Chapter 20: Commercial Fisheries

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20 Commercial Fisheries

20.1 Introduction

This chapter assesses the potential impacts of the NorthConnect interconnector project on commercial fisheries. This draws upon available data and consultation undertaken with fisheries organisations to provide information on the following:

- The types of and value of fisheries active along the Consenting Corridor;
- Seasonal variation in commercial fishing activity;
- Species targeted along the Consenting Corridor; and
- Potential restrictions on fishing activity in the vicinity of the Consenting Corridor.

The commercial fishing activities fall into two categories: effort expended by smaller, inshore vessels; and larger vessels which operate further offshore.

20.2 Sources of Information

The fisheries baseline description is based upon a comprehensive desk-based study supported by consultation. Key data sources used to inform the baseline included:

- Vessel Monitoring System (VMS) datasets for UK vessels over 15 m for the period 2011 – 2015;
- Marine Scotland landings value (£) liveweight (tonnes) data for the period 2011-2016 for UK vessels (all sizes);
- Marine Scotland seasonal fishing effort by UK vessels (all sizes);
- Marine Scotland fishing effort (days at sea) and gear type;
- ScotMap spatial data for inshore fishing activity; and
- Marine Scotland salmon and sea trout catch statistics.

In addition to these datasets, the following information sources were also used:

- UK-Norway HVDC Interconnector Cable Burial Risk Assessment (CA Report No.: C831R01 - 02) (Cathie Associates Ltd, 2018) (Appended to the Construction Method Statement (NorthConnect, 2018);
- NorthConnect Cable Protection Analysis Report (CA Report No.: C831R02 – 02) (Cathie Associates Ltd, 2018) (Appended to the Construction Method Statement (NorthConnect, 2018);
- Chapter 2: Project Description;
- Chapter 15: Fish and Shellfish;
- Chapter 19: Navigation and Shipping; and
- Appendix G.1: Navigation and Shipping Baseline.

20.3 Legislation, Policy and Guidance

The following legislation, policy and guidance is relevant to the assessment of potential effects on commercial fisheries and salmon and sea trout fisheries.

20.3.1 Legislative Framework

- EC Directive 2000/60/EC known as the 'Water Framework Directive' (or WFD) has the aim of preventing deterioration in ecological quality and where necessary improving the quality of our rivers, lochs, estuaries, coastal waters and groundwater.

- EC Regulation 1100/2007 the Eel Recovery Plan, aims to ensure recovery of European eel stocks. Scotland developed its own Eel Management Plan in 2010.
- Aquaculture & Fisheries (Scotland) Act 2013. Came into force in 2013 to ensure that farmed and wild fisheries, and their interactions with each other, continue to be managed effectively, maximising their combined contribution to supporting sustainable economic growth with due regard to the wider marine environment.
- The Marine (Scotland) Act 2010 provides a legal mechanism to help ensure clean, healthy, safe, productive and biologically diverse marine and coastal environments, managed to meet the long-term needs of both nature and people, by putting in place a new system for improved management and protection of the marine and coastal environment. The Act applies to Scottish territorial waters (up to 12 NM).
- Marine and Coastal Act 2009. Came into force in 2009 and provides the legal mechanism to help ensure clean, healthy, safe, productive and biologically diverse oceans and seas by putting in place a new system for improved management and protection of the marine and coastal environment. The Act applies to the offshore environment from 12 NM to the UK EEZ.
- The Conservation of Salmon (Amendment) Scotland Regulations 2018. The regulations outline a system whereby the killing of Atlantic salmon in inland waters is managed on an annual basis by categorising the conservation status of their stocks.

20.3.2 Policy

- Common Fisheries Policy. The CFP is a set of rules for managing European fishing fleets and for conserving fish stocks. Designed to manage a common resource, it gives all European fishing fleets equal access to EU waters and fishing grounds and allows fishermen to compete fairly.
- UK Marine Policy Statement (MPS) which aims to contribute to attaining sustainable development in marine UK waters and is the main policy in determining marine licence applications.

20.3.3 Guidance

- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments - guidelines based on outputs from a technical workshop organised by the UK Fisheries Economics Network (UFEN and Seafish, 2012);
- FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (January 2014);
- Guidance on Licensing and Environmental Impact Assessment (EIA) requirements for offshore wind farms (Centre for Environment, Fisheries and Aquaculture Science (CEFAS), 2004); and
- Guidance on Commercial Fisheries Mitigation and Opportunities from Offshore Wind commissioned by Collaborative Offshore Wind Research into the Environment (COWRIE), (Blyth-Skyrme, 2010).

20.4 Assessment Methodology

20.4.1 Scoping and Consultation

Consultation has been on-going throughout the Project and played an important part in ensuring the scope of the commercial fisheries baseline and impact assessment is appropriate to the project and the requirements of the regulators and their advisors.

Responses to comments made in the Marine Scotland Scoping Opinion (July, 2016) and Aberdeenshire Council Scoping Opinion (May, 2016) are presented in Chapter 4: Consultation.

Table 20.1 summarises fisheries related consultation activities carried out to date. The fisheries stakeholders with whom consultation has been carried out are listed below:

- Maritime and Coastguard Agency (MCA);
- Northern Lighthouse Board (NLB);
- Peterhead Harbour;
- Marine Safety Forum:
    - No technical feedback has been received;
- Fisheries representatives, namely:
    - Buchan Inshore Fisheries Association;
    - Scottish Fishermen's Federation (SFF); and
    - The Scottish White Fish Producer's Association (SWFPA).

Table 20.1. Summary of Consultation Relating to Commercial Fisheries.

Organisation	Description	Date
Various	Two-day pre-consultation drop in session at Peterhead Fishermen's Mission. Participants were asked to fill out questionnaires following discussions.	18th and 19th January 2018
SFF	Meeting with SFF, they were requested to direct members to the charts and questionnaires on the North Connect website.	9th February 2018
SWFPA	Request to SWFPA to direct members to charts and questionnaires on the NorthConnect website.	9th February 2018
SWFPA	Meeting with SWFPA members at Fraserburgh Leisure Centre	22nd May 2018
Various	Fisheries specific pre-application consultation event at Peterhead Fishermen's Mission.	24th May 2018
SFF and SWFPA	SFF and SWFPA were provided with GIS shapefiles and coordinates for the Consenting Corridor in advance of the official consultation period.	17th May 2018
Various	Attendance and liaison at Skipper Expo International.	25th May 2018
Various	Numerous one to one meetings conducted between NorthConnect Fisheries Liaison Officer (FLO) and Communications Manager and skippers of commercial fishing vessels and vessel owners.	Various dates between October 2016 and June 2018.

20.4.2 Desk study

A desk study was undertaken to inform the characterisation of the existing baseline conditions. The study included the interpretation of fishing data, including fishing effort and value of landings. The baseline was also informed by a fishing questionnaire which was distributed to local fishermen and

collected information on gear types, target species, fishing locations and seasonality. The key data sources used to inform the baseline description are detailed in Table 20.2.

Table 20.2. Summary of Relevant Data Sources.

Dataset	Date	Description
MMO Landings value and effort (time)	2011 - 2015	Vessel Monitoring System (VMS) datasets for UK vessels over 15 m were provided in GIS format. This included details at the International Council for the Exploration of the Sea (ICES) statistical sub-rectangle level.
Marine Scotland landings value (£) and liveweight (tonnes)	2012 - 2016	Landings and effort data for UK vessels landing from relevant ICES rectangles for the period 2012 – 2016 were provided in spreadsheet format by Marine Scotland. This data included details on effort by month, vessel size and gear type.
Marine Scotland Vessel Landing data	2012 - 2016	UK fleet landings and foreign fleet landings into the UK by port.
Marine Scotland salmon and sea trout catch statistics by Salmon Fishery District	2016	Salmon and sea trout catch data for rivers in the north east region including rod and line, fixed engine and net and coble fisheries.
ScotMap spatial data	2013	Spatial information on fishing activity of Scottish fishing vessels under 15 m in overall length. Includes data on creel activity, Langoustine trawls, other trawls, dredges and mackerel line fishing.
Marine Scotland seasonal landings of primary target species	2012 - 2016	Data on the landings of most targeted species in relevant ICES rectangles including value (£) and liveweight (tonnes).

In addition to these datasets, relevant sources of information were consulted to inform the background and baseline commercial fishing conditions in the Consenting Corridor, including:

- Scottish Sea Fisheries Statistics 2016 (Scottish Government, 2017);
- 2016 vessel and employment statistical tables (Marine Scotland, 2018); and
- Individual fishermen and their representatives during consultation (as detailed in Section 20.4.1).

20.4.3 Impact Assessment Methodology

The method presented here has been developed by reference to the Institute of Ecology and Environmental Management (IEEM) guidelines for marine impact assessment (IEEM, 2010), the Marine Life Information Network (MarLIN) species and ecosystem sensitivities guidelines (Tyler-Walters *et al*., 2001) and guidance provided by Scottish Natural Heritage (SNH) (SNH, 2018) and by The Institute of Environmental Management and Assessment (IEMA) (IEMA, 2016).

For each effect, the assessment identifies receptors sensitive to that effect and implements a systematic approach to understand the level of impact. The process considers the following:

- Sensitivity/value of a receptor;
- Magnitude of effect; and
- Determination and qualification of the level of impact of and effect or change on a receptor, considering the probability that it will occur, the spatial and temporal extent and the

importance of the impact. If the level of impact is determined as moderate, major or severe, it is considered a significant impact.

Once the level of potential impact has been assessed it is possible to identify measures that can be taken to mitigate impacts through design or operational measures. This process also identifies aspects of the proposed project that may require monitoring.

20.4.3.1 Sensitivity / Value

The sensitivity of a receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is affected. Sensitivity of the receptor is quantified via the following factors:

- Tolerance to change: the ability of a receptor to accommodate temporary or permanent change;
- Recoverability: the ability of a receptor to return to a normal state following cessation of an effect;
- Adaptability: the ability of a receptor to avoid or adapt to an effect; and
- Value: a measure of the receptors importance, rarity and worth.

The sensitivity criteria relevant to commercial fisheries are presented in Table 20.3. Sensitivity categories used include very high, high, medium, low and negligible. The sensitive receptors are summarised in Section 20.5.3.

Table 20.3. Criteria for Sensitivity of Commercial Fisheries.

Sensitivity	Definition
Very high	No spatial adaptability due to operational range and ability to deploy only one gear type. No recoverability due to inability to mitigate loss of fishing area by operating in alternative areas.
High	Low spatial adaptability due to limited operational range and ability to deploy only one gear type. Dependence mostly on one area but with some fishing activity occurring in other areas. Low recoverability due to inability to mitigate loss of fishing area by operating in alternative areas.
Medium	Some spatial adaptability due to extent of operational range and/or ability to deploy an alternative gear type. Dependence on a limited number of fishing grounds. Limited recoverability with some ability to mitigate loss of fishing area by operating in alternative areas.
Low	High spatial adaptability due to extensive operational range and/or ability to deploy a number of gear types. Ability to fish a moderate number of fishing grounds. High recoverability due to ability to mitigate loss of fishing area by operating in range of alternative areas.
Negligible	Fisheries are not sensitive to change.

20.4.3.2 Magnitude of Effects

The magnitude or size of an effect can be characterised by considering the following:

- Duration over which the effect is likely to occur i.e. days, weeks;
- Timing: when the effect is likely to occur;
- Size and scale: geographical area; and
- Frequency: how often the effect is predicted to occur.

The magnitude criteria relevant to commercial fisheries are presented in Table 20.4. Magnitude categories used include severe, major, moderate, minor and negligible. Magnitude of effect is presented as a variety of parameters including duration, timing, size and scale, and frequency.

Table 20.4. Criteria for Magnitude of Effect.

Magnitude of effect	Definition
Severe	Effect is widespread, or occurs over a prolonged duration, or at a high frequency (e.g. repeated or continuous effect), resulting in extensive permanent changes to baseline fishing areas and their condition.
Major	Effect is over a large scale or spatial extent, or occurs long term, or at a medium-high frequency, resulting in extensive temporary change or some permanent change to baseline fishing areas and their condition.
Moderate	Effect is localised, or occurs for a short duration, or at a medium frequency, resulting in temporary changes or limited permanent changes to baseline fishing areas and their condition.
Minor	Detectable disturbance or change to baseline fishing areas and their condition and no long term noticeable effects above the level of natural variation experienced for commercial fisheries.
Negligible	No change or an imperceptible change to the baseline fishing areas and their condition.

Definitions in Table 20.4 may not be appropriate for all effects, for example there may be an effect which is over a very small area (minor or moderate) but is repeated a large number of times during a particular phase of the project (major or severe). In such cases expert judgement is used to determine the most appropriate magnitude ranking and this is explained through the narrative of the assessment.

20.4.3.1 Level of Impact

The level of impact, be it beneficial or adverse, is determined using a combination of sensitivity of the receptor and magnitude of effect as illustrated in Table 20.5.

The likelihood of an impact occurring is another factor that should be considered in the assessment of potential impacts. This captures the probability that the effect will occur and also the probability that the receptor will be present and is generally based on knowledge of the receptor and experienced professional judgement. Consideration of likelihood is described in the impact characterisation text and used to provide context to the specific impact being assessed. Likelihood of impact is described as certain, likely, unlikely or very unlikely.

Table 20.5. Level of Impact.

Magnitude of Effect	Sensitivity/Value				
	Very high	High	Medium	Low	Negligible
Severe	Severe	Severe	Major	Moderate	Minor
Major	Severe	Major	Major	Moderate	Minor
Moderate	Major	Major	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

As required by the EIA Regulations, the significance of impacts is determined based on the level of impact as shown in Table 20.5.

Key:	
Severe	Significant impact under EIA Regulations
Major	
Moderate	
Minor	Non-significant impact under EIA Regulations
Negligible	

20.4.3.1 Mitigation

Where potentially significant impacts (i.e. those ranked as being of moderate impact level or higher) are identified, mitigation measures have been considered. The intention is that such measures should remove, reduce or manage the impacts to a point where the resulting residual significance is at an acceptable or insignificant level. Mitigation is also proposed in some instances to ensure impacts that are predicted to be insignificant remain so.

20.5 Baseline Information

20.5.1 Data Gaps

Analysis of the data and information sources used for the commercial fisheries assessment are subject to various qualifications, limitations, sensitivities and gaps as discussed below. Despite these minor limitations the published data supported by consultation is considered to have generated a robust baseline against which impacts can be assessed.

20.5.1.1 VMS Based Statistics

Vessel monitoring systems (VMS) provides commercial catch statistics (landings value, tonnage and effort) for vessels > 15m length. The MMO present these data in an ICES sub-rectangle grid system (3 x 1.75 NM) to provide a geographical context for interpretation. It is noted that fishing will not occur in a uniform fashion throughout the area of an ICES rectangle. Effort distribution is a continuum between those squares which contain little effort and those which are actively exploited. Fishing activity also varies both seasonally and annually. In order to take account of this fact, data is averaged over a five-year period (2012-2016). Due to the processing required for these data there is a lag before the data is available for use therefore the most recent VMS data used in this study is from 2016.

Some effort is being made to introduce VMS to the 12-15 m fleet and these data have been included in this assessment, however, there is as of yet, no way of currently addressing the lack of GPS information on where the < 12 m vessels fish.

20.5.1.2 Marine Scotland Fisheries Statistics

Fisheries data for Scotland is collected and collated by Marine Scotland. The data is presented by length category and for each category, statistics available include gear types utilised, species caught and effort. Statistics are reported at the scale of ICES statistical rectangles (30 x 30 NM). The area of ICES rectangles is very large with the Consenting Corridor intersecting with only a small region of each of the ICES rectangles that the corridor crosses. Analysis of these fisheries statistics by ICES rectangle should therefore be treated with caution as it may lead to an overestimation of the value of the fishery that the proposed Project covers.

20.5.1.3 ScotMap

Like VMS, ScotMap data has also been presented as a grid system. These data are based on interviews with the inshore fleet (representing < 15 m vessel length). ScotMap provides the best available data for the inshore area but notable gaps include:

- Not all vessels have been interviewed;
- Earnings information was not always available;
- The way some fishermen have defined their fishing areas affected the output resolution of the maps, dispersing value and giving a false impression of where some types of fishing are taking place; and
- The study took place in 2013 therefore some of the information presented may be out of date.

20.5.1.4 Catch Statistics for Salmon and Trout Fisheries

The catch data used for the purposes of this assessment are as reported to Marine Scotland Science (MSS) and refer to both commercial and recreational fisheries. It is recognised that there may be a degree of error within the catch dataset due to misclassification of fish between the grilse and salmon categories.

20.5.2 Fishing Activity

In 2016, 453,000 tonnes of fish were landed in Scotland, worth £557 million. In terms of weight, this is dominated by pelagic species which comprise 65% of landings, followed by demersal species comprising 21% of weight and shellfish species accounting for 14% of landings by weight. Pelagic species also dominate in terms of value, accounting for 40% of landings. Demersal species and shellfish species each comprise 30% for the value of landings (Scottish Government, 2017). Mackerel and herring are the main pelagic species landed in Scotland, accounting for 96% of the value of pelagic landings in 2016 in Scotland. Numerous demersal species are targeted in Scotland, but they are dominated by haddock, cod, monkfish, hake, saithe and whiting. Shellfish landings are dominated by langoustine, scallops, edible crab and lobster (Scottish Government, 2017).

The available fishing effort and landings data for vessels > 15 m in length with mobile gear for the Consenting Corridor is summarised in Figure 20.1 and Figure 20.2. These averaged data cover the period 2012 - 2016. No vessels over 15 m utilising passive gear were active along the Consenting Corridor during this time period. The data in Figure 20.1 and Figure 20.2 indicates that there is a small area of fishing activity approximately 10 km from the coastline in ICES rectangles 44E8 and 43E8 which the Consenting Corridor passes through. The Consenting Corridor passes through more significant

areas of mobile fishing (vessels over 15 m) further offshore in ICES rectangles 44E9 and 45F0 (MMO, 2017). This is in line with the information provided during consultation.

ScotMap data (Figure 20.3) indicates that there is a considerable amount of fishing activity within approximately 5 km of the cable landfall site, with the highest concentration west of the 1˚40" line, which was also highlighted during consultation with fishermen. This is supported by the information received during consultation, as discussed on a fishery by fishery basis.

