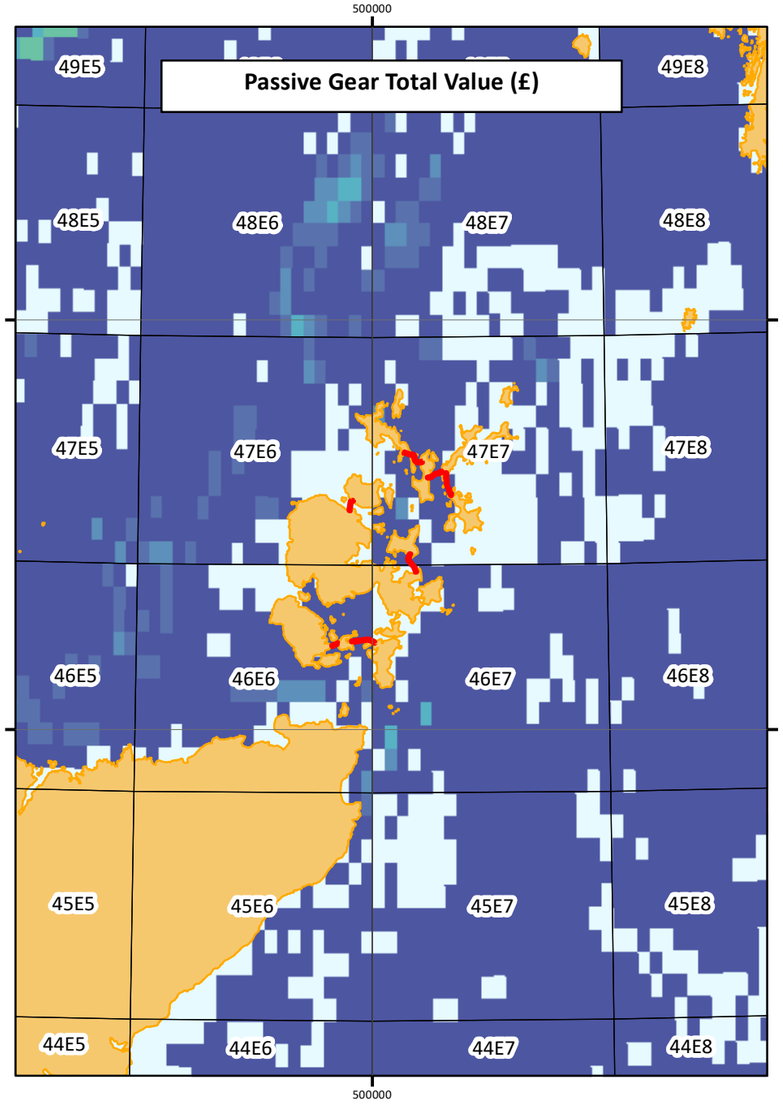

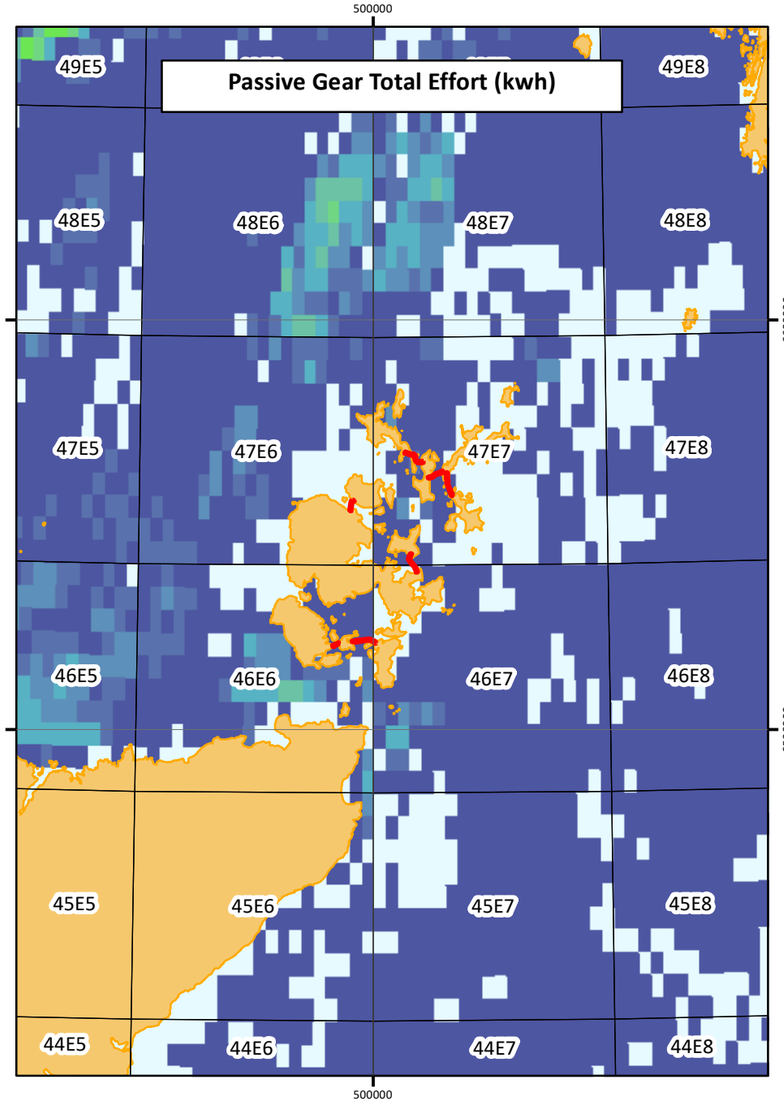

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT | **FISH AND FISHING - Fishing Activity for ≥ 15m UK Vessels 2017 by ICES Sub Rectangle (Passive Gears) - Orkney** | Drawing No: P2308-FISH-005_OR | A

Legend

- Cable Route Application Corridor
- ICES Rectangle

Total Weight (Tonnes)	Total Value (£ Sterling)	Total Fishing Effort (kilowatt/hours)
> 0 - 10 (Tonnes)	> £0 - £10,000	> 0 - 2,500 (kilowatt/hours)
> 10 - 20	> £10,000 - £20,000	> 2,500 - 5,000
> 20 - 40	> £20,000 - £40,000	> 5,000 - 10,000
> 40 - 80	> £40,000 - £80,000	> 10,000 - 20,000
> 80 - 160	> £80,000 - £160,000	> 20,000 - 40,000
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> 640 - 1,280	> £640,000 - £1.28 million	> 160,000 - 320,000
> 1,280 - 2,560	> £1.28 - £2.56 million	> 320,000 - 640,000
> 2,560 (Tonnes)	> £2.56 million	> 640,000 (kilowatt/hours)

NOTE: Not to be used for Navigation

Date	19 May 2021
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Data Source	MarineRegions; UKHO; MMO; OSOD; ICES; ESRI;
File Reference	J:\P2308\Mxd\03_FISH\ P2308-FISH-005_OR.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Nick Archibald

BT Global Marine intertek

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7. LANDINGS BY SPECIES

7.1 Introduction

This section summarises the key species targeted and landed within the ICES rectangles which lie in the Orkney geographical area. The data used to inform this section is the Scottish Sea Fisheries Statistics 2019 (Scottish Government 2020).

7.2 Key species landed in Orkney

The top species landed in the Orkney geographical area by value in 2019 include crabs, haddock, and cod. In terms of quantity (tonnage landed), the most important species within the Orkney geographical area are haddock and crabs. The top five species landed by value and quantity in the Orkney geographical area 47E7 are provided in Table 7-1 and Table 7-2 respectively. The statistics show that the fishery is dominated by shellfish (as described in Section 6) with pelagic fishing dominating in ICES rectangle 47E7.

