10. Marine Mammals and Marine Reptiles

10.1. Study Area Definition

This chapter of the Scoping Report describes the potential impacts arising from the construction, operation and maintenance (O&M), and decommissioning of the Eastern Green Link 4 (EGL 4) hereafter referred to as 'the Project' on marine megafauna receptors including marine mammals (Eurasian otter, cetaceans[4], pinnipeds[5]) and marine reptiles (chelonians[6]).

The Scoping Boundary for the Project extends from the MHWS in England to the MHWS in Scotland. It is nominally 1 km wide, 500 m either side of the centreline, but however, it widens in areas where there is still optionality in the design e.g., to allow for micro-routeing around potential seabed features. It is anticipated that the Marine Licence application boundary will ultimately be 500 m following refinement and rationalisation as the MEA and design process evolves.

There are two proposed Landfalls in England (Anderby Creek and Theddlethorpe) and two proposed Landfalls in Scotland (one in Kinghorn and one in Lower Largo/Lundin Links) being considered at this stage of the environmental assessment process. These options will be subject to further technical feasibility work and stakeholder consultation and will be refined to one preferred option for inclusion in the subsequent Marine Licence application for the Project.

Kilometre Points (KPs) are used throughout this Chapter to provide context as to where within the Study Area a feature lies. KP 0 is defined at the Anderby Creek Landfall. As there are still alternative Landfalls being considered, KPs have been created along the longest route from the proposed English Landfall at Anderby Creek, around the Holderness Offshore Marine Conservation Zone (MCZ) to the proposed Scottish Landfall at Kinghorn. The KPs for this route are referenced as KP 0 to KP 524.9. Alternative options, which branch off this longest route, are route from the proposed English Landfall at Theddlethorpe to the point where it converges with the longest route (referenced as T_KP 0 to T_KP 18); and through Holderness Offshore MCZ, which is referenced as KP 0 to H_KP 40 and from the longest route where it branches off to the two proposed Scottish Landfalls in Lower Largo/Lundin Links, which is referenced as KP 0 to KP 16.

The Study Area has been defined for each species based on the mobility of the species and its geographic extent, as outlined in Table 10-1. This is a precautionary maximum zone of influence that will be reviewed and refined for the marine environmental appraisal (MEA) based on the final project description and the conclusions of Chapter 6 – Marine Physical Processes.

Table 10-1: Study Area for marine mammals and marine reptiles

Receptor	Extent of Study Area England	Extent of Study Area Scotland	Justification
Cetaceans (porpoises, dolphins and whales)	Management Units (MUs)		Most cetaceans are wide-ranging, and individuals encountered within the North Sea form part of a much larger biological population whose range extends into the North Atlantic and North-West European waters. Management Units (MUs) have been agreed by the UK Statutory Nature Conservation Bodies (SNCBs) for seven of the common regularly occurring species, which provide an indication of the spatial scales at which effects of anthropogenic activities should be taken into consideration (IAMMWG, 2015). The relevant MUs have been used to define the Study Area. Figure 10-1 (Drawing: C01494-EGL4-SPEC-011) illustrates the spatial scale of the management unit through which the Project passes.
Grey seal (*Halichoerus gryphus*)	Assessment Units South-East England, North-East England,	Assessment Units East Scotland	It is estimated that grey seal forage up to 100 km from haul-out sites on the coast. Telemetry data indicates that there is exchange of grey seals between colonies in the Netherlands, France, England, Wales, Scotland and Ireland (OAP, 2022).
Harbour seal (*Phoca vitulina*)	50 km radius from landfall and coastline		Harbour seals are not known to make trips greater than 50 km from haul out sites (OAP, 2022).
Eurasian otter (*Lutra lutra*)	Up to 40 km along the coast		Forage in a narrow zone close to the shore (<100 m) (Gov.uk, 2022).
Chelonians Sea turtles	North Sea		Chelonians are wide ranging and infrequent visitors to UK waters.

[4] Definition of cetaceans is whales, dolphins and porpoises.
[5] Definition of pinnipeds is seals.
[6] Definition of chelonians is sea turtles.

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Marine Mammals Study Area and Management Units

C01494b-EGL4-SPEC-011-D

- Exclusive Economic Zone Limit (EEZ)
- 12NM Limit
- EGL 4 Scoping Boundary

Marine Mammal Management Units

- North Sea (Harbour Porpoise)
- Greater North Sea (Bottlenose Dolphin)
- Celtic and Greater North Sea (Short-Beaked Dolphin, White-Beaked Dolphin and Minke Whale)
- OSPAR Seal Indicator Assessment Units

0 10 20 NM

0 25 50 km

Date	05/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:1,450,000
Created	EP
Reviewed	SP/JC
Authorised	AF

Document Path: X:\GIS\GIS_PROJECTS\C01494_EGL3&4\Project\QGS\EGL4\08_SPEC\C01494b_EGL4_SPEC_011.qgz

Export Date: 05/12/2023

10.2. Data Sources

Data sourced for the baseline characterisation will be presented in accordance with relevant guidance for the topic. The datasets that will be used to inform the description of the baseline environment for the MEA are described in the following sub-sections.

10.2.1. Site-specific Survey Data

Extensive contemporary and historic information is available regarding abundance and distribution of marine mammals and marine reptiles in the North Sea. Following a detailed review to inform the scope of the data and assessment, as presented, no site-specific surveys are planned for this topic.

10.2.2. Publicly Available Data

Desk based review of publicly available data sources (literature and GIS mapping files) will be used to describe the baseline environment. Table 10-2 lists the key data sources which will be used in the assessment.

Table 10-2: Key publicly available data sources for marine mammals and marine reptiles

Data Source	Description	Coverage Relative	
		English Study Area	Scottish Study Area
Natural England	Natural England Conservation Advice for Marine Protected Areas	✓	
NatureScot - SiteLink	SiteLink provides access to data and information on key Protected Areas across Scotland		✓
Joint Nature Conservation Committee (JNCC)	JNCC Conservation Advice for Marine Protected Areas	✓	✓
Marine Scotland – National Marine Plan Interactive tool (NMPI)	An interactive tool that enables access to spatial information relating to the marine environment in Scotland		✓
Magic Maps	Is an interactive mapping system developed by Defra that holds maps and data on the natural environment	✓	✓
DECC (2022)	Offshore Energy Strategic Environmental Assessment 4	✓	✓
Reid *et al.* (2016)	Atlas of cetacean distribution in northwest European waters	✓	✓
Hammond *et al.* (2021)	Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III	✓	✓
Gilles *et al.* (2023)	Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys.	✓	✓
Heinanen and Skov (2015)	The identification of discrete and persistent areas of relatively high harbour porpoise density in the wider UK marine area	✓	✓
Russell *et al.* (2017)	Updated seal usage maps: The estimated at-sea distribution of grey and harbour seals	✓	✓
Sea Watch Foundation	Sea Watch Foundation sightings data	✓	✓
The Marine Life Information Network (MarLIN 2023)	Species Information	✓	✓
National Biodiversity Network Gateway http://data.nbn.org.uk/	Occurrence records for marine turtles, cetaceans, pinnipeds and Eurasian otter.	✓	✓

Data Source	Description	Coverage Relative	
		English Study Area	Scottish Study Area
Waggitt *et al.* (2020)	Distribution maps of cetacean and seabird populations in the North-East Atlantic	✓	✓
Hague et al (2020)	Provides a review of abundance estimates and distribution of marine mammals across the North Sea and Atlantic areas of Scottish waters	✓	✓
Special Committee on Seals (SCOS, 2022)	UK seals monitoring programme – annual report 2022 (or subsequent update if released)	✓	✓
Carter *et al.* (2020)	Habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles	✓	
Reeds (2004)	Provides a summary of turtle distribution data supplied by the Ocean Biodiversity Information Systems (OBIS),	✓	✓
Crawford (2010)	Fifth otter survey of England 2009 – 2010	✓	
IAMMWG (2022)	Updated abundance estimates for cetacean Management Units in UK waters. JNCC Report No. 680	✓	✓
Offshore Wind Farm Aerial/Boat Surveys	Offshore Wind Farms collect two years of aerial survey data to establish the baseline for marine mammals within the array sites. The following OWFs lie within the Study Area and data will be sought from the projects consent applications to inform the baseline: Hornsea Three, (England) Dogger Bank A, (England) Neart na Gaoithe Offshore Windfarm (Scotland) Berwick Bank Offshore Wind Farm (Scotland) Other applications will be monitored to see if any developments at the pre-consent phase release any relevant information which can be used. Examples may include Dogger Bank South (England).	✓	✓

10.2.3. Additional Studies

10.2.3.1. Electromagnetic Field (EMF) Study

A study will be undertaken to calculate the predicted electromagnetic fields to be generated by the submarine electricity cables due to the electric current flowing along the cables. The electric and magnetic field strengths will be highest where the cables are separated and/or partially or unburied. The study will therefore focus on determining the maximum field strengths and the distance at which the fields dissipate to background values. This study will be used to determine the spatial extent over which electromagnetic changes could affect sensitive receptors including how they navigate.

10.3. Consultation

Consultation will be undertaken with relevant stakeholders to supplement the desk-top review and studies. The following bodies will be consulted, as a minimum, to ensure that the most up-to-date information is collated:

Table 10-3: List of stakeholders to be consulted

England	Scotland
JNCC	JNCC
Natural England	NatureScot
Cefas	Cefas

10.4. Baseline Characterisation

10.4.1. Introduction

This section has been split into the following sub-sections to provide an overview of the ecological baseline in the Study Area:

- General species information
- English baseline characterisation
- Scottish baseline characterisation

Due to the nature of cetaceans being wide ranging species and not being restricted by country boundaries, species descriptions are presented in a general section. The section is then divided to describe the baseline characteristics in the English and Scottish Study Areas respectively. The baseline characterisation sections include information on sightings data, designated sites, and protected species specific to the Study Areas of each country.

10.4.2. General Species Information

10.4.2.1. Overview

Large scale surveys to monitor the cetacean population size have been carried in UK Waters by Small Cetacean Abundance in the European Atlantic and North Seas (SCANS) and Cetaceans Offshore Distribution and Abundance in the European Atlantic (CODA). Surveys were carried in 1994, 2005, 2016 and 2022 by SCANS and 2007 for CODA. The Project passes through survey Block O in English waters and Block R in English and Scottish waters as designated in the SCANS III survey and renamed respectively Block NS-C and NS-D in the SCANS IV survey. Figure 10-2 illustrates the survey blocks used in the 2016 SCANS III survey and the 2022 SCANS IV survey.

This data showed that twenty-eight cetacean species have been recorded in UK waters, however there are only eleven species who are regular visitors. The other recorded species are rare occasional visitors (DECC, 2022). Compared to other parts of the UK continental shelf the North Sea has relatively low densities and numbers of species recorded.

The Sea Mammal Research unit (SMRU) at the University of St Andrews provide annual reports on the state of the UK Seal populations through the Special Committee on Seals (SCOS). There most recent report dated 2021 looked at data from between 2016 and 2019 for the two species of seal, harbour seal (*Phoca vitulina)* and grey seal (*Halichoerus grypus)* (SCOS, 2022). This data showed an overall increase of the grey seal population between 2016 and 2019 of <1.5% in England and Scotland, however, there has been a decline in the population of harbour seal of up to 38% in some English waters. There is similar decline in numbers for the east coast of Scotland, yet this does not appear to be the case on the west coast.

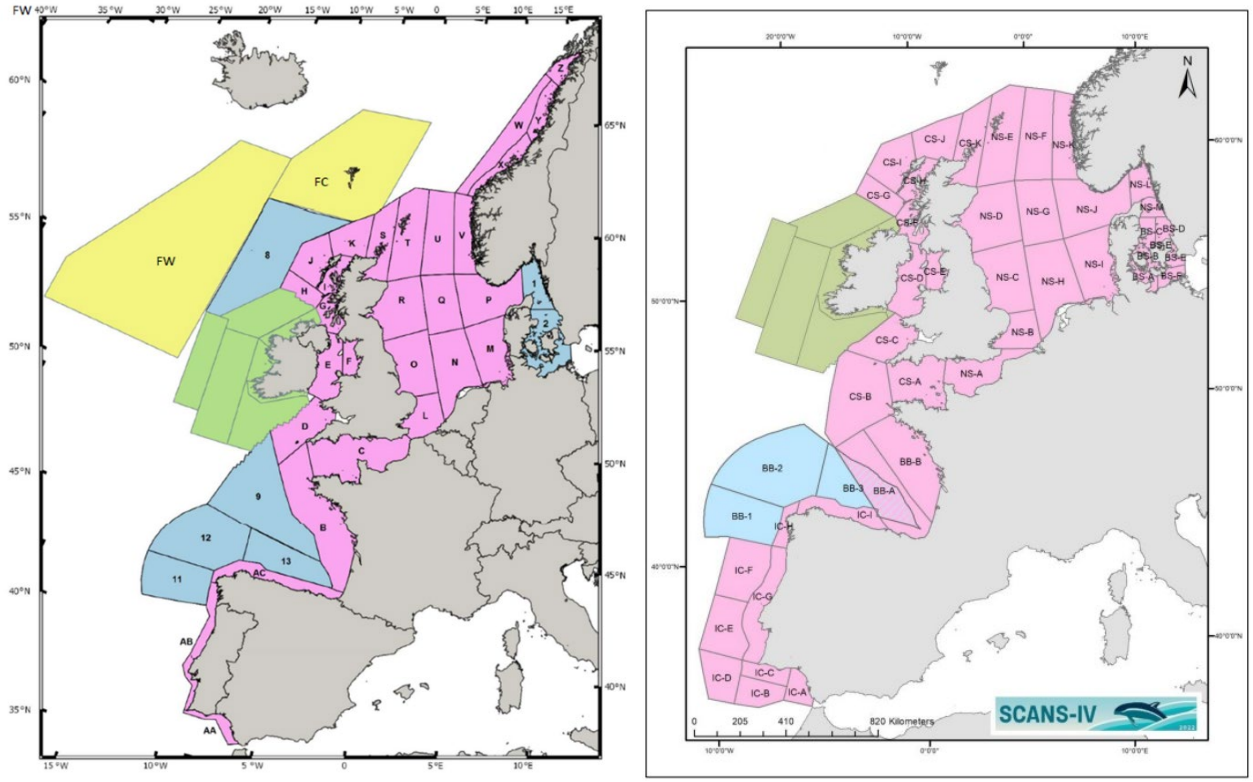

Figure 10-2: Left image - SCANS III survey blocks – blue areas surveyed by vessel and pink areas surveyed by air (from Hammond et al., 2021) Right image – SCANS IV survey blocks – blue areas surveyed by vessel and pink areas surveyed by air (from Gilles et al. 2023)

10.4.2.2. Cetaceans

Harbour porpoise (*Phocoena phocoena*)

The harbour porpoise is widespread around the UK. It is the smallest and most common cetacean found within the north-western European continental shelf waters. It is the most populous cetacean species in the North Sea.

Individuals can grow up 1.6 m in length with the females being about 0.15 m larger than the male. Typically, they are found in small groups of 1 to 3 animals. They generally appear shy, avoiding other species and rarely interact with boats. Due to their size and nature, they are typically difficult to spot for survey purposes.

Though the porpoise has been recorded all year round, they are more common in the summer when they move closer to the shoreline to breed. Individuals also tend to move further north during the summer months so are more frequently recorded in the English Study Area during winter (Hammond, 2021).

The mating season lasts from April to September (peaking in July and August). Calves are born between May and August (breeding season peaks in June).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

Short-beaked common dolphin (*Delphinus delphis*)

The short-beaked common dolphin is easily identified at sea by the light-coloured hour-glass pattern on their lower flanks. This species grows up to 2.4 m in length (MarLIN, 2022). They commonly breach and often bow-ride. Average groups sizes observed are between 6 and 10 individuals, though large schools have been frequently recorded.

Although commonly seen off the west coast of Britain and Ireland they are only occasionally observed in the North Sea, mainly during the summer (June to September) (DECC, 2022).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

White-beaked dolphin (*Lagenorhynchus albirostris*)

The white-beaked dolphin is recognisable by its short, often white, beak. It can grow up to 3.2 m in length (MarLIN, 2022a). This species frequently displays forward, vertical or side breaches and frequently bow-ride vessels. This species is also known to mix with other dolphins and whales to assist in co-operative food herding.

The white-beaked dolphin occurs over a large part of the northern European continental shelf and is frequently recorded in the central and northern North Sea but is only occasionally observed in the southern North Sea. Whilst present all year round it has been most frequently observed between June and October (DECC, 2022).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

Bottlenose dolphin (*Tursiops truncatus*)

The bottlenose dolphin is the largest dolphin which frequents British waters, growing up to 4 m. They often display forward to sideways breaches, somersaults and tail slaps and frequently bow-ride. Like the white-beaked dolphin it is frequently seen mixing with other species. Group sizes are regularly between 2 and 25 animals, but individuals can travel in much larger groups, although this is most likely in deep water (DECC, 2022).

There are resident populations of this species in Cardigan Bay, Wales and the Moray Firth, Scotland but animals are occasionally sighted in the North Sea (MarLIN, 2022b).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

Minke whale (*Balaenoptera acutorostrata*)

The minke whale is the most common and widely distributed of the baleen whales in British waters. They are recorded throughout the northern and central North Sea but are rare visitors in the southern North Sea (DECC, 2022).

The minke whale is one of smallest of the baleen whales, their length averages 8.5 m. Spy hopping and breaching are common for this whale which tend to form groups of about 3 animals (MarLIN 2022c). Although the species occurs year-round most sightings have been recorded between May and September (JNCC, 2003).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

Humpback whale (*Megaptera novaeangliae*)

Humpback whales are present worldwide in tropical, temperate and polar seas of both hemispheres, typically favouring waters over and along the continental shelf edge and around oceanic islands. They migrate annually from high latitude, cold water, feeding grounds in summer to low-latitude, warm water, breeding grounds in winter. They are usually observed singly or in pairs and groups rarely exceed 4 or 5 individuals when not feeding or breeding. Humpback whale populations, including those in the North Atlantic, had been severely depleted by over-exploitation (DECC, 2022), however since the introduction of legal protection in 1955 their abundance has increased (Stevick et al, 2003). They are occasional visitors to UK waters.

The humpback whale is a baleen whale and can reach up to 16 m in length. It is a member of the rorqual family with the characteristic ventral pleats of skin under the eye and the relatively flat and broad jaw. At close range, it is one of the easiest whales to identify. It has extremely long distinctive flippers with a white colouration and knobs on the leading edge. The dorsal fin is low and usually sits on a hump. The head has a single ridge and is covered with numerous bumps. It is a grey-black colour dorsally and laterally and is white underneath (MarLIN, 2008a).

Recent sightings data for this species is shown in Table 10-5 and Table 10-6.

Killer whale (*Orcinus orca*)

The orca, (often referred to as killer whale) is the largest species in the dolphin family. They are fast swimmers, reaching speeds in excess of 30 knots and feed on squid, octopus, fish, seals and other smaller dolphins and may eat seabirds and marine turtles occasionally. The killer whale is known for its black and white colouring. The distinctive, large dorsal fin can reach 1.8 m in length in males and 0.9 m in females. It has large paddle like flippers. Their snout is blunt with short, poorly defined beaks. Males can be in excess of 9 m in length, 6 m for females. They are usually found in deep water, although it may enter shallow water to catch prey. They have been recorded off the Shetlands, north and west Scotland, Irish coastline and south and west coasts of England and Wales (MarLIN, 2006).

Recent sightings data for this species is shown in Table 10-6.

Other Cetaceans

The following cetaceans have had no recorded sightings (recent or otherwise) within the Study Area:

- Atlantic white-sided dolphin (*Lagenorhynchus acutus*)

- Risso's dolphin (*Grampus griseus*)
- Long-finned pilot whale (*Globicephala melas*)
- Fin whale (*Balaenoptera physalus*)
- Northern bottlenose whale (*Hyperoodon ampullatus*)
- Sperm whale (*Physeter macrocephalus*)

10.4.2.3. Pinnipeds

Grey seal (*Halichoerus grypus*)

The grey seal is the larger of the two species of seal in the UK, spend most of their time at sea only coming to shore in autumn to form breeding colonies. They are amongst the rarest seals in the world and the UK population represents 36% of the global grey seal population (JNCC, 2022). Grey seals prefer to use remote islands, bays and caves as 'haul out' areas to give birth to their pups but also between foraging trips for food.

Grey seals are mainly distributed around and between haul-out sites and foraging areas and are more commonly seen in the central and northern North Sea. Foraging areas can be up to 100 km offshore and generally connected to haul-out sites by a corridor of higher use (DECC, 2016).

Breeding takes place in the autumn, with a gestation period of 11 months. Exact timings vary not only between years but also by location. In eastern England pupping occurs between November and December. Peak pupping times for the Firth of Forth are around mid-October. At the proposed Kinghorn landfall pupping is typically between mid-October to December. A large proportion of the grey seal population will be on land and in waters close to colonies for several weeks from October to December during the pupping and breeding season, and again in February and March during the annual moult. Densities at sea are likely to be lower during this period than at other times of the year (BEIS, 2022).

Harbour (Common) seal (*Phoca vitulina)*

The harbour or common seal is a species that is frequently found in British estuaries and on mudflats. Though they spend much of their time at sea they do require land for breeding purposes and therefore haul locations are important. The UK population represents 5% of the global harbour seal population (JNCC, 2022a). Unlike the larger grey seal, the harbour seal foraging area is within 40 – 50 km of their haul out site.

The harbour seal has a slightly shorter gestation period than the grey seal of 10 months. Pupping occurs on land from June to July while the moult is centred around August and extends into September (BEIS, 2022). Therefore, from June to September harbour seals are ashore more often than at other times of the year.

Figure 10-3 (Drawing: C01494-SPEC-012) illustrates the grey seal and harbour seal population density estimates within the Study Area.

