Good Practice Guidance for assessing fisheries displacement by other licensed marine activities

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Table of acronyms and abbreviations

Abbreviation	Definition
AIS	Automatic Identification System
CES	Crown Estate Scotland
CIEEM	Chartered Institute of Ecology and Environmental Management
CIFA	Community Inshore Fisheries Alliance
DDM	Degrees Decimal Minutes
DMS	Degrees Minutes Seconds
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FFSRG	Fish and Fisheries Specialist Receptor Group
FIR	Fisheries Industry Representative
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FMMS	Fisheries Management and Mitigation Strategy
FOIA	Freedom of Information Act
ICES	International Council for the Exploration of the Sea
JNCC	Joint Nature Conservation Committee
kW	Kilowatt
kWh	Kilowatt hours
MASTS	Marine Alliance for Science and Technology
MMO	Marine Management Organisation

MRE	Marine Renewable Energy
NM	Nautical Miles
NMPi	Marine Scotland Maps (National Marine Plan Interactive)
OWF	Offshore Wind Farm
PO	Plan Option
REM	Remote Electronic Monitoring
ScotMER	Scottish Marine Energy Research
SFF	Scottish Fishermen's Federation
SNH	Scottish Natural Heritage (now known as NatureScot)
STECF	Scientific, Technical and Economic Committee for Fisheries
SWFPA	Scottish Whitefish Producers Association
TCE	The Crown Estate
UTM	Universal Transverse Mercator
VMS	Vessel Monitoring System

Glossary of technical terms

Automatic Identification System (AIS)	A vessel tracking system which enables vessels to transmit and receive vessel position data via an AIS transponder.
Co-existence	Two activities existing at the same time and / or in the same space.
Creels	Pots and traps, generally used to catch crab and lobster.
Commercial fisheries	Legal fishing activity undertaken for commercial profit.
Cumulative impact	The combined impact that occurs when the impacts of two or more past, present of future plans / projects / activities overlap in time and space.
Demersal fish	Fish that live on or near the seabed.
Demersal trawl	Cone shaped net towed along the seabed.
Displacement	The relocation of fishing activity (i.e. pressure or effort) into another area as a result of restricted access to or closure of an area.[1]
Environmental Impact Assessment	Process of evaluating the environmental impacts of a proposed project or development. An EIA is required when a development qualifies as an EIA project under the relevant regulations.
Fish1 forms	In Scotland, under-10 m vessels submit Fish1 forms which are similar to logbooks.
Fisheries Industry Representative (FIR)	The FIR will support the FLO. This individual should be trusted by local fishermen and have an extensive knowledge of the local fishing industry. The FIR will communicate information from the developer to the fishing community and vice versa via the FLO.

[1] For the purposes of this guidance, displacement is defined as occurring as a result of other licenced activity or infrastructure.

Fisheries Liaison Officer (FLO)	An appointed individual nominated by a developer who is the main point of contact for the fishing industry when direct communication with the developer is needed. The FLO will liaise with and between the fishermen and the developer, with support from the FIR.
Home port	The port at which the vessel is based and primarily operates from.
In-combination impact	Pressures of a different type acting on the same receptors.
ICES rectangle	ICES rectangles are a spatial unit used for the collection and analysis of fisheries statistics by the European Commission (EC) Member States, and the UK.
Landings declarations	Landings declarations include details on the weight and presentation of fish landed by species.
Logbook	Logbooks detail fishing activities and voyages including fishing gear, locations of catches (at ICES statistical rectangle scale) and the species and quantity caught.
Nephrops	Also known as Norway lobster and langoustine.
Not Take Zone	An area of the seabed in which all forms of exploitation are prohibited (including fishing).
Offshore	Any location which is non-terrestrial and deeper than Mean High Water Springs.
Pair trawling	Demersal trawl net towed by two vessels simultaneously.
Pelagic fish	Fish that live in the water column.
Remote Electronic Monitoring (REM)	Integrated on-board systems of GPS, video, gear sensors and cameras to capture fishing activity and provide positional data.
Round 4 seabed leasing round	The most recent offshore wind leasing round in English and Welsh waters, launched by The Crown Estate[2].

[2] Offshore Wind Leasing Round 4 | Offshore Wind Leasing Round 4 (thecrownestate.co.uk)