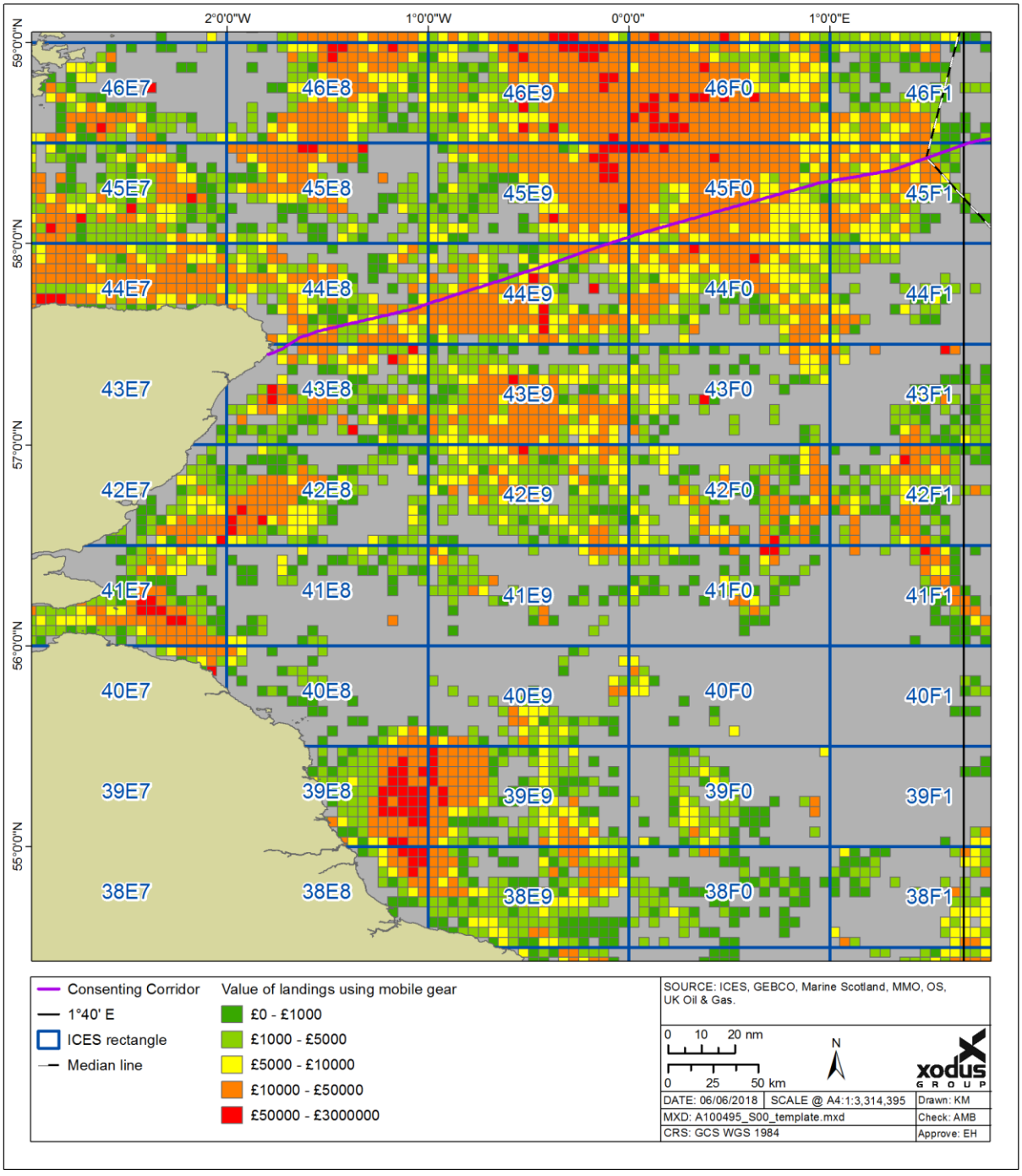


Figure 20.1. Distribution of Value of Landings (£) of Vessels >15 m Using Mobile Gear (MMO, 2017).

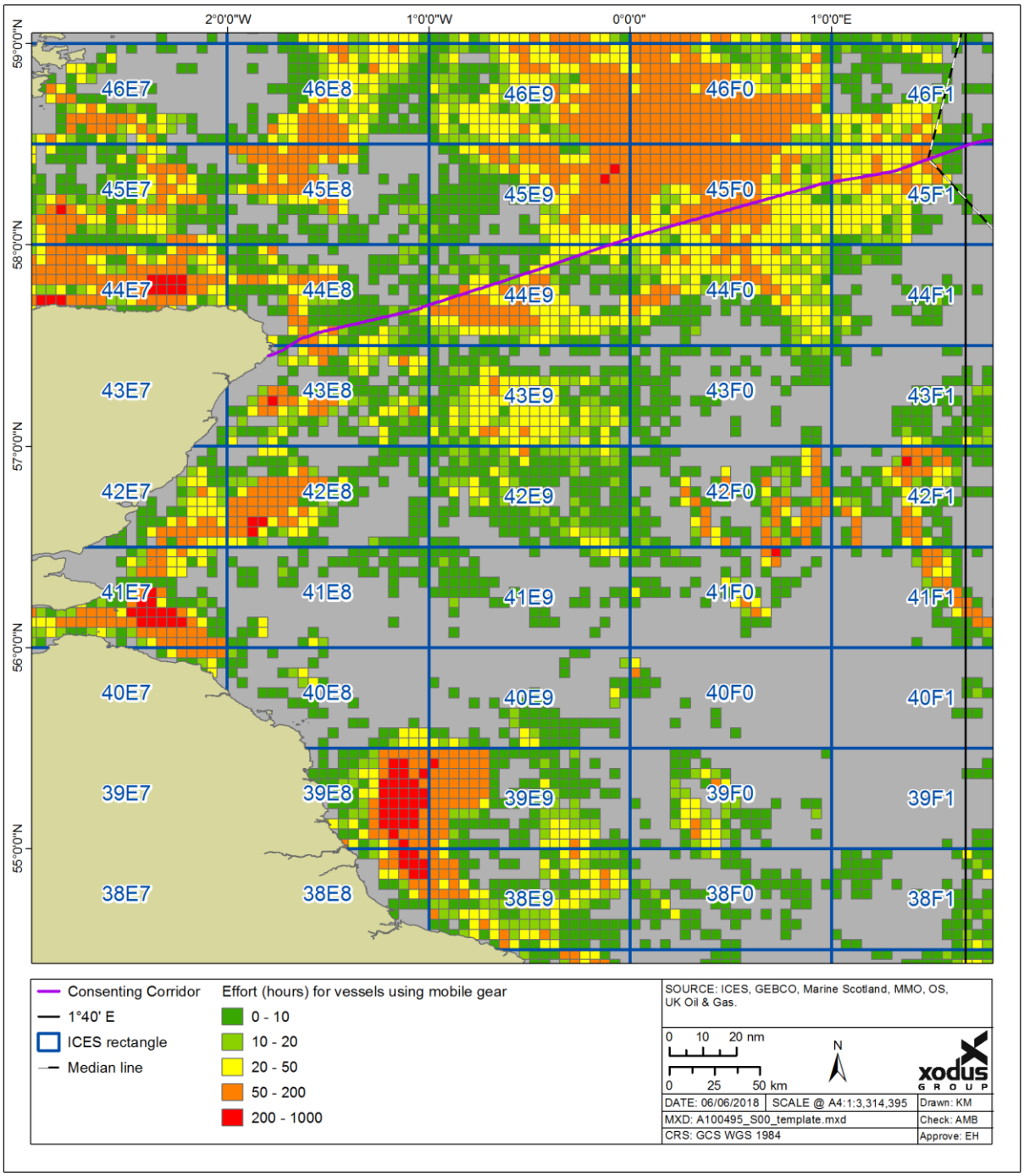


Figure 20.2. Distribution of Effort (Time) by Vessels >15 m Using Mobile Gear (MMO, 2017).

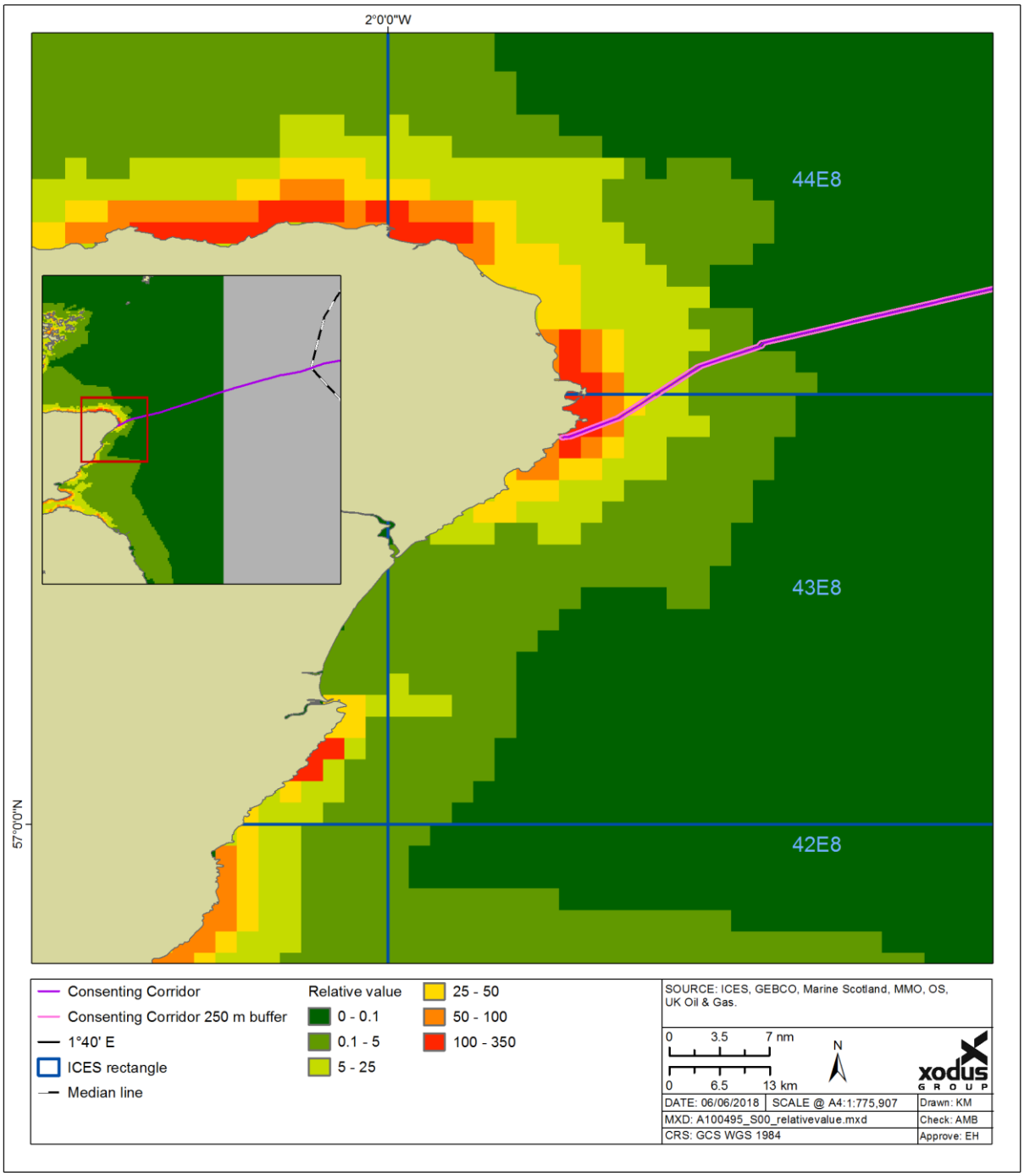


Figure 20.3. Relative Value of Inshore Fisheries (ScotMap, 2014).

The Consenting Corridor runs across seven ICES rectangles in the UK: 43E8, 44E8, 44E9, 44F0, 45E9, 45F0 and 45F1. Vessels under 10 m operate in ICES rectangles 43E8 and 44E8, typically extending approximately 14 km from shore, as shown in Figure 20.3. Landings by these vessels are dominated by shellfish and pelagic species, whilst the value and tonnage of demersal species comprises less than 1% of landings, as shown in Figure 20.4. Demersal, shellfish and pelagic species are targeted in all of these ICES rectangles by vessels over 10 m in length as shown in Figure 20.5. In terms of value, shellfish dominate landings in all ICES rectangles, except 44E9 which is dominated by demersal landings. In terms of landed weight, pelagic landings dominate all rectangles except 44E9 and 45E9 which are dominated by demersal landings.

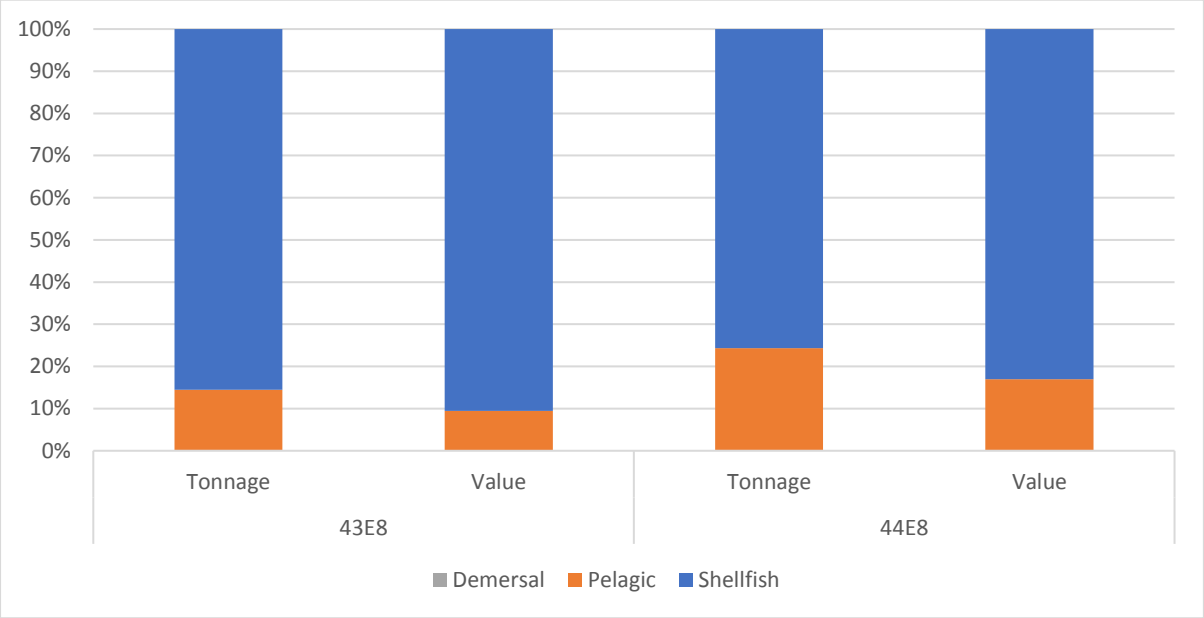


Figure 20.4. Proportional Landings by Species Type – Vessels under 10 m (average 2012-2016) (Scottish Government, 2018).

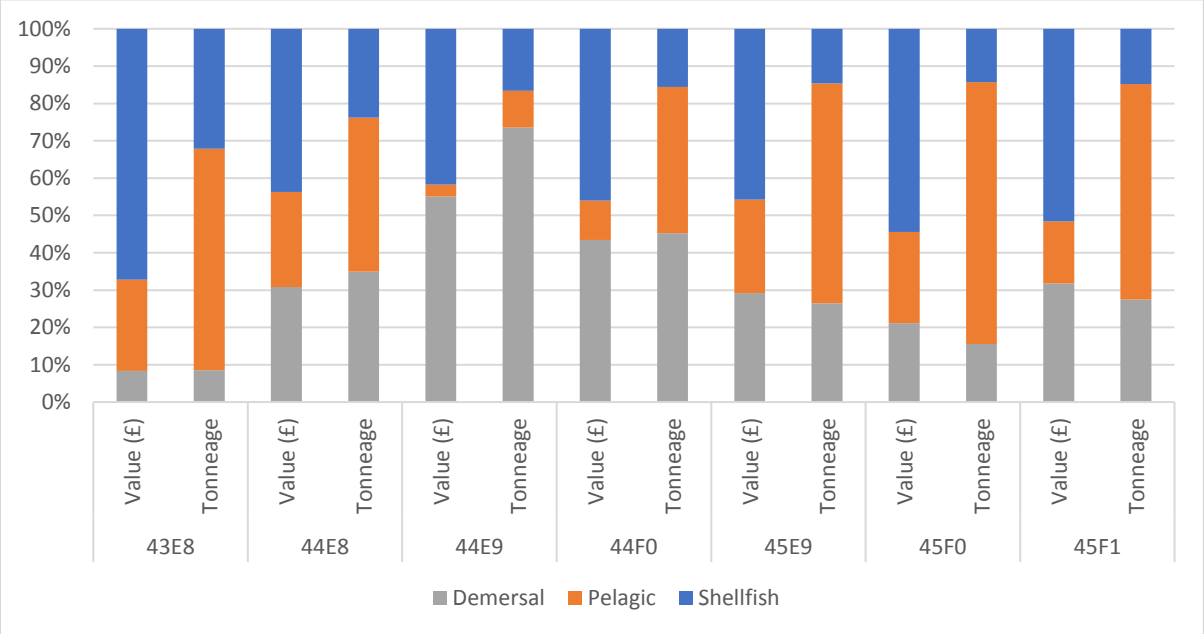


Figure 20.5. Proportional Landings by Species Type – Vessels over 10 m (average 2012-2016) (Scottish Government, 2018).

20.5.2.1 Target species

Vessels under 10 m in length operate primarily in the coastal ICES rectangles 43E8 and 44E8. Vessels under 10 m have also operated in ICES rectangle 44E9 and 45F1 in 2012 and 2014 respectively. As landings from this vessel size group this far offshore is atypical in terms of location and are sporadic in terms of time, these landings have not been included in the analysis.

Figure 20.6 details the value of the top landed species in ICES Rectangles 43E8 and 44E8 for vessels under 10 m in length. The top five species are the same in both rectangles with the value of landings

consistently dominated by brown crab from 2012 to 2016. Lobsters, mackerel, velvet crab and langoustine comprise the remaining top five landed species in terms of value and liveweight of landings, as shown in Table 20.6.