Grey seal distribution
(main foraging season summer)

Harbour seal distribution
(main foraging season spring)

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Grey Seal and Harbour Seal Densities within the Study Area

C01494b-EGL4-SPEC-012-D

12NM Limit
Scottish Adjacent Waters
EGL 4 Scoping Boundary

Seal Density Distribution
(Mean % at sea population per 25 km2)

- 0 - 0.0025
- 0.0025 - 0.005
- 0.005 - 0.0075
- 0.0075 - 0.01
- 0.01 - 0.0125
- 0.0125 - 0.015
- 0.015 - 0.0175
- 0.0175 - 0.02
- 0.02 - 0.03
- >=0.03

0 10 20 NM

0 25 50 km

Date	08/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:2,000,000
Created	EP
Reviewed	SP/JC
Authorised	AF

Document Path: X:\GIS\GIS_PROJECTS\C01494_EGL3&4\Project\QGS\EGL4\08_SPEC\C01494b_SPEC_012.qgz

Export Date: 08/12/2023

10.4.2.4. Chelonians

Leatherback turtle (*Dermochelys coriacea*)

Although not indigenous to the UK, sea turtles are the only marine reptiles to be found in UK waters. The leatherback turtle is the most widely distributed turtle species and is the largest, growing up to 1.7 m in length, being found in all oceans except the Southern Ocean.

Within the North Atlantic its range extends from the tropics to the polar region right across to Europe's north-easterly fringe (Seamap, 2022).

Leatherback turtles are pelagic feeders and their presence in UK waters is part of this species' wide-ranging migration in response to food distribution, notably jellyfish and other gelatinous zooplankton.

10.4.2.5. Eurasian Otter

The Eurasian otter (*Lutra lutra*) is a largely solitary semi-aquatic mammal, which occurs in a wide variety of aquatic habitats such as rivers, streams, lakes, estuaries and on the coast. Coastal dwelling populations use shallow, inshore marine areas for feeding but they also require access to fresh water for bathing and terrestrial areas for resting and breeding. Their foraging range in the marine environment is limited to coastal areas (JNCC 2022b).

An otter's foraging range is highly dependent on the quality of its habitat and food. There is evidence that some male otters will travel as far as 80 km but it is more usual for them to range between 10 and 40 km along the coast line (Gov.uk, 2022). Coastal otters can hunt as far as 100 m offshore in water up to 10 m deep, but most feeding is done much closer to shore in water that is less than 3 m deep (The Otter Consultancy, 2009).

Sightings for the Eurasian otter peak in May to June, and September to October, although they can be seen all year round (NBN Atlas, 2023).

10.4.2.6. Protected Species

Table 10-4 lists the protection afforded to species which have been identified within the Study Areas. This list includes historical and recent sightings. Marine mammals are protected by several national and international organisations including:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora – CITES. Whose aim is to protect endangered plant and animal species from illegal trade and over-exploitation.
- Convention for the Protection of the Marine Environment of the North-East Atlantic – OSPAR Convention. The OSPAR Convention aims to protect the marine environment of the North-East Atlantic.
- International Union for Conservation of Nature and Natural Resources- IUCN. The IUCN Red Data list catalogues and highlights those animals and plants at high risk of global extinction.
- The Conservation of Habitats and Species Regulations 2017 (as amended)
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)
- Natural Environment and Rural Communities (NERC) Act
- Wildlife and Countryside Act 1981 (as amended in 1985)

Table 10-4: Protected species

	International			UK		England	Scotland	
Species	**OSPAR**	**CITES**	**IUCN**	**Wildlife and Countryside Act**	**Conservation of Offshore Habitats and Species Regulations**	**Species of Principal Importance[7]**	**Scottish Biodiversity List**	**Priority Marine Features**
Cetacean								
Harbour porpoise	Yes	Appendix II	Least Concern	Schedule 5	Annex II & Annex IV	Y	Y	Y
Common dolphin		Appendix I	Least Concern	Schedule 5	Annex IV	Y	Y	Y
Bottlenose dolphin		Annex A	Least Concern	Schedule 5	Annex IV	Y	Y	Y
White-beaked dolphin		Appendix I	Least Concern	Schedule 5	Annex II & Annex IV	Y	Y	Y
Atlantic white-sided dolphin		Appendix I	Least Concern	Schedule 5	Annex IV	Y	Y	Y
Risso's Dolphin		Appendix I	Least Concern	Schedule 5	Annex IV	Y	Y	Y
Minke whale		Appendix I	Least Concern	Schedule 5	Annex IV	Y	Y	Y
Humpback whale		Appendix II	Least Concern	Schedule 5	Annex IV		Y	
Long-finned pilot whale		Appendix II	Least Concern	Schedule 5	Annex IV	Y	Y	Y
Fin whale		Appendix I	Vulnerable	Schedule 5	Annex IV	Y	Y	Y
Northern bottlenose whale		Appendix I	Near threatened	Schedule 5	Annex IV		Y	Y
Killer whale		Appendix I	Data deficient	Schedule 5	Annex IV	Y	Y	Y
Sperm whale		Appendix I	Vulnerable	Schedule 5	Annex IV	Y		Y
Pinniped								
Grey seal			Least Concern		Annex II			Y
Harbour (Common) seal			Least Concern		Annex II	Y		Y
Otters								
Eurasian otter		Appendix I	Near Threatened	Schedule 5	Annex II & Annex IV			
Chelonians								
Leatherback turtle	Yes		Vulnerable	Schedule 5	Annex IV	Y	Y	

[7] As listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act (NERC, 2006)

10.4.3. English Baseline Characterisation KP 0 to KP 418.7

10.4.3.1. Sightings Data

Cetaceans, pinnipeds and marine turtles

Table 10-5 is a list of recent marine mammal sightings within the English Study Area along with their relevant management unit, seasonality and frequency. Four data sources have been used in Table 10-5:

- Sea Watch Foundation - an organisation which collates sightings data from scientists and members of the public. Sightings for a rolling twelve-month period are typically publicly available. The period referenced for this Scoping Report was March to August 2023 which was the data time period shown on the site at the time of Scoping Report preparation. As SeaWatch is a voluntary organisation it does not follow standard data periods.
- National Biodiversity Network (NBN) Atlas - holds species data back to the 1900's for some species. Data for the period 2018 to 2022 was used for this Scoping Report.
- Data has been reviewed from two recent offshore windfarm (OWF) projects where aerial marine mammal surveys have been undertaken, namely Hornsea 3 OWF (surveys between 2016 to 2017) and Dogger Bank (survey in 2013).
- The species density estimates are taken from the SCANS III survey undertaken in 2016 and SCANS IV survey undertaken in 2022. The Project passes through SCANS III survey Blocks O and R and SCANS IV survey Blocks NS-C and NS-D (see Figure 10-2).

Table 10-5: Species and Sightings within the English Study Area

Species	Relevant MU	Seasonality	Frequency	Sightings Data				
				Density estimate individuals per km^2		SeaWatch Foundation Sightings Apr – Aug 2023 *	NBN Atlas – Sighting 2020 - 2022†	OWF observations
				2016 ^	2022+			
Harbour porpoise	North Sea	All year	Common	Block O – 0.888 Block R 0.599	NS-C – 0.6027 NS-D – 0.5985	23 sightings with a max group size of 10	21 sightings	1007 sightings in 20 months ** 365 sightings in 2 months #
Short-beaked common dolphin	Celtic and Greater North Sea	Summer	Occasional	-	NS-C – 0.0032	3 sightings with a max group size of 10	-	-
Bottlenose dolphin	Greater North Sea	All year	Occasional	Block R 0.0298 individuals per km^2	NS-C – 0.0419	71 sightings with a max group size of 18	14 sightings	-
White-beaked dolphin	Celtic and Greater North Sea	Summer	Occasional	Block O – 0.002 Block R 0.243	NS-C – 0.0149 NS-D - 0.0799	3 sightings with a max group size of 50	-	5 sightings in 20 months ** 5 sightings in 2 months #
Minke whale	Celtic and Greater North Sea	Summer	Rare	Block O – 0.010 Block R 0.387	NS-C – 0.0068 NS-D – 0.0419	3 sightings with a max group size of 1	7 sightings	1 sighting in 20 months ** 16 sightings in 2 months #
Humpback whale	n/a	-	Rare	n/a	-	2 sightings with a max group size of 1	-	-
Fin whale	n/a	-	Rare	-	NS-D – 0.0009	-	-	-
Grey seal	n/a	All year	Common	-	-	3 sightings with a max group size of 6	46 sightings	6 sightings in 20 months *
Harbour (Common) seal	n/a	All year	Common	-	-	1 sighting with a max group size of 1	13 sightings	1 sighting in 20 months *
Leatherback turtle	n/a	Summer	Rare	-	-	-	4 sightings since 1998	-

Sources:

*^ Hammond (2021) * SeaWatch, 2023) † NBN, (2023a) ** Ørsted , (2018) # WUR.nl, (2014) + Gillies et al, (2023)*

Eurasian otter sightings

Although the Eurasian otter is found along the UK coastline there have only been rare recent sightings recorded within the English Study Area. Figure 10-4 illustrates a 40 km buffer from the proposed English landfall site and the number of sightings between 2012 and 2022.

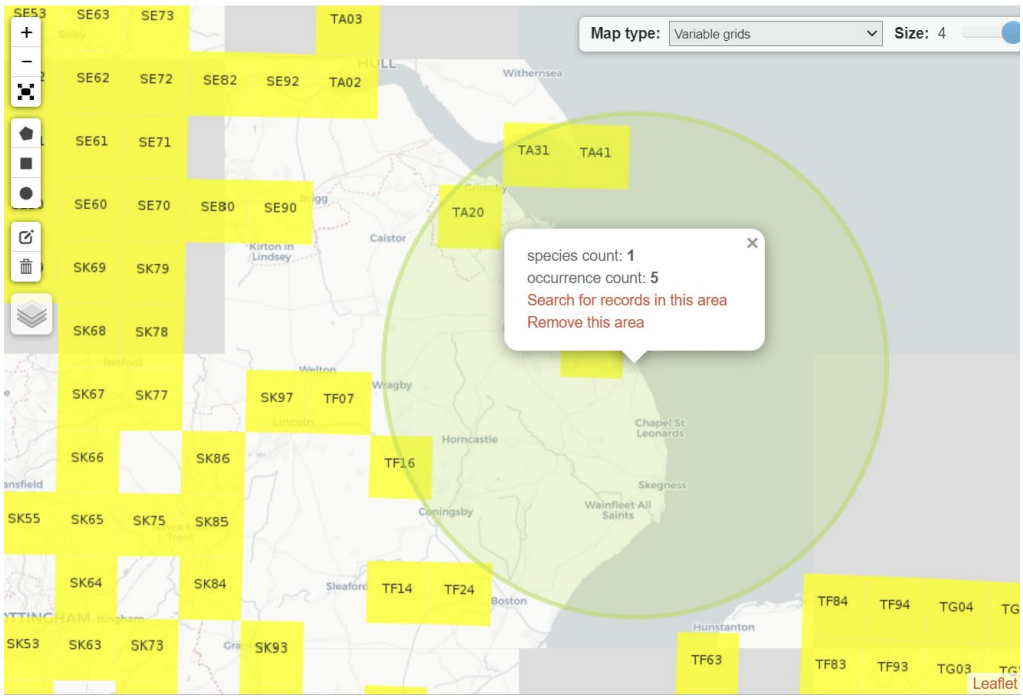

Figure 10-4: Eurasian otter sightings between 2012 and 2022 at the proposed English Landfall site. Source NBN Atlas (2023b)

10.4.3.2. Designated Sites

Southern North Sea SAC

The Scoping Boundary crosses through the Southern North Sea SAC, for approximately 47 km, which is an area of importance for harbour porpoise. This European site stretches from the central North Sea (north of Dogger Bank) to the Straits of Dover in the south, covering an area of 36,951 km^2 (JNCC, 2019). It is estimated the site supports 17.5% of the UK North Sea Management Unit population (JNCC, 2023). The population size for the Southern North Sea SAC was estimated to be between 11,864 and 28,889 in 2019 (JNCC, 2019a). Animals are thought to move latitudinally between preferred summer and winter grounds within the SAC. The Scoping Boundary for the Project crosses both the harbour porpoises' summer and winter grounds for 41 km and 6.5 km respectively. The conservation objective for the site is to maintain the favourable conservation status of the species.

Figure 10-5 (Drawing: C01494-EGL4-SPEC-014) illustrates both the summer and winter grounds for the harbour porpoise in the Southern North Sea SAC.

Humber Estuary SAC

The Scoping Boundary lies approximately 4.26 km from the Humber Estuary SAC. The site extends for 366.57 km^2 and includes the second largest coastal plain Estuary in the UK. Grey seals are listed as a qualifying feature of this SAC. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seal, vascular plants and invertebrates (Natural England, 2014). The main haul out site used throughout the year by grey seal on the Lincolnshire coast is Donna Nook (Humber Nature Partnership, 2023). In 2018 there was an estimated pup count of 2,066 with a total population counted of 6,288 (SCOS, 2022). However, in recent years the grey seal population has decreased by nearly 40% to 3,897 in 2021. The conservation objective for the site is to maintain and/or restore the favourable conservation status of the species.

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600000
700000
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6100000
6000000
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Harbour Porpoise Summer and Winter Grounds within Southern North Sea SAC

C01494b-EGL4-SPEC-014-A

- 12NM Limit
- Scottish Adjacent Waters
- EGL 4 Scoping Boundary
- Southerrn North Sea Special Area of Conservation (SAC)
- Summer Area (Southern North Sea SAC)
- Winter Area (Southern North Sea SAC)

Harbour Porpoise (Animals per km2)

- <= 0.0938
- 0.0938 - 0.2198
- 0.2198 - 0.3298
- 0.3298 - 0.4397
- 0.4397 - 0.5496
- 0.5496 - 0.6595
- 0.6595 - 0.7694
- 0.7694 - 0.8794
- 0.8794 - 0.9893
- > 0.9893

0 10 20 NM

0 25 50 km

Date	01/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:1,900,000
Created	EP
Reviewed	S Pearce
Authorised	A Farley

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Export Date: 01/12/2023

The Wash and North Norfolk Coast SAC

The Scoping Boundary lies approximately 16.6 km from The Wash and North Norfolk Coast SAC. The SAC encompasses the largest embayment in the UK covering an area of 1,078 km^2. The extensive intertidal flats here and on the North Norfolk Coast provide ideal conditions for harbour seal breeding and hauling-out. This site is the largest colony of harbour seal in the UK, with some 7% of the total UK population. The Study Area falls within the foraging range of Eurasian otter from within The Wash and North Norfolk Coast SAC. Otters occur along the North Norfolk coast and can be found in a variety of freshwater and coastal habitats. The conservation objective for the site is to maintain and/or restore the favourable conservation status of the species.

Berwick and Northumberland Coast SAC (also partly in Scotland)

The Scoping Boundary lies approximately 22.6 km from the Berwick and Northumberland Coast SAC within the English Study Area and 19.4 km within the Scottish Study Area. The SAC stretches from Fast Castle Head in Scotland to Alnmouth in England, encompassing both Lindisfarne and the Farne Islands. The site is 652.26 km^2 in size. The site supports a breeding colony of grey seals which supports around 2.5% of annual UK grey seal pup production (JNCC, 2023). The conservation objective for the site is to maintain and/or restore the favourable conservation status of the species.

Seal Haul out sites

The main breeding and haul out sites within the English Study Area for grey seals is Donna Nook on the Lincolnshire coast, which is 7.9 km away from the Scoping Boundary, and further up the coast in Northumberland at the Farne Islands, Lindisfarne and Coquet Islands.

The main harbour seal haul-out site is located in The Wash on the Lincolnshire/Norfolk coast. Harbour seals have been also observed hauling out at Donna Nook in Lincolnshire.

10.4.4. Scotland Baseline Characterisation KP 418.7 to KP 524.9

10.4.4.1. Sightings Data

Table 10-6 is a list of recent marine mammal sightings within the Scottish Study Area along with their relevant management unit, seasonality and frequency. Five data sources have been used in Table 10-6:

- Sea Watch Foundation – an organisation which collates sighting data from scientists and members of the public. Sightings for a rolling twelve-month period are typically publicly available. The period referenced for this Scoping Report was March to August 2023 which was the data time period shown on the site at the time of Scoping Report preparation. As SeaWatch is a voluntary organisation it does not follow standard data periods.
- National Biodiversity Network (NBN) Atlas – holds species data back to the 1900's for some species. Data for the period 2018 to 2022 were used for this Scoping Report.
- Data have been reviewed from two recent OWF projects where boat and aerial marine mammal surveys were conducted, namely Neart na Gaoithe Offshore Windfarm during Nov 2010 and Oct 2012; and Berwick Bank Offshore Wind Farm during 2019 and 2021.
- The species density estimates are taken from the SCANS III survey undertaken in 2016 and SCANS IV survey undertaken in 2022. The Project passes through SCANS III survey Block R and SCANS IV survey Block NS-D (see Figure 10-2).

Table 10-6: Species and Sightings within the Scottish Study Area

Species	Relevant MU	Seasonality	Frequency	Sightings Data				
				Density estimate individuals per km^2		SeaWatch Foundation Sightings Mar – Aug 2023 *	NBN Atlas – Sighting 2020 - 2022 †	OWF observations
				2016^	2022+			
Harbour porpoise	North Sea	All year	Common	Block R 0.599	NS-D – 0.5985	6 sighting with a max group size of 6	74 Sightings	2034 sightings in 25 months ** 172 sightings in 24 months #
Common Dolphin	Celtic and Greater North Sea	Summer	Occasional	-	-	2 sighting with a max group size of 10	7 Sightings	-
Bottlenose Dolphin	Greater North Sea	All year	Occasional	Block R 0.0298	-	34 sightings with a max group size of 15	33 sightings	7 sightings in 25 months **

Species	Relevant MU	Seasonality	Frequency	Sightings Data				
				Density estimate individuals per km²		SeaWatch Foundation Sightings Mar – Aug 2023 *	NBN Atlas – Sighting 2020 - 2022 †	OWF observations
				2016^	2022+			
	Coastal East Scotland							
White-beaked dolphin	Celtic and Greater North Sea	Summer	Occasional	Block R 0.243	NS-D – 0.0799	-	-	45 sightings in 25 months ** 16 sightings in 24 months #
Minke Whale	Celtic and Greater North Sea	Summer	Rare	Block R 0.387	NS-D – 0.0419	4 sighting with a max group size of 5	8 sightings	57 sightings in 25 months ** 12 sightings in 24 months #
Humpback whale	n/a	-	Rare	n/a	-	1 sighting with a max group size of 1	22	-
Fin whale	n/a	-	Rare	-	NS-D – 0.0009	-	-	-
Killer whale	n/a	-	Rare	-	-	-	-	1 sightings in 24 months #
Grey Seal	n/a	All year	Common	-	-	-	153 sightings	180 sightings in 25 months ** 100 sightings in 24 months #
Harbour (Common) seal	n/a	All year	Common	-	-	-	12 sightings	3 sightings in 25 months ** 21 sightings in 24 months #
Leatherback turtle	n/a	Summer	Rare	-	-	1 sighting since 2012	-	-

Sources:

*^ Hammond (2021) * (SeaWatch, 2023) † NBN, (2023a) ** RPS, (2022) # Mainstream Renewable Power, (2023) + Gillies et al, (2023*

Eurasian otter

The Eurasian otter is found along the UK coastline and there have been 708 sightings recorded within the Scottish Study Area between 2012 and 2022. It should be noted that many of these sightings are inland rather than coastal. Figure 10-6 illustrates a 40 km buffer from the proposed Scottish landfalls and the number of sightings between 2012 and 2022.

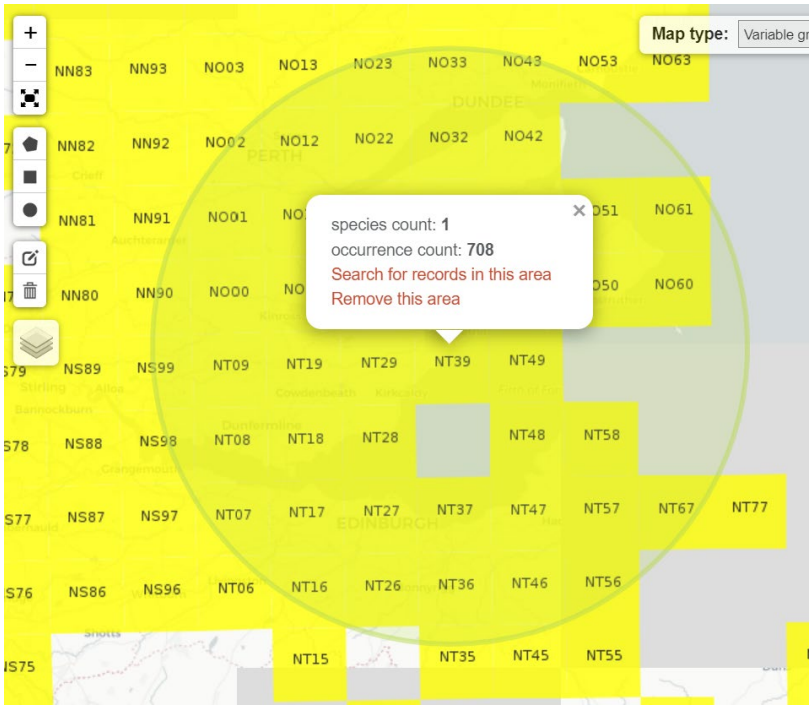


Figure 10-6: Eurasian otter sightings between 2012 and 2022 at the proposed Scottish Landfalls. Source: NBN Atlas (2023b)

10.4.4.2. Designated Sites

Isle of May SAC

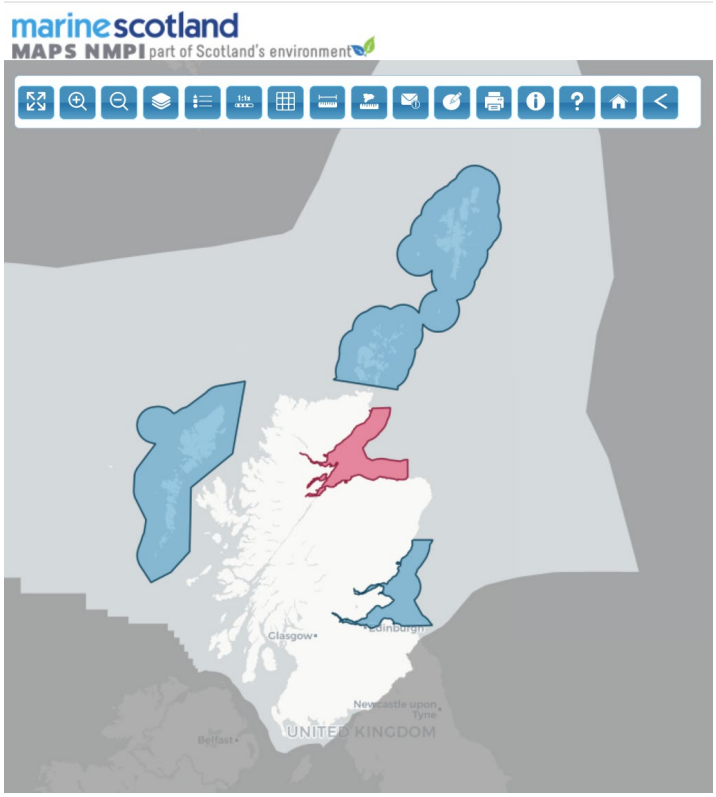
The Scoping Boundary lies approximately 2.2 km from the Isle of May SAC. The Isle of May lies at the entrance to the Firth of Forth on the east coast of Scotland and is 3.56 km^2 in size, it supports a breeding colony of grey seals. The European site is the largest east coast breeding colony of grey seals in Scotland and the fourth-largest breeding colony in the UK, contributing approximately 4.5% of annual UK pup production. The conservation objective for the site is to maintain the favourable conservation status of the species (JNCC, 2023c).