Table 7-1 Top five landed species by value (£) in 2019 per ICES rectangle

Rank	46E6	46E7	47E6	47E7
1	Crabs (C.P.Mixed Sexes)	Crabs (C.P.Mixed Sexes)	Cod	Herring
2	Lobsters	Haddock	Monks or Anglers	Scallops
3	Cod	Scallops	Crabs (C.P.Mixed Sexes)	Crabs (C.P.Mixed Sexes)
4	Haddock	Lobsters	Haddock	Crabs - Velvet (Swim)
5	Scallops	Plaice	Ballan Wrasse	Lobsters

Source: Scottish Government (2020)

Table 7-2 Top five landed species by quantity (tonnes) in 2019 per ICES rectangle

Rank	46E6	46E7	47E6	47E7
1	Crabs (C.P.Mixed Sexes)	Haddock	Crabs (C.P.Mixed Sexes)	Herring
2	Haddock	Crabs (C.P.Mixed Sexes)	Cod	Crabs (C.P.Mixed Sexes)
3	Cod	Scallops	Monks or Anglers	Mackerel
4	Scallops	Plaice	Haddock	Scallops
5	Crabs - Velvet (Swim)	Whelks	Whiting	Crabs - Velvet (Swim)

Source: Scottish Government (2020)

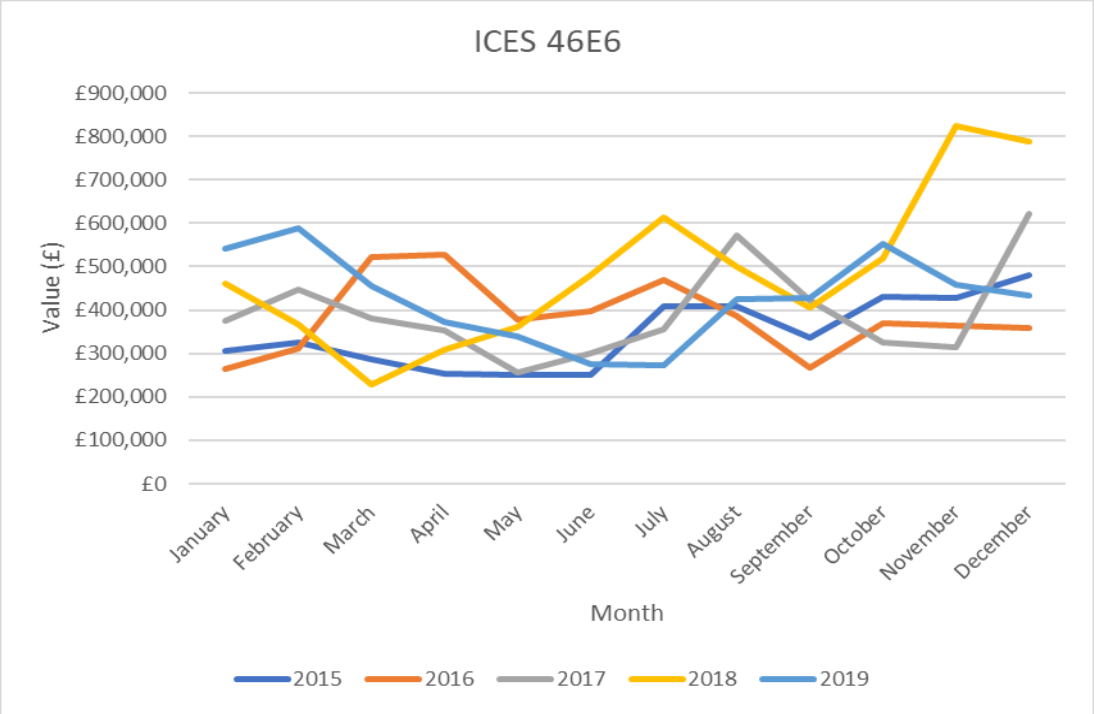
8. SEASONAL TRENDS

8.1 Value

Figures 8-1 to 8-4 show the monthly landings in terms of value. Seasonal trends within the Orkney geographical area are variable. Analysis of the figures shows:

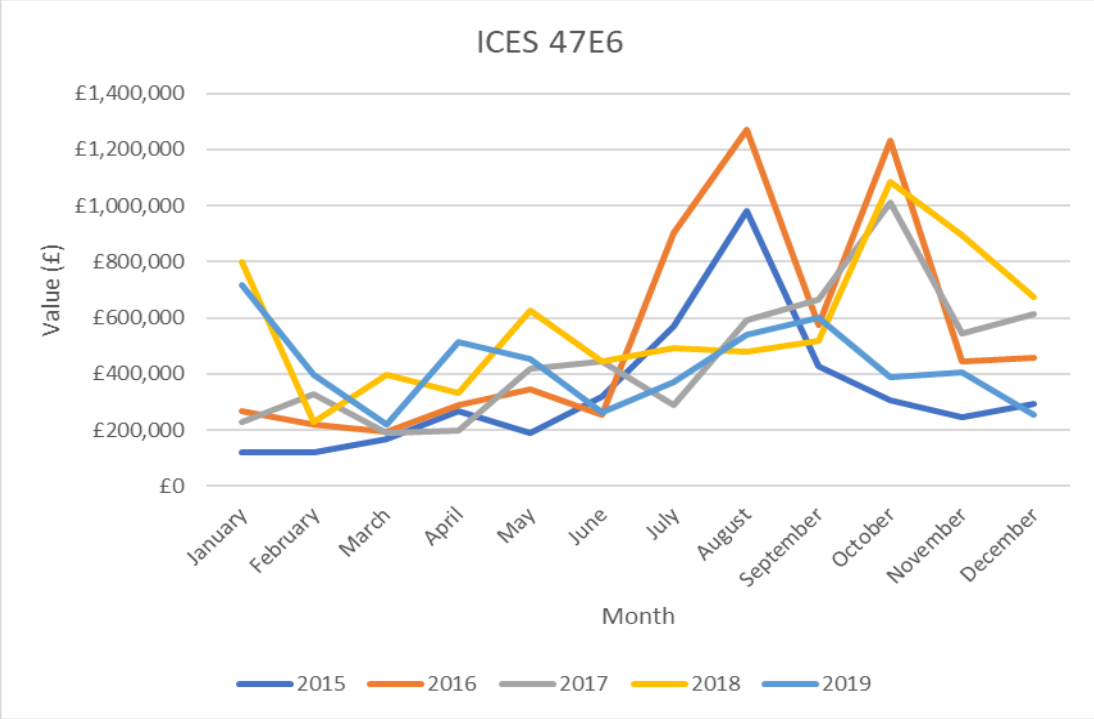
- ICES rectangle 46E6 landings value has an average of over £4,000,000 across all 5 years considered. The value is variable across the year and between the years dependant on species landed and market value. There appears to be a slight increase in landings value in August and November and December for the years considered (2015 – 2019).
- Within ICES rectangle 46E7, there is a seasonal trend of increasing value from May until February, when value falls again. The seasonal trend is likely to be attributed to a return to the more traditional autumn lobster fishery which strengthens later in the season (Fishing News 2016)
- Peak landings within ICES rectangle 47E6 occur July and August and again in October (most likely attributed to shell fishing). The area is important for demersal fishing and shellfish and average annual value is relatively constant across the years considered. The highest peak values were in 2016, however, the fishery in this ICES area is generally increasing in value and was worth almost £7 million in 2019.
- Within ICES rectangle 47E7, landings value is generally low through the year with a large peak between August and October each year. This is repeated annually with little variation on the peak value timings. This area is the most important in the project area by value, therefore the months August to October are important to Orkney fishing vessels. Data presented in Figure 6-1 indicate that a large component of this peak activity is likely to be pelagic fishing, which is likely to occur further offshore beyond the Orkney geographical area.