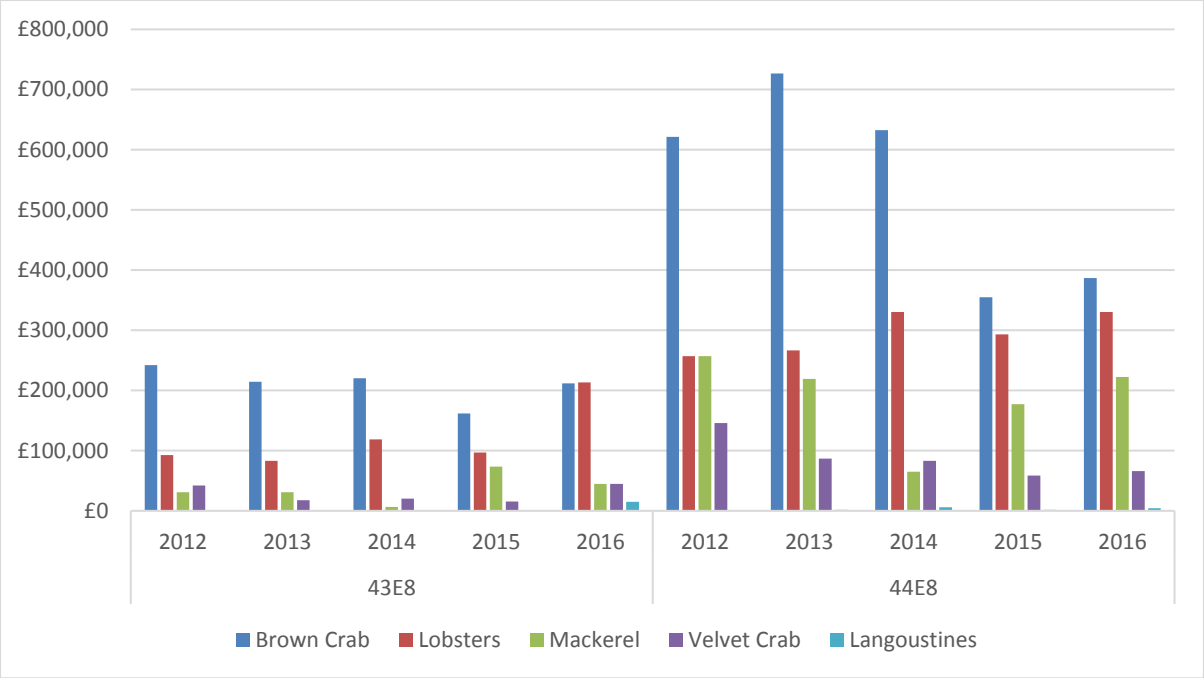


Figure 20.6. Top Five Target Species by Vessels under 10 m (Scottish Government, 2018).

Table 20.6. Value and Liveweight of Species by Vessels under 10 m in ICES Rectangles 43E8 and 44E8 (Average 2012-2016) (Scottish Government, 2018).

Species	**43E8**				**44E8**			
	Value		Liveweight		Value		Liveweight	
	£	%	Tonnes	%	£	%	Tonnes	%
Brown crab	210,050	52	172.05	74	544,470	48	399.73	63
Lobsters	120,942	30	10.93	5	295,537	26	153.49	24
Mackerel	37,353	9	32.95	14	188,211	17	49.98	8
Velvet crab	28,122	7	13.30	6	88,050	8	28.41	4
Langoustines	3,171	1	1.00	0	2,732	<1	1.03	<1
Other Species	The remaining <1% of value and liveweight is made up from catches of the following species: green crab, plaice, squat lobster, haddock, brown shrimps, squid, cod and whelks.				The remaining <1% of value and liveweight is made up from catches of the following species: squid, pollack, cod, green crab, monkfish, scallops, haddock, whelks, redfishes, squat lobster, oysters, saithe, crawfish, lemon sole, brill, hake, octopus, plaice, whiting and cuckoo ray.			

Figure 20.7 details the value of the top five landed species by vessels over 10 m in length in ICES rectangles 43E8 and 44E8. As shown the dominant species are different to those targeted by vessels under 10 m in length, with scallops shown to be the highest value species landed in both ICES rectangles. Pelagic species are also important with herring and mackerel as the second most landed species in ICES rectangle 43E8 and 44E8 respectively. Langoustine and haddock are also important target species in these ICES rectangles (Figure 20.7 and Table 20.7).

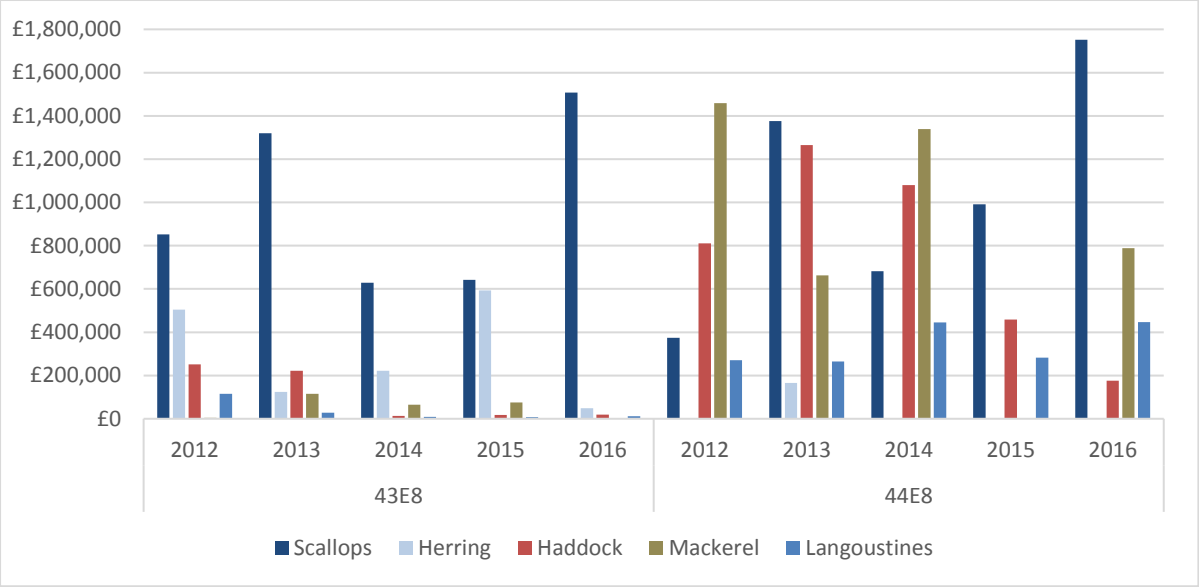


Figure 20.7. Top Five Target Species by Vessels over 10 m from 2012 to 2016 (Scottish Government, 2018).

Table 20.7. Value and Liveweight of Species by Vessels over 10 m in ICES rectangles 43E8 and 44E8 (Average 2012-2016) (Scottish Government, 2018).

Species	43E8				44E8			
	Value		Liveweight		Value		Liveweight	
	£	%	Tonnes	%	£	%	Tonnes	%
Scallops	990,354	64	493.33	31	1,035,280	30	528.50	19
Herring	298,490	19	830.72	53	33,117	1	96.04	3
Haddock	104,878	7	116.85	7	757,749	22	774.08	27
Mackerel	52,602	3	72.40	5	850,276	24	1071.92	38
Langoustines	34,243	2	9.83	1	341,902	10	91.54	3
Horse mackerel	27,400	2	33.83	2	58	<1	0.15	<1
Squid	11,368	1	2.86	<1	81,632	2	19.84	1
Whiting	7,598	<1	8.70	1	80,508	2	83.54	3
Monkfish	5,911	<1	2.22	<1	123,111	4	49.24	2
Cod	3,088	<1	1.46	<1	37,625	1	19.51	1
Brown crab	1,238	<1	0.92	<1	41,902	1	32.84	1
Other Species	The remaining <1% of value and liveweight is made up from catches of the following species: lemon sole, saithe, plaice, hake, halibut, lobsters, common skate, witch, megrim, turbot, catfish, pollack, gurnard and latchet, tusk, red and grey gurnards, brill, ling, thornback ray, velvet crab, red mullet, octopus, cuckoo ray, northern prawn, sole, dabs, squat lobster, spotted ray, john dory and whelks.				The remaining ~3% of value and liveweight is made up from catches of the following species: lobsters, lemon sole, hake, saithe, plaice, witch, halibut, megrim, turbot, ling, grey and red gurnards, velvet crabs, cuckoo ray, catfish, brill, dogfish, skates and rays, thornback ray, pollack, lesser spotted dogfish, octopus, john dory, red mullet, horse mackerel, dabs, tusk, conger eels, spotted ray, sole, eels, cuttlefish, greater forked beard, redfishes, albacore.			

Haddock and langoustine are the most valuable species landed in ICES rectangle 44E9 from 2012 to 2016, comprising and average of 40% and 34% respectively of the value of landings (Table 20.8). The species comprising 'other whitefish' are species landed in this rectangle include monkfish, cod and whiting (Figure 20.8).

Langoustine is consistently the most valuable species landed from ICES rectangles 44F0, 45E9, 45F0 and 45F1 except during 2015 and 2016 in ICES rectangle 45F0 and 2013 in rectangle 45F1 when herring landings dominated in terms of value (Figure 20.8). Other key species in these ICES rectangles include other demersal whitefish species such as monkfish, whiting and cod (Table 20.6, Table 20.7, Table 20.8, Table 20.9, and Table 20.10).

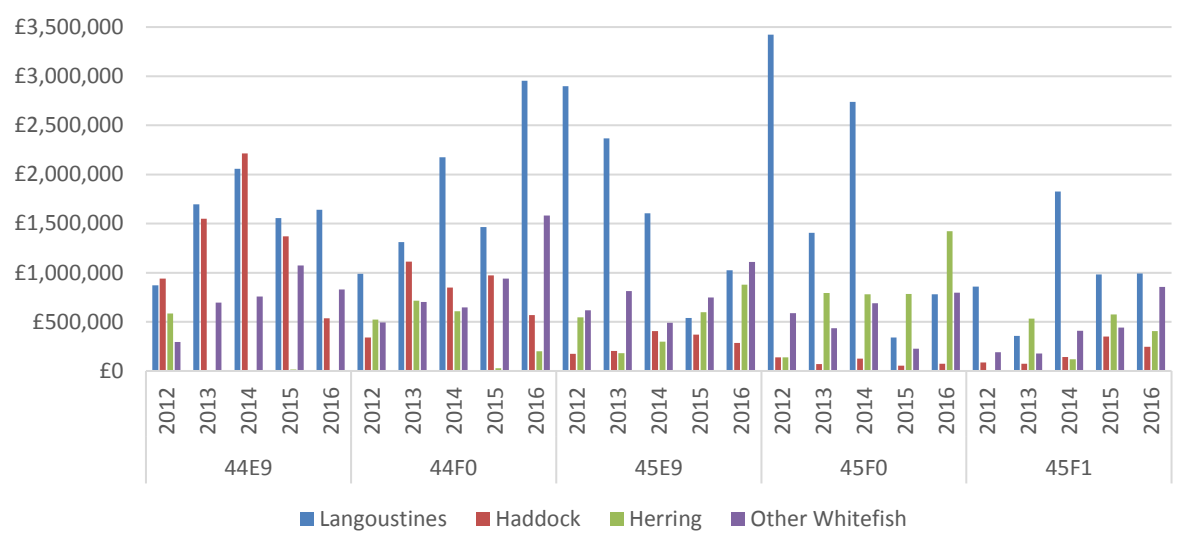


Figure 20.8. Top Six Target Species by Vessels over 10 m from 2012 to 2016 (Scottish Government, 2018).

Table 20.8. Value and Liveweight of Species by Vessels over 10 m (average 2012-2016) in ICES Rectangles 44E9 and 44F0 (Scottish Government, 2018).

Species	44E9				44F0			
	Value		Liveweight		Value		Liveweight	
	£	%	Tonnes	%	£	%	Tonnes	%
Langoustines	1,564,396	40	412.24	16	1,779,740	45	442.93	15
Haddock	1,321,900	34	1,320.58	51	769,616	19	703.24	24
Monkfish	315,105	8	134.07	5	305,119	8	116.11	4
Whiting	194,119	5	214.39	8	158,542	4	173.63	6
Herring	120,307	3	251.83	10	414,686	10	1137.68	39
Cod	86,375	2	44.01	2	169,708	4	85.93	3
Lemon sole	58,619	2	28.74	1	86,016	2	36.40	1
Squid	52,357	1	15.19	1	39,443	1	12.49	<1
Saithe	32,197	1	35.78	1	61,930	2	66.65	2
Hake	26,743	1	20.19	1	69,606	2	55.86	2
Other Species	The remaining ~3% of value and ~4% liveweight is made up from catches of the following species: witch, halibut, turbot, plaice, ling, grey and red gurnards, scallops, pollack, megrim, mackerel, catfish, cuckoo ray, thornback ray, octopus, red mullet, lesser spotted dogfish, brill, lobsters, sole, tusk, conger eels, john dory, cuttlefish, spotted ray, brown crab, tope, redfishes, common skate, greater forked beard, white skate, sandy ray, spider crabs and black dogfish.				The remaining ~3% of value and ~4% liveweight is made up from catches of the following species: witch, halibut, ling, plaice, turbot, pollack, grey and red gurnards, catfish, mackerel, cuckoo ray, megrim, octopus, thornback ray, red mullet, lesser spotted dogfish, cuttlefish, spotted ray, brill, blonde ray, mullet, skates and rays, brown crab, common skate, blue whiting, tusk, john dory, sandy ray, greater forked beard, redfishes, sole, spider crabs, flounder, lobsters and white skate.			

Table 20.9. Value and Liveweight of Species by Vessels over 10 m in ICES Rectangles 45E9 and 45F0 (Average 2012-2016) (Scottish Government, 2018).

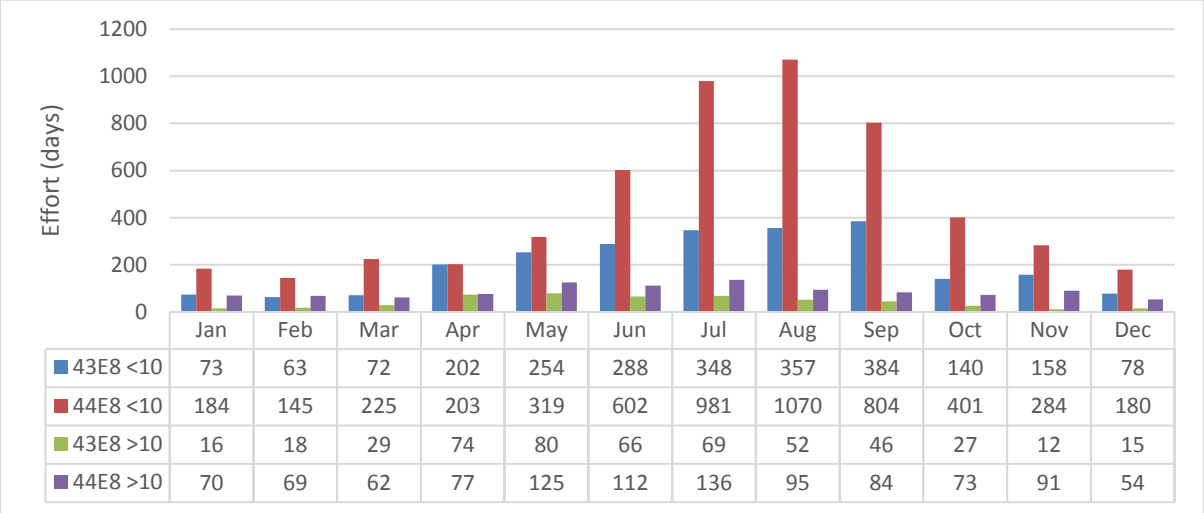
Species	45E9				45F0			
	Value		Liveweight		Value		Liveweight	
	£	%	Tonnes	%	£	%	Tonnes	%
Langoustines	1,687,344	45	435.33	14	1,737,654	54	440.16	14
Herring	499,958	13	1,349.79	44	783,895	24	2179.63	70
Mackerel	441,995	12	451.03	15	1,712	<1	4.56	<1
Monkfish	369,620	10	134.61	4	206,274	6	72.88	2
Haddock	287,766	8	282.50	9	92,659	3	95.45	3
Whiting	180,841	5	214.26	7	104,846	3	125.00	4
Cod	100,536	3	51.81	2	112,635	3	54.50	2
Saithe	34,426	1	38.89	1	62,866	2	68.32	2
Lemon sole	32,483	1	14.31	0	22,527	1	8.34	<1
Squid	31,412	1	10.29	0	15,387	<1	5.48	<1
Witch	24213	1	25.75	1	29,670	1	29.26	1
Other Species	The remaining ~2% of value and ~2% liveweight is made up from catches of the following species: witch, hake, halibut, ling, megrim, plaice, turbot, pollack, grey and red gurnards, catfish, cuckoo ray, lesser spotted dogfish, octopus, red mullet, thornback rays, brill, redfishes, tusk, spotted ray, brown crab, conger eel, wrasses, john dory, tope, cuttlefish, greater forked beard, bass, dabs, sandy ray, spider crabs.				The remaining ~2% of value and ~2% liveweight is made up from catches of the following species: ling, halibut, hake, plaice, pollack, catfish, mackerel, turbot, megrim, grey and red gurnards, octopus, cuckoo ray, tusk, red mullet, cuttlefish, thornback ray, brill, bluemouth, lesser spotted dogfish, mullet dabs, john dory, bass, conger eels, greater forked beard, northern shrimp and blue whiting.			

Table 20.10. Value and Liveweight of Species by Vessels over 10 m in ICES Rectangle 45F1 (average 2012-2016) (Scottish Government, 2018).

Species	45F1			
	Value		Liveweight	
	£	%	Tonnes	%
Langoustines	1,004,375	51	232.69	14
Herring	326,508	17	927.18	57
Haddock	179,673	9	167.30	10
Monkfish	166,656	8	56.11	3
Cod	85,136	4	41.39	3
Whiting	53,304	3	65.85	4
Witch	35,862	2	34.63	2
Lemon sole	35,650	2	12.55	1
Saithe	27,408	1	27.03	2
Squid	15,300	1	5.64	0
Other species	The remaining ~3% of value and ~3% liveweight is made up from catches of the following species: hake, ling, plaice, halibut, pollack, grey and red gurnards, catfish, mackerel, turbot, megrim, cuckoo ray, octopus, cuttlefish, thornback ray, tusk, red mullet, skates and rays, lesser spotted dogfish, brill, dabs, blue whiting, sole, greater forked beard, spotted ray, lobster, long rough dabs and John Dory.			