Firth of Tay and Eden Estuary SAC

The Scoping Boundary lies approximately 31.6 km from the Firth of Tay and Eden Estuary SAC, which is approximately 154 km^2 in size. The European site supports a nationally important breeding colony of harbour seal, part of the east coast population of harbour seal that typically utilise sandbanks. In the most recent surveys, conducted in 2021, only 261 harbour seals were counted which was 24% lower than the previous survey undertaken in 2016 (SCOS, 2022). Grey seals are also found at the SAC but are not a protected feature of it. In the most recent survey of 2021, 1940 grey seals were counted. The conservation objective for the site is to maintain the favourable conservation status of the species (Nature Scot, 2023).

Seal Conservation Area

In response to local decline in numbers of harbour seals within Scottish waters the Scottish government introduced conservation orders under the Conservation of Seals Act 1970. It was designed to provide additional protection for vulnerable local populations of harbour seal. The Conservation of Seals Act 1970 was replaced by the Marine (Scotland) Act 2010 which makes it an offence to shoot seals in Scotland (Gov.scot, 2023). For licence purposes the coast was divided into seven seal management areas, including the East Coast Seal Conservation Area which the Scoping Boundary lies within. The East coast Seal Conservation Area came into effect on the 1st February 2011 and protects harbour seal populations. Figure 10-7 taken from Marine Scotland's NMPI tool illustrates where the Seal Conservation Areas are located.



Key	Areas designated for common/harbour seals			Area designated for common/harbour seals and grey seals	

Figure 10-7: Seal Conservation areas. Source Marine Scotland, 2023

Seal Haul Out Sites

The proposed Kinghorn landfall lies within 200 m of, and the Scoping Boundary overlaps, the Kinghorn Rocks (EC-001) - a designated haul out site under Section 117 of Marine (Scotland) Act. The Kinghorn Rocks site protects the grey and harbour seal all year round from harassment. Harassing a seal (intentionally or recklessly) at a haul-out is an offence. During the most recent survey, 85 seals were counted at Kinghorn Rocks.

There is another harbour seal haul out site at Inchmickery and Cow & Calves which is 9.3 km from the Scoping Boundary. There are also breeding colonies for grey seal at Inchkeith, which lies approximately 2.5 km from the Scoping Boundary; and Craigleith, which lies approximately 8.3 km from the Scoping Boundary.

Figure 10-8 (Drawing: C01494-EGL4-SPEC-013) illustrates the seal haul out sites within proximity of the Scoping Boundary.

Designated Seal Haul Out Sites within Proximity of the EGL 4 Scoping Boundary

C01494b-EGL4-SPEC-013-D

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SP Energy Networks

- Economic Exclusive Zone Limit (EEZ)
- 12NM Limit
- Scottish Adjacent Waters
- EGL 4 Scoping Boundary

Designated Haul-Out Sites for Seals (Protection of Seals Orders)

- Seal Haul Out
- Breeding Colony Seal Haul Out

0 25 50 NM

0 50 100 km

Date	19/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:1,850,000
Created	EP
Reviewed	SP
Authorised	JDM/AF

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Export Date: 19/12/2023

10.5. Proposed Assessment Methodology

The marine mammal and marine reptile MEA will follow the approach set out in Chapter 4 of this Scoping Report, using the project-wide assessment matrix. The assessment of potential effects will be established using the standard Source-Pathway-Receptor approach. The MEA chapter will be prepared in accordance with the following guidance:

- Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (NOAA, 2018).
- Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. (Southall *et al*., 2019).
- Sound Exposure Guidelines for Fishes and Sea Turtles (Popper *et al.,* 2014) .
- Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland) (JNCC, 2020).
- The protection of Marine European Protected Species from injury and disturbance. Guidance for Scottish Inshore Waters (Marine Scotland, 2020).
- Guidance on the Offence of Harassment at Seal Haul-out Site (Marine Scotland, 2014).

Results from other topic chapters, such as marine physical processes, fish and shellfish and intertidal and subtidal benthic ecology will be used to establish the potential impacts on supporting habitat and prey species for marine mammals and marine reptiles. Where impacts are not predicted to be significant, simple assessments, using an evidence-based approach that is proportionate to the anticipated level of significance will be undertaken.

Underwater noise impacts from vessels and equipment and the potential for mortality, permanent and temporary injury and behavioural disturbance would be assessed using the latest peer-reviewed impact thresholds reported in Southall et al. (2019) and Popper et al. (2014), to provide a quantitative prediction of the number of animals at risk. This information would take into account the best available scientific evidence on the movement and behaviour of marine mammals, both under baseline conditions and would calculate the probability of animals being exposed to sufficient noise levels to cause injury or behavioural disturbance.

The details of the assessment methodology will be refined as information becomes available on the project description, the physical site conditions (bathymetry, substrate types) and the construction programme. An estimation of numbers of animals at risk will be given for the Project alone and in-combination with other projects in the area. The proposed methodology will be discussed and agreed with Cefas, JNCC, NatureScot and Natural England.

Where significant effects are identified, mitigation measures will be proposed and residual effects presented.

10.6. Scope of Marine Environmental Appraisal

A range of potential impacts on marine mammals and marine reptiles have been identified which may occur during the construction, operation and maintenance (O&M), and decommissioning phases of the Project. Table 10-7 describes the potential impacts identified and provides justification as to whether they will be scoped in or out of the MEA. A precautionary approach has been taken and where there is no strong evidence base, or the significance is uncertain at this stage the impact has been scoped ‘in’ to the MEA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped ‘out’ of the MEA.

Table 10-7: Species and Sightings within the Study Area

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
Underwater noise changes	Presence of project vessels and equipment (including cable trenching)	Cetaceans and pinnipeds	**OUT -** The presence of project vessels and equipment used to install the cables will generate underwater noise. The Oslo and Paris (OSPAR) Convention (2012) considered that sound associated with the construction, removal or operation of submarine cables is less harmful compared to impulsive sound activities such as seismic surveys, military activities or construction work involving pile driving (OSPAR Convention 2012). Animals would need to remain in close proximity (<100 m) to the source continuously for 24 hours to be exposed to levels sufficient to cause auditory injury (Barham and Mason 2019, Ørsted 2019). For all auditory hearing groups, the noise levels from these activities are low enough that there is negligible risk. Therefore, this impact pathway has been scoped out of the MEA. It should be noted that geophysical surveys are exempt from requiring a Marine Licence under the MCAA, provided they meet certain conditions. The MEA will not consider the effects of the pre- and post-installation surveys. Instead, survey contractors will be required to provide Screening for Appropriate Assessment and a European Protected Species Assessment to ensure they meet the required conditions for an exempt activity. Entries into the UK Marine Noise Registry will be made as appropriate.	**OUT -** If the cable is installed correctly the likelihood of it requiring maintenance and repair is significantly reduced. However, there remains the potential that localised repair works or remedial external cable protection may be required. In these circumstances the significance of the effect will be of lower magnitude than during installation and has therefore been scoped out of the MEA for the same reasons.	**OUT -** The significance of the effect during decommissioning is similar or of lower magnitude than installation and has therefore been scoped out of the MEA for the same reasons.
Changes in prey availability	Pre-sweeping of sand waves Cable burial and trenching Deposit of external cable protection	Cetaceans and pinnipeds	**IN –** Changes in prey availability is a potential indirect impact which could arise during any phase of the project life cycle if the Project has a significant effect on fish species such as sandeel and Atlantic herring which are important prey species. Disturbance of the seabed during the spawning season for species with a demersal life stage could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. The impact pathway has been scoped IN under the fish and shellfish topic with respect to sandeel and Atlantic herring habitat, but no significant indirect effects are predicted for marine mammals. This impact has therefore been scoped out of the MEA.		
Collision with project vessels	Presence of project vessels and equipment	Cetaceans and pinnipeds	**OUT –**There are known incidents of marine mammals colliding with fast moving vessels. However, it is largely recognised that the key factors contributing to collision between marine mammals and vessels are the presence of both in the same area and vessel speed (see Schoeman *et al.* (2023) for review). Injuries to marine mammals from vessel strikes are species-dependent but generally are more severe at higher impact speeds (Wang *et al.,* 2007). Laist *et al.* (2001) conclude that fatal collisions with marine mammals occur at vessel speeds of 14 knots or more. Vessels involved in the Project are likely to be either stationary or travelling slowly (circa 5 knots) during construction, maintenance or decommissioning activities, thus allowing both the vessel and any animal in the area time to avoid collision. During transit times, project vessels will be travelling at speeds greater than 5 knots. However, project vessels will follow the shipping routes within the Study Area. Cetaceans and pinnipeds in the area are exposed to vessels of all sizes on a regular basis due to the density of shipping in the North Sea. Therefore, the collision risk posed by project vessels associated with the Project is likely to be significantly lower than that posed by commercial shipping activity. No significant effects are predicted. This impact pathway has therefore been scoped out of the MEA.		

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
Electromagnetic changes / Barrier to species movement	Presence of cables	Cetaceans and pinnipeds	N/A	**OUT –** No evidence of magnetic sensitive has been reported for pinnipeds (BOEMRE 2011). It is acknowledged that cetaceans use magnetic cues, such as the earth's geomagnetic field, to navigate. The mechanism for how this is achieved is still unknown (BOEMRE 2011). Calculations of EMF fields for similar specification HVDC cables to the Project show rapid attenuation of the magnetic fields to background levels within 10 m - 50 m of the cables (National Grid and Energinet 2017, BOEMRE 2011). This localised change in the magnetic field may temporarily affect sensitive species as they cross the cables or pass alongside their length and may temporarily reduce their navigational ability within the zone of effect. However, Gill (2005) reports that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker (2001) note harbour porpoise migration across the Basslink has been observed unhindered despite several crossings of operating sub-sea HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a relatively low likelihood of being affected by EMF. The impact pathway has been scoped out of the MEA.	N/A
Temperature increase	Presence of cables	Cetaceans and pinnipeds	N/A	**OUT –** During the operation of an HVDC cable heat losses occur because of the resistance in the cable/conductor. This can cause localised heating of the surrounding environment (i.e., sediment for buried cables, or water in the interstitial spaces of external cable protection). There are no specific regulatory limits applied to temperature changes in the seabed, although a 2 °C change between seabed surface and 0.2 m depth is used as a guideline in Germany. Conservative calculations undertaken for Viking Link (which crosses German waters) concluded that heating in excess of 2 °C at 20 cm sediment	N/A

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
				depth will only occur if cables are bundled and buried to less than 0.75 m (National Grid and Energinet 2017). Any temperature changes will be localised to the immediate environment surrounding the cable and undetectable against natural temperature fluctuations in the surrounding sediments and water column. No significant effects are predicted. This impact pathway has therefore been scoped out of the MEA.	
Accidental Spills *(Hydrocarbon & PAH contamination)*	Presence of project vessels and equipment	Cetaceans and pinnipeds	**OUT -** Project vessels and contractors will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 which relate to pollution from oil from equipment, fuel tanks etc and release of sewage (black and grey water). It is a legal requirement that all vessels have a SOPEP. Compliance with Regulations will be sufficient to minimise the risk to the environment.		
Visual disturbance	Presence of project vessels and equipment	Cetaceans and pinnipeds	**IN –** The physical presence of the project vessels and equipment during all phases of the Project has the potential to disturb marine mammals. Pinnipeds are more sensitive to anthropogenic disturbance when hauled out. Wilson (2013) presents a review of such studies, and concludes that as an overall generalisation, unless habituation has been established by frequent non-intrusive visits, a safe boat distance for harbour and grey seals (i.e., one at which there is a low risk of significant numbers of seals flushing) is about 200 m. The Kinghorn Rocks haul out site is within the Scoping Boundary. Consultation with Forth Port has confirmed that the area is used for the transit of large ships and ferries, as well as the turning of vessels in the nearshore. As the region experiences heavy vessel traffic, it is considered likely that marine mammals in the area will be habituated to a certain extent to the presence of vessels. The presence of project vessels will be temporary and transient, restricted to discreet activities and periods and will not increase the shipping baseline other than briefly. Vessels will be moving slowly (circa 5 knots) whilst within the proposed submarine cable corridor. Though, no significant disturbance effects are predicted from the presence of project vessels due to the close proximity of the haul out site and the Project the impact pathway cannot be scoped out at this stage.		

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11. Shipping and Navigation

11.1. Study Area Definition

This chapter of the Scoping Report describes the potential impacts arising from the construction, operation (including maintenance and repair) and decommissioning of the Eastern Green Link 4 (EGL 4) hereafter referred to as 'the Project' on shipping activity and key navigation features.

The Scoping Boundary for the Project extends from MHWS in England to MHWS in Scotland. It is nominally 1 km wide, 500 m either side of the centreline, however, it widens in areas where there is still optionality in the design e.g., to allow for micro-routeing around potential seabed features. It is anticipated that the Marine Licence application boundary will ultimately be 500 m following refinement and rationalisation as the marine environmental assessment (MEA) and design process evolves.

There are two proposed Landfalls in England (Anderby Creek and Theddlethorpe) and two proposed Landfalls in Scotland (on in Kinghorn and one in Lower Largo/Lundin Links) being considered at this stage of the environmental assessment process. These options will be subject to further technical feasibility work and stakeholder consultation. It will be refined to one preferred option for inclusion in the subsequent Marine Licence application for the Project.

The Study Area for shipping and navigation includes the Scoping Boundary plus an additional 5 Nautical Miles (NM) either side to ensure that all shipping patterns and navigational features are captured.

Kilometre Points (KPs) are used throughout this Chapter to provide context as to where within the Study Area a feature lies. KP 0 is defined at the Anderby Creek Landfall. As there are still alternative Landfalls being considered, KPs have been created along the longest route from the proposed English Landfall at Anderby Creek, around the Holderness Offshore Marine Conservation Zone (MCZ) to the proposed Scottish Landfall at Kinghorn. The KPs for this route are referenced as KP 0 to KP 524.9. Alternative options, which branch off this longest route, are route from the proposed English Landfall at Theddlethorpe to the point where it converges with the longest route (referenced as T_KP 0 to T_KP 18); and through Holderness Offshore MCZ, which is referenced as KP 0 to H_KP 40 and from the longest route where it branches off to the alternative proposed Scottish Landfalls in Lower Largo/Lundin Links, which is referenced as L_KP 0 to L_KP 16.

11.2. Data Sources

Data sources for the baseline characterisation will be presented in accordance with relevant guidance for the topic. The datasets that will be used to inform the description of the baseline environment for the MEA are detailed in Table 11-1 and described in the following sub-sections.

Table 11-1: Shipping & navigation data sources

Data Source	Description	Coverage	
		English Study Area	Scottish Study Area
Automatic Identification System (AIS) Vessel Data	5-minute time series data of shipping activities from 01/03/2022 to 28/02/2023 (12 months of data). Purchased from MariTrace.	✓	✓
Royal Yachting Association (RYA) UK Coastal Atlas of Recreational Boating 2.1	AIS dataset of recreational vessels. Purchased from RYA.	✓	✓
European Marine Observation and Data Network (EMODnet) vessel density maps of European waters	Coarse-grained vessel density maps. Publicly available at https://www.emodnet-humanactivities.eu/view-data.php	✓	✓
Marine Management Organisation (MMO) Fishing Data Marine Traffic	UK sea fisheries annual statistics from 2022. Publicly available at https://www.gov.uk/government/statistics/uk-sea-fisheries-annual-statistics-report-2022	✓	✓

Data Source	Description	Coverage	
		English Study Area	Scottish Study Area
Royal National Lifeboat Institution (RNLI) Incidents Data	RNLI 2008-2022 datasets including Returns of Service, lifeboat stations, and support centres. Publicly available at https://data-rnli.opendata.arcgis.com/ (note that Returns of Service is currently not available online as of November 2023).	✓	✓
Marine Accident Investigation Branch (MAIB) annual reports	MAIB incident reports, covering a ten-year period from 2013 to 2023. Publicly available at https://www.gov.uk/maib-reports	✓	✓
Marine Themes Vector Data	Marine Themes Vector data tiles including anchorage areas, marine use areas, aquaculture, navigational lines, navigational routes, beacons and buoys. Purchased from FIND Mapping.	✓	✓
Admiralty Charts	Admiralty charts via a Web Mapping Service (WMS) feed. Purchased from MarineFind.	✓	✓

11.2.1. Site-Specific Survey Data

The Applicants hold AIS data purchased from MariTrace for the entire area (1 March 2022 – 28 February 2023, 12 months of data). This data will be used to inform the MEA. This 5-minute time series data, supplemented by publicly available EMODnet data, will be used to create vessel density maps. The AIS data extends past the 5 NM Study Area to cover previously identified potential Project routes and provide a characterisation of general vessel behaviour in the area.

Furthermore, the Project Fisheries Liaison Officer (FLO) will be consulted to validate desk-based fishing data and identify any fishing hotspots which need to be captured in the Project Navigational Risk Assessment (NRA).

11.2.2. Publicly Available Data

The European Marine Observation and Data Network (EMODnet) vessel density maps are created from AIS data, which is an automatic tracking system used to identify and locate vessels by electronically exchanging data with other nearby ships, AIS coastal stations and satellites. They provide the total ship presence time for ship categories for every month (vessel hours per month) on a 1 km grid that follows the European Economic Area (EEA)/Inspire standards. The International Maritime Organisation (IMO) requires AIS transponders to be fitted aboard international voyaging ships with gross tonnage of 300 or more tons, and all passenger ships regardless of size (IMO, 2015). This would cover almost all commercial vessels and most private vessels; however, some smaller fishing and recreational vessels could be missing from the AIS dataset.

AIS data from recreational vessels sourced from the Royal Yachting Association (RYA) will be used to determine the density per unit area of boating in United Kingdom (UK) coastal waters, to give a picture of the most utilised routes and areas by leisure boaters.

Publicly available vessel data will be cross referenced with the live traffic maps on the Marine Traffic website (not available to purchase/download) to ensure that shipping patterns, usage of anchorages and usage of ports remain unchanged. Furthermore, the vessel density for purchased data is in a finer resolution (0.08 km grid) than the publicly available data, therefore smaller shipping patterns in vessels can be identified.

11.2.3. Additional Studies

11.2.3.1. Navigation Risk Assessment (NRA)

A Navigational Risk Assessment (NRA) will be carried out; this will include a baseline study which will summarise the available background navigation data and focus on any key shipping routes and/or anchoring areas and fishing activity in the vicinity of the Project. The primary input to the NRA will be 12 months of up-to-date AIS data, considering seasonal variations. Additional data and information sources beyond those used in this Scoping Report include:

- MAIB and RNLI maritime incident data in the area (10 years);
- Incident data from Forth Ports and ABP Humber;
- Additional fishing vessel activity data (e.g., Vessel Monitoring System (VMS) satellite data); and
- Port statistics.

The NRA will be carried out using a Formal Safety Assessment (FSA) compliant with IMO Revised Guidelines for FSA for Use in the IMO Rule-Making Process (IMO, 2018). The assessment approach is described in Section 11.5.

The NRA will draw upon project specific data such as the cable burial risk assessment to be completed for the Project which will define the depth of burial for the cables and the location and quantity of external cable protection required. The MEA for shipping and navigation would be based on the conclusions of the NRA.

11.2.3.2. Commercial Fishing Activity

A study to assess commercial fishing activity was undertaken by Brown and May Marine Ltd. in March 2023 to understand the spatial and temporal distribution of fishing activity within the Study Area. Alongside this, and to inform the MEA and NRA, interviews with local and regional fisheries stakeholders have been conducted to obtain additional information on fishery statistics such as fishing vessels operating in the area, types and sizes of vessels, fishing gear(s) used, fishing effort, target species, seasonality in effort or species abundance, and location of key grounds. The interviews will be supplemented by a desk-based review of catch and effort statistics. AIS data from UK and European fishing vessels over 15 m in length and VMS data from UK registered commercial fishing vessels over 12 m in length will also be obtained and interrogated to assess the distribution of fishing effort. Aerial surveillance data gathered by the MMO will also be used to augment a qualitative assessment of the smaller fishing boats operating in the area. Information will also be sought from the relevant IFCA's including Eastern, North-Eastern and Northumberland. This information would be used to inform the NRA and subsequent MEA.

11.3. Consultation

Consultation will be undertaken with the relevant stakeholders to supplement the desktop review and studies; stakeholder consultation has been an ongoing process since the early stages of the Project. Consultations will be used to agree the planned approach for the NRA, verify the desk-based data sources and fill in any information gaps. The following, non-exhaustive list of bodies will be consulted to ensure that the most up-to-date information is collated:

Table 11-2: List of stakeholders to be consulted

England	Scotland
Maritime and Coastguard Agency (MCA)	Maritime and Coastguard Agency (MCA)
Chamber of Shipping	Chamber of Shipping
Trinity House	Northern Lighthouse Board (NLB)
RYA	RYA
Local sailing clubs	Local sailing clubs
National Federation of Fisheries Organisations (NFFO) - Eastern, North-Eastern and Northumberland.	Scottish Fishermen's Federation
ABP Humber Port	Fife Fishermen's Association
Port of Tyne	North Sea Transition Authority (NSTA)
Port of Sunderland	Forth Ports
Seaham Harbour	Marr Bank OWF
Tees and Hartlepool Port Authority	Berwick Bank OWF
Port of Blyth	Neart Na Gaoithe Offshore Wind
Triton Knoll Offshore Wind Farm (OWF)	Forthwind
Lincs OWF	North Sea Transition Authority (NSTA)
North Sea Transition Authority (NSTA)	

Outputs from the stakeholder engagement will be incorporated into the development of the NRA, any potential hazards and concerns raised will be addressed in the NRA and mitigation measures will be discussed and established where appropriate.