Figure 8-1 Landing value per month for ICES rectangle 46E6



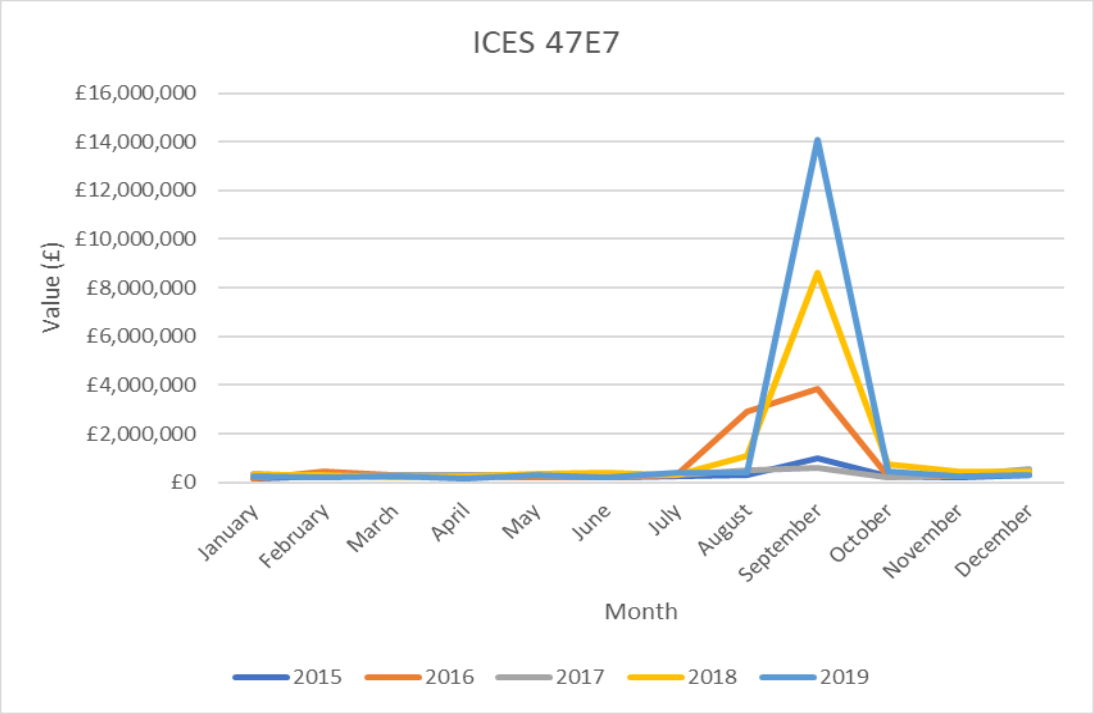
Source: Scottish Government (2020)

Figure 8-2 Landing value per month for ICES rectangle 47E6



Source: Scottish Government (2020)

Figure 8-3 Landing value per month for ICES rectangle 47E7



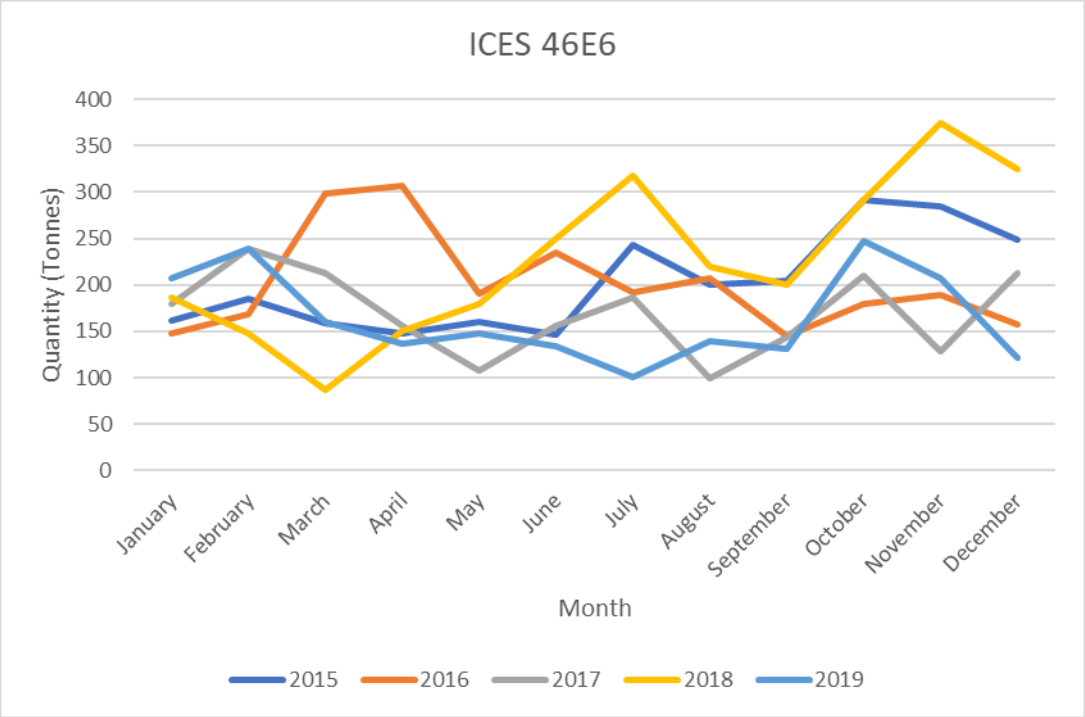
Source: Scottish Government (2020)