20.5.2.2 Seasonal Variation

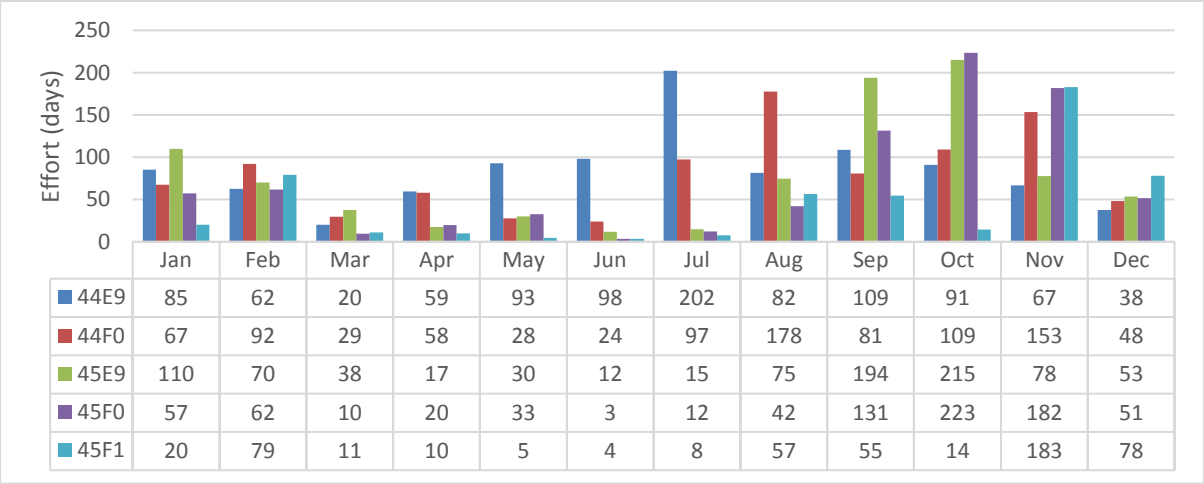
Fishing activity takes place all year round in all ICES rectangles that intersect with the Consenting Corridor. Figure 20.9 shows the average number of days spent fishing by vessels under and over 10 m in length from 2012 to 2016. As shown, effort is consistently higher in ICES rectangle 4E8, which also shows the most dramatic seasonal variation in activity by vessels under 10 m in length with activity peaking in summer and early autumn. Activity by vessels under 10 m in ICES rectangle 43E8 is also higher from May to September compared with the rest of the year. Effort by vessels over 10 m is much lower than less than 10 m vessels in these ICES rectangles.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
43E8 <10	73	63	72	202	254	288	348	357	384	140	158	78
44E8 <10	184	145	225	203	319	602	981	1070	804	401	284	180
43E8 >10	16	18	29	74	80	66	69	52	46	27	12	15
44E8 >10	70	69	62	77	125	112	136	95	84	73	91	54

Figure 20.9. Monthly Effort in ICES Rectangles 43E8 and 44E8 by Vessels under 10 m (average 2012 to 2016).

Figure 20.10 shows the average number of days spent fishing in ICES rectangles 44E9, 44F0, 45E9, 45F0 and 45F1 by vessels over 10 m in length.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
44E9	85	62	20	59	93	98	202	82	109	91	67	38
44F0	67	92	29	58	28	24	97	178	81	109	153	48
45E9	110	70	38	17	30	12	15	75	194	215	78	53
45F0	57	62	10	20	33	3	12	42	131	223	182	51
45F1	20	79	11	10	5	4	8	57	55	14	183	78

Figure 20.10. Monthly effort in ICES Rectangles 43E8 and 44E8 by vessels over 10 m (average 2012 to 2016).

20.5.2.3 Gear Types

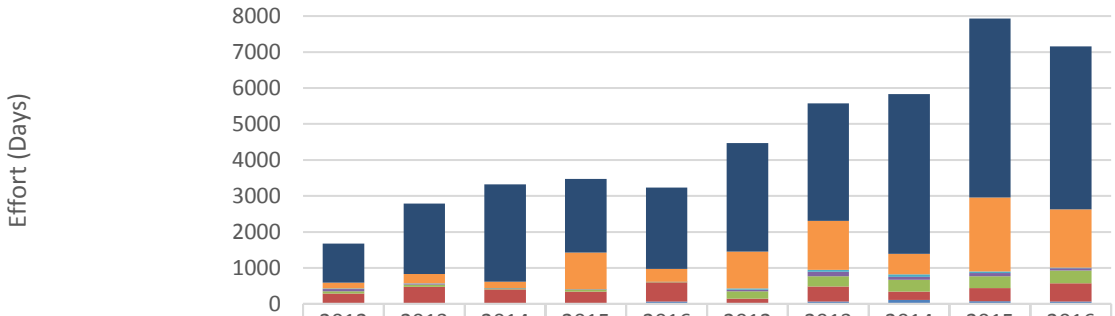
As the Consenting Corridor extends across a range of depths and habitat types, numerous gear types are in use across the Consenting Corridor, targeting a variety of different species, and these are

detailed in Table 20.11. Demersal gear, including dredging, has the potential to interact with cables on the seabed, and associated cable protection. Pelagic gear has the potential to interact with vessels during marine cable installation.

Table 20.11. Summary of Fishing Gear Likely to be Operating in Consenting Corridor.

Gear type	Number of vessels required	Number of nets required	Towing speed (knots)	Tow duration (hours)	Additional information	Target species
Single bottom trawl	One	One	2-4	Up to 6	Nets used are chosen to be compatible with seabed conditions in the area being fished	Mixed whitefish, Langoustine and squid
Twin-rig trawl	One	Two	2-3	4-7	Sometime associated with heavy rock hopper ground gear	Mixed whitefish, Langoustine and squid
Demersal pair trawl	Two	One	3-3.5	4-5	Vessels 370 m apart; will close during hauling and pairing up	Mixed whitefish
Pelagic pair seining	Two	One	2	4	Nets follow ~2,200 m behind vessels; vessels between one quarter and one third of 1 NM from each other	Herring and mackerel
Seine net	One	One	1-2	2	At greatest distance net is over 1 NM from vessel	Demersal species
Dredge	One	n/a	3-5	4-5	Dredges are towed up to 1 NM from the vessels	King scallop, queen scallop
Creels	One	n/a	n/a	n/a	Baited creels are left in place for a period of time before being hauled (up to two weeks)	Lobster, brown crab, velvet crab, green crab
Lines	One	n/a	n/a	n/a	Hand lines or jigging machines	Mackerel

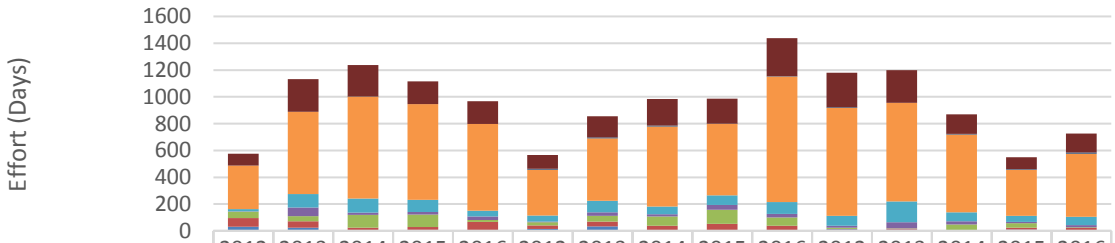
In the under 10 m fleet, pots, or creels, are the most utilised gear as shown in Figure 20.11 'Other' gear types utilised in these rectangles comprise mechanical handlines (jiggers), bottom otter trawls, hand fishing, trolling lines, boat dredges, otter twin trawls (all under 10 m fleet), bottom trawls, midwater trawls, langoustine trawls, midwater and unspecified otter trawls, pair trawls seine nets and mechanized dredges. Hand lines (jiggers), used to target mackerel, are the second most utilised gear by the under 10 m fleet in the ICES rectangles 43E8 and 44E8. Boat dredges, used to target scallops, dominate the gear utilised by the over 10 m fleet in ICES rectangles 43E8 and 44E8. The use of bottom otter trawls by the over 10 m fleet is also apparent in ICES rectangle 44E8.



	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
	43E8					44E8				
Pots <10	1089	1955	2708	2042	2265	3019	3273	4448	4980	4526
Hand Lines <10	157	257	176	1028	351	1018	1360	562	2055	1618
Pair Trawls (bottom) >10	17	8	5	10	0	35	53	73	44	17
Otter Twin Trawls >10	59	26	1	3	6	49	119	82	89	66
Otter Trawls (bottom) >10	67	61	30	44	15	207	285	328	327	358
Boat Dredges >10	283	459	392	330	534	122	425	232	365	499
Other (all vessles)	4	17	11	13	67	20	62	111	73	70

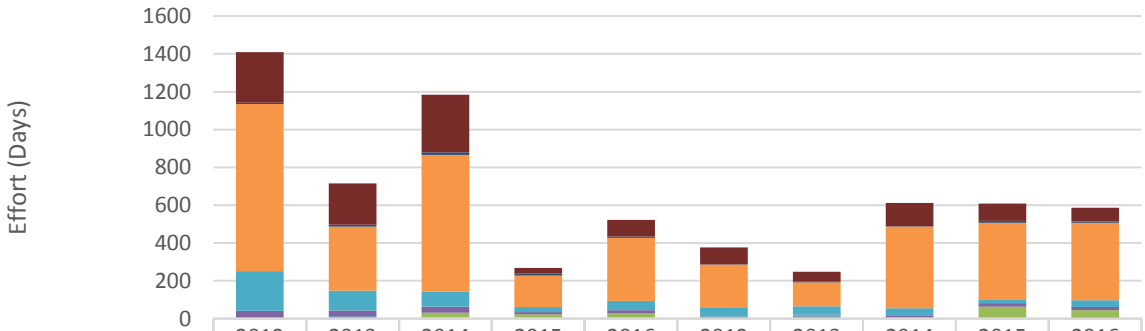
Figure 20.11. Effort by Gear Type in ICES rectangles 43E8 and 44E8 (all vessel sizes) (Scottish Government, 2018).

The over 10 m fleet is dominated by bottom otter trawling gear in all other ICES rectangles, as shown in Figure 20.12 and Figure 20.13 'Other' gear types adopted by the over 10 m fleet in ICES rectangles 44E9, 44F0, 45E9, 45F0 and 45F1 comprise boat dredges, midwater trawls, unspecified otter trawls, midwater and unspecified pair trawls, pots, seine nets and mechanized dredges. Otter twin trawls are the second most utilised gear adopted in these ICES rectangles, followed by langoustine trawls (Figure 20.12 and Figure 20.13).



	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
	44E9					44F0					45E9				
Otter (Twin)	87	245	233	171	171	101	159	198	185	284	257	244	147	89	141
Otter (midwater)	0	0	1	0	0	9	6	6	1	3	6	0	5	6	10
Otter (bottom)	327	613	763	714	646	341	468	598	534	937	804	736	580	343	470
Nephrops Trawl	15	101	104	91	44	45	85	56	72	88	75	155	65	45	64
Bottom Trawls	3	63	16	18	25	5	26	17	35	27	14	46	25	10	16
Pair (bottom)	47	39	95	94	16	23	43	68	105	62	8	3	46	34	3
Scottish Seines	65	47	23	21	62	26	37	34	51	33	2	6	1	15	20
Other	31	25	2	7	5	15	33	5	3	5	13	11	0	10	3

Figure 20.12. Effort by Gear Type in ICES Rectangles 44E9, 44F0 and 45E9 (vessels >10 m) (Scottish Government, 2018).



	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
	45F0					45F1				
Otter (Twin)	267	219	305	29	88	89	52	124	92	74
Otter (midwater)	7	10	13	12	8	3	3	2	10	7
Otter (bottom)	883	339	723	167	334	226	128	432	405	409
Nephrops Trawl	210	104	80	26	49	49	43	40	20	36
Bottom Trawls	39	31	32	12	15	10	6	10	19	16
Pair (bottom)	1	0	26	17	22	1	3	5	59	36
Scottish Seines	0	0	0	2	1	0	0	0	5	7
Other	1	12	6	3	7	0	12	0	0	3

Figure 20.13. Effort by Gear Type in ICES Rectangles 45F0 and 45F1 (Vessels >10 m) (Scottish Government, 2018).

20.5.2.4 Crab and Lobster Fishery

Brown crab is targeted on a variety of substrate whilst lobsters are targeted on rocky, uneven ground and around wreck sites. Velvet crab is a swimming crab most commonly found on rocky substrates to depths up to 25 m. Crab and lobster are not currently quota restricted, although all vessels landing over a particular weight (200 kg of lobster, 750 kg of crab) must be licensed.

Brown and velvet crab and lobster are principally targeted by static gear vessels setting creels (pots). The Peterhead inshore fleet is largely comprised of vessels up to 10 m in length which operate from the harbour on a daily basis. A creel fleet is also known to operate from Boddam harbour located approximately 3 km south of Peterhead. The fleet is active over the summer months but less so over the winter as the harbour is vulnerable to large swells particularly from the north and east. ScotMap data (2014) indicates that the majority of creeling activity occurs within 3 NM, although some vessels operate as far out as 6 NM and very few operate beyond that. ScotMap suggests that no creeling activity occurs beyond 12 NM. Although the ScotMap data was collected several years ago, feedback during consultation suggests that this pattern is still in place. In particular, fishermen operating creel boats noted that they typically remain within the 1° 40' longitude line as part of an agreement with scallop fishermen who utilise waters further offshore. The creel fishery is therefore operational at the Long Haven Bay landfall site and up to 6 NM from the coast.

The majority of brown crab in Scotland is landed from June to December and velvet crab between July and November. As a result of the limited size of vessels in the area, weather conditions are a significant factor in determining levels of activity in the winter months. In addition to full time vessels, there are also a number of part time vessels that will set a small number of creels in inshore areas during the summer months.

The crab and lobster fishery is the highest value fishing activity by the inshore fleet of <10 m length vessels (Scottish Government, 2018). Brown crab is the most landed species in terms of value and liveweight in ICES rectangles 43E8 and 44E8 by the under 10 m fleet, comprising 52% and 48% of the value of landings respectively and 74% and 63% of landed weight respectively (Table 20.6). Average landings from 2012-2016 are worth £210,050 and £544,470 in 43E8 and 44E8 respectively. Brown crab landings by the over 10 m fleet in these rectangles is worth £1,238 and £41,902 (average 2012-2016). Lobsters are the second most landed species by the under 10 m fleet, worth £120,942 (30%) and £295,537 (26%) of value in 43E8 and 44E8 and weighing 10.93 tonnes (5%) and 153.49 tonnes (24%) respectively (average 2012-2016) (Table 20.6).

20.5.2.5 Herring and Mackerel Fishery

Pelagic species, mainly herring, mackerel, and sprat, are habitually mid-water shoaling fish, but during full daylight conditions they will congregate in dense shoals near the sea-bed. Normally they are caught while they are nearer the surface but it is possible to trawl for them near the bottom. In normal circumstances these nets would not come into hard contact with the seabed, having no protective ground-line.

20.5.2.5.1 Vessels Under 10m

There is a significant hand-line fishery for mackerel in the summer months between May and November. An estimated 45 vessels are understood to target the fishery from Peterhead, with a declining number of vessels further from the coast (based on ScotMap data as shown in Figure 20.14). Hand lining also includes the automated lines used to target mackerel known as jigging machines. Consultation with fishermen highlighted that mackerel grounds are variable from year to year and vessels will operate wherever the mackerel are.

Mackerel is the third most important species targeted by vessels under 10 m in ICES rectangles 43E8 and 44E8, worth £37,353 (9%) and £188,050 (17%) and weighing 32.95 tonnes (14%) and 49.98 tonnes (8%) respectively (Table 20.6). In the same ICES rectangles mackerel worth £52,602 (3%) and £850,276 (24%) is landed by the over 10 m fleet respectively. ICES Rectangle 44E8 has therefore been more productive for mackerel than 43E8 based on the average landings from 2012-2016.

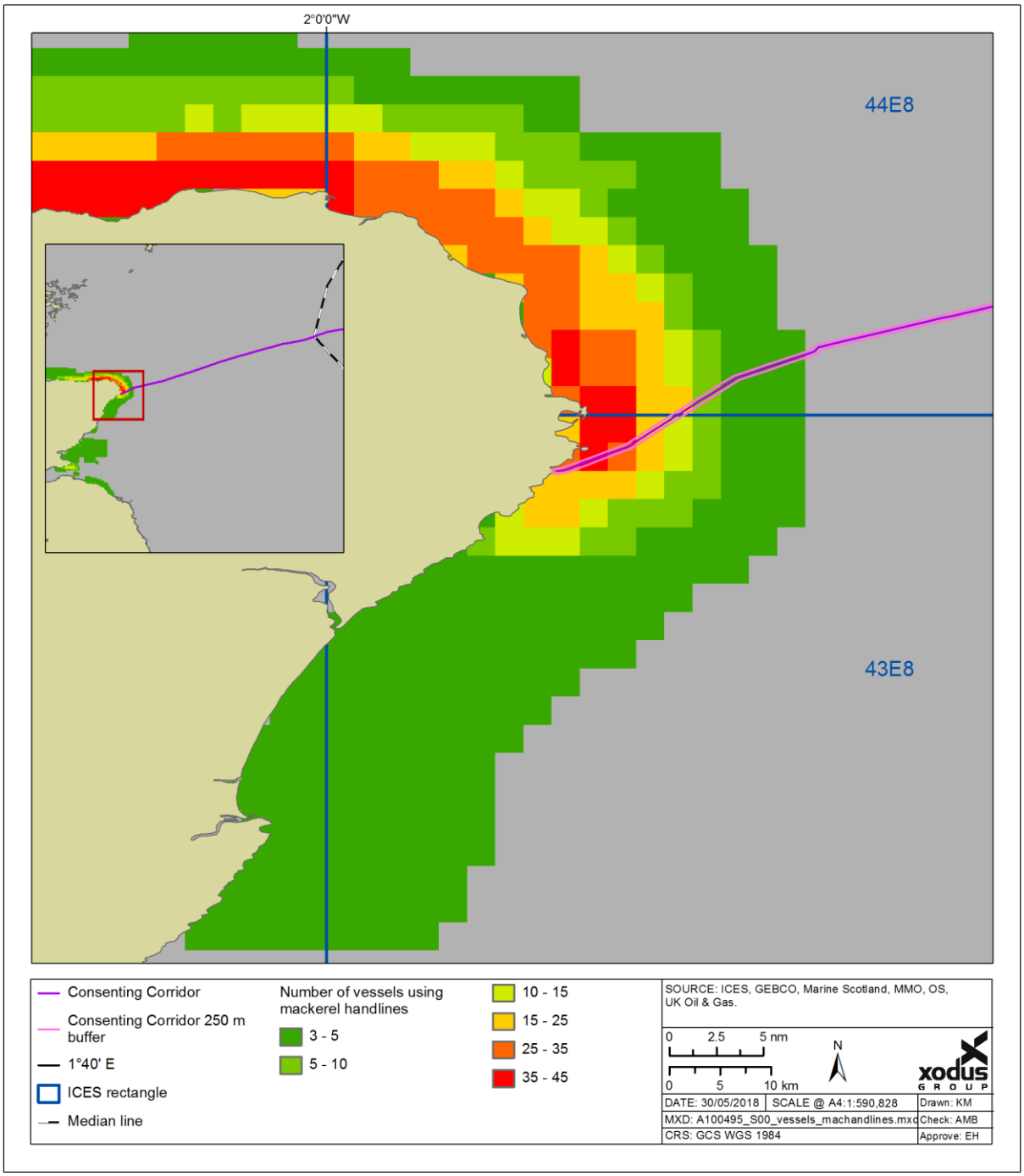


Figure 20.14. Number of Mackerel Handlining Vessels (ScotMap, 2014).