11.4. Baseline Characterisation

11.4.1. Introduction

This section has been split into the following sub-sections to provide an overview of the baseline characterisation:

- Overview;
- English baseline characterisation; and
- Scottish baseline characterisation.

11.4.2. Overview

For the Project, AIS data has been used to determine the size and quantity of vessels which operate in the vicinity of the proposed submarine cable corridor. AIS provides information on the type of vessel (see Table 11-3 below). It should be noted that in England vessels under 12 m are not required to carry AIS equipment. In Scotland this requirement is for vessels under 15 m, therefore there will be a gap in data for these smaller vessels.

The number of AIS vessel data points within the dataset totals 966. Table 11-3 displays the distribution of vessels of each vessel type, categorised by vessel type; the output of all vessels is illustrated in Figure 11-2 and Figure 11-4.

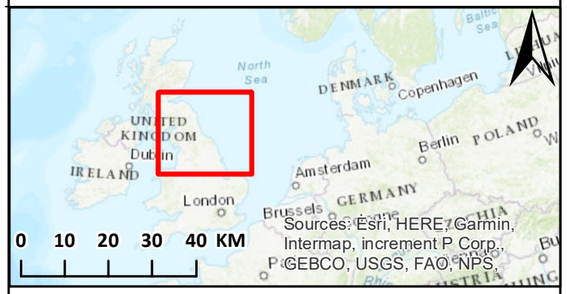
Table 11-3: Number of AIS data points by each vessel type

Vessel Type	English % of Total AIS Data	Scottish % of Total AIS Data
Cargo	50.286%	7.895%
Dredging or Underwater Operations	1.286%	1.880%
Fishing	5.571%	11.278%
High-Speed Craft	1.429%	1.880%
Military And Law Enforcement	0.571%	4.511%
Other	5.143%	10.150%
Passenger	0.286%	12.406%
Pleasure Craft	1.857%	9.774%
Sailing	5.000%	20.677%
Service	1.286%	6.015%
Tanker	24.429%	8.271%
Tug or Towing	1.857%	3.383%
Unknown	1.000%	1.880%
Total Number of AIS Data Points	*700*	*266*

Values have been rounded to 3 decimal places

AIS Vessel Density

C01494-EGL4-SHIP-001



- 12 NM Limit
- Exclusive Ecomonic Zone (EEZ) Limit
- EGL4 Study Area
- EGL4 Scoping Boundary

Vessel Density (Hours per Year)

- < 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 150
- 150 - 200
- 200 - 500
- > 500

0 10 20 30 NM

0 10 20 30 40 KM

Date	27 November 2023
Coordinate System	ETRS 1989 UTM Zone 30N
Projection	Transverse Mercator
Unit	Meters
Scale at A3	1:1,400,000
Created	Joseph Frean
Reviewed	Alice Gymer
Authorised	Andrew Page

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Document Path: J:\P2675\Mxd_QGZ\01_AIS\ P2675-AIS-002.mxd

Export Date: 27 November 2023

11.4.3. English Baseline Characterisation KP 0 – KP 418.7

The key navigational features found in this area are:

- Humber Vessel Traffic Services
- Associated British Ports (ABP) Humber
- Sand Hole deep water anchorage
- OWFs (Triton Knoll, Lincs, Inner Dowsing, Humber Gateway)
- Donna Nook Military Area
- Military Practice Area - Areas of Intense Aerial Activity, Staxton, Druridge Bay

There are three main shipping lanes or areas within the identified by AIS data as shown in Figure 11-1 (C01494-EGL4-SHIP-001:). Most vessel traffic exists around the English Landfall area between KP 0 to H_KP 23 and KP 39 on the base route, numerous shipping lanes leave the Port of Hull harbour (Humber Estuary). To a lesser extent between H_KP 39 and KP 108 to KP 162 on the base route, there are shipping lanes out of Bridlington, Scarborough and Whitby, which mostly comprise of fishing vessels. Between KP 239 and KP 250, a minor shipping lane is visible leaving Middlesbrough orientated in a North East – South West direction; the Scoping Boundary crosses perpendicular to this lane.

High vessel activity (over 500 vessel hours per year in certain locations) is found in English waters within and in close vicinity to the Humber estuary. High numbers of vessels travelling to/from the Associated British Ports (ABP) Humber ports transect the Scoping Boundary offshore of Lincolnshire in multiple locations at KP 12, T_KP 10-11 and KP 43-50 to the West of the Project. Another shipping channel heading northwest transects the Scoping Boundary at KP 65-68 and H_KP 9 -13.

Vessels to the north of East Anglia can be shown to skirt around the existing offshore wind farm (OWF) developments (e.g., Triton Knoll, Hornsea Projects, Race Bank) and those under development (e.g., Outer Dowsing), seen in Figure 11-3 (C01494-EGL4-SHIP-002).

There is a deep-water anchorage at Sand Hole approximately 8-10 km to the West of KP 39-50, partly inside the Study Area. This anchorage is 2.5 km to the East of the Humber Gateway OWF, which is fully commissioned.

As shown in Figure 11-2, cargo vessels comprise the highest proportion of vessel types identified within the English Study Area, with 352 cargo vessels (50.3% of the total vessels). Cargo vessels are seen within the AIS dataset traversing over the Scoping Boundary in the shipping lanes between the Humber Estuary, East Anglia and the North, with the greatest intensity of cargo vessels between KP 39-50. Tankers (24.4% of the total vessels) follow a similar pattern to the cargo vessels.

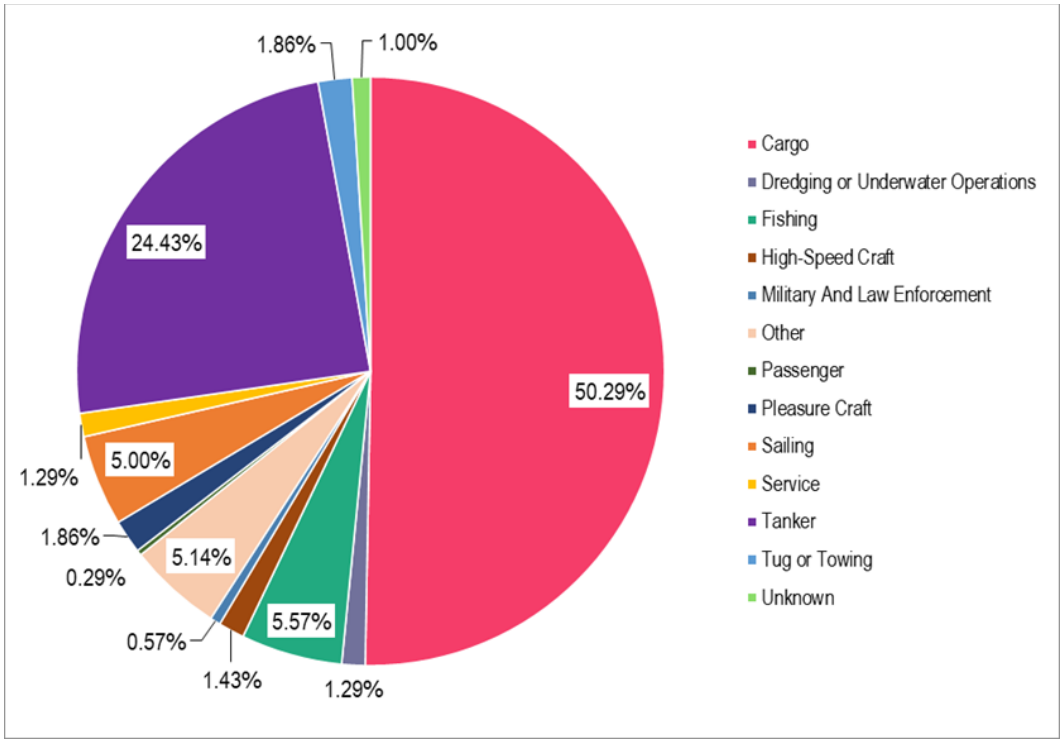


Figure 11-2: Pie chart showing distribution of different vessel types in English waters

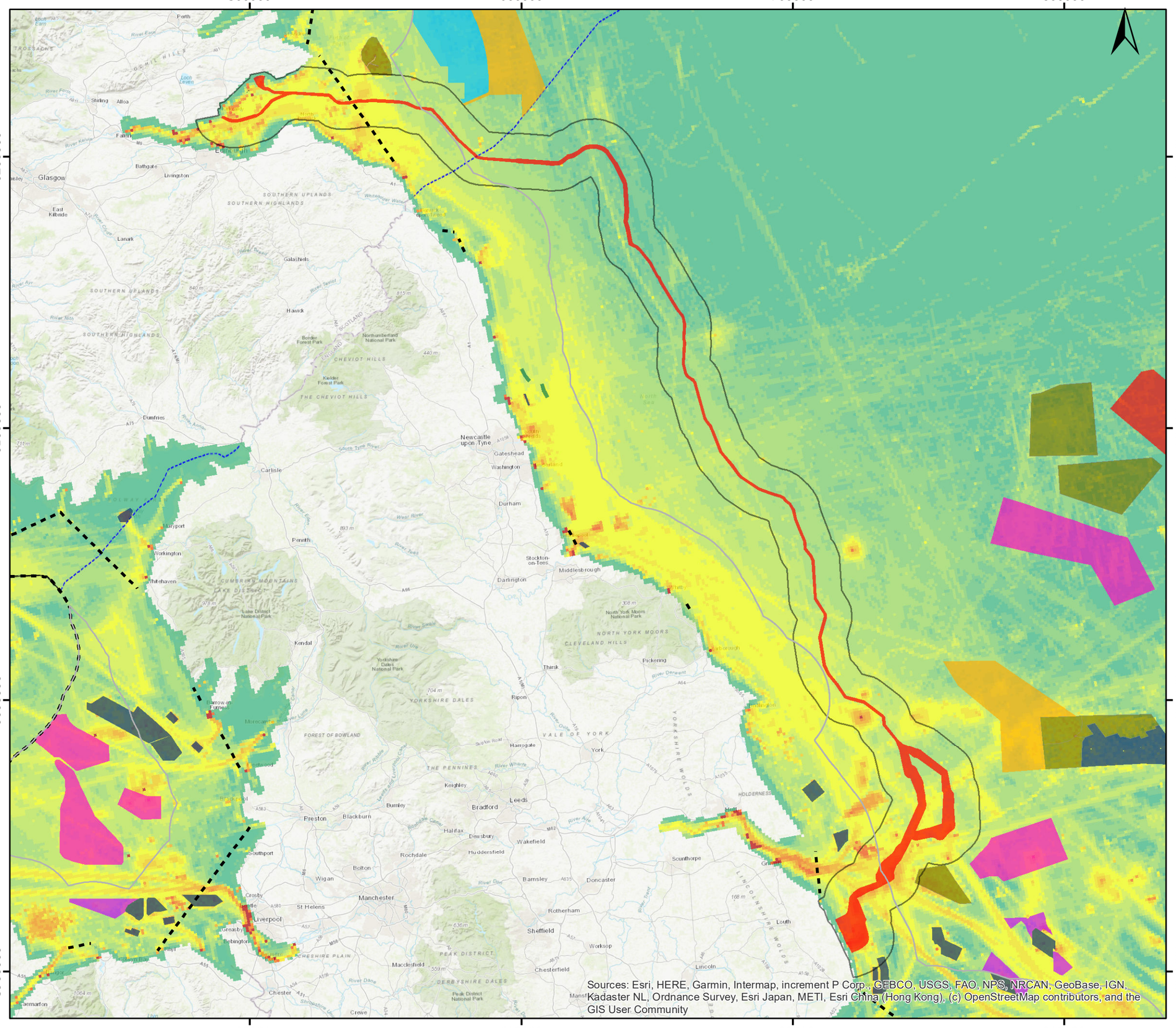
11.4.4. Scottish Baseline Characterisation KP 418.7 to KP 524.9

The key navigational features found in this area are:

- Forth Ports (Burntisland, Kirkcaldy, Methil, Grangemouth, Leith, Rosyth); the Project enters the Eastern Forth Port authority limit at KP 486.8, extending 38 km from the limit to the landfall on the base route
- Three small vessel anchorages and 17 deep water anchorages
- Marinas (North Berwick, Crail, Lower Largo, West Wemyss, Dysart, Pettycur Pier, Fisherrow)
- OWFs (Marr Bank, Berwick Bank, Neart Na Gaoithe Offshore Wind)
- Military Practice Area (Areas of Intense Aerial Activity, Firth of Forth Banks Complex, Forth Middle, Forth Deep, Aberlady)
- Cross Forth Ferry between North Berwick and Anstruther; Bass Rock and the Isle of May sightseeing boat trips

As displayed in Figure 11-3 (C01494-EGL4-SHIP-002), from KP 418.7 to the proposed Scottish Landfalls, there is an increase in vessel density towards the entrance of the Firth of Forth. The number of vessel hours rise to a maximum of 19,098 vessel hours per year at Burntisland port, and 15,384 vessel hours per year at Granton port.

There are a number OWFs present to the North of the Scottish Study Area above KP 419 – 467, with the Neart Na Gaoithe OWF (currently under construction) bordering the Study Area



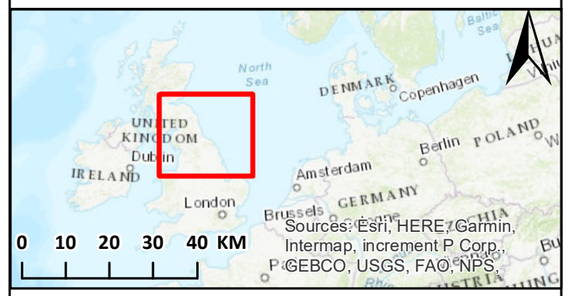
nationalgrid

intertek

SP Energy Networks

OWF Developments

C01494-EGL4-SHIP-002



- 12 NM Limit
- Exclusive Ecomonic Zone (EEZ) Limit
- EGL4 Study Area
- EGL4 Scoping Boundary

Offshore Windfarm Status

- Active/In Operation
- Consented
- Earlier Stages of Development
- Government Support on Offer
- In Planning
- Inactive/Decommissioned
- Pre Planning
- Preferred Project – Subject to HRA
- Under Construction

EMODnet Vessel Density (hours per km²)

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

0 10 20 30 NM

0 10 20 30 40 KM

Date	27 November 2023
Coordinate System	ETRS 1989 UTM Zone 30N
Projection	Transverse Mercator
Unit	Meters
Scale at A3	1:1,400,000
Created	Alice Gymer
Reviewed	Oliver Bula
Authorised	Andrew Page

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Export Date: 27 November 2023

Figure 11-4 illustrates the mixed distribution of different vessel types within Scottish waters, with sailing vessels making up the majority of the AIS dataset (55 vessels, 20.7% of the total), these are concentrated around the south of the Firth of Forth near Granton. There is a high proportion of sailing vessels in this area, in addition to a concentration of passenger vessels collected around the Newhaven and Granton ports.

Vessels follow the estuary inland towards the Queensferry and Grangemouth ports, which is where a fair number of tanker (8.3% overall) and tug or towing (3.4% overall) vessels can be found.

Within Kirkcaldy Bay, there are three small vessel anchorages, and 17 circular deep-water anchorages distributed around the Ministry of Defence Exercise Area X5611. Several of the circular anchorages are used to anchor offshore oil rigs using a fixed anchor pattern. Furthermore, consultation with Forth Ports identified that anchor points can extend outside of the anchorages.

The Project runs parallel to the Military Area/Foul Ground within the Firth - this area off Kinghorn has also been identified via stakeholder consultation as being used for the vessel turning.

The Cross Forth ferry is a direct service between North Berwick and Anstruther across mouth of the River Forth, which operates seasonally during the summer typically between May and October. There are additionally two sightseeing boat tours for the seabirds on the Isle of May and Bass Island nearby Anstruther and North Berwick respectively.

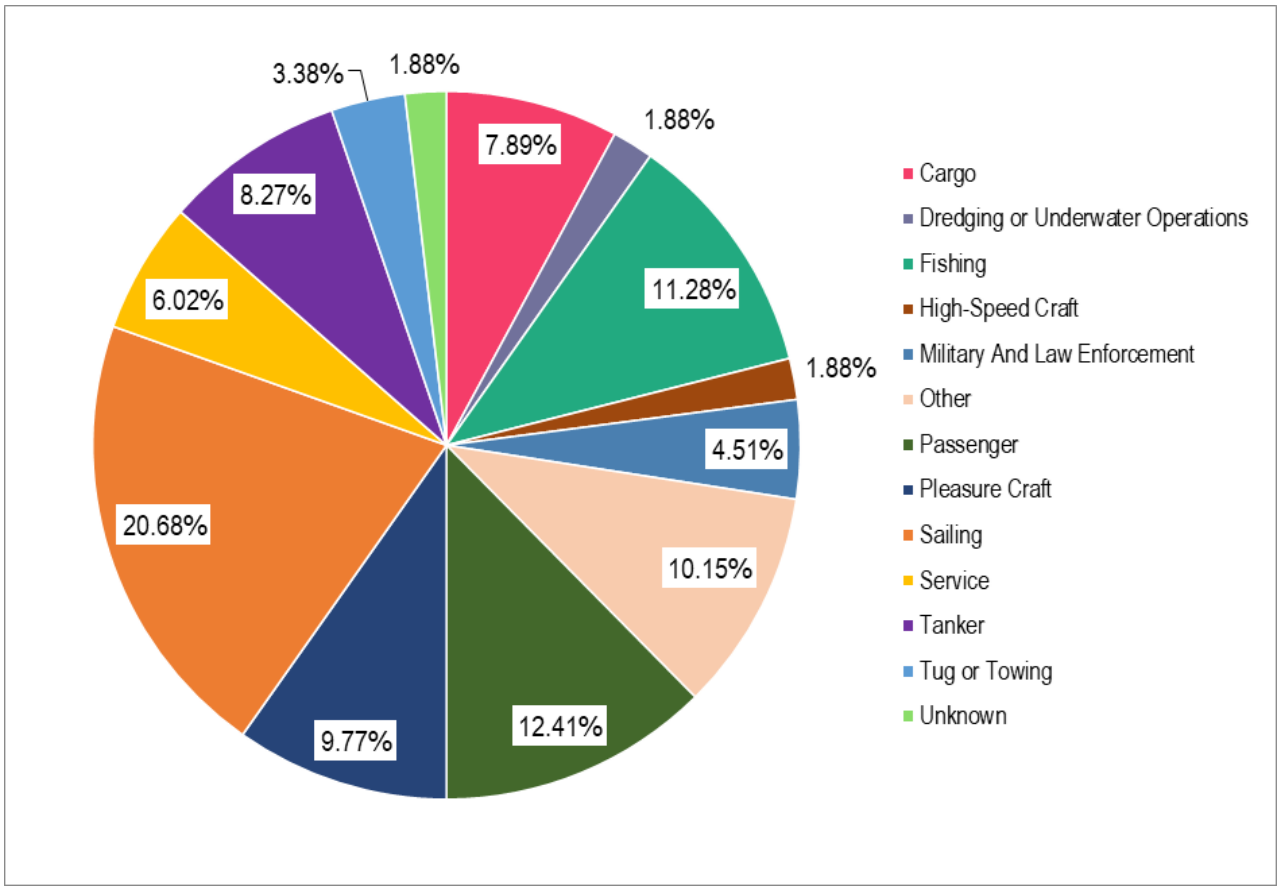

Figure 11-4: Pie chart showing distribution of different vessel types in Scottish waters

11.5. Proposed Assessment Methodology

11.5.1. Methodology Overview

The assessment process involves the following main steps presented in Figure 11-5. The NRA will be undertaken based on IMO standards (IMO, 2018) and using Marine Guidance Notes (MGNs; MGN, 2021). In carrying out these assessments, as far as reasonably possible, all three phases of the Project's life will be addressed, i.e., construction, operation and maintenance, and decommissioning. The methodology for accomplishing each step is described below.

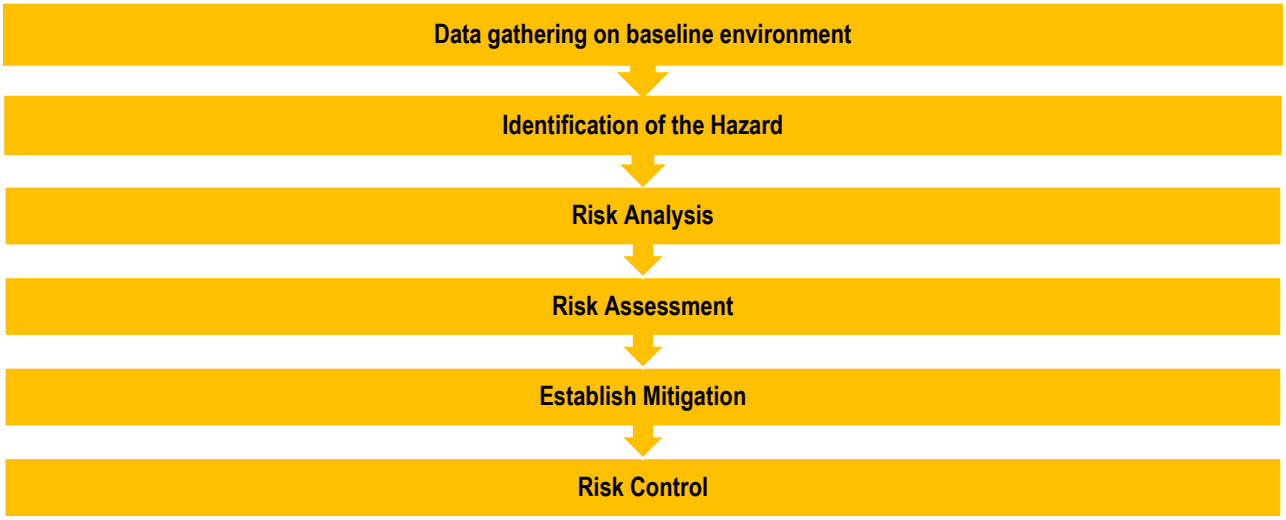

Figure 11-5: Assessment steps

The definition of "hazard" and "risk" for the NRA:

- **Hazard** - A potential source of marine incidences and collisions to the existing baseline of other marine users; and
- **Risk** - The probability of suffering harm, loss or displacement and is a measure of the probability (frequency) and consequence of a hazard.