8.2 Quantity

Figures 8-5 to 8-8 show the monthly landings in terms of quantity (tonnage). Similarly, to the trends by landings value, they vary within each ICES rectangle within the Orkney geographical area. Analysis of the data indicates:

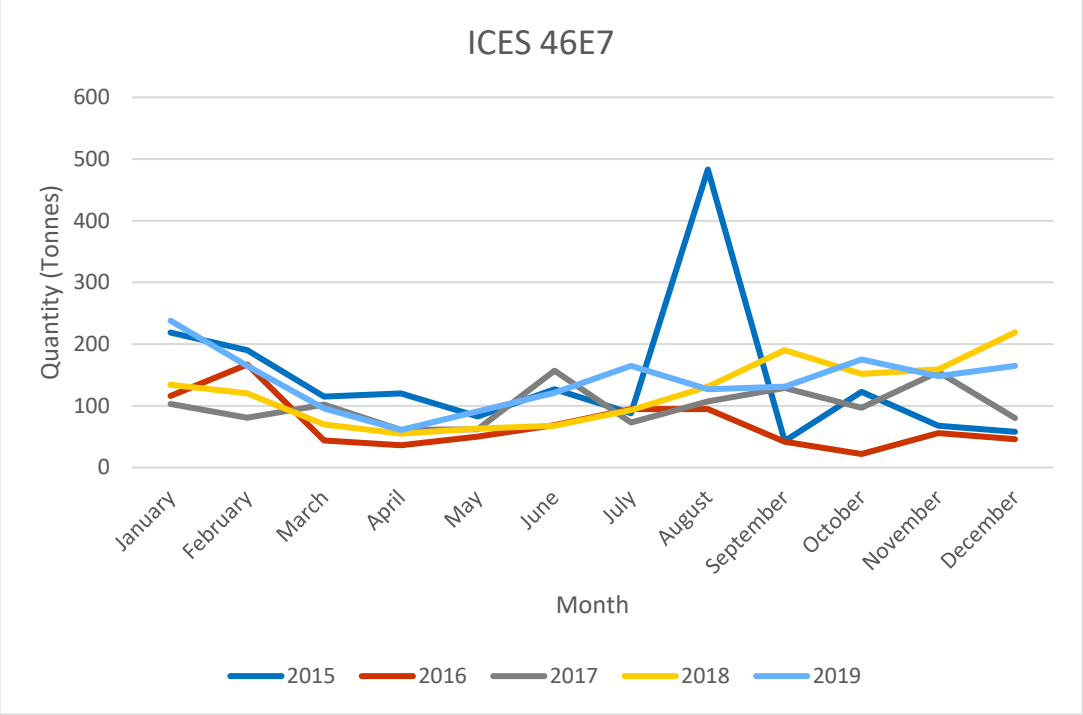
- The peak landings quantity within ICES rectangle 46E6 mirrors the peak landings value, with peaks in October and November across all the years considered.
- Within ICES rectangle 46E7, the peak landings by quantity increase between September to January without a distinctive peak across all 5 years considered. During 2015 there was also a peak in August.
- In ICES rectangle 47E6, there is a distinct peak in quantity landed in July – August and again in September across all years considered. This follows the same trend as landings value.
- Within ICES rectangle 47E7, landings quantity has a distinct peak between August and October which is consistent across the years.