20.5.2.5.1 Vessels Over 10m

Pelagic species (herring and mackerel) further offshore are targeting by vessels > 10 m using seines and mid water trawls. Mid-water trawls are towed at the appropriate level in the water column to intercept shoaling fish such as herring. Seining depends on long lengths of rope up to three kilometres per side which herd fish into the path of the net as the gear is hauled. Pelagic fishing methods tend to be highly efficient by targeting shoals, large catches are possible over short time periods which leads to sporadic effort where periods of intense fishing are followed by periods of vessels not working for prolonged periods of time. The relative value of landings from vessels using pelagic gear (Figure 20.15) is low for the entirety of the Consenting Corridor. A small area of high value occurs directly

adjacent to the Consenting Corridor in rectangle 44E9. The effort of vessels using this gear mirrors the value, with low effort along the Consenting Corridor apart from a small area of higher effort in rectangle 44E9. For ICES rectangles 45E9, 44E9 and 44F0, seine nets accounted for approximately 1% of the fishing effort in 2016, mid water trawls accounted for less than 1 % of the fishing effort in 2016 (Figure 20.11). For ICES rectangles 45F0 and 45F1 seine nets and mid water trawls each accounted for less than 1% of the effort for 2016 (Figure 20.12).

In the ICES rectangles further offshore, herring is a key species. For ICES rectangles 45E9, 45F0 and 45F1 herring was the second most valuable species accounting for 13%, 24% and 17% of the landings value respectively. Mackerel was also important in rectangles 45E9 being the third most valuable species and accounting for 12% of the landings value. The high value of these species in comparison to the low value placed on pelagic gear methods indicates that these species are also likely to be targeted using other gear types too.

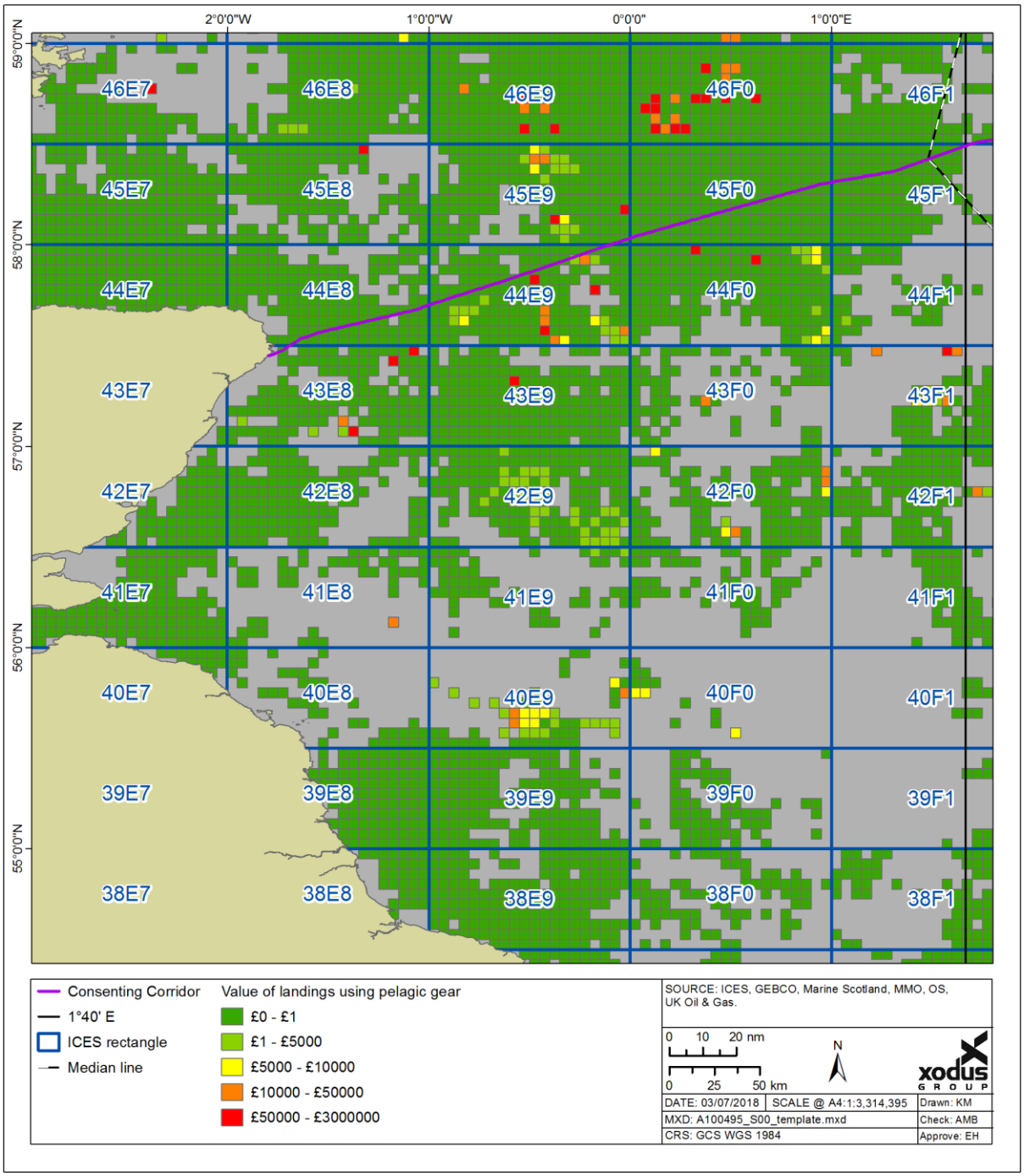


Figure 20.15. Relative Distribution of Landings (£) of Vessels >10 m Targeting the Pelagic Fishery (MMO, 2018).

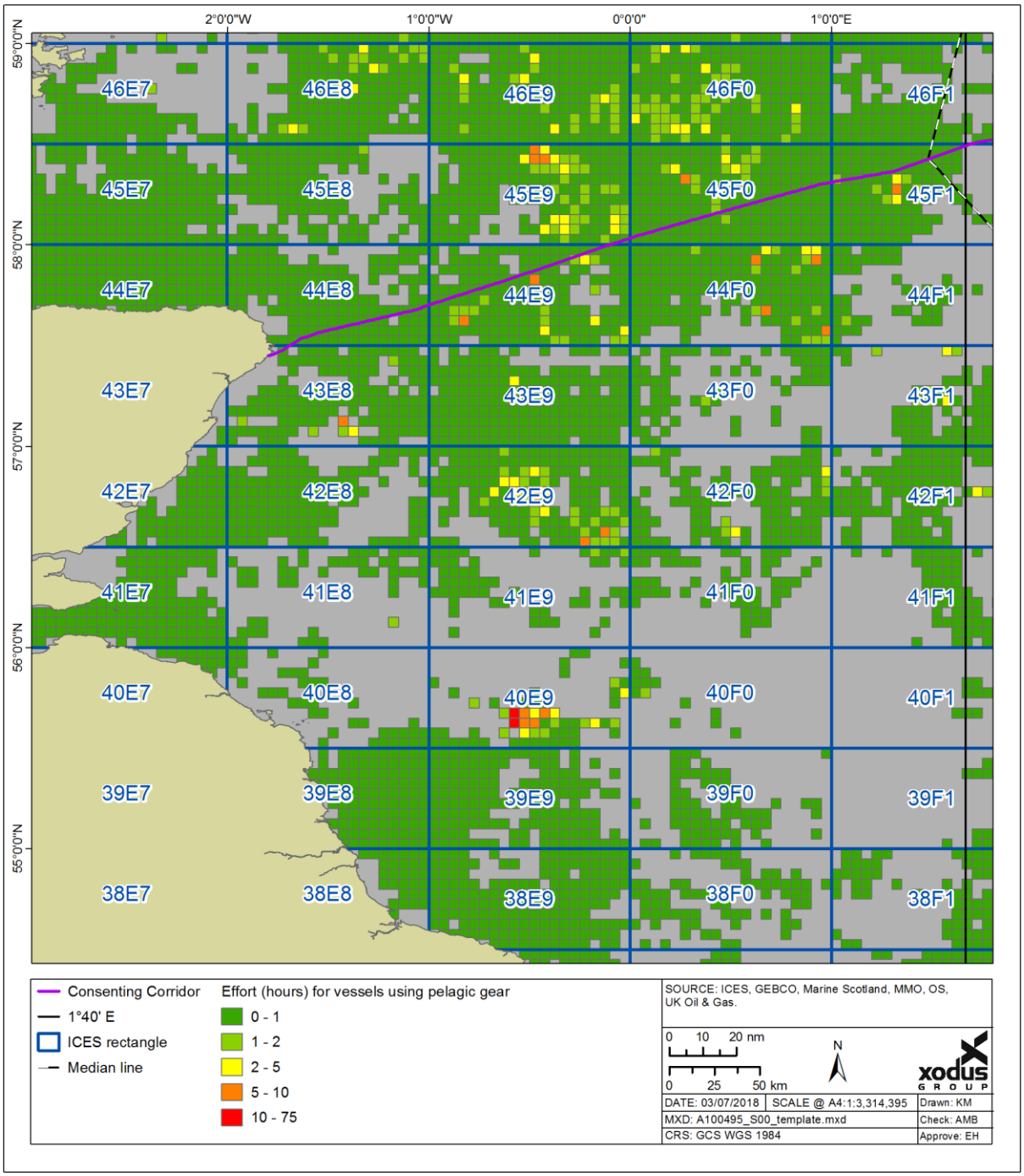


Figure 20.16. Relative Distribution of Effort (Hours) of Vessels >10 m Targeting the Pelagic Fishery (MMO, 2018).

20.5.2.6 Scallop Fishery

Scallops occur on the seabed primarily on sediments comprising sand, gravel and mud and possibly interspersed with stones, rocks or boulders. Scallops lie disguised in the sediments and are generally considered sedentary, however, they are able to swim short distances propelled by jets of water.

Scallop vessels tow one (astern) or two (either side) beams onto which a number of dredges are attached. The number of dredges used depends on vessel size, engine power and winch capacity. In Scottish waters vessels are restricted to eight dredges per side inside 6 NM from shore and up to ten

dredges per side between 6 and 12 NM from shore. Scallops are "raked" from the seabed by a row of sprung steel teeth up to 11 cm in length. Mesh bags are situated behind the teeth to retain the catch. The maximum penetration depth of this gear is up to 20 cm, although this will vary depending on substrate composition. Scallops are not targeted by vessels under 10 m in length (.

Table 20.6). They are however the most valuable landed species in ICES rectangles 43E8 and 44E8 by vessels over 10 m in length, worth an average of £990,354 (64%) and £1,035,280 (30%) respectively (Table 20.7). Scallops do not comprise a significant proportion of landings from any of the other ICES rectangles which intersect with the Consenting Corridor (Figure 20.17 and Figure 20.18).

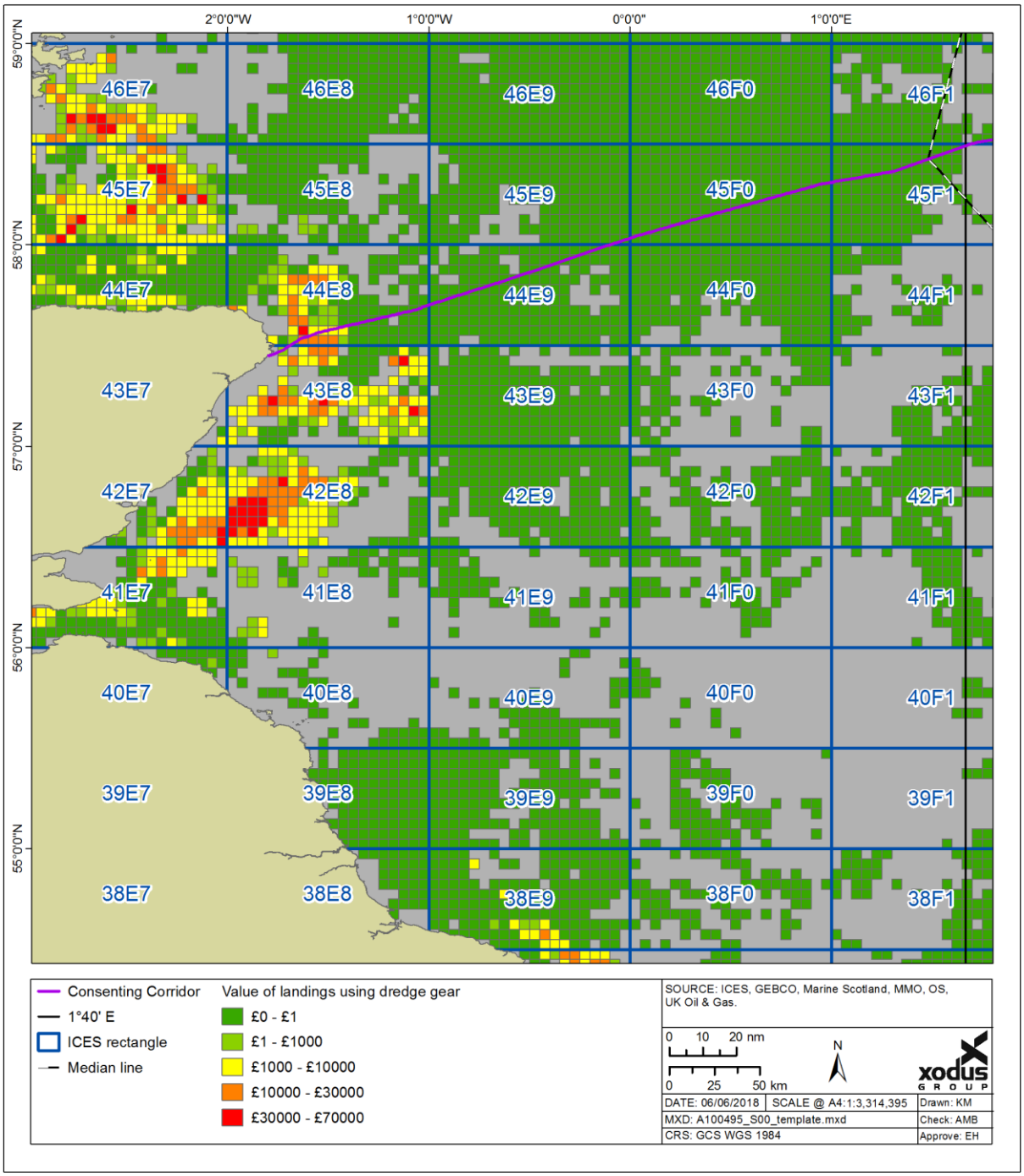


Figure 20.17. Relative Distribution of Landings (£) of Vessels >15 m Using Dredge Gear (MMO, 2018).

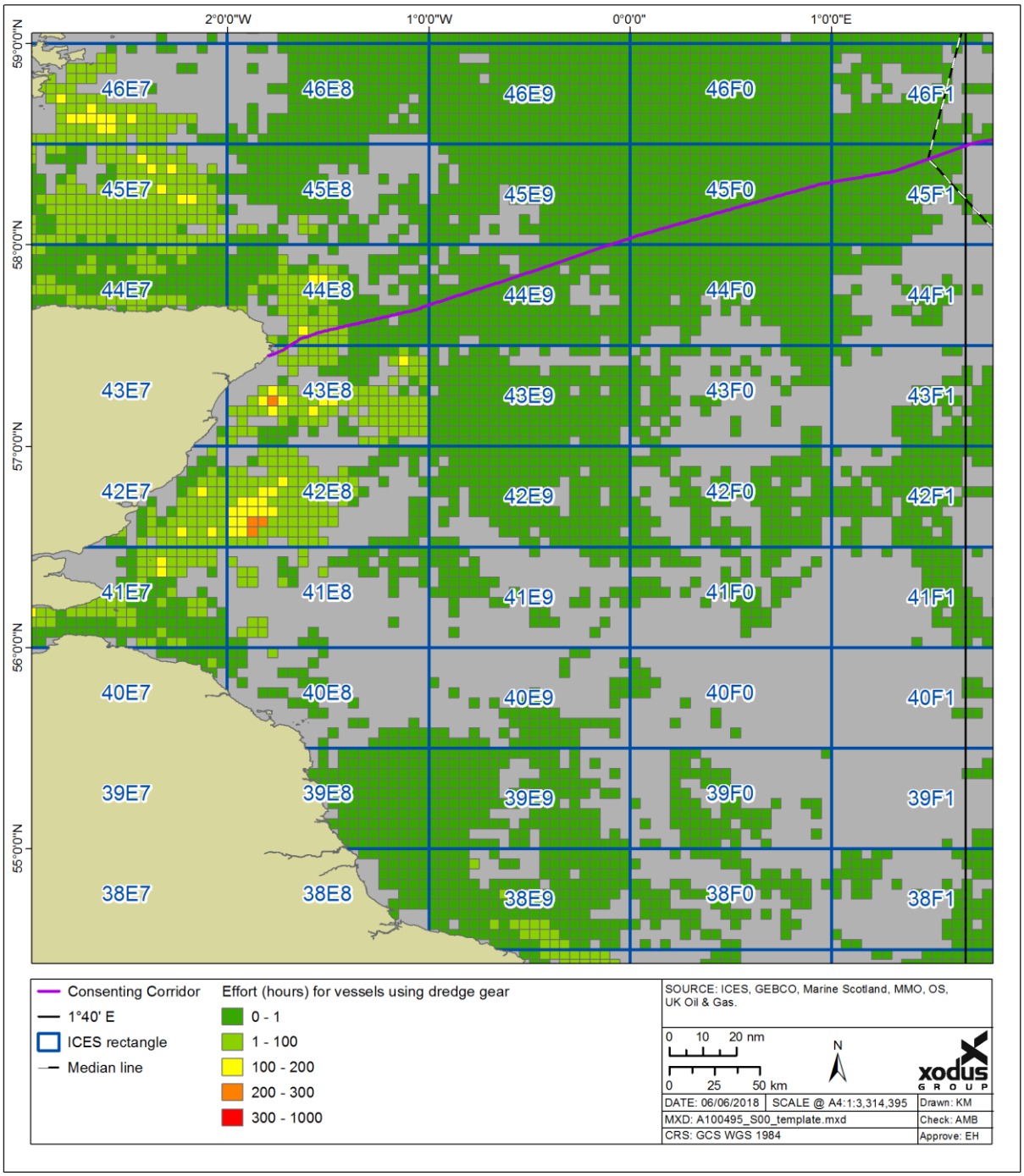


Figure 20.18. Relative Distribution of Effort (Days) of Vessels >15 m using Dredge Gear (MMO, 2018).

20.5.2.7 Demersal Trawl Fishery

The demersal trawl fishery is for the most part a mixed fishery whereby multiple demersal species are simultaneously caught. EU quota restrictions and upon the landing of cod have reduced the fleet's ability to fish alternative species. As a result of a lack of available quota, demersal trawlers have diversified into the langoustine fishery, where quota levels are not so restrictive.