Below, Table 11-4 illustrates a high-level summary of each step of the NRA. Further information on the steps is detailed below in Sections 11.5.2. to 11.5.7.

Table 11-4: Overview of NRA methodology

Data Requirement	Method	Data Sources
Baseline Assessment	Establish current shipping conditions and features that exist within the study area. A specialist study to provide data on maritime activity, shipping intensity and density in the study area and a risk assessment of potential shipping hazards such as collision risk and anchoring risks. A 5 NM buffer will be applied around the proposed Marine Licence Application Boundary to ensure that all shipping patterns and navigational features are captured.	EMODnet vessel density maps of European waters AIS datasets (01/03/2022 – 28/02/2023) Admiralty charts Royal Yachting Association (RYA) UK Coastal Atlas of Recreational Boating Marine Management Organisation (MMO) Fishing Data Marine Traffic Royal National Lifeboat Institution (RNLI) Incidents Data Marine Accident Investigation Branch (MAIB) annual reports Port Authority Information as required Sailing and Pilot books Inshore Fisheries and Conservation Authority (IFCA) - Eastern, North-Eastern and Northumberland, Scottish Creel Fisherman's Association. Project-specific reports and studies (e.g., AIS data fisheries study, EMF study)
Consultation	Proactive consultation with key ports authorities (e.g., Forth Ports, ABP Humber) and the Maritime and Coastguard Agency (MCA), alongside other maritime stakeholders (e.g., local sailing clubs, RYA, Trinity House, Northern Lighthouse Board, Chamber of Shipping).	Stakeholder consultation meetings

Data Requirement	Method	Data Sources
Hazard Identification	Identify known hazards expected to be encountered as a result of the offshore operations and presence of project vessels.	Data gathered from the baseline assessment Potential hazards raised by stakeholders during consultation
Risk Analysis	Determine the impact of hazards on navigational safety, displacement of vessels, and human safety in terms of frequency and consequence, developed using International Maritime Organisation (IMO) guidelines.	Hazard identification phase IMO Guidelines (IMO, 2018)
Risk Assessment	Risks are examined using a risk matrix, which illustrates the combination of the frequency and the consequence of the hazard to establish the potential impact	Frequency & consequences from the risk analysis phase
Mitigation	Mitigation measures for each hazard is established to (in preferential order): prevent/avoid, reduce, or offset the potential risk. Gaps in existing procedures and areas in which mitigation may need to be enhanced will also be considered. Care to be taken to ensure that any new hazards created as a result are themselves identified and managed.	International Regulations for Preventing Collisions at Sea (COLREGs) IMO Guidelines UK Standards European Subsea Cable Association Guidance
Risk Control	Reduce risks on the existing shipping baseline to As Low As Reasonably Practicable (ALARP) using mitigation measures. Additional analysis, consultation and enhanced mitigation measures are normally needed for risks that are assessed as Major after reducing risks to ALARP. Where further mitigation is not possible a residual hazard may remain.	Stakeholder consultation if required

11.5.2. Baseline Assessment

To assess the potential effects resulting from the Project it is necessary to establish the current shipping conditions and features that exist along and near the Project. A 5 NM buffer would be applied around the Project to ensure that all shipping patterns and navigational features are captured.

The analysis would include:

- Potential accidents resulting from navigation activities (MAIB & RLNI);
- Navigation activities affected by the Project;
- Project structures that could affect navigation activities;
- Project phases that could affect navigation activities;
- Other structures and features that could affect navigation activities;
- Vessel types involved in navigation activities;
- Conditions affecting navigation activities; and
- Human actions related to navigation activities for use in hazard identification (if possible).

11.5.3. Hazard Identification

The hazard identification phase seeks to build on the work of the data gathering and identify known hazards expected to be encountered as a result of the offshore operations and presence of project vessels.

This would include any effects which the Project might make on the lights and shapes to be carried by vessels (e.g., interference to the visibility of navigation lights), on navigation marks ashore and at sea, and to the light and sound signals made by vessels and navigational aids in particular circumstances.

The approach for hazard identification would comprise a combination of both qualitative and analytical techniques, the aim being to identify all relevant hazards. Where relevant, consultation would be undertaken with stakeholders to help to identify and discuss hazards. In addition, the exercise will be undertaken with Forth Ports where the cable route transects a port jurisdiction to coordinate the identification of hazards specific to the activities associated with the port.

11.5.4. Risk Analysis

The risk analysis introduces the concept of risk in a qualitative way in order to prioritise the hazards identified during the hazard identification process and assess their impact on navigational safety.

Risk is the combination of frequency and consequence which are defined in Table 11-5 and Table 11-6 below. The definitions below, developed using the IMO guidelines, would be used and examine effects on human safety and ships as well as displacement of existing vessels (as this is the most likely consequence of the Project).

Table 11-5: Frequency of a Hazard

Frequency Value	Description	Definition
1	Extremely Remote	Likely to occur once in the lifetime of the project (e.g. 25 years)
2	Remote	Likely to occur once per year
3	Probably	Likely to occur once per month
4	Very Probable	Likely to occur once per week
5	Frequent	Likely to occur once per day

Table 11-6: Consequence of a Hazard

Consequence Value	Description	Definition		
		Effects on Human Safety	Effect on Ship(s)	Displacement of Vessel(s)
1	Minor	Single or minor injuries	Single local equipment damage	Temporal displacement of vessel (hours)
2	Significant	Multiple minor injuries	Multiple local equipment damage	Temporal displacement of vessel (days)
3	Severe	Multiple or severe injuries	Non-severe ship and equipment damage	Temporal displacement of vessel (weeks)
4	Serious	Single fatality or multiple severe injuries	Severe damage to ship and equipment	Temporal displacement of vessel (months)
5	Catastrophic	Multiple fatalities	Total loss of ship and equipment	Permanent displacement of vessels

11.5.5. Risk Assessment

To undertake the risk assessment, a risk matrix approach would be utilised that has been adapted from the guidance, which examines the frequency and consequence of a hazard to determine the combined risk. The risk matrix contains risk ratings based on both the consequence and the frequency of the hazard. Risk ratings are calculated using Table 11-7, which can be interpreted using Table 11-8.

Where the frequency of a hazard has been assessed as extremely remote and the consequence assessed as minor, the risk can be said to be negligible. On the other end of the scale, where hazards are assessed as frequent and the consequence catastrophic, then risk is intolerable.

Table 11-7: Risk rating matrix based on the consequence and frequency of the risk

		Consequence				
		Minor	Significant	Severe	Serious	Catastrophic
Frequency	Extremely Remote	1	2	3	4	5
	Remote	2	4	6	8	10
	Probable	3	6	9	12	15
	Very Probable	4	8	12	16	20
	Frequent	5	10	15	20	25

Table 11-8: Definition of risk levels

Score	Classification	Definition
1-2	Negligible	A hazard which causes noticeable changes in the navigation environment but without effecting its sensitivities. Generally considered as insignificant.
3-4	Minor	A hazard that alters the character of the navigation environment in a manner that is consistent with existing baseline. Hazards are generally considered as minor and adequately controlled by best practice and legal controls. Opportunities to reduce hazards further through mitigation may be limited and are unlikely to be cost effective.
5-9	Moderate	A hazard which, by its frequency and consequence alters the aspect of the navigation environment. Generally considered as Moderate but effects are those, considered to be tolerable. However, it is expected that the hazard has been subject to feasible and cost-effective mitigation and has been reduced to As Low As Reasonably Practicable (ALARP) and that no further measures are feasible.
10-14	Major	An effect which, by its frequency and consequence alters most of the aspects of the navigation environment. Generally regarded as unacceptable prior to any mitigation measures being considered.
15-25	Intolerable	Regarded as unacceptable prior to any mitigation measures being considered.

After determining the risk ratings for each hazard before and after mitigation measures, the resultant risk matrix is split into two halves. The first describes the frequency and consequences before mitigation (inherent risk); the second half describes the frequency and consequences after mitigation measures have been applied (residual risk).

11.5.6. Mitigation

The risk assessment reviews existing hazards and their associated mitigation measures, including compliance with best practices, regulations and guidance. This review will identify if new mitigation measures or changes to existing mitigation measures are required e.g., where there are gaps in existing procedures and where mitigation needs to be enhanced.

Care will be taken to ensure that any new hazards created as a result are themselves identified and managed. The overall risk to the existing baseline during this stage will allow recommendations to be made to enhance safety.

A standard hierarchical approach to identifying mitigation requirements will be used to inform the NRA as follows:

- Avoid / Prevent: In the first instance, mitigation will seek to avoid or prevent the adverse effect at source for example, by recommending how the Project could be routed away from a hazard;
- Reduce: If the effect is unavoidable, mitigation measures will be recommended which seek to reduce the significance of the hazard; and
- Offset: If the hazard can neither be avoided nor reduced, mitigation will be recommended to offset the hazard through the implementation of compensatory mitigation.

All mitigation recommended will be appropriate, feasible and cost-effective, will have been agreed and confirmed with stakeholders and all relevant parties.

Mitigation measures fall into two categories: mitigation which forms part of the Project design, taking industry standard practice and design methodology into account which reduce risk, which are referred to as Embedded Mitigation; and mitigation which have been proposed as part of the design and construction processes of the Project to mitigate project-specific hazards that have been identified, which is referred to as Project Specific Mitigation.

The result of using this matrix approach is to ensure that the level of risk is reduced to As Low As Reasonably Practicable (ALARP) for the effects that the Project has on the baseline shipping environment. Risk ratings are undertaken prior to any mitigation and details the inherent risk. Embedded and Project Specific Mitigation will then be applied to generally reduce the risks to ALARP to determine residual risk ratings post-mitigation.

11.5.7. Risk Control

The aim of assessing the Project operations on the existing shipping baseline is to reduce risk to ALARP.

The risk assessment is repeated taking into consideration the application of both Embedded Mitigation and Project Specific Mitigation, determining the risk level of the hazard with mitigation applied. When the risk assessment is undertaken after mitigation is applied, the resulting risk level is referred to as ALARP.

Risks that have been assessed as Major or above after considering mitigation will normally require additional analysis and consultation to discuss and possibly further mitigate hazards where possible. Where further mitigation is not possible a residual hazard may remain and will be clearly noted in the NRA.

11.6. Scope of Assessment

A range of potential impacts on shipping and navigational features have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Project. Table 11-9 describes the potential impacts identified and provides justification as to whether they will be scoped in or out of the NRA and MEA. A precautionary approach has been taken and where there is no strong evidence base, or the risk is uncertain at this stage the impact has been scoped ‘in’ to the NRA/MEA. Where there is a clear evidence base that the risk from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped ‘out’ of the NRA as part of the MEA.

Table 11-9: Scoping assessment of impacts on Shipping and Navigation

Potential Impacts	Possible Hazards	Project Activities	Sensitive Receptors	Scoping Justification		
				Construction	Operation (including repair and maintenance)	Decommissioning
Impact on Human Safety	Vessel collisions	Mobilising project vessels	Vessel crew	**IN** - An increased collision risk is associated with the construction phase for all passing traffic due to the presence of the vessels associated with the cable installation. The nature of cable installation and other construction activities requires large, slow-moving vessels which will be restricted in their ability to manoeuvre. The collision risk is likely to be greater in higher density shipping areas, in particular within shipping channels.	**IN** - A collision risk is associated with the operational phase for vessels involved in maintenance works. However, this is expected to be a lesser risk than for construction vessels as maintenance works are likely to be of a shorter duration.	**IN** - The significance of the risk during decommissioning is similar or of lower magnitude than construction.
Impact on Human Safety	Reduced visibility	Mobilising project vessels in extreme weather conditions	Vessel crew	**IN** – Reduced visibility may occur due to extreme weather conditions, which can be unpredictable in the North Sea. During the cable lay process, this could mean cutting and buoying the cable in a situation that is too dangerous to continue working.	**IN** – Reduced visibility may occur due to extreme weather conditions, which can be unpredictable in the North Sea. However, this risk is anticipated to be lower than for construction vessels due to shorter operation duration.	**IN** – Reduced visibility may occur due to extreme weather conditions, which can be unpredictable in the North Sea. However, this risk is anticipated to be lower than for construction vessels.
Impact on Navigational Safety & Features	Anchor strike/drag	Surface laying cable	Subsea cables	**IN** – The risk of accidental anchor strike or drag over surface-laid cable is low in the construction phase due to notices and presence of project vessels. There is a small risk of emergency anchoring of project vessels.	**IN** – The risk of accidental anchor strike or drag over surface-laid/exposed cable is highest in the operational phase, as cable exposures may have occurred due to mobile sediment/scour.	**IN** – There is a very low risk of accidental anchor strike over surface-laid/exposed cable during decommissioning only associated with emergency anchoring of project vessels.
Impact on Navigational Safety & Features	Fishing gear snagging & Anchor strike/drag	Cable crossing	Third-party assets	**IN** – The risk of fishing gear snagging or accidental anchor strike or drag on third-party assets is low in the construction phase due to notices and presence of project vessels. There is a small risk of emergency anchoring of project vessels. The risk is additionally low since the Project will enter into crossing agreements and/or proximity agreements with third-party asset owners. Installation crossing designs will be in accordance with these agreements and will ensure both appropriate separation and protection.	**IN** – There is a minor increase in risk for anchor strike and fishing gear snagging on third-party assets during the operational phase, as cable exposures may have occurred due to mobile sediment/scour.	**IN –** The risk of fishing gear snagging or anchor strike/drag on third-party assets is very low, as decommissioning will be carried out in accordance with the third-party asset agreements to mitigate risks.

Potential Impacts	Possible Hazards	Project Activities	Sensitive Receptors	Scoping Justification		
				Construction	Operation (including repair and maintenance)	Decommissioning
Impact on Human Activities	Fishing gear snagging	Post-installation	Fishing vessels & Fisheries	**IN** – The risk of fishing gear snagging is extremely low in the construction phase due to notices and presence of project vessels.	**IN** – The risk of fishing gear snagging is highest in the operational phase once fishing vessels resume activities in the area.	**IN** – The risk of fishing gear snagging is extremely low in the decommissioning phase.
Displacement of Vessels	Project vessels blocking navigational features	Mobilising project vessels	Vessels travelling to/from anchorages and port approaches	**IN** – There is a high risk of project vessels blocking navigational features during construction, such as anchorages or approaches to ports, causing some displacement of other marine users.	**IN** – There is a small risk of project vessels blocking navigational features during operation, such as anchorages or approaches to ports, causing some minor displacement of other marine users at a small-scale.	**IN** – There is a small risk of project vessels blocking navigational features during decommissioning, such as anchorages or approaches to ports, causing some minor displacement of other marine users at a small-scale.
Displacement of Vessels	Disturbance to existing shipping patterns	Mobilising project vessels	Vessels	**IN** – The risk of disturbing existing shipping patterns during construction is highest, as vessels may have to re-route around or reduce speed on approach to the project vessels which may lead to a temporary disturbance.	**IN** – The risk of disturbing existing shipping patterns during the operational phase is low, as there a few vessels required to undertake repairs and maintenance which results in a minor temporary disturbance to existing shipping patterns.	**IN** – The risk of disturbing existing shipping patterns during the decommissioning phase is low, as there a few vessels required which results in a minor temporary disturbance to existing shipping patterns.
Impact on Human Activities	Reduction in under-keel clearance	Post-installation	Vessels	**IN** - There is a low risk of reduction in under-keel clearance during construction only associated with project vessels.	**IN** – The risk of reduction in under-keel clearance is highest during the operational phase due to the presence of cable protection measures that reduce the navigable water depth for vessels.	**IN** - There is a low risk of reduction in under-keel clearance during decommissioning only associated with project vessels.
Impact on Human Activities	Interference with marine navigation equipment	Post-installation	Vessels	**OUT -** There is no risk of electromagnetic forces from the cable causing magnetic compass deviations in the construction phase.	**IN –** The risk of electromagnetic forces from the cable causing deviations in magnetic compasses is highest in the operational phase once the cable is in place and other marine users can traverse the marine corridor, disrupting navigation	**OUT -** There is no risk of electromagnetic forces from the cable causing magnetic compass deviations in the decommissioning phase.

11.7. References

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MGN (2021). MGN 654 (M+F) Offshore Renewable Energy Installations (OREI) safety response. Published on 28/04/2021. Available at: https://www.gov.uk/government/publications/mgn-654-mf-offshore-renewable-energy-installations-orei-safety-response

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12. Commercial Fisheries

12.1. Study Area Definition

This chapter of the Scoping Report describes the potential impacts arising from the construction, operation and maintenance (O&M), and decommissioning of the Eastern Green Link 4 (EGL 4) hereafter referred to as 'the Project' on commercial fisheries. Commercial fisheries receptors include pelagic (species that live within the water column), demersal (species live and feed on or near the bottom of seas or lakes), and shellfish (crustaceans and molluscs.)

The Scoping Boundary for the Project extends from MHWS in England to the MHWS in Scotland. It is nominally 1 km wide, 500 m either side of the centreline, but however, it widens in areas where there is still optionality in the design e.g., to allow for micro-routeing around potential seabed features. It is anticipated that the Marine Licence application boundary will ultimately be 500 m following refinement and rationalisation as the MEA and design process evolves.

There are two proposed Landfalls in England (Anderby Creek and Theddlethorpe) and two proposed Landfalls in Scotland (one in Kinghorn and one in Lower Largo/Lundin Links) being considered at this stage of the environmental assessment process. These options will be subject to further technical feasibility work and stakeholder consultation and will be refined to one preferred option for inclusion in the subsequent Marine Licence application for the Project.

The Study Area for this receptor includes the Scoping Boundary plus an additional 15 km buffer either side. This is a precautionary maximum zone of influence that encompasses the potential impact pathways from underwater noise and increased suspended sediment concentrations. It will be reviewed and refined for the Marine Environmental Assessment (MEA) based on maximum tidal excursions and if appropriate sediment dispersion modelling. The zone of influence will be influenced by the conclusions of Chapter 6 – Marine Physical Processes, and this chapter should be read in conjunction with these findings.

Kilometre Points (KPs) are used throughout this Chapter to provide context as to where within the Study Area a feature lies. KP 0 is defined at the Anderby Creek Landfall. As there are still alternative Landfalls being considered, KPs have been created along the longest route from the proposed English Landfall at Anderby Creek, around the Holderness Offshore Marine Conservation Zone (MCZ) to the proposed Scottish Landfall at Kinghorn. The KPs for this route are referenced as KP 0 to KP 524.9. Alternative options, which branch off this longest route, are route from the proposed English Landfall at Theddlethorpe to the point where it converges with the longest route (referenced as T_KP 0 to T_KP 18); and through Holderness Offshore MCZ, which is referenced as KP 0 to H_KP 40 and from the longest route where it branches off to the two proposed Scottish Landfalls in Lower Largo/Lundin Links, which is referenced as L_KP 0 to L_KP 16.

12.2. Data Sources

Data sourced for the baseline characterisation will be presented in accordance with relevant guidance for the topic. The datasets that will be used to inform the description of the baseline environment for the MEA are described in the following sub-sections.

12.2.1. Site-specific Survey Data

Extensive information is available to characterise the commercial fisheries of the North Sea. Following a detailed review to inform the scope of the data and assessment, as presented, no site-specific surveys are planned for this topic.

12.2.2. Publicly Available Data

Desk based review of publicly available data sources (literature and GIS mapping files) will be used to describe the baseline environment. Table 12-1 lists the key data sources which will be used in the assessment.

Table 12-1: Key publicly available data sources for commercial fisheries

Data Source	Description	Coverage	
		English Study Area	Scottish Study Area
Inshore Fisheries and Conservation Authority (IFCA)	Website with information about fishing and the species in the different regional IFCAs	✓	
Environment Agency	Transitional and Coastal Waters (TraC) Fish Monitoring Programme	✓	✓

Data Source	Description	Coverage	
		English Study Area	Scottish Study Area
Department of Energy & Climate Change (DECC) (2022)	Offshore Energy Strategic Environmental Assessment 4	✓	✓
Marine Management Organisation (MMO 2023)	UK Sea Fisheries annual statistics report 2022 and accompanying datasets which includes species catch list for the relevant ICES rectangles. https://assets.publishing.service.gov.uk/media/6512f96df6746b0012a4ba77/UK_Sea_Fisheries_Statistics_2022_.pdf Landings statistics for the period 2018- 2022 Aerial surveillance data for the period 2018- 2022	✓	✓
Vessel Monitoring System (VMS) data	VMS data for the period 2018 - 2022	✓	✓
EMODnet	Interactive reference website which shows fish abundance and distribution. http://www.emodnet.eu/biology	✓	✓
FishBase	Species reference website www.fishbase.org	✓	✓
Nature Scot	An executive non-departmental public body of the Scottish government responsible for the country's natural heritage. https://www.nature.scot/		✓
Marine Directorate	Scottish Government's Marine Directorate is responsible for managing Scotland's seas and freshwater fisheries https://marine.gov.scot/		✓
Scottish Fishermen's Federation	Organisation representing Scottish fishermen https://www.sff.co.uk/		✓
Regional Inshore Fisheries Groups (RIFGs)	Scottish commercial fishers forum to explore local fisheries management initiatives. https://rifg.scot/		✓
JNCC	Species specific data, of native species of conservation interest UK BAP List of UK Priority Species | JNCC Resource Hub	✓	✓
Brown & May Marine Ltd (2023)	Eastern Green Link Three and Four Transmission Reinforcement Cable Projects: Fishing Activity Report	✓	✓
IUCN	The International Convention for the Conservation of Nature (IUCN) Red List of Threatened Species (https://www.iucnredlist.org/)	✓	✓

12.2.3. Additional Studies

12.2.3.1. Commercial Fishing Activity

A study to assess commercial fishing activity was undertaken by Brown and May Marine Ltd in March 2023 to understand the spatial and temporal distribution of fishing activity within the Study Area. Alongside this, and to inform the MEA, interviews with local and regional fisheries stakeholders will be conducted to obtain additional information on fishery statistics such as fishing vessels operating in the area, types and sizes of vessels, fishing gear(s) used, fishing effort, target species, seasonality in effort or species abundance, and location of key grounds. The interviews will be supplemented by a desk-based review of catch and effort statistics. Automatic Identification System (AIS) data from UK and European fishing vessels over 15 m in length and Vessel Monitoring System (VMS) data from UK registered commercial fishing vessels over 12 m in length will also be obtained and interrogated to assess the distribution of fishing effort. Aerial surveillance data gathered by the MMO will also be used to augment a qualitative assessment of the smaller fishing boats operating in the area. Information will also be sought from the relevant IFCA's including Eastern, North-Eastern and Northumberland.