Sales notes	Sales notes include details of the fish sold and the price paid for it at the point when it is first sold.
Scallop dredge	Rigid triangle-frame structure with 'teeth' which rake the seabed to collect scallops into a chain mail bag.
Scoping	Scoping occurs in advance of EIA. It involves the request of a Scoping Opinion from the appropriate authority via the submission of a Scoping Report. The Scoping Report outlines the content and extent of the EIA, highlighting the key environmental sensitivities to be addressed within the EIA and the methodologies to do so. The Scoping Opinion should detail what requires further elaboration or addition in the EIA.
ScotWind leasing round	The most recent offshore wind leasing round in Scottish waters, launched by Crown Estate Scotland[3].
ScotWind Plan Option (PO)	There are 15 plan option areas located in the Scottish zone which represent the areas of seabed available for lease under the ScotWind leasing round. Not all plan options may be progressed as there is a limit of up to 10 GW available in this leasing round.
Seine net	A triangle shaped net with long weighted ropes attached on each side. The net is shot in a circular motion from a vessel and then towed to close the net and herd fish.
Total Allowable Catch (TAC)	Catch limit set for a particular fishery.
Transboundary	Transboundary effects include those effects on the environment within a state which is not under the same jurisdiction as the development location.
Vessel Monitoring System (VMS)	Vessel satellite tracking system, operated on vessels > 12 m in EU waters.

[3] Crown Estate Scotland

1 Introduction and background

The cultural and economic importance of the commercial fishing industry, and renewable energy sector is recognised by Scotland's National Marine Plan[4], together with the need to facilitate coexistence between development sectors, ecological resources, and activities within the Scottish Marine area and in the wider context of Marine Spatial Planning (Scottish Government, 2015). With the spatial expansion and technological advancement of offshore[5] energy projects expected to occur over the next few decades, particularly offshore wind farm (OWF) projects, there is an increasing focus on the approach and methods for offshore Environmental Impact Assessments (EIA).

Commercial fisheries are a key receptor and stakeholder for offshore EIAs, particularly in relation to OWF projects. Developing guidance for assessing commercial fishing effort displacement was highlighted as a priority evidence gap in the Scottish Marine Energy Research (ScotMER) fish and fisheries evidence map (Brown and May Marine, 2021; ABPmer 2017).

This Good Practice Guidance document (hereafter referred to as the / this "Guidance") has been commissioned by Marine Scotland in response to the ScotMER evidence map programme work mentioned above. Extensive consultation has been carried out to inform the Guidance with the ScotMER Fish and Fisheries Specialist Receptor Group (FFSRG)[6], commercial fisheries industry, offshore energy and regulatory sectors.

Through the process of the development of this Guidance, knowledge gaps and subsequent potential areas of future research have been identified, which are detailed within the accompanying Literature Review (Section 8).

2 Objectives

The objectives of this document are as follows:

1. Provide a clear definition for commercial fisheries displacement;
2. Provide standardised guidance for the sourcing, analysis and presentation of commercial fisheries data for the production of environmental baselines; and
3. Provide guidance and key points for consideration for developers, EIA practitioners and stakeholders, relevant to the assessment of commercial fisheries displacement.

[4] Please note that Scotland's National Marine Plan is under review at the time of writing with a decision on any updates to be made by the end of 2021.
[5] Offshore means any location which is non-terrestrial and deeper than Mean High Water Springs (MHWS).
[6] Fish and Fisheries Specialist Receptor Group - gov.scot (www.gov.scot)

3 Summary of the Literature Review

This Guidance has been informed by a Literature Review which was conducted between February and May 2021 (available here[7]). The Literature Review focussed on identifying existing relevant guidance, EIAs, consent plans, scientific literature and consultation responses relevant to fisheries displacement. Extensive consultation was conducted as part of the Literature Review. Further details on consultation are provided in Section 3.1 in this Guidance, and Sections 5 and 7 of the Literature Review.

The Literature Review includes the following:

- Background, stakeholder consultation approach and objectives;
- Definition of displacement;
- Information on commercial fishing practices for fishing methods identified as being priority research areas;
- Information on other licensed marine activities with a focus on renewables;
- Existing research and approaches into fisheries displacement, including EIA case studies;
- Recommendations / areas of focus for the Guidance; and
- Knowledge gap analysis and recommendation for future studies / research.

3.1 Consultation

Extensive consultation was carried out with the FFSRG throughout the development of the Literature Review and Guidance. The members of the FFSRG who were consulted regarding both documents are provided in Table 3-1. This group was originally established by Marine Scotland to inform the development of the ScotMER Evidence Maps and was considered to also be relevant for the fisheries displacement assessment scope of work. Marine Scotland during the development of the receptor group aimed to ensure balanced representation from each of the fishing and offshore wind industries, Marine Scotland (multiple relevant branches), Crown Estate Scotland (CES), The Crown Estate (TCE), Regional Inshore Fisheries Groups, research institutions and government advisory bodies.

Three 1-hour long workshops were held with the FFSRG at which the Literature Review and Guidance were discussed. The first workshop introduced the project to the FFSRG. The draft Literature Review and the draft Guidance documents were issued to consultees ahead of meetings 2 and 3 respectively, with a 3-week consultation period being provided for comments on each. The second and third workshops provided an opportunity for guided discussion on the Literature Review and Guidance at the beginning of the consultation period.

[7] Good Practice Guidance for assessing fisheries displacement by other licensed marine activities: Literature Review

Key questions were provided to consultees to focus their feedback, such as information on commercial fishing practices, sensitivities of commercial fisheries to displacement, the knowledge gap analysis and recommendations for further work.