Figure 8-4 Landing quantity per month for ICES rectangle 46E6



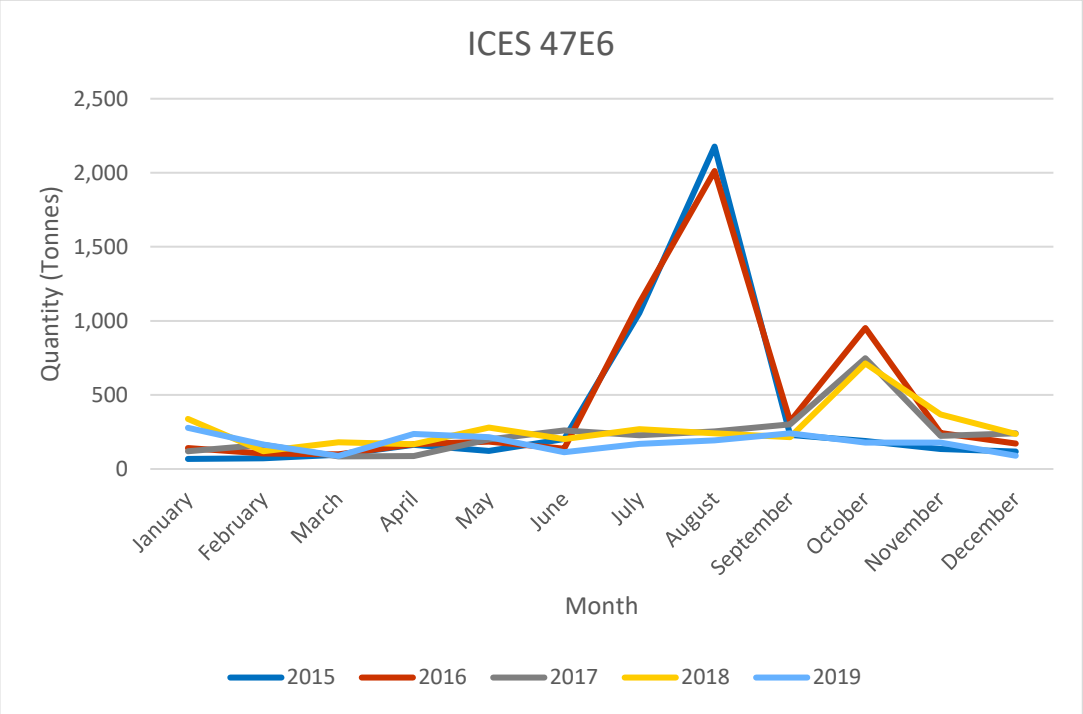
Source: Scottish Government (2020)

Figure 8-5 Landing quantity per month for ICES rectangle 46E7



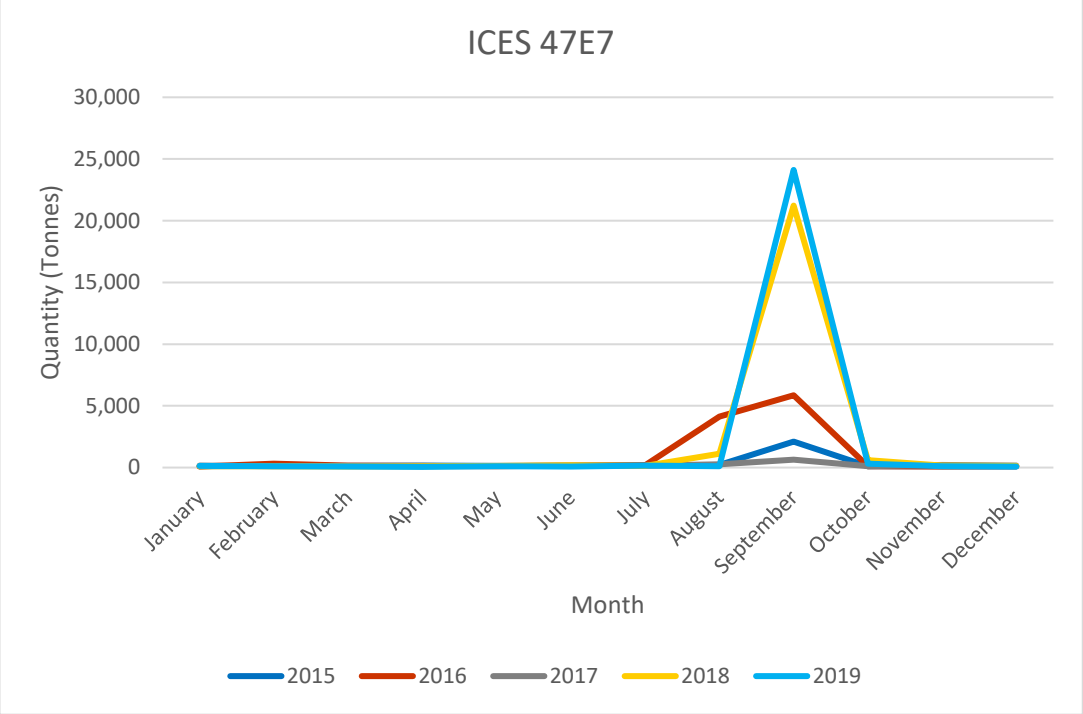
Source: Scottish Government (2020)