12.2.3.2. Fisheries Liaison and Mitigation Action Plan (FLMAP)

A Fisheries Liaison and Mitigation Action Plan will be written which will outline how the Applicants will interact with all the legitimate sea users prior and during any works on the Project. This will be written by Brown & May Marine Ltd who are the Fisheries Liaison Officer (FLO) for the Project.

12.2.3.3. Other Relevant Studies

To inform the MEA an electromagnetic field (EMF) study and a Sandeel & Atlantic Herring Habitat Assessment will be carried out to inform the fish and shellfish assessment. Although not directly applicable to commercial fisheries these studies inform the assessment of the significance of impacts on fish and shellfish and therefore the implications for commercial fisheries targeting those resources. They are described in full in Chapter 8.

12.3. Consultation

Consultation will be undertaken with fisheries stakeholders to supplement the desk-top review and studies. The following bodies will be consulted, as a minimum, to ensure that the most up-to-date information is collated:

Table 12-2: List of consultees

England	Scotland
MMO	MD-LOT
Centre for Environment, Fisheries and Aquaculture Science (Cefas)	NatureScot
Environment Agency	Scottish Environment Protection Agency (SEPA)
National Federation of Fishermen's Organisation (NFFO)	National Federation of Fishermen's Organisation (NFFO)
Inshore Fisheries and Conservation Authority (IFCA) Eastern, North-Eastern and Northumberland.	Scottish Fishermen's Federation (SFF)
North Shields Fishermen's Association	Fisheries Associations to be identified by FLO
Individual Fishers	Scottish Pelagic Fishermen's Association
Natural England	Scottish White Fish Producers Association
	Individual Fishers
	Centre for Environment, Fisheries and Aquaculture Science (Cefas)

12.4. Baseline Characterisation

12.4.1. Introduction

This section has been split into the following sub-sections to provide an overview of the commercial fisheries baseline in the Study Area:

- General fisheries information
- English baseline characterisation
- Scottish baseline characterisation

It describes the key commercial fisheries along the route of the Project; the local fishing fleet; any fishing restrictions; and provides landings data to contextualise the value of the fishing industry in the region for the purposes of reviewing the proposed scope of the assessment and data collection approach that will be adopted in the MEA.

The section has been informed by the latest publicly available catch statistics available from the MMO (MMO 2023), AIS and VMS data and consultation undertaken by CEA and the FLO for the Project with local fishing organisations and vessels. It should be noted that AIS, VMS and landings data derived from MMO catch statistics only provide a general overview of fishing effort, and do not accurately reflect the effort in the region i.e., not all vessels will carry AIS, and smaller vessels do not directly report landings data to the MMO. However, the Applicants consider that the combination of data and consultation undertaken to inform the MEA would provide

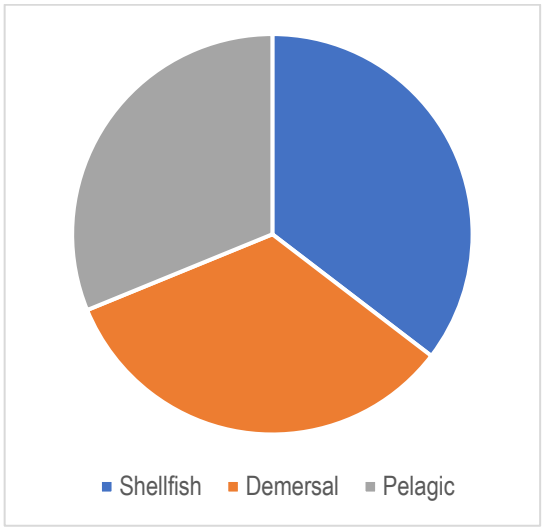
an appropriate characterisation of the receiving environment in which the Project will be constructed, which is adequate for the purposes of the MEA.

12.4.2. General Fisheries Information

The number of fishers working on UK registered vessels is approximately 10,000, a figure which has been decreasing over the last 10 years from approximately 12,000. The number of UK registered vessels has also decreased by 14% in the last 10 years with now only 5541 UK Register vessels. In 2022 UK vessels landed 640 thousand tonnes of sea fish with an overall value of £1.04 billion. This is a decrease of 2% on the quantity caught in 2021, but an increase of 13% in value due the high fish prices particularly shellfish and demersal species. Multiple factors have had an impact on fishing and landings which tend to fluctuate considerably over time. However, since 2020 the largest impact on sea fisheries has been the UK's departure from the EU. This has impacted the stocks the UK fleet had access to fish (MMO, 2023).

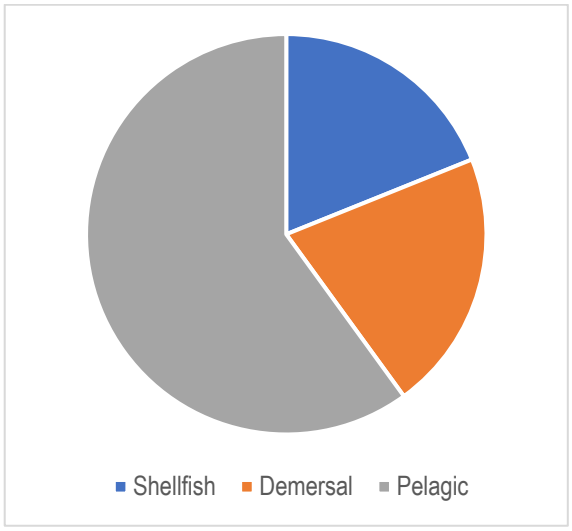
Figure 12-1 illustrates the overall 2022 landings value in £'s, which shows that they are approximately shared equally between the three types of species. Figure 12-2 illustrates the overall 2022 landing by weight in tonnes which shows that the pelagic species catch accounts for 60% but accounted for just under a third of the value. This is due to the lower price for pelagic species.

Figure 12-1: UK 2022 Landing by species type by value



Source MMO, 2023

Figure 12-2: UK 2022 Landing by species type in tonnes



Source MMO, 2023

In 2022, UK vessels landed 245 thousand tonnes of fish overseas, 50% of these were to Norway. This is 38% of the total quantity of fish landed by UK vessels and represents 24% of the value of all fish landed by UK vessels. Most landings abroad are of pelagic fish species accounting for 90% of landings, 52% of which was mackerel.

12.4.2.1. Overview of Fisheries along the Project

The Project crosses several different commercial fishing areas. To enable accurate monitoring of commercial fisheries the sea is divided into ICES Rectangles (ICES, 2022). The Project lies within 11 of these rectangles, namely 35F0, 36F0, 37F0, 38E9, 38F0, 39E9, 40E8, 40E9, 41E8, 41E7 and 41E6. Of these 11 rectangles seven are within English waters, three are in Scottish waters and one is in both English and Scottish waters. Analysis of the fishing data for these 11 rectangles has been used as an indication of the commercial fish species caught in these regions.

The North Sea is home to important fishing grounds used not only by the local English and Scottish fleet but also by international vessels from Belgium, the Netherlands, Denmark, France, Ireland, Spain and Germany. However, the majority of this occurs in ICES rectangles next to the Projects Scoping Boundary further offshore.

12.4.2.2. Shellfish

The Shellfish industry within the North Sea is very important and contributes to over 97% of the catch values in both the English and Scottish Study Areas. The majority of shellfish caught is by using static gear such as pots/creels and traps, which target species such as crabs (*Cancer pagurus* and *Necora puber*), lobsters (*Homarus gammarus*) and whelks (*Buccinum undatum*).

Other shellfish species such as nephrops also known as Norway Lobster (*Nephrops norvegicus*), squid (*Alloteuthis subulata*), and octopus (*Octopus vulgaris*) are caught using demersal trawl gear. It should be noted that fishers are required to have licenses to catch shellfish which is obtained from the MMO in England and the Marine Directorate in Scotland. Beam trawl gear is also used to target brown shrimp (*Crangon crangon*) and Aesop shrimp (*Pandalus montagui*); although primarily in ICES rectangle 35F0.

Razor clam (*Ensis ensis*) is a commercially targeted species by the Scottish fishers in ICES rectangle 41E7. The proposed submarine cable corridor passes through the Firth of Forth Approved Management area for Razor clam trials using an electrofishing technique to catch the razor clams (Marine Scot, 2021). The main landing point for them is Pittenweem.

Surf clam (*Spisula elliptica*) and King scallop (*Pecten maximus*) are other highly targeted species within the Study Area which are caught using dredge gear. It should be noted that the scallop fishery is cyclical in nature with the production grounds rotating around the UK on a seven-to-eight-year cycle. Due to the cyclical nature, other offshore wind farm and cable projects within the Study Area have been asked to gather and analyse data over an eight-year period to be able to monitor them more effectively. The main landing port for scallops in the English Study Area is Hartlepool and in Scotland it is Peterhead despite not being within the Scottish Study area.

Cockle fishing is an important and highly valuable part of the commercial fishing industry in the region with highly productive cockle grounds in The Wash, this is primarily in ICES rectangle 35F0 which is within the English Study Area. The main landing ports for cockles are at Boston and Kings Lynn. The Wash Cockle Fishery is regulated by the Eastern Inshore Fisheries and Conservation Authority (EIFCA) which has set times when cockle fishing is permitted, and strict total allowable catch (TAC) set for the year (EIFCA, 2019). Permits are required to fish cockles in this area. They can be caught using various methods including dredge, other mobile gears and pots and traps,

Table 12-3 illustrates shellfish catch seasonality within the Study Area.

Table 12-3: Shellfish catch seasonality

Feature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brown Shrimp												
Cockles												
Crabs												
Lobster												
Razor clam												
Scallops												
Squid												
Whelks												

Key: High Season; Low Season

Source: Direct Seafoods (2023)

Analysis of landings data (MMO, 2023) shows that the port of Bridlington, is the most important port for shellfish in the English Study Area and Pittenweem in the Scottish Study area. Landings peak during the period from July to October in Bridlington. Landings peak during the period from July and August and then again in December and March in Pittenweem.

12.4.2.1. Demersal Fish

A variety of demersal (bottom contact) trawl gear methods are used in the North Sea to target demersal whitefish species such as whiting (*Merlangius merlangus*), haddock (*Melanogrammus aeglefinus*), halibut (*H. hippoglossus*), sole (*Solea solea*), cod (*Gadus morhua*), and plaice (*Pleuronectes platessa*). They are fished not only by the UK fleet but also by international vessels from Belgium, the Netherlands, Denmark, France, Ireland, Spain and Germany.

Beam trawling is used in the North Sea by UK registered vessels for catching brown shrimp, however they are more commonly used by the Belgian vessels and occasionally by the Dutch vessels. Fly seine netting is a more recent alternative to the traditional heavy beam trawling due to the depleted fish stocks. Bottom drift nets are rarely used by the UK fleet nowadays with very limited catches using this gear type.

Analysis of landing data (MMO, 2023) shows that the port of North Shields is the most important port for demersal whitefish for the landed catch in the English Study Area and Peterhead in Scotland despite not being within the Scottish Study Area. Landings peak during the period from September to December in North Shields. Landings peak during the period from May to July and then again in October and November in Peterhead.

12.4.2.2. Pelagic Fish

The North Sea pelagic catch are shoaling fish species such as herring (*Clupea harengus),* mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*). They are caught using demersal seine and demersal trawl gears, but primarily handlines. Many of the large catches of herring are landed in Norway and the Netherlands rather than UK ports, however Peterhead is the most landed

port within Scotland despite note being with the Scottish Study Area. Landings at Peterhead peak during August and September and accounts for 92% of all pelagic catch over the year.

12.4.3. English Baseline Characterisation KP 0 – KP 418.7

The Scoping Boundary within English waters crosses seven ICES rectangles (35F0, 36F0, 37F0, 38E9, 38F0, 39E9, 40E9) and one which covers both the English and Scottish Study Areas (40E8). For the purpose of this scoping report 40E8, has been included within the data for the English baseline.

12.4.3.1. Key Fishery Types

Five key fishery types have been identified along the proposed submarine cable corridor. Table 12-4 shows the KP points where the types of gear are predominantly used along the proposed submarine cable corridor within the English Study Area.

Table 12-4: Key fisheries that spatially overlap with the English Scoping Boundary

Fishery	Gear Type	KP points - spatial overlap between the fishery and the Project
1	Static Gears	KP 0 – KP 6, KP 12 – KP 24, KP 25 – KP 224, KP 233 – KP 256, KP 259 – KP 271, KP 275 – KP 278, KP 283 – KP 313 T_KP 0 – T_KP 12, T_KP13 – T_KP 14 H_KP 0 – H_KP 39
2	Dredging	KP 21 – KP 24, KP 35 – KP 40, KP 50, KP 58 – KP 59, KP 62 – KP 69, KP 73 – KP 79, KP 84 – KP 90, KP 91 – KP 100, KP 108, KP 132 – KP 133, KP 136 – KP 165, KP 166 – KP 177, KP 183 – KP 188, KP 200 – KP 206, KP 320, KP 363 – KP 369, KP 370 – KP372, KP 379 – KP 399 T_KP 0 – T_KP 4, T_KP 6 – T_KP 12 H_KP 2 – H_KP 13, H_KP 20 - H_KP 24, H_KP 27 – H_KP 32, H_KP 34 – H_KP 38
3	Pelagic Trawl	KP 25 – KP 32, KP 35 – KP 40, KP 50, KP 91 – KP 99, KP 100 – KP 103, KP 108 – KP 259, KP 265, KP 275 – KP 278, KP 289 – KP 356, KP 363 – KP 369, KP 373 – KP 376, KP 393 – KP 396, T_KP 13 – T_KP 14 H_KP 34 – H_KP 39
4	Bottom Otter Trawl	KP 0 – KP 2, KP 66– KP 69, KP 73 – KP 79, KP 91 – KP 99, KP 108 – KP 265, KP 271 - KP 275, KP 300 – KP 314, KP 320 – KP 326, KP 369 – KP 376, KP 418 T_KP 0 – T_KP 4 H_KP 38 – H_KP 39
5	Beam Trawling	KP 0 – KP 18, KP 129 - KP 132, KP 133 – KP 148, KP 149 – KP 153, KP 166 – KP 171, KP 241 – KP 247 T_KP 0 – T_KP 6
T_KP refer to the submarine cable corridor option to the proposed landfall site at Theddlethorpe. H_KP refer to the submarine cable corridor option that crosses the Holderness Offshore MCZ		

12.4.3.2. English Commercial Fisheries

The UK fishing industry is worth over £1 billion from a catch of over 640,000 tonnes, it is therefore an important part of the economy and as such is regulated by the government. The MMO registers all UK vessels on a monthly basis. The fleet is split into two categories; under 10 m in length and over 10 m in length. UK registered fleet of vessels under 10 m in length comprises 3827 vessels as of August 2023 (MMO, 2023a). Of this, 2574 vessels are licensed to catch shellfish equating to 67% of vessels. Of the under 10 m vessels 1933 vessels are registered as English with the remainder registers as Welsh, Scottish or Northern Irish.

The UK registered fleet of vessels over 10 m in length comprises 1028 vessels as of August 2023 (MMO, 2023b). Of this, only 323 vessels are licensed to catch shellfish which is 31% of the over 10 m vessels. The other 69% vessels target demersal or pelagic species. Of the vessels over 10 m 437 are registered as English with the remainder registers as Welsh, Scottish or Northern Irish.

Table 12-5 shows the overall catch information for the UK in 2022 broken down by species type of percentage of overall catch, weight and catch value.

Table 12-5: Overall catch information for the UK in 2022

Species Type	Percentage	Catch weight in tonnes	Catch value in £
Demersal	21%	135,000	£350 million
Pelagic	60%	384,000	£332 million
Shellfish	19%	121,000	£377 million

The English fleet operates from ports all around England, with the three key ports being Newlyn with a catch value of over £38 million, Brixham £45 million, and Shoreham £18 million. Newlyn being the most important in terms of quantity; and Brixham most important in terms of value.

Figures 12-3 and 12-4 show the top 5 ports within the English Study Area with catch values for vessels under 10 m and over 10 m in length respectively.

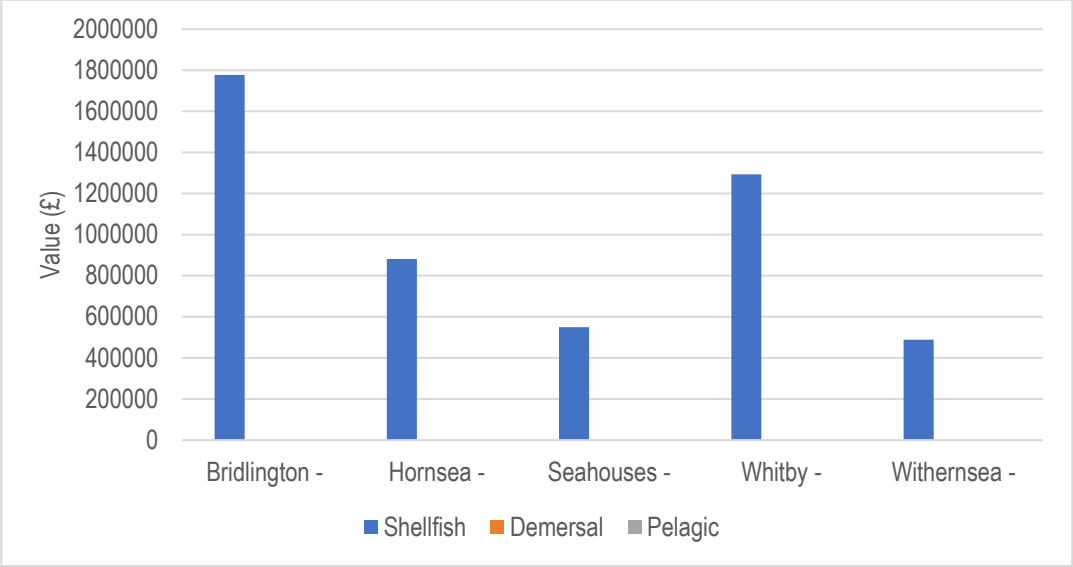


Figure 12-3: Top 5 Ports in the English Study Area for under 10 m vessel catches. Source: MMO 2023

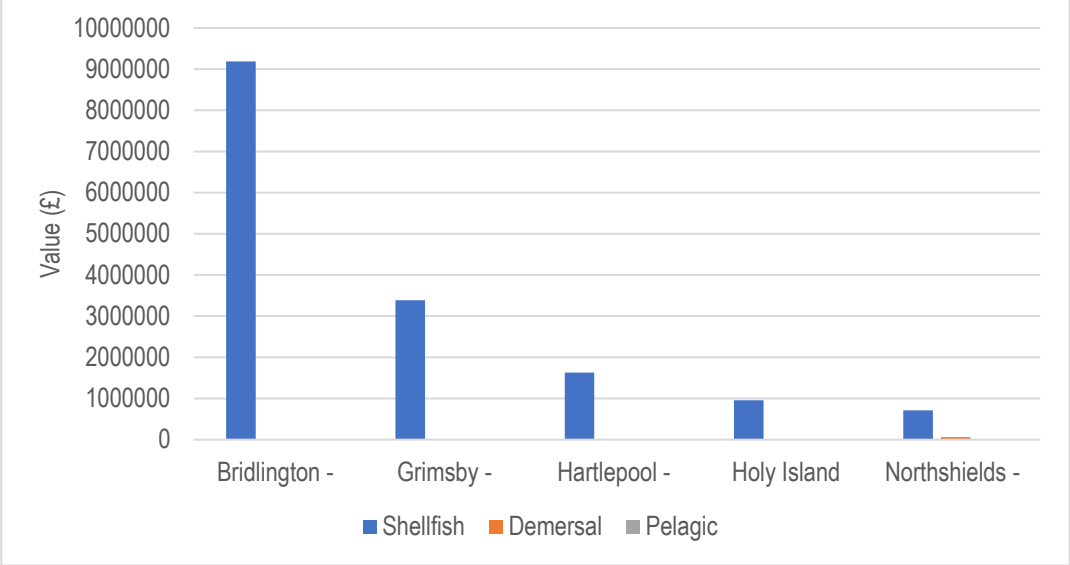


Figure 12-4: Top 5 ports in the English Study Area for over 10 m vessel catches Source: MMO 2023

12.4.3.3. Local Fishing Fleet England

UK vessels of less than 17 m in length and with less than 300hp (221kW) are permitted to fish inside the 6-mile fishery limit, with some fishing restrictions. Based on the MMO's UK Fishing Vessel Registry list from August 2023, it is estimated that there are total of 343

registered and licensed fishing vessels operating in the vicinity of the English Study Area. Of these vessels 252 were under 10 m in length and are not currently required to have VMS onboard.

224 of the under 10 m vessels hold licenses to fish shellfish which accounts for 88% of the fleet. 91 vessels are over 10 m in length 46 of these have shellfish licences, which is 50% of the fleet. Additionally, four vessels have licenses to dredge for Scallops. This correlates with the catch figures that Shellfish is the most caught species within the Study Area, see Figures 12-1 and Figure 12-2.

Consultation with the local fisheries associations has identified that there are approximately 20-25 vessels actively fishing along the English section of the proposed submarine cable corridor.

12.4.3.4. Overview of English Landings Data within the Study Area

A high-level review of landings data from 2018 to 2022 across the eight ICES rectangles relevant to the English Study Area, provided information on the economic importance of different commercial fish species.

Over the 5-year period (2018 to 2022) over 64,000 tonnes of fish were landed with a value of over £139 million (Table 12-6). Of this value, £31 million was landed by under 10 m vessels with the remaining £108 million landed by the over 10 m fleet. Approximately 96% of the total value of landings from all eight rectangles were represented by shellfish. This table shows that there is a lot of annual variability on the catch in terms weight and value, this is reflected in the average value per tonne whereby up until 2022 the price had been steadily decreasing. However, the UK Sea Fisheries Statistics 2022, written by the MMO, note that there has been an overall increase of 13% in the average value per tonne in 2022 due to higher fish prices.