There is a historic whitefish fishery in the region, targeting species such as haddock, cod and whiting using demersal otter trawl and Scottish seine netting fleets. Demersal trawling is the most common fishing method in Scottish waters in terms of vessel numbers.

Haddock and monkfish are the most valuable whitefish species landed along the cable corridor, with the average value of haddock (2012-2016) landed from any of the intersecting ICES rectangles peaking at £1,321,900 (34%) in ICES rectangle 44E9, a liveweight of 1,320.58 tonnes, or 51% of the average landed weight (Table 20.8). As shown in Figure 20.8 haddock and other whitefish are an important species landed in all ICES rectangles which intersect with the Consenting Corridor.

Langoustine gear is configured in the same way as that used to target whitefish, but with modified nets. Langoustine inhabit burrows in the seabed and favour muddy and soft substrates. Vessels tow one or more trawl nets (single or twin rig) along the seabed.

Along the Consenting Corridor demersal trawling is most important in terms of effort and value in ICES rectangle 44E9, with the cable corridor passing through the area considered the most valuable within the rectangle (Figure 20.19 and Figure 20.20). Demersal trawls are also of some importance to ICES rectangles 45F0, 44F0, 45E9 and 45F1 with the cable corridor passing through areas of moderate value and effort in comparison to the surrounding rectangles. Demersal trawling is not considered important in the more coastal ICES rectangles (44F8 and 43E8) that the cable corridor passes through (Figure 20.19 and Figure 20.20). AIS data for 2017 confirms that demersal trawls are the most utilised gear type along the Consenting Corridor (Figure 20.23).

Langoustine is frequently the most valuable species landed from ICES rectangles 44E9, 44F0, 45E9, 45F0 and 45F1 as shown in Figure 20.8.

As part of the Navigational and Shipping Baseline (Appendix G.1), an analysis was undertaken to identify tracks of demersal vessels actively engaged in fishing, as opposed to transiting through the area. Within the AIS data, vessels can change their navigation status to “engaged in fishing” where appropriate, although it is noted that fishing vessels do not always keep this reliably updated. The analysis was therefore based on a combination of navigation status, destination, speed and course (e.g. consistent course or several turns). The results are presented in Figure 20.24 and correlate with the effort and value results presented in Figure 20.19 and Figure 20.20 in that ICES rectangle 44F9 shows the greatest level of activity, with the highest level occurring in a concentrated area to the north of the Consenting Corridor.

Anecdotal information from consultation with fishermen indicates that the langoustine fishery reportedly travels from a west to east direction as the species migrate during the season.

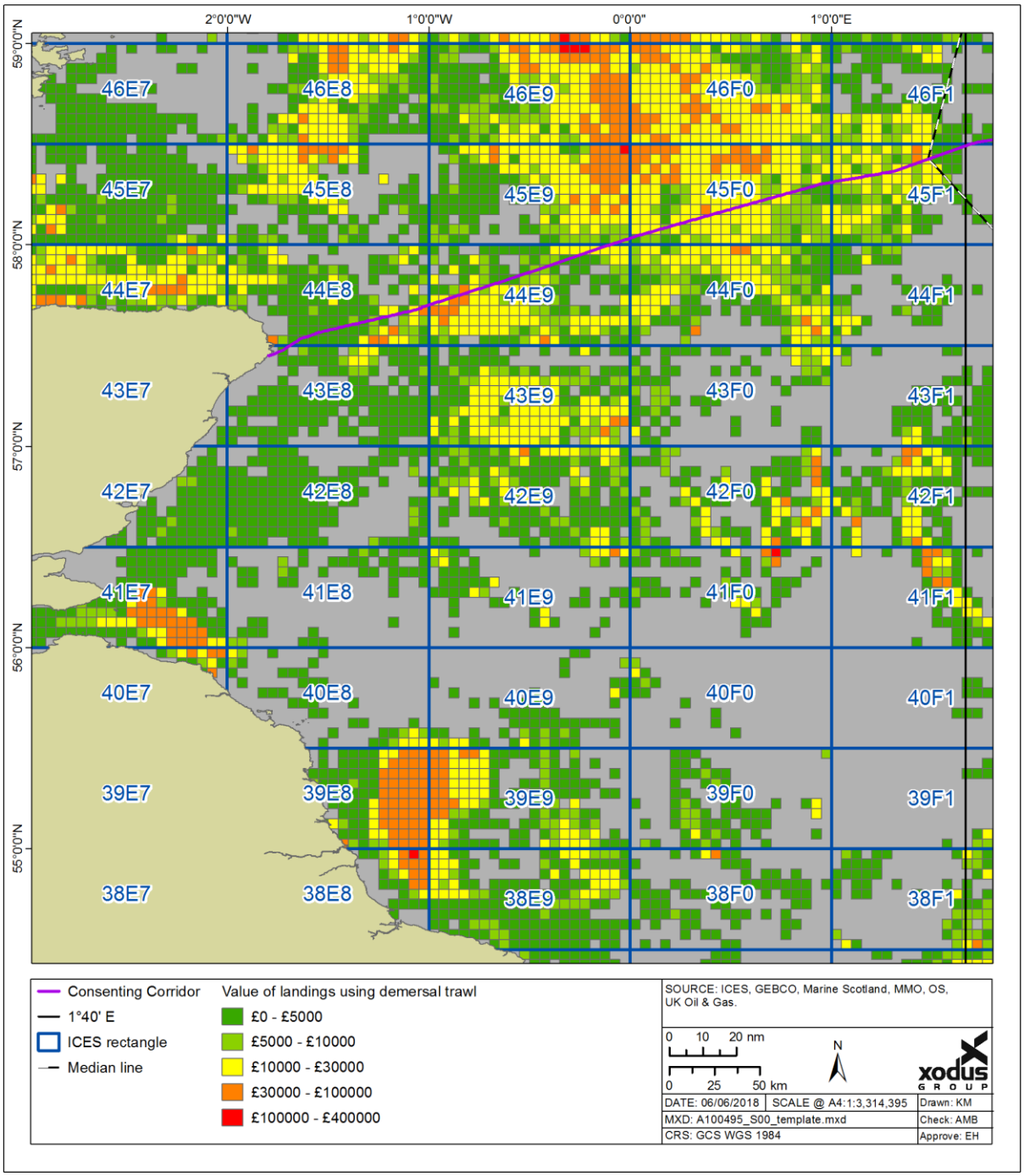


Figure 20.19. Relative Distribution of Landings (£) of Vessels >15 m using Demersal Trawling (MMO, 2018).

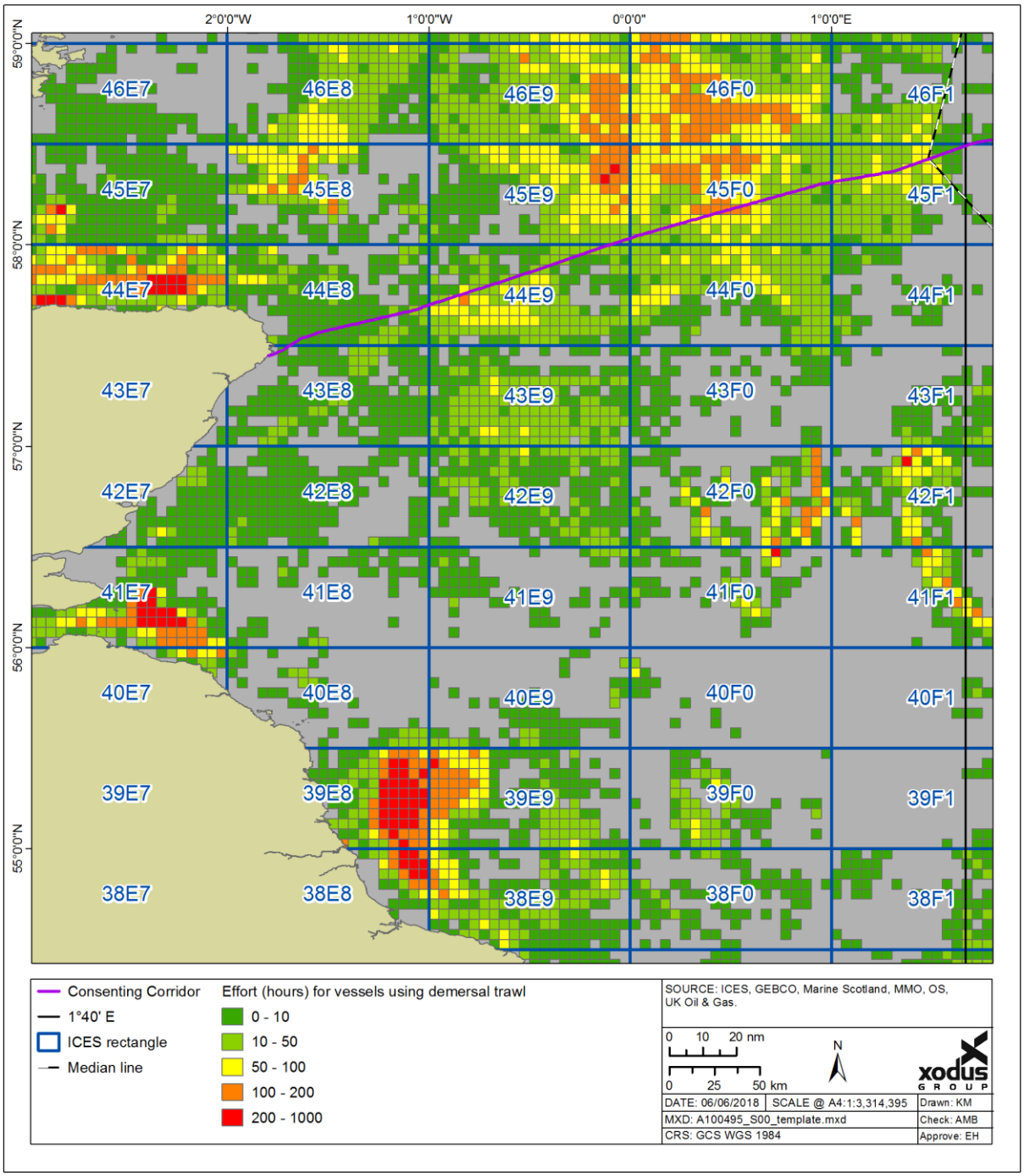


Figure 20.20. Relative Distribution of Effort (Days) of Vessels >15 m using Demersal Trawling (MMO, 2018).

20.5.2.8 AIS data

In support of the Chapter 19: Navigation and Shipping Chapter, a Navigation and Shipping Baseline has been prepared (Appendix G.1). The baseline utilised AIS information to present gear types used both in the coastal area and the offshore Consenting Corridor for the year 2017 (Figure 20.21 and Figure 20.22).

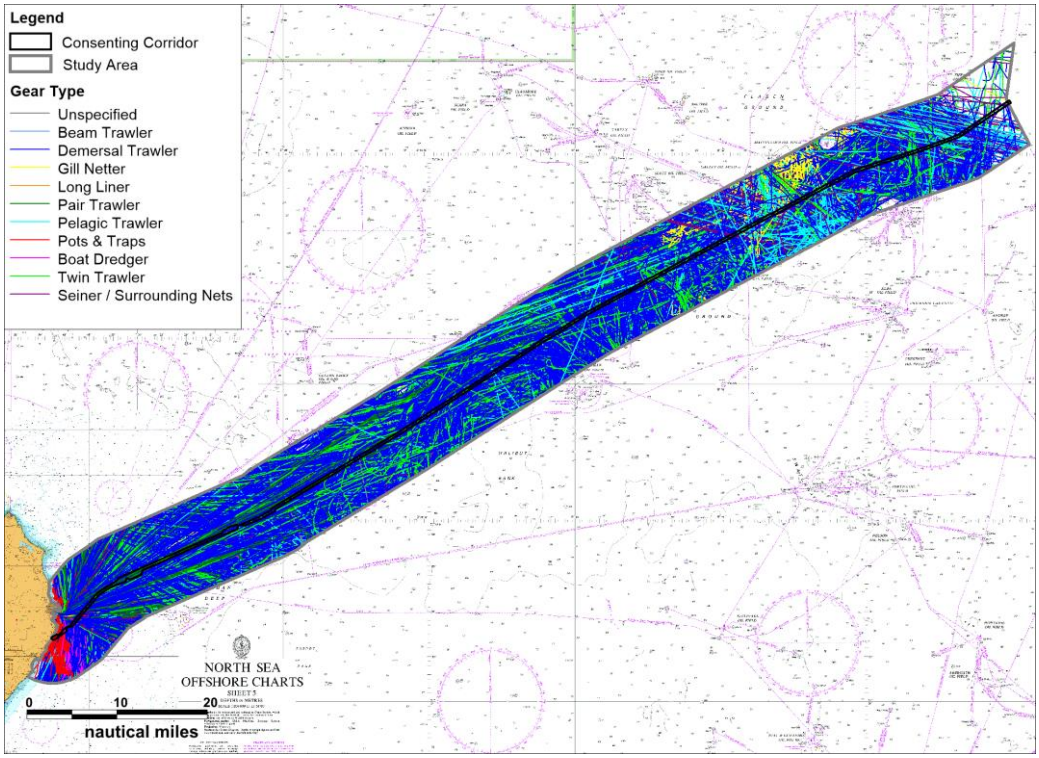


Figure 20.21. AIS Fishing Tracks by Gear Type for the year 2017 along the Consenting Corridor (Taken from Navigation and Shipping Baseline Appendix G.1).

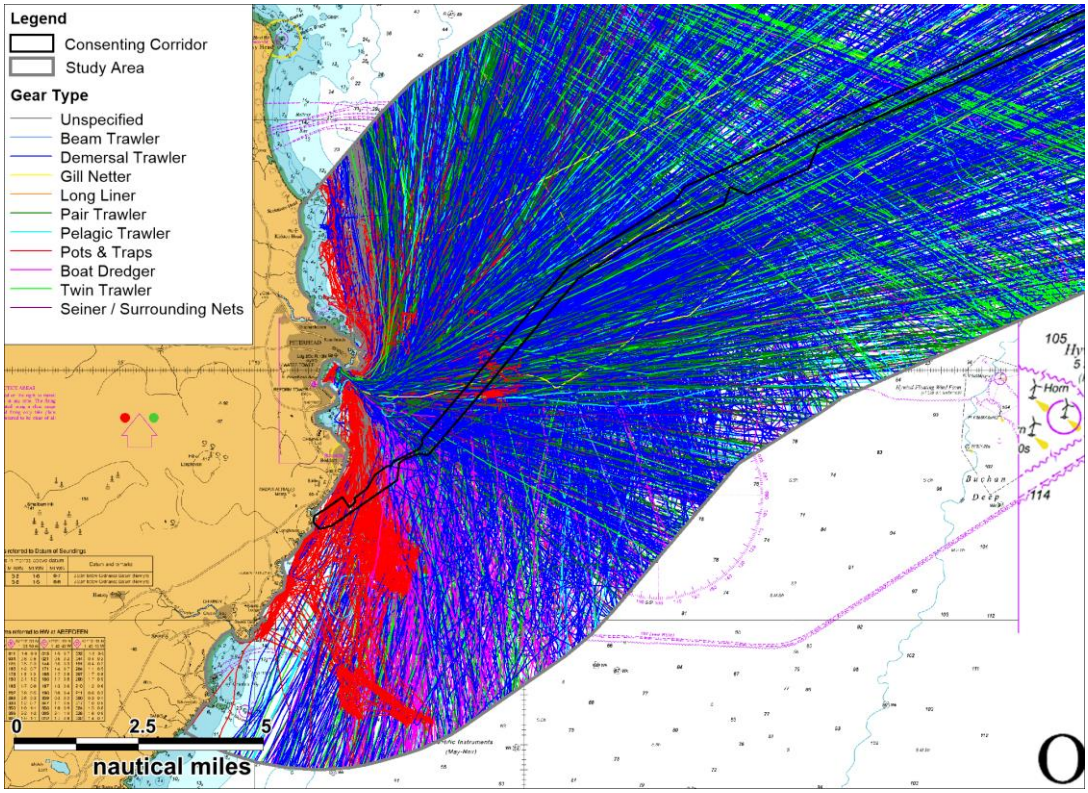


Figure 20.22. AIS Fishing Tracks by Gear Type for the Year 2017 in the Coastal Area of the Consenting Corridor (Taken from Navigation and Shipping Baseline Appendix G.1).

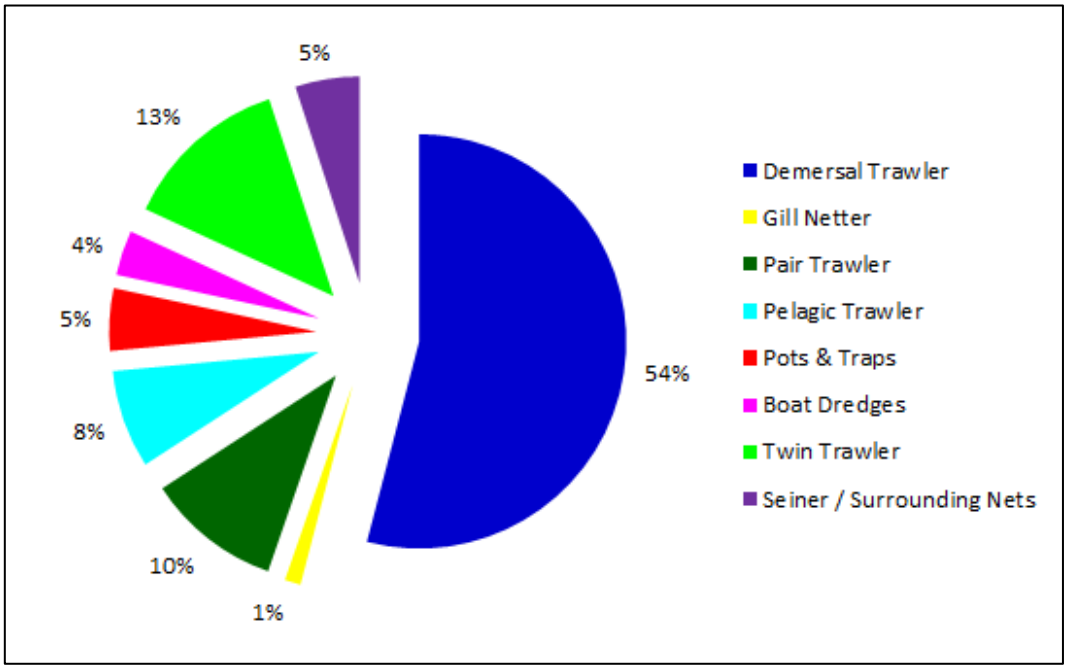


Figure 20.23. AIS Fishing Main Gear Type Distribution (Taken from Navigation and Shipping Baseline Appendix G.1).