Figure 8-6 Landing quantity per month for ICES rectangle 47E6



Source: Scottish Government (2020)

Figure 8-7 Landing quantity per month for ICES rectangle 47E7



Source: Scottish Government (2020)

9. SUMMARY OF FISHING ACTIVITY FOR ORKNEY GEOGRAPHICAL AREA

9.1 Overview

This report has reviewed publicly available fisheries data and has identified the fishing activity across the Orkney geographical area. This includes a review of target species and fishing methods, spatial patterns, landings data and seasonal trends. The findings have been summarised for each cable corridor within the Orkney geographical area in Table 9-1 below.

Table 9-1 Summary of fisheries activity by cable corridor

Cable Corridor	ICES rectangle	Target Species	Dominant Fishing type			Peak season
			Shellfish	Demersal	Pelagic	
2.5 Eday – Westray	47E7	Crab, Haddock, Scallop, Lobster, Plaice	✓			August - October
2.6 Eday - Sanday				✓		August - October
2.7 Sanday-Stronsay	47E7	Herring, Scallop, Crab, Lobster, Mackerel	✓			August - October
2.9 Orkney Mainland - Rousay	47E6	Cod, Monks or Anglers, Crabs, Haddock, Ballan Wrasse			✓	July - August
			✓			October
2.10 Orkney Mainland - Shapinsay	46E7	Crab, Haddock, Scallop, Lobster, Plaice	✓			December - January
				✓		
	47E7	Herring, Scallop, Crabs, Lobster, Mackerel	✓			August - October
2.11 Hoy - Flotta	46E6	Crab, Lobster, Cod, Haddock, Scallops	✓			October- December
2.12 Flotta – South Ronaldsay	46E6	Crab, Lobster, Cod, Haddock, Scallops	✓			October- December
					✓	
	46E7	Crab, Haddock, Scallop, Lobster, Plaice	✓			December - January
					✓	
				✓		

10. CONCLUSION

The Scottish fishing fleet is largely comprised of vessels of 10m and under (74% of the fleet). These vessels are not required to record their landings or be traced using VMS, therefore may be under-represented within fishing statistics. From the information available, key fishing activities within the Orkney geographical area in relation to the proposed cable corridors are shellfish, demersal and aquaculture fishing. Shellfish are a key component with crab, European lobster, and scallop as target species. Static gear is widely used across the area in the nearshore region (within 6NM). Plaice are the key demersal target species. There are no active aquaculture sites within 500m of the proposed cable corridors.

The waters in the north of Orkney are the most important ICES rectangles in terms of value (47E7 and 47E6) (Scottish Government 2020). The seasonality of fishing activity within the vicinity of the proposed cable corridors varies between north of Orkney and south of Orkney. The peak time for shellfishery for north of Orkney (covering corridors: 2.5 Eday-Westray, 2.6 Eday-Sanday, 2.7 Sanday-Stronsay, 2.9 Orkney Mainland-Rousay and partially 2.10 Orkney Mainland-Shapinsay) is between August – October. In the south of Orkney (covering corridors: 2.11 Hoy-Flotta and 2.12 Flotta-South Ronaldsay and partially 2.10 Orkney Mainland-Shapinsay) the peak time for shellfish is later between October – December. Similarly, the demersal fishing peak is August – October in the north of Orkney and December to January in the south.

The Project Fishing Liaison Officer is in regular communication with the Orkney fishing interests and has held pre-application meetings and workshops to seek the opinion of fishing interests. These communications will continue through the Marine Licence determination and into the installation phase of the R100 Project. A Fisheries Liaison Mitigation Action Plan (FLMAP) has been developed which considers the fishing interest opinions. The mitigation measures proposed will seek to minimise displacement and disturbance to commercial fishers within the Orkney geographical area as far as possible. The mitigation measures proposed in the FLMAP (Appendix F to the MEA), are summarised in the MEA Section 8 (Report Ref: P2308_R5388_ Rev0).

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