Table 12-6: Annual catch value from 2018 to 2022 for ICES Rectangles within English Study Area

Year	Live Weight (Tonnes) 10m or under	Live Weight (Tonnes) over 10m	Value (£) Under 10m	Value (£) Over 10m	Average Value per tonne (£/tonne)
2018	2669	6917	£6,795,002.00	£20,028,346.00	£2,798
2019	2595	7942	£6,834,097.00	£20,324,100.00	£2,577
2020	2396	8147	£5,234,772.00	£15,819,393.00	£1,996
2021	2092	23836	£7,644,333.00	£32,408,146.00	£1,544
2022	1268	6663	£4,789,021.00	£19,678,759.00	£3,085
Total for 5 yr period	**11020**	**53505**	**£31,297,225.00**	**£108,258,744.00**	
Average	**2204**	**10701**	**£6,259,445.00**	**£21,651,748.00**	**£2,400**

Source: MMO 2023

As mentioned in Section 12.4.2 the fishing industry uses various types of fishing gear. Table 12-7 presents the annual catch value by gear type within the English Study Area. This table shows that the over the last five years pots and traps have the greatest value, which as shown in other sections of the report demonstrates how important the shellfish industry is to the North Sea.

Table 12-7: Annual catch value from 2018 to 2022 by Gear Type for ICES Rectangles within the English Study Area

Year	Demersal Trawl	Pelagic Trawl	Pots and Traps	Dredge	Drift and Fixed Nets	Demersal seine	Pelagic Seine	Gears using hooks **	Beam Trawl	Other mobile gears
2018	£1,568,114	£86,473	£20,464,499	£3,438,995	£2583	£1,388		£10,449	£662,826	£588,018
2019	£4,256,914	£1,163,329	£21,302,797	£2,643,322	£9	£258,143		£9,443	£122,359	£219,049
2020	£2,299,853	£843,080	£15,080,560	£1,0583,43	£4,015	£878,780		£6,951	£220,984	£661,594
2021	£1,793,714	£10,351,185	£23,580,827	£2,892,682	£1,991	£331,320	£40,948	£1,980	£145,476	£912,351
2022	£,1345,340	£790 384	£22,792,351	£1,590,057	£14,730	£186,185		£4,133	£128,202	£279,155
Total	**£11,263,935**	**£13,234,451**	**£103,221,034**	**£11,623,399**	**£23,328**	**£1,655,816**	**£40,948**	**£32,956**	**£1,279,847**	**£2,660,167**

** Handlines and longlines have been combined to Gears using hooks

Source: MMO 2023

To illustrate this information further Figure 12-5 (Drawing C1494-EGL4-FISH-003), which shows rectangles 35F0, 36F0, 37F0 and 38F0, and Figure 12-6, (Drawing C1494-EGL4-FISH-004), which shows rectangles 38F0, 38E9, 39E9, 40E9 and 40E8, presents the fishing activity by species type and by gear type in 2022.

600000 700000 800000

6100000

6000000

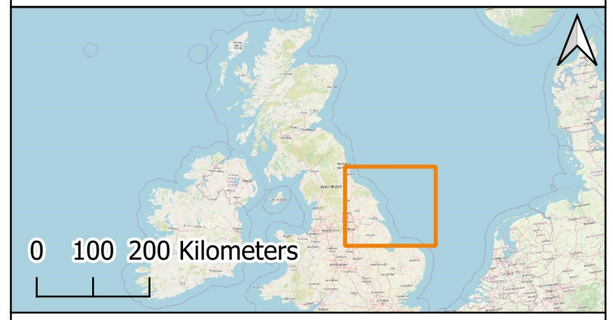
5900000

39E8 39E9 38E8 38E9 37E9 36E9

38F0 38F1 38F2 37F0 37F1 37F2 36F0 36F1 36F2 35F0 35F1 35F2 34F1 34F2

Annual Catch by Gear and Species Type in English Study Area - Map 1

C01494b-EGL4-FISH-003-A



- 12NM Limit
- EGL 4 Scoping Boundary
- ICES Statistical Rectangles
- ICES Statistical Rectangles Intersected by the Scoping Boundary

Gear Type

- Demersal seine
- Pelagic seine
- Demersal trawl
- Pelagic trawl
- Pots and traps
- Beam trawl
- Drift and fixed nets
- Dredge
- Gears using hooks
- Other mobile gears
- Other passive gears

Type of Fishing

- Demersal
- Pelagic
- Shellfish

0 10 20 NM

0 25 50 km

Date	21/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:850,000
Created	EP
Reviewed	DS/SP
Authorised	AF

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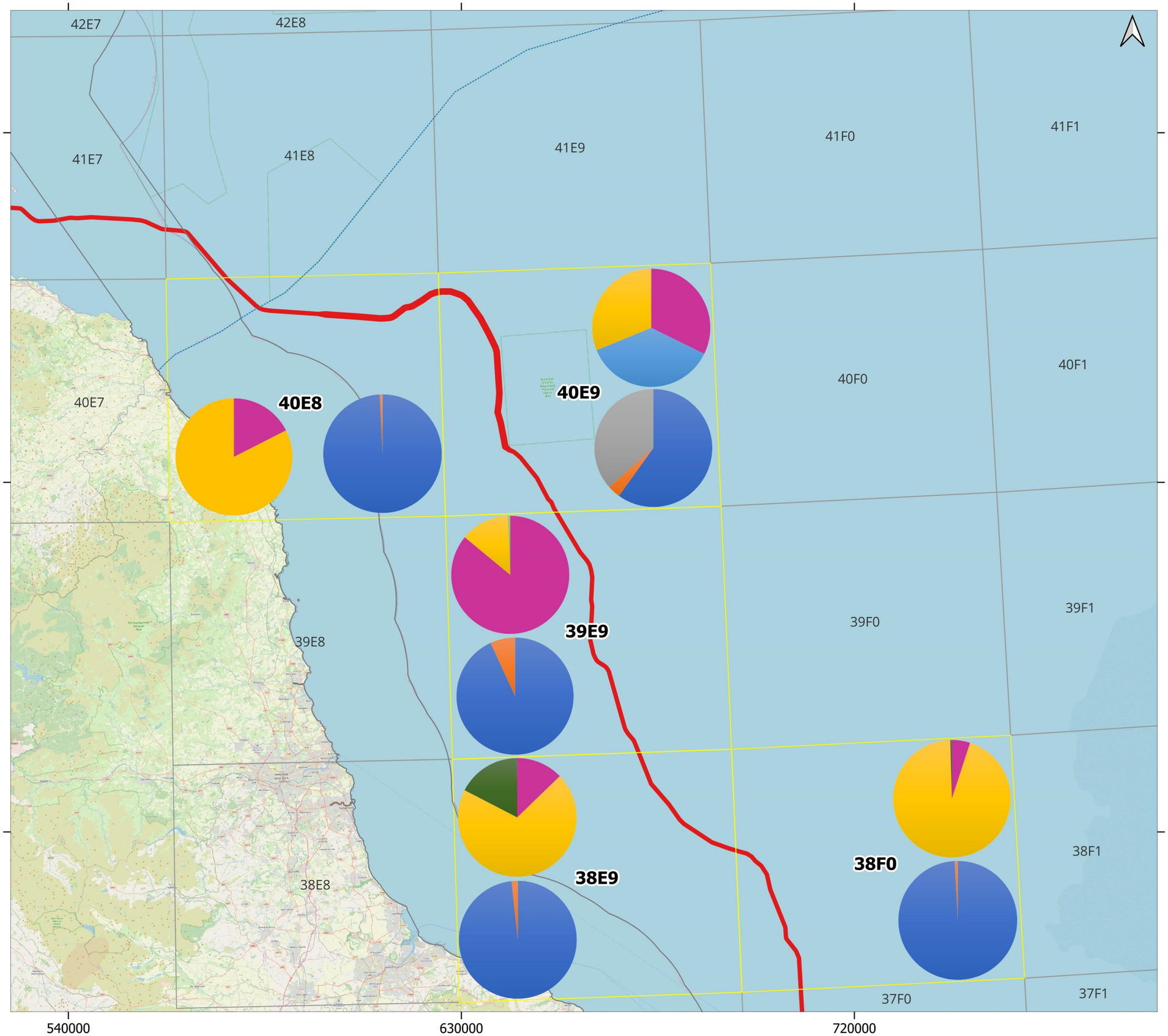

Annual Catch by Gear and Species Type in English Study Area - Map 2

C01494b-EGL4-FISH-004-A

- Scottish Adjacent Waters
- 12NM Limit
- EGL 4 Scoping Boundary
- ICES Statistical Rectangles
- ICES Statistical Rectangles Intersected by the Scoping Boundary

Gear Type

- Demersal seine
- Pelagic seine
- Demersal trawl
- Pelagic trawl
- Pots and traps
- Beam trawl
- Drift and fixed nets
- Dredge
- Gears using hooks
- Other mobile gears
- Other passive gears

Type of Fishing

- Demersal
- Shellfish
- Pelagic

0 10 20 NM

0 25 50 km

Date	21/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:860,000
Created	EP
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Export Date: 21/12/2023

12.4.3.5. Landings by Weight and Value English Study Area

In terms of annual landed weight in 2022 within the English Study Area, shellfish is the largest target group representing almost 81% of the overall catch. Demersal fishing only accounted for approximately 2% and pelagic fishing approximately 16%. However, in terms of catch value, shellfish account for over 95% with demersal and pelagic coming in at 1.2 and 2.8% respectively. These figures again show how important shellfish fishing in the North Sea is.

Table 12-8 shows the top five species caught within the English Study Area. Of the eight rectangles analysed, only one rectangle had a non-shellfish as the top species (herring in 40E9). For all remaining rectangles the top valued catch species were either crabs (C.P.Mixed Sexes) in 35F0, 37F0, and 38F0, lobsters in 36F0, 38E9 and 40E8 or nephrops in 39E9.

In terms of high value species lobster and halibut are the top species followed by nephrops and squid within the North Sea and specifically the English Study Area.

Table 12-8: Top five landed species by value (£) in 2022 in ICES Rectangles within English Study Area

		ICES Rectangles				
		35F0	**36F0**	**37F0**	**38E9**	**38F0**
Landed Species	1	Crabs (C.P.Mixed Sexes)	Lobster	Crabs (C.P.Mixed Sexes)	Lobster	Crabs (C.P.Mixed Sexes)
	2	Cockles	Crabs (C.P.Mixed Sexes)	Lobster	Crabs (C.P.Mixed Sexes)	Lobsters
	3	Whelks	Scallops	Herring	Scallops	Nephrops
	4	Lobster	Whelks	Scallops	Nephrops	Halibut
	5	Brown shrimp	Velvet crab	Squid	Monks and Anglers	Scallops
		39E9	**40E8***	**40E9**		
	1	Nephrops	Lobster	Herring		
	2	Lobsters	Crabs (C.P.Mixed Sexes)	Nephrops		
	3	Crabs (C.P.Mixed Sexes)	Nephrops	Crabs (C.P.Mixed Sexes)		
	4	Monks and Anglers	Velvet Swim Crab	Lobster		
	5	Halibut	Monks and Anglers	Halibut		

* ICES Rectangle 40E8 is in both English and Scottish territorial waters

Source: MMO 2023

It should be noted that species and quantities of fish caught vary considerably not only by location but also annually. Figure 12-7 describes the number of different species caught within each of the ICES rectangles within the English Study Area during a five-year period from 2018 to 2022. Within rectangles 35F0,38E9, 39E9 40E8 and 40E9 there has been an increase in the different number of species caught. In rectangles 36F0 and 37F0 there has been a fairly gradual increase in different species however a drop in 2022 of at least 7 species. 38F0 has had a fairly constant number of species with the exception of 2019 where there was a drop.

This graph does not show any specific trend in the number of species being caught but does illustrate how much it can vary.

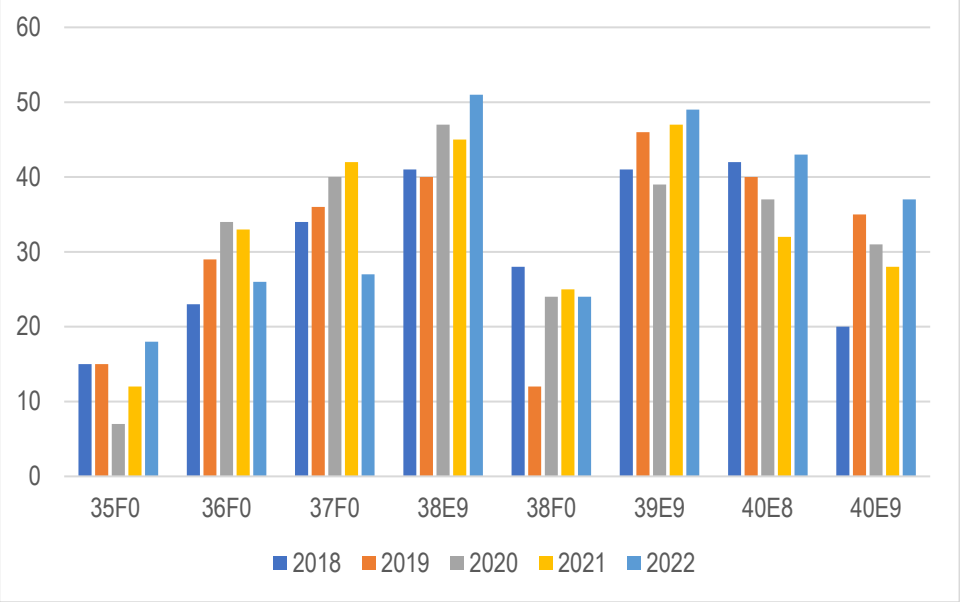

Figure 12-7: Chart showing the number of different species caught within the English Study Area between 2018 and 2022. Source MMO, 2023

12.4.3.6. Temporal Trends

Despite a reduction in vessel numbers over the last decade and reductions in fish quotas for all EU member state fishing fleets, it is considered unlikely that there will be any significant change to fishing effort and activity in the North Sea fishing grounds and in the vicinity of the Project in the near future.

The majority of the local fishing fleet rely on pots and traps for shellfish and trawling for demersal and pelagic species. As a result, coastal waters have seen an increase in the deployment of static gear to fulfil the market for shellfish.

12.4.3.7. Restricted Fishing Areas England

The submarine cable corridors near the English landfalls go through or within proximity of areas which have fishing restrictions. These are either put in place by the regional IFCA or by the MMO. Figure 12-8 (Drawing: C01494-EGL4-FISH-010) illustrates the areas where fishing is restricted.

EIFCA Byelaw areas

Byelaw 3 – Molluscan Shellfish methods of Fishing which requires Fishers to request authorisation for a license to fish shellfish in these areas (EIFCA, 2023).

Byelaw XXIV: Humber Estuary Cockles Fishery – provisions of this Byelaw state no person shall take, remove or disturb any cockle unless that person holds a current permit issued by the Committee (EIFCA, 2023a).

Whelk Permit Byelaw 2016 – The byelaw requires whelk fishers to have a permit to fish for whelks and to fish in accordance with flexible permit conditions. Whelk permits are issued annually and expire on the 31st March each year, regardless of when fishers applied or received a permit. (EIFCA, 2023b)

NEIFCA Byelaw areas

Seine Net, Draw Net or 'Snurrevaad': Prohibition of. Byelaw IV – No person shall use in fishing for sea fish any seine net or any draw net of the kind known as the Danish seine or 'Snurrevaad'. (NEIFCA, 2023)

Permit to Fish for Lobster, Crab, Velvet Crab and Whelk Byelaw XXII – No person shall fish for or take any of the following specified kinds of sea fish: Lobster (*Homarus gammarus*), Crab (*Cancer pagurus*), Velvet Crab (*Necora puber*), or Whelk (*Buccinum undatum),* within the area of the North Eastern Sea Fisheries Committee District except under a specified permit issued by the Committee (NEIFCA, 2023a)

MMO

Inner Dowsing Race Bank and North Ridge SAC 2022 – Towing. Which says that the use bottom towed fishing gear is prohibited within a specified reef or sandbank area (gov.uk, 2022).

Farne Deeps Fishing Restrictions – Which says Vessels deploying demersal trawls and seines (with the exception of beam trawls) are prohibited from fishing in the Farne Deeps. Mesh restrictions apply (Gov.uk, 2023).

680000 700000 720000 740000 760000 780000

5940000 5920000 5900000 5880000 5860000

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Restricted Fishing Areas within Proximity of the English Landfall

C01494b-EGL4-FISH-010-A

- 12NM Limit
- EGL 4 Scoping Boundary
- Byelaw 3: Molluscan Shellfish Methods of Fishing
- Byelaw 24: Humber Estuary Cockles Fishery
- Whelk Permit Byelaw 2016
- Byelaw 28 Crustacea Conservation

MMO Marine Conservation Byelaws

- Bottom Towed Fishing/ Subtidal Sandbank Communities
- Bottom Towed Fishing-Static Gear/ Biogenic Reef

0 5 10 NM

0 10 20 km

Date	21/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:400,000
Created	J Cunningham
Reviewed	D Summers/ S Pearce
Authorised	A Farley

Document Path: X:\GIS\GIS_PROJECTS\C01494_EGL3&4\Project\QGS\EGL4\07_FISH\C01494b_EGL4_FISH_010.qgz

Export Date: 21/12/2023

12.4.4. Scottish Baseline Characterisation KP 418.7 – KP 524.9

The Scoping Boundary crosses three ICES rectangles which are solely within the Scottish Study Area, namely 41E6, 41E7 and 41E8.

12.4.4.1. Key fishery types

Table 12-9 shows the KP points where the types of gear are predominantly used along the proposed submarine cable corridor within the Scottish Study Area.

Table 12-9: Key fisheries that spatially overlap with the Scottish Scoping Boundary

Fishery	Gear Type	KP points – spatial overlap between the fishery and the Project
1	Static Gears	KP 457 – KP 464
2	Dredging	KP 426 – KP 454, KP 457 – KP 470, KP 476 – KP 483, KP 485 – KP 498, KP 507 – KP 509 L_KP 1 – L_KP 16
3	Pelagic Trawl	KP 445 – KP 448, KP 457 – KP 464, KP 467 – KP 476, KP 479 – KP 485, KP 496 – KP 502, KP 507 – KP 511, KP 514 – KP 518 L_KP 1 – KP 3, L_KP 13 – L_KP 16
4	Bottom Otter Trawl	KP 419 – KP 421, KP 436, KP 445, KP 448 – KP 524.7 L_KP 1 – L_KP 16
5	Beam Trawling	KP 476 – KP479, KP 502 – KP 507

L_KP refer to the alternative proposed landfall site at Lower Largo/Lundin Links.

12.4.4.2. Scottish Commercial Fisheries

Of the 3827 under 10 m long vessels registered in the UK, 1421 vessels are registered as Scottish. 465 of the 1028 UK vessels over 10 m in length are Scottish registered.

The Scottish fleet operate from ports all around mainland Scotland and the Scottish islands. The primary port for both catch weight and catch value is Peterhead which has takings that are three times higher than any other port in Scotland of over £192 million. Other high value Scottish ports are Lerwick at £61 million, Scrabster at £39 million and Fraserburgh at £31 million catch values.

Figures 12-9 and 12-10 show the top five ports within the Scottish Study Area with catch values for vessels under 10 m and over 10 m in length respectively.

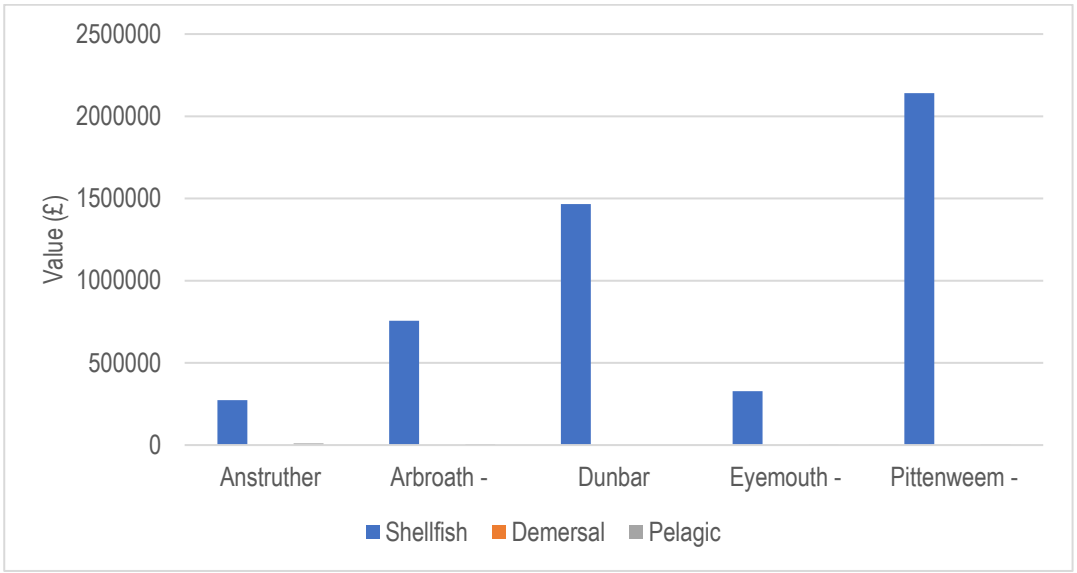


Figure 12-9: Top 5 ports in the Scottish Study Area for under 10 m vessel catches. Source MMO, 2023

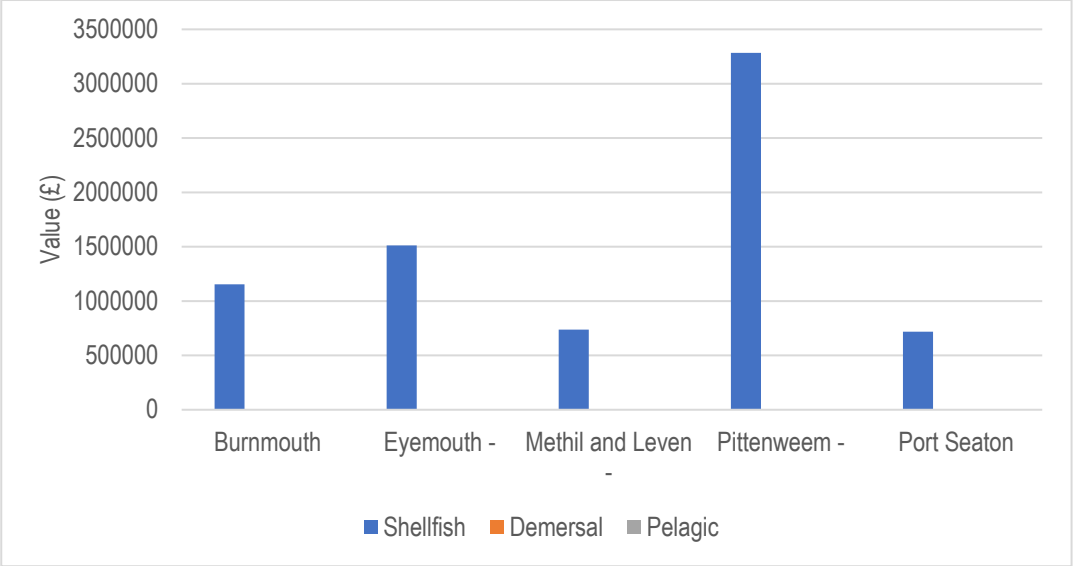


Figure 12-10: Top 5 ports in the Scottish Study Area for over 10 m vessel catches. Source: MMO 2023

12.4.4.3. Local Fishing Fleet Scotland

Based on the MMO's UK Fishing Vessel Registry list from August 2023, it is estimated that there are a total of 419 registered and licensed fishing vessels operating in the vicinity of the Scottish Study Area. Of these vessels 280 were under 10 m in length and 139 are over 10 m. As with the English fleet the majority (243), of the under 10 m vessels hold a Shellfish license which equates to 86% of the vessels. Lobster and crabs are typically caught in pots which are referred to as creels in Scotland and northeast England. This vessel information correlates with the catch information shown in Figure 12-11 Drawing C01494-EGL4-FISH-005).