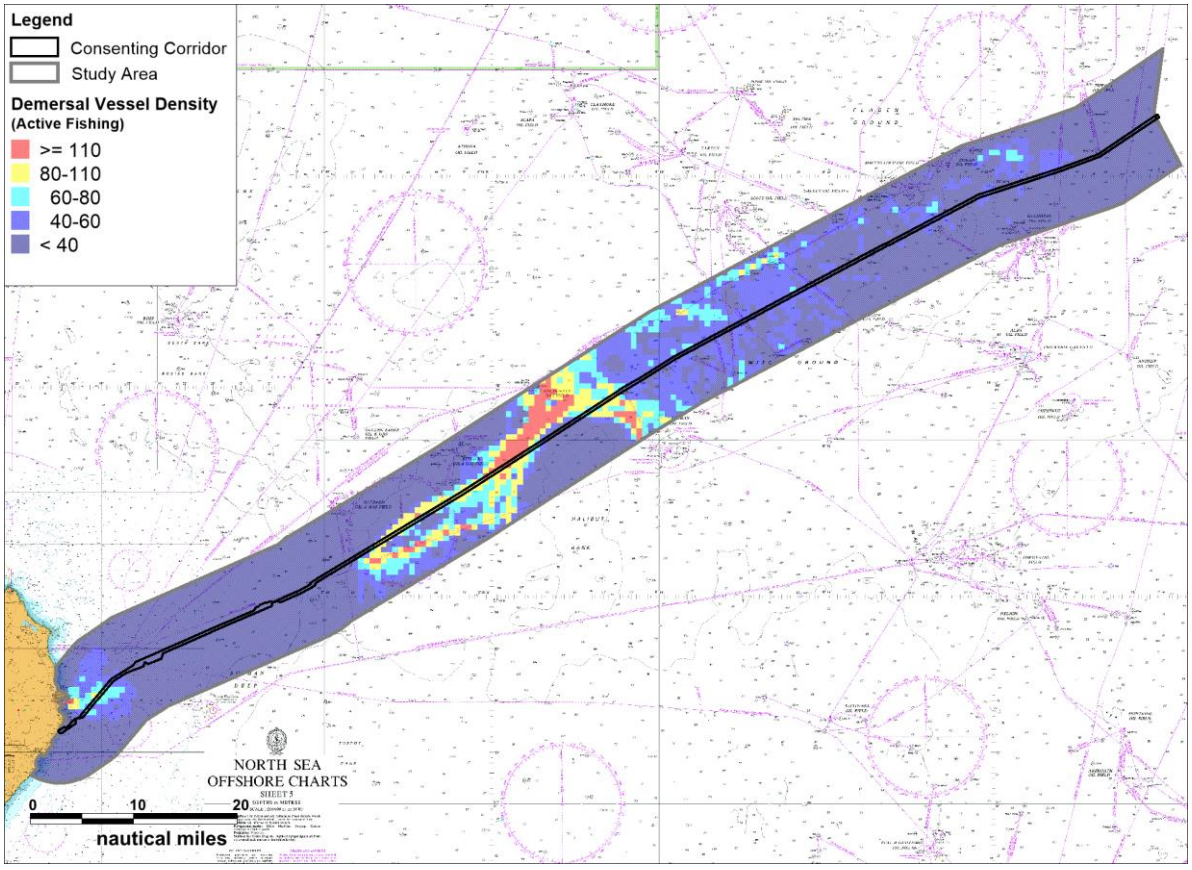


Figure 20.24. Demersal Trawls Actively Fishing along the Consenting Corridor from January to December 2017 (Taken from Navigation and Shipping Baseline Appendix G.1).

20.5.2.9 Salmon and Sea Trout Fishery

Atlantic salmon and sea trout are diadromous or migratory species of fish, with a lifecycle that includes time in freshwater river environments and at sea. After a period spent in a riverine environment, the individuals undertake a marine migration to offshore feeding grounds, returning after a varying number of years to their natal river to spawn (see Chapter 15: Fish and Shellfish Ecology for further information). It is probable that they will transit the Consenting Corridor, therefore, migration and catch levels could potentially be disrupted.

Each fishery in Scotland is required to provide the number and total weight of salmon and grilse and sea trout caught and retained each month of the fishing season. The principal salmon and sea trout fisheries are rod and line (including catch and release), fixed engine (bag netting) and net and coble.

The fishery is managed through fishery districts, each of which has a District Salmon Fishery Board (DSFB). Salmon and sea trout catches are recorded under the following categories:

- Sea trout (sea trout that have spent multiple winters at sea);
- Finnock (sea trout that have only spent one winter at sea);
- Salmon (salmon that have spent multiple winters at sea); and
- Grilse (salmon that have only spent one winter at sea).

The cable landfall is located in the North-East region which covers seven DSFBs: South Esk, North Esk, Bervie, Dee, Don, Ythan and Ugie. The cable landfall is in the River Ugie DSFB. Salmon and sea trout

catch methods are shown in Table 20.12. Rod and line gears dominate with the greatest proportion of caught fish subsequently being released. There were no fixed engine salmon or sea trout landings in 2016, however, this appears to be an anomaly rather than typical for the region, therefore, 2015 data has been used for this catch method (Scottish Government, 2018).

Table 20.12. Salmon and Sea Trout Catches by Fishery in 2016[1] in North East Region and the East Region (Scottish Government, 2018).

Catch Method	Salmon	Grilse	Sea Trout	Finnock	Total
North East Region					
Rod and line (released)	4195	1470	1857	2600	10,122
Rod and line (retained)	276	170	956	103	1,505
Net and Coble	1094	1207	1288	0	3,589
Fixed Engine	1433	1380	396	0	3,209
Total	6,998	4,227	4,497	2,703	18,425
East Region[2]					
Rod and line (released)	10,640	1,693	1,398	531	14,262
Rod and line (retained)	1,186	592	586	7	2,371
Net and Coble	274	201	193	0	668
Fixed Engine	0	0	170	0	170
Total	12,100	2,486	2,347	538	17,471

The rod and line salmon fishery can be subdivided into 'catch and release' and 'catch and retain' activities. As shown in Table 20.12 catch and release activities dominate salmon and sea trout fishing activities, comprising 55% of all fish caught in the north-east region and 82% of fish caught in the River Tweed and River Tay in the east region. Fish which are retained comprise 8% and 14% in the north east and east regions respectively.

The net and coble fisheries typically operate between May and August and the rod and line (retained) fishery operate between April and October. The rod and line (released) fishery has the longest operational period, occurring from February to October in 2016. No salmon or sea trout were caught between November and January (Scottish Government, 2018).

20.5.2.10 Aquaculture

There are currently no aquaculture sites registered with Marine Scotland Science located in the close vicinity of the Consenting Corridor (NMPi, 2018). No aquaculture sites are anticipated to be affected by this development and are therefore not considered further.

20.5.3 Valuation of Key Receptors

The key commercial fishery receptors of the NorthConnect Consenting Corridor are:

- Inshore creel fishery targeting brown crab, lobster and velvet crab all year round and mackerel from May to November;

[1] Fixed engine fisheries did not operate in the North East in 2016 therefore 2015 data has been used instead.
[2] Specifically, the Tay and Tweed Rivers as specified in the Scoping Opinion (there are no catches in the River Teith to include).

- Scallop fishery, which operates in a similar area to the creel fishery but extends further offshore;
- The offshore pelagic fleet (vessels > 10 m) targeting pelagic species such as herring and mackerel;
- The demersal fishery operating between 12 nautical miles and the UK Norway median line, primarily targeting Langoustine; and
- Salmon fishery associated with the east and north east regions.

The inshore creel fishery, scallop fishery and demersal fishery could be affected during the cable installation and decommissioning activities. The latter two and the salmon fishery may also be affected during the operational phase of the project.

20.6 Impact Assessment

Following establishment of the baseline conditions of the project and surrounding area, and an understanding of the project activities, it is possible to assess the potential impacts from the project on commercial fishery interests in the vicinity of the project. The range of impacts that have been considered is based on impacts identified during EIA scoping and any further potential impacts that have been identified as the EIA has progressed. The impacts assessed are summarised in Table 20.13.

For each potential impact, the implications for fisheries during the installation and operation / maintenance phase of the project are assessed separately where appropriate. Decommissioning is considered under Section 20.5.5. The assessment is based on the information that has been provided to date in relation to methods of installation, operation and decommissioning, as presented in Chapter 2 (Project Description).

Table 20.13. Impact Summary.

Project Activity	Potential impact	Considered in this impact assessment	Relevant phase of Project			Zone of influence
			I	O	D	
Presence of vessels	Loss of access to fishing grounds.	Yes, see Sections 20.6.2.1 and 20.6.3.1	✓	✓	✓	Immediate vicinity of the installation vessels.
Presence of vessels	Change of distribution of species.	Yes, see Sections 20.6.2.1 and 20.6.3.1	✓	✓	✓	Immediate vicinity of the installation vessels.
	Collision risk.	No, this is covered in Chapter 19: Navigation and Shipping				
Sections of exposed cable between laying and burial.	Loss of access to fishing grounds.	Yes, see Section 20.6.2.1	✓	×	×	Indicative 500m protection zone along any unprotected sections of cable.
Cable burial (jet trenching, ploughing and mechanical trenching)	Potential for fouling of fishing equipment on fishing grounds.	The potential for fouling of fishing equipment on fishing grounds is anticipated to be limited to the immediate area surrounding the installation vessels and the risk of fouling will be removed through by having protection zones around unprotected cables therefore, this impact is not considered further. Once the protection zone is removed there is not considered a risk of fouling.				Immediate vicinity of Consenting Corridor.
	Change in Distribution of Target Species.	Yes, see Sections 20.6.2.2 and 20.6.3.2.	✓	×	✓	

Project Activity	Potential impact	Considered in this impact assessment	Relevant phase of Project			Zone of influence
			I	O	D	

Rock placement used for cable protection	Snagging risk as a result of obstruction on the seabed.	Yes, see Section 20.6.3.3	✓	✓	✓	• Pipeline Crossings: 70 m of rock either side.
						• Cable crossings, 25 m either side.
						• The slope used is assumed to be 1:2.5. The rock berm height will vary from 1 m for buried cables to 2 m for surface laid pipelines.
						• Remedial rock berms may be required in areas were the cable is not sufficiently protected by trenching. Remedial berm heights will be a maximum of 1.5m, with slope angles no greater than 1:2.5.
						  ○ Within the 12NM limit is predicted that remedial berms may be required for between 5-10% of each cable.
						  ○ From 12NM to the limit of the UK EEZ, remedial berms may be required for approximately 1% of each cable.
						• Rock placement backfill may be required in areas where the trenching tool does not provide a sufficient depth of burial. Rock placement backfill will be finished level with the existing seabed, and hence presents no snagging risk and is not considered further.

	Loss of access to fishing grounds if rock berms are not overtrawlable.	Yes, see Section 20.6.3.1	×	✓	×	Immediate vicinity of rock berms.
Cable operation	Emission of EMF – compass deviation effect	No, this is covered in Chapter 19: Navigation and Shipping				
	Emission of EMF – change in distribution of species	Yes, see Section 20.6.3.2	×	✓	×	Close to seabed, in immediate vicinity of cables.

Project Activity	Potential impact	Considered in this impact assessment	Relevant phase of Project			Zone of influence
			I	O	D	
Cable operation	Sediment redistribution, sediment heating	No, this is covered in Chapter 15: Fish and Shellfish				
Cable installation and operation	Ghost fishing	No, this is covered in Chapter: 24 Resource Usage and Waste				

20.6.1 Primary and Tertiary Mitigation

All mitigation described in the following sections is, unless stated otherwise, considered to be embedded mitigation, i.e. primary or tertiary mitigation. These are measures that are assumed to be in place prior to the cable installation phase, identified during the concept design phase or as per industry best practice. Relevant primary and tertiary mitigation will be identified in specific impact assessments and will also be included in the Schedule of Mitigation (Chapter 25).

20.6.2 Installation stage

20.6.2.1 Loss of access to fishing grounds

Some fishermen will experience a temporary loss of access to traditional fishing grounds in the immediate vicinity of the cable route due to the presence of installation vessels. A detailed installation schedule is yet to be developed, however, it is anticipated there will be four separate installation campaigns in UK waters and cable installation will occur in approximately 150 km sections. Campaigns will be separated by periods of several months and, as a worst case, it is assumed that cable installation activity could be conducted at any time of year, apart from the HDD drilling operations, which will occur between September-March, and the cable laying, which will be between April-September. The HVDC cables will be installed using one of the techniques described in Chapter 2 (Project Description). The cable trenches will either be infilled during the laying process or left to infill naturally, as the sediment will naturally fill back into the trench. Where trenching does not provide sufficient protection, remedial rock berms will be installed. Rock berms will also be used to protect the cables at subsea asset crossings where trenching is not possible. Cable laying will begin with the operation of landfall cable pulling, with the trenching vessel starting approximately seven days following the commencement of laying activities. Throughout installation there will be an indicative 500 m protection zone in place around installation spread and areas of exposed cable between the laying and cable protection. This area will be enforced by guard vessels. Surveys will identify when the cable has been adequately protected to allow the protection zone to be removed. NorthConnect is committed to ensuring all protection works (including rock placement) are completed within three months of laying, in order to open up the areas to fishermen again.

20.6.2.1.1 Mobile vessels

During installation there will be an indicative 500 m protection zone around the cable laying spread. All fishing vessels will be prohibited from operating within the protection zone in order to prevent collisions and interference between fishing vessels and cable installation vessels.

The nature of towed gear such as trawls and dredges requires that vessels operating such demersal gear will be excluded from the unprotected or unburied sections of the cable. It is estimated that such areas will be restricted to small areas of the cable route. This temporary 500 m protection zone will occur behind the cable lay vessel in area of exposed cable prior to burial. Protection zones will last for periods of up to three months per 150 km section until the cable has reached an adequate level of protection. It is expected that fishermen will be able to exploit alternative fishing grounds during the cable installation works but it is acknowledged that some disruption is inevitable. Fishing industry representatives including SFF and SWFPA will be kept informed of NorthConnect's activities. Additionally, Notices to Mariners, and notices in the Kingfisher Bulletin, will be issued in good time to advise fishermen of where and when the installation activities will be operating. Further details are provided in the Fisheries Liaison Mitigation Action Plan (FLMAP).

The sensitivity of fisheries is considered **medium** on the basis that, although some fishing activity is located within the Consenting Corridor, there are alternative fishing areas in the vicinity. The magnitude of the impact is considered **minor** as the area of protection zones where certain activities will be restricted will be short term and confined to a small area of fishing grounds. The overall level of effect is therefore **minor**, **non-significant.** This effect is **certain** to occur.

20.6.2.1.2 Static gear

The dominant gear types for vessels < 10 m are static (pots and creels). These vessels are recorded predominantly in the coastal rectangles (43E8 and 44E8), with which the Consenting Corridor intersects (Section 20.5.2.2). Fishing vessels using static gear will need to avoid the temporary protection zone during installation. Any static gear lying within the Consenting Corridor, or the 500m protection zone, would need to be removed by the fishing vessel operators immediately prior to and during the installation period. On completion of cable laying and burial, static gear can be redeployed in the area. The disruption period is therefore temporary. It is however recognised that the area of cable lay operations is important for static gear operators, especially over the summer months and, at any time, a significant amount of static gear can be deployed in the area. This means that options for relocating static gear are quite limited. Additionally, it is acknowledged that removal of static gear takes time and effort away from fishing and temporarily reduces grounds for fishing. This will predominantly impact vessels < 10 m fishing in coastal areas of the Consenting Corridor. Notices to Mariners, and notices in the Kingfisher Bulletin will be issued in good time to advise fishermen of where and when the installation activities will be operating. Further detail is provided in the FLMAP.

The sensitivity of static gear fisheries is considered **medium to high** on the basis that some of the Consenting Corridor is known to be important for static gear and that movement to alternative grounds may be difficult. Taking into account the proposed mitigation and the fact that area of protection zones where certain activities will be restricted will be short term and confined to a relatively small area of fishing grounds, the magnitude of the impact is considered **minor**. The overall level of effect is therefore **moderate**, and this therefore considered a **significant** impact under the EIA regulations**.** This impact is **certain** to occur. As this impact is considered significant, secondary mitigation measures are described in Section 20.8.

20.6.2.2 Change in Distribution of Target Species

Chapter 15 (Fish and shellfish) has been used to inform the descriptions on behaviour and sensitivity of commercial fish species in the vicinity of the Project in the following assessment.

During installation there is the potential for indirect impacts on commercial fisheries due to impacts on the distribution of fish and shellfish species as a result of installation activities. During cable installation benthic habitat may be removed or disturbed which could affect the spawning success of commercial species.

Langoustine are one of the most valuable species landed in the area of the Consenting Corridor (Section 20.5.2.1). The corridor passes through Fladen Ground, which is indicated by OSPAR as a langoustine spawning area. Langoustine spawn all year round (Coull *et al*., 1998) across extensive areas of seas around Scotland and Ireland. Although they could be adversely affected by the installation activities, it is unlikely that there will be population level effects. Additionally, langoustine are noted as having a degree of tolerance to smothering (OSPAR, 2010), so any temporary impact to the population as a result of changes in sediment concentration will be short-term and localised in nature. Indirect effects on the langoustine fishery in the area are therefore not anticipated.

In relation to other crustacean species in the Consenting Corridor, such as scallops which contribute significantly to the landings value in the area, it is considered there is limited possibility of impact as a result of installation, as the habitat loss resulting from trenching is minimal and species have the ability to move away from the impact. Once the trench has refilled, crustacean species are likely to move back into the area. Rock placement will lead to a change in habitat which can be considered long term, and this change may lead to some species seeking alternate habitat. However, this is estimated to apply to only 0.04% of the Consenting Corridor which represents an insignificant proportion of habitat available, both within the Consenting Corridor and the wider North Sea. It is therefore considered that there will be no significant impact to the commercial interest for crustacean species in the Consenting Corridor.

Haddock and monkfish are the most valuable whitefish species caught along the Consenting Corridor. The corridor is known to be a nursery area for both species (Coull *et al*., 1998 and Ellis, 2012). The fish and shellfish impact assessment (Chapter 15) reported that no significant impact would occur to these species during any stage of the Project. It can therefore be concluded that there will be no indirect impact to the commercial fisheries which target these species.