Of the vessels over 10 m only 12 hold shellfish licenses equating to only 8% of the fleet and 10 hold a scallop license which equates to 7% of the fleet. This data correlates with the catch data which shows that there are more demersal and pelagic catches within the Scottish study area for vessels over 10 m.

Consultation with the local fisheries and individual fishers has confidentially identified the number of vessels actively fishing along the Scottish section of the proposed submarine cable corridor.

12.4.4.4. Overview of Scottish Landings Data within the Study Area

The Scottish Study Area is located within three ICES rectangles, namely 41E6, 41E7 and 41E8. A high-level review of landings data from 2018 to 2022 provided information on the economic importance of different commercial fish species.

Within the Scottish Study Area over the 5-year period (2018 to 2022), 8,377 tonnes of fish were landed with a value of over £36 million (Table 12-10). Of this value, £12 million was landed by under 10 m vessels with the remaining £23 million landed by the over 10 m vessel fleet. 99% of the total value of landings from all three rectangles were represented by the shellfish catch. As with the English Study Area there is a lot of annual variability in terms of catch weight and value.

Table 12-10: Annual catch value from 2018 to 2022 for ICES Rectangles in Scottish Study Area

Year	Live Weight (Tonnes) 10m or under	Live Weight (Tonnes) over 10m	Value (£) Under 10m	Value (£) Over 10m	Value per tonne (£/tonne)
2018	710	1753	£4,107,107.00	£7,501,950.00	£4,713
2019	790	1601	£4,903,864.00	£6,950,301.00	£4,959
2020	496	1090	£3,047,854.00	£3,805,755.00	£4,321
2021	636	1194	£465,861.00	£4,751,876.00	£2,851
2022	45.6	61	£325,758.00	£364,879.00	£6,454
Total for 5yr period	**2678**	**5699**	**£12,850,444.00**	**£23,374,761.00**	
Average	**536**	**1139**	**£2,570,088.00**	**£4,674,952.00**	**£4,659**

Source MMO, 2023

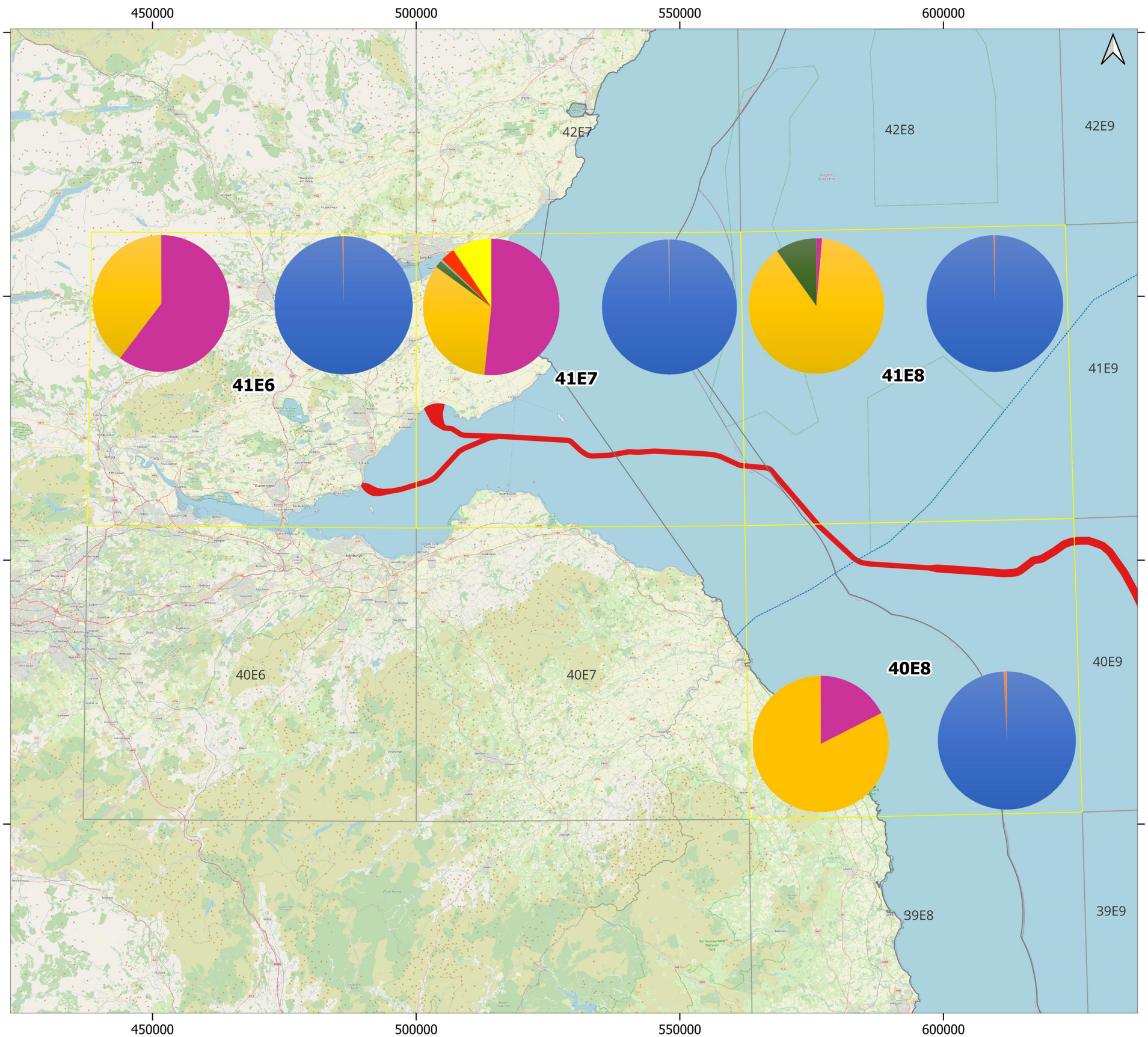
Table 12-11 presents the annual catch value by gear type within the Scottish Study Area that intersect the three ICES rectangles. This table shows that over the last five years the creels and traps greatest catch value followed by demersal trawl and other passive gears which are primarily used to catch razor clams. This illustrates the different type of targeted catch within the Scottish Study Area compared with the English Study Area.

Table 12-11: Annual catch value from 2018 to 2022 by gear type for ICES rectangles within the Scottish Study Area

Year	Demersal Trawl	Creels and Traps	Dredge	Pelagic Seine	Beam Trawl	Other mobile gears	Handlines	Other passive gears
2018	£788,865	£2,571,739	£35,195	-	-	£696,806	£14,501	£893,444
2019	£775,963	£3,200,355	£151,506	-	-	£726,328	£49,710	£1,001,713
2020	£354,393	£202,652	£74,639	-	-	£573,649	£19,519	£520,989
2021	£2,809,057	£1,108,829	£75,523	£49,986	£3,753	£704,726	-	£1,135,027
2022	£31,775	£181,464	£20,077	-	-	£92,442	-	£1,079,990
Total	**£4,760,053.00**	**£7,265,039.00**	**£356,940.00**	**£49,986.00**	**£3,753.00**	**£2,793,951.00**	**£83,730.00**	**£4,631,163.00**

Source MMO, 2023

To illustrate this information further Figure 12-11 (Drawing C01494-EGL4-FISH-005), shows fishing activity by species type and by gear type for 2022 within rectangles 41E6, 41E7 and 41E8.



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Annual Catch by Gear and Species Type in Scottish Study Area

C01494b-EGL4-FISH-005-A

- Scottish Adjacent Waters
- 12NM Limit
- EGL 4 Scoping Boundary
- ICES Statistical Rectangles
- ICES Statistical Rectangles Intersected by the Scoping Boundary

Gear Type

- Demersal seine
- Pelagic seine
- Demersal trawl
- Pelagic trawl
- Pots and traps
- Beam trawl
- Drift and fixed nets
- Dredge
- Gears using hooks
- Other mobile gears
- Other passive gears

Type of Fishing

- Demersal
- Pelagic
- Shellfish

0 10 20 NM

0 25 50 KM

Date	21/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:700,000
Created	EP
Reviewed	DS/SP
Authorised	AF

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Export Date: 21/12/2023

12.4.4.5. Landings by Weight and Value Scottish Study Area

In terms of annual landed weight in 2022 within the Scottish Study Area, shellfish species are the largest target species accounting for approximately 98% of the overall catch, demersal accounted for approximately 0.3% with pelagic fishing accounting for approximately 0.8%. However, in terms of catch value shellfish account for over 99% with demersal and pelagic species representing 0.09% and 0.18% respectively. This shows how the types of species targeted around the North Sea varies particularly between the English and Scottish Study Areas.

Table 12-12 shows the top five species caught within the Scottish Study Area. Of the three rectangles analysed, two rectangles 41E6 and 41E7 had nephrops as the top landed species. In rectangle 41E7 Crab (C.P.Mixed Sexes) were the most landed species. Only one rectangle, 41E6, did not have shellfish for the entirety of its top five species, which was monks and anglers.

In terms of high value species lobster, turbot and razor clams are the top species followed by nephrops, squid and surf clams within the North Sea and within the Scottish Study Area. However, in terms of quantity landed by weight and commercial value in 2022 nephrops was the top species.

Table 12-12: Top five landed species by value (£) in 2022 in ICES Rectangles within Scottish Study Area

		ICES Rectangles		
		41E6	41E7	41E8
Landed Species	1	Nephrops	Nephrops	Crabs (C.P.Mixed Sexes)
	2	Lobster	Lobster	Lobsters
	3	Velvet swim crab	Razor Clam	Scallops
	4	Crabs (C.P.Mixed Sexes)	Crabs (C.P.Mixed Sexes)	Nephrops
	5	Monks and Anglers	Velvet swim crab	Velvet swim crab

Source MMO, 2023

As noted above the species and quantities of fish caught vary considerably not only by location but also annually. Figure 12-12 describes the number of different species caught within each ICES rectangle within the Scottish Study Area during a five-year period from 2018 to 2022. Unlike the English Study Area, the number of species are more stable with little difference during the five-year period. However, there was large decrease of more than 10 species in 41E8 in 2020 and in 41E6 in 2019 however these numbers have since increased. The overall number of different species is lower than within the English Study Area except for 41E7.

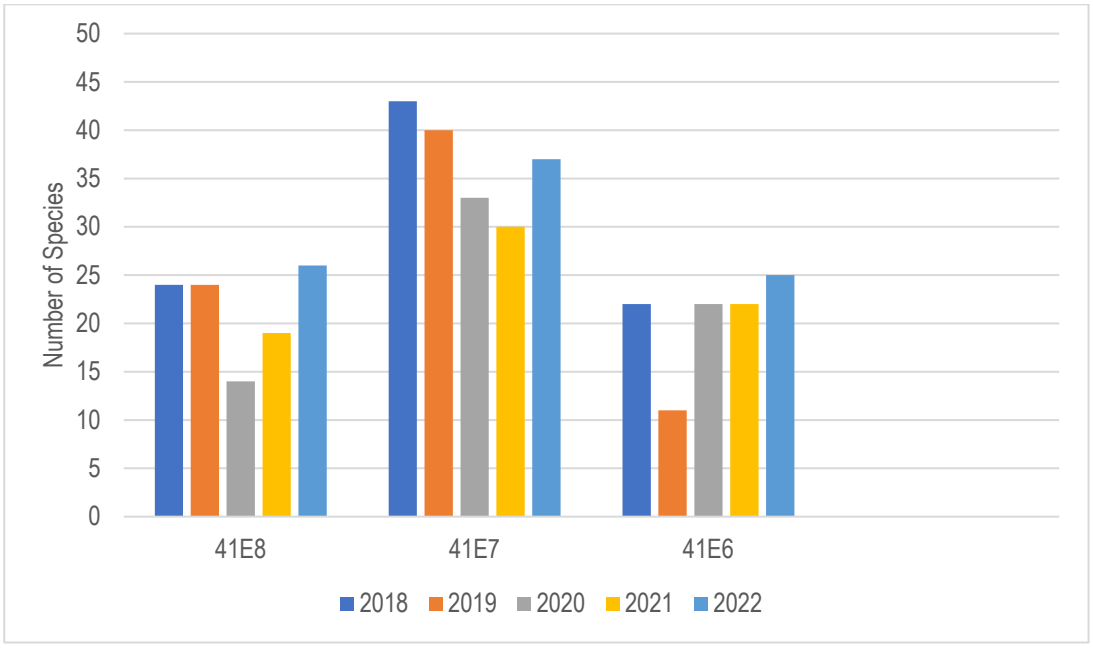

Figure 12-12: Chart showing the number of different species caught within the Scottish Study Area between 2018 and 2022. Source MMO, 2023

12.4.4.6. Temporal Trends

As with the English Study Area the number of Scottish registered vessels has decreased over the last decade. The Scottish fishing industry has also been affected by the reduction of fishing quotas for all EU member states. It is considered unlikely that there will be any significant change to fishing effort and activity in the North Sea fishing grounds and in the vicinity of the Project in the near future.

12.4.4.7. Restricted Fishing Areas Scotland

A large area off Eastern Scotland has restrictions on catching sandeel. This is not a permanent ban or byelaw but has been something that the Scottish Government has put in place for the last three years to benefit the wider marine ecosystem including marine mammals and seabirds who feed on sandeel. (gov.uk, 2023a) this area is illustrated in Figure 12-13, Drawing C01494-EGL4-FISH-011)

Within the Firth of Forth there are some seasonal restrictions on fishing for sprat from the 1st October through to the 31st March annually using trawl gear or seine nets.

There are also restrictions on the size of fishing vessels fishing within the Firth of Forth. The vessel size must be under 16.77 m for all gear types. There are exceptions if the vessels are catching herring, mackerel and sprats.

Restricted Fishing Areas within the Scottish Study Area

C01494b-EGL4-FISH-011-C

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450000 500000 550000 600000 650000

6300000 6250000 6200000 6150000

12NM Limit

Scottish Adjacent Waters

EGL 4 Scoping Boundary

Permanent/ Conservation of Sandeel

0 7.5 15 NM

0 10 20 km

Date	01/12/2023
Coordinate System	ETRS89 / UTM Zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	Meters
Scale at A3	1:800,000
Created	J Cunningham
Reviewed	D Summers/ S Pearce
Authorised	A Farley

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Export Date: 01/12/2023

12.5. Proposed Assessment Methodology

The commercial fisheries MEA will follow the assessment approach set out in Chapter 4 of this Scoping Report, using the project-wide assessment matrix. The assessment of potential effects will be established using the standard Source-Pathway-Receptor approach.

The commercial fisheries chapter of the MEA will be prepared in accordance with the following guidance:

- Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (FLOWW, 2014)
- Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015)
- Changes to fishing practices around the UK as a result of the development of offshore windfarms (Gray et al. 2016)

Interviews with local and regional fisheries stakeholders will be conducted to establish the baseline and obtain information on fisheries such as fishing vessels operating in the area, types and sizes of vessels, fishing gear(s) used, fishing effort, target species, seasonality in effort or species abundance, and location of key grounds. The interviews will be supplemented by a desk-based review of catch and effort statistics. Automatic Identification System (AIS) data from UK and European fishing vessels over 15 m in length and VMS data from registered commercial fishing vessels over 12 m in length will also be obtained and interrogated to assess the distribution of fishing effort. Information will also be sought from the MMO.

In addition, the impact assessment on inter-related topics such as marine physical processes, fish and shellfish, water and sediment quality and shipping and navigation will be used to inform the conclusions in the commercial fisheries chapter. The potential for displacement as a result of cumulative impacts will be considered carefully and an appropriate assessment approach agreed with key stakeholders once the number of other projects to be assessed is defined.

Where significant impacts are identified, consultation will be undertaken with local and regional fisheries stakeholders to agree proportionate and effective mitigation, and any residual effects will be presented.

12.6. Scope of Assessment

A range of potential impacts on commercial fisheries have been identified which may occur during the construction, O&M, and decommissioning phases of the Project. Table 12-13 describes the potential impacts identified and provides justification as to whether they will be scoped in or out of the MEA. A precautionary approach has been taken and where there is no strong evidence base, or the significance is uncertain at this stage the impact has been scoped 'in' to the MEA. Where there is a clear evidence base that the effect from the impact will not be significant, either alone or in combination with other plans and projects, the impact has been scoped 'out' of the MEA.

The following potential impacts although applicable to commercial fisheries have been considered In Chapter 11 Shipping and Navigation:

- A vessel engaged in fishing activity snags its gear on the cable
- Reduction in under-keel clearance
- Interference with Marine Navigational Equipment

Table 12-13: Scoping assessment of impacts on commercial fisheries

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
Temporary restricted access to fishing ground (including required static gear clearance)	Presence of project vessels and equipment	Commercial fisheries	**IN** – The implementation of advisory clearance distances around construction vessels and safety zones during construction works may result in temporary loss or restricted access to fishing grounds within the Project. The fishing industry will be consulted on the proposed construction programme and efforts made to ensure co-existence is feasible. Notices to Mariners will be issued in advance of the works.	**IN** – If the cable is installed correctly the likelihood of it requiring maintenance and repair is significantly reduced. However, there remains the potential that localised repair works or remedial external cable protection may be required. In this case there would be advisory clearance zones put in place. The fishing industry would be advised in advance and efforts made to ensure co-existence. Notices to Mariners will be issued in advance of the works.	**IN** – At the point of decommissioning project vessels and equipment would be required in which case the advisory clearance distances would be implemented. The fishing industry would be advised in advance and efforts made to ensure co-existence. Notices to Mariners will be issued in advance of the works.
Temporary displacement of fishing activity into other areas	Presence of project vessels and equipment	Commercial fisheries	**IN** – Fishing activity may be temporarily displaced to other areas due to loss of or restricted access to fishing grounds as a result of the presence of project vessels and safety zones. Established steaming routes may also be disrupted increasing transit times to fishing areas. Although displacement will be temporary, due to the high level of construction activity in the North Sea there is the potential for cumulative impacts with other projects.	**IN** – If the cable is installed correctly the likelihood of it requiring maintenance and repair is significantly reduced. However, there remains the potential that localised repair works may be required. In these circumstances the significance of the effect will be of lower magnitude than during installation.	**IN** – The significance of the effect during decommissioning is similar or of lower magnitude than installation.
Loss of grounds	Deposit of external cable protection	Bottom drift netting	N/A	**IN** – The deposit of external cable protection will cause a localised change in seabed topography. Bottom drift nets are reliant on a flat featureless seabed to operate effectively. The placement of external cable protection would therefore exclude the gear type from being used in that area. As yet the final route design has not been developed but measures to mitigate potential impacts of avoiding areas of high drift net use through consultation with the local fishers. It is possible that a significant impact may occur, this will be covered by the MEA.	N/A
Changes in distribution of target species	Pre-sweeping of sandwaves Cable burial / trenching Installation of cable protection	Commercial fisheries	**IN** – Distributions of fish and shellfish populations have the potential to be affected by the activities during installation. If the fish and shellfish MEA concludes that the impacts on fish and shellfish are significant there is the potential that this could directly affect commercial fisheries. This assessment will include consideration of other impacts such as changes in underwater noise, seabed disturbance during sensitive periods for species with demersal life cycles and permanent changes in seabed habitat.		
Temporary increase and deposition of	Pre-sweeping of sand waves	Cockles	**IN** – Seabed levelling i.e., during cable routeing, and certain construction activities such as cable trenching, has the potential to lead to localised and temporary increases in suspended	**OUT –** If the cable is installed correctly the likelihood of it requiring maintenance and repair is significantly reduced. However, there remains the	**OUT –** The significance of the effect during decommissioning is similar or of lower magnitude than

Potential Impacts	Project Activities	Sensitive Receptors	Scoping Justification		
			Construction	Operation (including repair and maintenance)	Decommissioning
suspended sediments *(Changes in suspended solids (water clarity)* *Smothering and siltation rate changes* *Hydrocarbon & PAH contamination)*	Cable burial and trenching Deposit of external cable protection		sediments. The level and area of impact depend on a number of factors including localised hydrodynamics, source activity and seabed substrate. It has been estimated that the extent of potential effects arising from an increase in suspended sediment will be a maximum of 15 km due to tidal excursion. Increases in suspended sediment will be temporary but have the potential to lead to smothering of sensitive receptors e.g., commercial shellfish beds. Given the proximity of the Project to sensitive shellfish waters the potential for significant impacts cannot be ruled out at this stage. Any potential for re-suspension of contaminated sediment to reach sensitive habitats will be investigated and will be informed by studies undertaken to inform the marine physical processes chapter of the MEA.	potential that localised repair works may be required. In these circumstances the significance of the effect will be of lower magnitude than during installation and has therefore been scoped out of the assessment.	installation and has therefore been scoped out of the assessment.

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