Herring is a notable species landed from the Consenting Corridor (Section 20.5.2.1). Herring are reported to spawn along the Consenting Corridor (Coull *et al*., 1998 and Ellis, 2012). Herring spawn on the seabed in specific habitat types and their eggs are demersal, which means they are particularly vulnerable to benthic impacts occurring as a result of installation operations. As reported in Chapter 15 (Fish and Shellfish), section 15.1.2.1.4, the Project will result in the temporary disturbance to 7.2ha of suitable herring spawning habitat due to trenching, along the 3.6 km length of suitable habitat within the Consenting Corridor identified by MMT (2017). This equates to 0.0006% of the local herring spawning ground as designated by Coull *et al*. (1998) and Ellis *et al*. (2012). This is considered a very small area in relation to the extensive spawning habitat in the wider environment. Sediment redistribution is not expected to have a significant impact on herring spawning as the impact will be locally confined and temporary. The installation activities associated with the Project are therefore not anticipated to have any significant impact on herring distribution.

The sensitivity of fisheries is considered **low** on the basis that, although some commercially targeted species occur within the Consenting Corridor, this comprises a small fraction of the spawning grounds within Scotland and recoverability is assessed as high. The magnitude of the impact is considered **minor** as the majority of effects are considered to be short and long-term effects (rock placement) will

impact a very small area. Variation will be within the range of experience for the fishery. The overall level of effect is therefore **minor** and **non-significant**. This impact is **certain** to occur.

20.6.3 Operation and Maintenance

20.6.3.1 Loss of access to fishing grounds

The cables will be trenched, and the trenches allowed to backfill for the majority of the route. The designed protection levels and associated trench depths have taken demersal fishing gear into consideration and trenching will occur to a depth which will not be penetrated by fishing gear. At existing subsea asset crossings, and in areas where adequate cable protection is not provided by trenching, the cables will be protected by rock berms. All rock berms will be designed to have a smooth over trawlable profile, with the rock grade utilised suitable for the nature of fishing activity typically undertaken in the area. As such, mobile fishing vessels will not be excluded from the Consenting Corridor during the operational phase. Static gear such as pots are also not anticipated to be affected during the operational phase, since the cable protection design accounts for the placement of static gear over the cable. There is therefore not considered to be a significant impact to commercial fishing vessels through loss of access to fishing grounds as a result of the operation of the cable.

There will be periods of repair and maintenance during the operational life of the cable. These will cause disruption similar to that experienced during the installation phase, however, on a smaller scale and for a shorter duration, it is predicted that a repair may be required once every three years which over the 40-year lifespan of the cable would equate to approximately 13 repair events.

Surveys of the cable will be conducted during the lifetime of the cable, and protection zones will be required around the survey spread which may disrupt fishing activities. Approximately two years after completion of installation and every fifth year, a survey of the entire route shall be carried out. Certain critical areas will be inspected approximately every 12 months. Protection zones for survey operations will be short in duration, and transient, so will not have a significant effect on fishing activities.

Prior to conducting survey or maintenance operations, NorthConnect will issue Notice to Mariners, notices in the Kingfisher bulletin and liaise with fishing industry representative bodies, or directly with fishermen. This will ensure the commercial fishing fleets are aware of any possible disruption, and allow any necessary arrangements to be made.

The sensitivity of fisheries is considered **low** on the basis that, although some fishing activity is located within the consenting corridor, most effort is outside the area. The magnitude of the impact is considered **minor** as the area of protection zones where certain activities will be restricted will be short term, localised, and transient. Fishermen will have the ability to utilise the wider environment for fishing. The overall level of effect is therefore **minor** and **non-significant**. This impact is **certain** to occur.

20.6.3.2 Change in Distribution of Target Species

There will be minimal disturbance to fish species during operation of the cable. Repairs and maintenance will occur as described in Section 20.6.3.1. These events will be short in duration and impact a very limited area. It is not anticipated there will be any impact to fish or shellfish as a result of these repair activities and therefore no indirect impacts on commercial fishing in the vicinity of the Consenting Corridor.

When operational, the HVDC will emit a magnetic field. An assessment of the EMFs created by the project is provided in Chapter 18 (EMF and Sediment Heating) and the impacts of this EMF on fish species is considered in Chapter 15 (Fish and Shellfish). Either no change or negligible impacts are predicted for all species groups found in the vicinity of the Consenting Corridor, including species of commercial value. Additionally, no significant impact is predicted to spawning or nursery areas in the Consenting Corridor as a result of EMF. It is therefore considered there will be no indirect impact on commercial fisheries in the area as a result of EMF.

The sensitivity of fisheries is considered **low** on the basis that although some commercially targeted species occur within the cable route this comprises a small fraction of the spawning grounds within Scotland and recoverability is assessed as high. The magnitude of the impact is considered **negligible** as effects will be intermittent, short term and limited in duration with no change or an imperceptible change to the baseline fishing areas and their condition. Variation will be within the range of experience for the fishery. The overall level of effect is therefore **minor** and **non-significant**. This impact is **certain** to occur.

20.6.3.3 Exposed Cable and Degradation of Rock Berms

If any section of cable was to become exposed during the operational phase, this could present a snagging risk to fishing vessels. This could cause a significant hazard to fishing vessels and, in turn, a loss of earnings to fishermen as a result of lost or damaged gear. The likelihood of this occurring is considered very low. However, the sensitivity of fishermen to this and other snagging hazards is recognised. The safety aspect of this impact is considered in Chapter 19 (Navigation and Shipping).

A further potential impact would be that external cable protection measures (rock berms) become eroded or degraded causing them not to be over trawlable by fishermen. If a rock berm degrades to the point where it is no long over trawlable, it could present a snagging risk to demersal trawlers and inshore creel vessels. This could result in loss of earnings, expenses due to the loss of, or damage to gear, and displacement from the area.

The Construction Method Statement (CMS) (NorthConnect, 2018) has been produced which details the cable protection requirements. Following the installation of the cables, as built survey information will be provided to the UKHO for inclusion in admiralty charts, and the Kingfisher Cable awareness charts will be updated to advise fishermen on their location. Post installation inspection surveys and any necessary maintenance will be conducted along the length of the cable on a regular basis, which will ensure cables remain buried and protected, and rock berms remain over trawlable.

The sensitivity of commercial fisheries to a snagging incident is considered **medium to high**, as the Consenting Corridor is known for importance for dredging and demersal trawls which are at risk from snagging incidents. The **likelihood of the impact is considered low** due to the relevant mitigation measures and regular surveys which will ensure the seabed is in an over trawlable condition. The magnitude of the impact is considered **negligible** as, if a snagging incident did occur, it would not cause long term effects to commercial fisheries in the area of the Consenting Corridor, although the financial implications from time lost due to replacement of fishing gear is recognised. Variation will be within the range of experience for the fishery. The overall level of effect is therefore **minor**, **non-significant.**

20.6.4 Decommissioning

The exact methodology for decommissioning will not be known until closer to the end of the cable lifespan.

Impacts during the decommissioning phase associated with the removal of the cable are expected to be of a similar or lesser magnitude than for cable installation. On a precautionary basis for the following decommissioning phase impacts, the magnitude of impact is assessed to be the same as for the installation phase:

- Loss of habitat; and
- Displacement from fishing areas.

No other impacts are anticipated during decommissioning.

20.7 Mitigation Measures

The only aspect of the NorthConnect Interconnector project identified as having the potential to cause a significant impact on the commercial fishing fleets is the displacement of inshore creel fishing vessels and gear during the installation phase.

In order to mitigate this risk, NorthConnect along with their FLO will work with local fishing organisations to identify all vessels which will be affected. NorthConnect will then work directly with the vessel owners and operators on an individual basis well in advance of operations commencing, in order to make arrangements to ensure all gear is removed from a protection zone within a required time period prior to work commencing. Ensuring early communications with the fishing owners and operators will allow all parties to plan and prepare for the potential disruption, and thus allowing impacts to be minimised. During installation, the FLO will maintain a dialogue with the affected fishing vessels in order to keep them up to date with progress, and allowing them to renter the protection zone as soon as it is safe to do so.

20.8 Residual Effects

For the majority of impacts assessed, the primary and tertiary mitigation applied means that no significant impact is predicted and therefore there is no requirement for any further (secondary) mitigation. However, as discussed in Section 20.6.2.1, there is predicted to be a significant impact to static gear operators as a result of loss of access to fishing grounds as a result of installation activities. For this reason, secondary impact specific mitigation is required. It is proposed that NorthConnect with their FLO will consult with individual static gear operators who will be impacted. They will ensure that these operators are fully aware of the Project including timescales, operations and protection zones. The sensitivity of static gear fisheries is considered **medium to high** on the basis that some of the Consenting Corridor is known to be important for static gear and that movement to alternative grounds may be difficult. Taking into account the proposed primary and tertiary mitigation, in addition to the secondary impact specific mitigation and, considering areas of protection zones during installation will be short term and confined to a relatively small area of fishing grounds, the magnitude of the impact is considered **negligible**. The overall level of effect is therefore reduced to **minor, non-significant.** This impact is **certain** to occur.

20.9 Cumulative Effects

The consideration of potential cumulative impacts is an important stage in the impact assessment process, as combined incremental impacts may pose a threat to sensitive receptors. The fish species in the area of the Consenting Corridor which are targeted commercially are largely mobile species and/or occur widely throughout the region. Cumulative impacts impacting commercial fish species and directly on the fishing fleets may arise from impacts originating from the installation, operation

or decommissioning of the project as assessed in Sections 20.6, with impacts from other planned or consented projects upon the same receptor populations.

A list of cumulative projects requiring assessment within the EIAR has been agreed with Marine Scotland and further detail is provided in Chapter 6: Cumulative Effects. The potential for cumulative impacts is considered in relation to these projects in Table 20.14.

Table 20.14. Potential for Cumulative Impacts.

Project	Potential for cumulative impacts			Rationale
	Project Phase			
	I	O and M	D	
Moray East/West Offshore Windfarm Development **Seagreen Alpha and Bravo Windfarms** **Inch cape offshore windfarm** **Neartna Gaoithe offshore Windfarm** **Beatrice offshore windfarm** **Kincardine Offshore Windfarm**	✓	×	×	It is possible that installation activities associated with the Project and any of the offshore wind projects listed, may have a schedule overlap for installation activities. This could lead to fishermen in the region being excluded from more than one area at the same time. However, given the wide geographic range of these projects it is likely that not all fishing vessels will face exclusion from all of the projects, with some exclusion areas being out with the range fished by certain vessels. Additionally, given the short-term duration and rolling nature of protection zones associated with the installation of the Project and the likelihood that any overlap with the installation phase of any of the mentioned projects will be minimal if at all, it is not anticipated that there is the potential for a significant cumulative impact. Any impact to commercial fisheries as a result of the operation and maintenance of the Project was concluded to be insignificant. It is expected that any impact to commercial fisheries as a result of the offshore windfarm projects listed will be as a result of repair and maintenance activity causing temporary exclusion and possibly EMF impacting on fish species. Given the minimal nature of NorthConnect's impacts, the likelihood that maintenance work will not occur at the same time, and taking into account that the EMF from the project will have negligible impact on commercial fish species, it is considered there will be no cumulative impact. Decommissioning is anticipated to have the same or lesser impact than installation activities. No cumulative impact predicted.
European offshore wind development centre EOWDC, Aberdeen Bay	×	×	×	This project is currently being constructed and therefore no installation overlap is predicted. Any impact to commercial fisheries as a result of the operation and maintenance of the Project was concluded to be insignificant. It is expected that any impact to commercial fisheries as a result of the offshore windfarm projects listed will be as a result of repair and maintenance activity causing temporary exclusion and possibly EMF impacting on fish species. Given the minimal nature of NorthConnect's impacts, the likelihood that maintenance work will not occur at the same time, and taking into account that the EMF

				from the project will have negligible impact on commercial fish species, it is considered there will be no cumulative impact. Decommissioning is anticipated to have the same or lesser impact than installation activities. No cumulative impact predicted.
Hywind Scotland pilot park offshore wind farm	×	×	×	This project is currently operational so has been considered as part of the baseline against which the project has been assessed.
Aberdeen harbour dredge and harbour extension project	×	×	×	This project is currently being constructed and therefore no installation overlap is predicted. Impacts are not predicted as a result of the operation of the harbour extension and the NorthConnect installation activities. Given the localised coastal nature of the Aberdeen harbour project, it is not considered there will be any cumulative impacts as a result of the NorthConnect operation and maintenance activities and its own. Decommissioning is anticipated to have the same or lesser impact than installation activities. No cumulative impact predicted.
Peterhead port authority Harbour masterplan	×	×	×	The Peterhead Harbour Masterplan is limited in geographical context to within the existing breakwaters and existing harbours of Peterhead Port. The masterplan serves to assist in the development of current fishing markets, renewables and decommissioning sectors. Installation activities are currently underway and will be completed prior to installation of the Project, therefore, there is no chance of cumulative impact as a result of installation activities occurring simultaneously Once in place the plan and associated harbour improvements will serve to be beneficial to local fishing fleets. The operation and maintenance of the Project will not impact on this and liaison with Peterhead Port authority will ensure that any possible disruption during installation as a result of increased vessel activity is kept to a minimum and local fishing fleets are kept informed of activities. Decommissioning is anticipated to have the same or lesser impact than installation activities. No cumulative impact predicted.
North Sea Network Link Interconnector cable	✓	×	×	Installation of the North Sea Network Link Interconnector is underway with commissioning expected in 2021. It is therefore possible there will be an overlap with the installation phase of the Project however this is anticipated to be minimal. This could lead to fishermen in the region being excluded from both areas at the same time. However, given the wide geographic range of these projects it is likely that not all fishing vessels will rely on both of these areas and will therefore not be simultaneously impacted by the exclusion from two areas. Additionally, given the short-term duration and rolling nature of protection zones associated with the NorthConnect installation, and the likelihood that any overlap with the installation phases of interconnector projects, will be minimal if at all, it is not anticipated that there is the potential for a significant cumulative impact.

				Any impact to commercial fisheries as a result of the operation and maintenance of the Project was concluded to be insignificant. It is expected that any impact to commercial fisheries as a result of the Interconnector project will be as a result of repair and maintenance activity causing temporary exclusion and possibly EMF impacting on fish species. Given the minimal nature of NorthConnect's impacts, the likelihood that maintenance will not occur at the same time, taking into account that the EMF from the Project will have negligible impact on commercial fish species, it is considered there will be no cumulative impact. Decommissioning is anticipated to have the same or lesser impact than installation activities. No cumulative impact predicted.
NorthConnect HVDC subsea cable (from UK median line-start of Norwegian fjord)	✓	×	×	It is anticipated that the installation of the NorthConnect HVDC cables in Norwegian waters will have similar effects to those predicted in Scottish waters, given that installation will occur utilising similar methodologies and equipment. Similar impacts are also anticipated in Norwegian water during the operational and maintenance phase. During installation there is the potential for UK vessels which fish in both UK and Norwegian waters to be excluded from fishing grounds in both areas simultaneously. However, if this did occur it would be for a limited duration of time during cable lay installation. It is therefore considered that if the same mitigation and management is applied which will include rolling protection zones, notices to mariners, and FLO's there is no likelihood of a significant cumulative impact at any Project stage.

20.10 Summary

The area surrounding the Consenting Corridor is important for the < 10 m and > 10 m fishing fleets. Shellfish species dominate landings by all vessel sizes with Langoustine being the most valuable species landed in all three of the ICES rectangles which intersect the Consenting Corridor. Demersal trawlers over 15 m in length, which target langoustine, operate along the Consenting Corridor although peak effort is greatest in the eastern section of the cable route in rectangle 45F0 approximately 40 NM from the UK-Norway median line. Value of landings for vessels over 15 m using demersal gear is greatest in ICES rectangle 45F0. Whitefish and pelagic species are also targeted along the cable route, collectively comprising less than 10 % of the average value of fish landed in ICES rectangles 44E4, 45E3 and 45E4 from 2012-2016.

Fishing activity will be displaced during the installation activities, which will most likely take place between April and October. Due to the localised nature and short duration of activities, no significant impact is anticipated on vessels using mobile gear. Fishing will be able to resume in the Consenting Corridor when it becomes operational. Changes in the distribution of commercially important species is not anticipated therefore commercial fisheries are not anticipated to be indirectly affected by effects on fish species.

The only potential significant effect identified during this assessment is the displacement of inshore creel fishermen during the installation phase. However, appropriate mitigation has been identified which reduces the impact to non-significant. Therefore, this assessment finds that no residual significant adverse impacts on commercial fisheries are anticipated as a result of the installation,

operation and decommissioning of the NorthConnect HVDC cables. Mitigation measures will be adopted to ensure that fishermen are aware of the location of the cable and the timing and duration of all installation and maintenance operations. Additionally, it will be ensured that the cable is left in a condition which minimises potential impacts to commercial fisheries and periodic surveys will confirm that this remains the case. A summary of the predicted impacts and associated significance and mitigation is presented in Table 20.15.

Table 20.15. Summary of predicted impacts for commercial fisheries in the vicinity of the Project.

Impact	Receptor	Phase	Frequency Likelihood	Severity of Consequence	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of residual Effect
Loss of access to fishing ground	Mobile gear operators	Installation	Certain	Minor	Non-significant	Cable protection works to be completed within three months of cable laying. Fisheries Liaison Officer (FLO) will be employed to facilitate communications between the project and the fishing sector. Guard vessels will be used to monitor and advise vessels in the vicinity of the installation works as appropriate. Circulation of information via Notices to Mariners, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings in advance of and during the offshore works. Early communications with the fishing sector, to allow preparations to be made for the potential disruption. Ongoing dialogue to update on progress and when re-entry to protection zone for fishing activities is possible.	Non-significant impact following primary and tertiary mitigation so residual impact remains non-significant.	Non-significant
	Static gear operators	Installation	Certain	Moderate	Significant	As per mobile gear mitigation above. Fisheries Liaison Officer will work with local fishing organisations to identify static gear vessels that will be affected. Arrangements will be made with individual vessel owners.	Negligible	Non-significant

Impact	Receptor	Phase	Frequency Likelihood	Severity of Consequence	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of residual Effect
Change in distribution of target species	Commercial fish species	Installation	Certain	Minor	Non-significant	No specific mitigation as impact non-significant.	Non-significant impact following primary and tertiary mitigation so residual impact remains non-significant.	Non-significant
		Operations and maintenance	Possible	Negligible	Non-signficant	No specific mitigation as impact non-significant.	Non-significant impact following primary and tertiary mitigation so residual impact remains non-significant.	Non-significant
Snagging risk – damage to fishing gear	Mobile gear operators	Operation	Low likelihood	Minor	Non-significant	Rock berm and mattresses will be designed to have a smooth over trawlable profile, utilising appropriate rock grades. Cable to be installed with appropriate protection as per the Construction Method Statement. Routine surveys will be carried out to verify that the cable protection status is adequate. As built information will be provided to the UKHO for inclusion in admiralty charts, and the Kingfisher Cable awareness charts, with appropriate notes.	Non-significant impact following primary and tertiary mitigation so residual impact remains non-significant.	Non-significant

20.11 References

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