Additional feedback was obtained by way of separate meetings held with members of the FFSRG as required.

The flexible approach to consultation provided several opportunities for written and verbal feedback. This ensured that the documents were shaped collaboratively with Marine Scotland, Xodus and the FFSRG. This was a priority for the project.

Table 3-1 Members of the Fish and Fisheries Specialist Receptor Group (FFSRG)

Organisation
Marine Scotland Science
Marine Scotland Planning and Policy
Marine Scotland - Licensing Operations Team
Marine Scotland (Inshore Fisheries Policy)
NatureScot
Joint Nature Conservation Committee (JNCC)
Crown Estate Scotland (CES)
The Crown Estate (TCE)
Scottish Renewables / Forth and Tay Developers / EDF Renewables
Scottish Fishermen's Federation (SFF)
Moray Firth Developers / Ocean Winds
Scottish Regional Inshore Fisheries Group
Community Inshore Fisheries Alliance (CIFA)
Marine Alliance for Science and Technology (MASTS) Marine Renewable Energy (MRE) Forum
Fisheries Innovation Scotland
Sustainable Inshore Fisheries Trust
Scottish Whitefish Producers Association (SWFPA)

4 Definition of displacement

For the purpose of this Guidance, displacement of commercial fishing activity (or commercial fisheries displacement) refers to the relocation of fishing activity (effort) from an area where that fishing activity typically occurs into other area(s) as a result of other licensed marine activities and associated infrastructure ('the development').

The following list provides examples of potential impacts according to stakeholder consultation and existing research:

- Increased competition for fishing grounds and conflict between and within fishing methods;
- Potential decreases or changes in catch of certain target species (loss of access to fishing grounds in reference to previous area / productivity) which could potentially lead to an individual exiting the fishing industry; and
- Increased steaming time to access alternative fishing grounds.

4.1 Assumptions and exclusions

This Guidance focusses on fishing methods which have been identified as priority research areas for displacement through the ScotMER evidence map and consultation, which are as follows:

- The Scottish King Scallop dredge fishery;
- The Demersal Trawl fishery including pair trawling and *Nephrops* trawling;
- Scottish Seine Net fleet; and
- Static fishing gear (creels).

The Guidance provided in Sections 5 and 6 is intended to equip EIA practitioners and reviewers with transferable key points for consideration during the assessment of commercial fisheries displacement which will be relevant to fishing methods other than those highlighted above, within and outside of the Scottish Zone[8]. This Guidance, although targeted for OWF, is also intended to be transferable for assessments which are carried out for the consent applications of a range of other licensed marine activities, such as other marine renewable energy developments (wave and tidal), oil and gas, aquaculture, marine spatial planning and marine protected areas.

For the purpose of the application of this Guidance, it is recommended that consideration is made of the potential impacts to the commercial fishing fleets

[8] Scottish Zone encompass the waters out to 200 NM from the Scottish coast, as per the Scotland Act 1998.

which are displaced (sometimes referred to as primary displacement[9]) and those which are already active in the area to where primary displacement takes place to (sometimes referred to as secondary displacement), either seasonally, cyclically or year-round (see Box 1).

Further displacement effects such as displacement of already existing fisheries into a third area, or potential impacts to environmental receptors other than commercial fisheries will not be covered within this Guidance.

Box 1 – Primary and Secondary Displacement

Primary displacement refers to the first instance of displacement where fishing effort is relocated to another area as a result of a change in the spatial environment. In the context of this guidance, this corresponds to displacement that is a direct result of other licensed marine activities and associated infrastructure.

Secondary displacement is an indirect effect of the other licensed marine activity and associated infrastructure. This occurs when the fishing effort that is relocated through primary displacement also displaces fishing effort.

Overlap of other licensed marine activity and fishing effort – Primary displacement – Displacement of fishing effort to another area operated by pre-established fishing fleets – Secondary displacement – Displaced Effort.

4.2 Relevant Marine Scotland and Scottish Government guidance and plans

There are several guidance documents, plans and strategies which are relevant to marine spatial planning, offshore renewable development, fisheries management and commercial fisheries displacement. A full list of those which are of relevance to this Guidance are provided in Section 3 of the Literature Review (available here[10]).

5 Good Practice Guidance: commercial fisheries data

This section of the Guidance provides recommendations for the sourcing, analysis and presentation of commercial fisheries data, which is required to inform commercial fisheries environmental baselines. These baselines inform fisheries displacement (and other impact) assessments.

5.1 Recommended data types and sources

International Council of the Exploration of the Sea (ICES) statistical rectangles are the smallest spatial unit used for the collection and analysis of fisheries statistics by the European Commission (EC) Member States, and the UK. ICES rectangles

[9] The terms primary and secondary displacement are not consistently used within commercial fisheries EIAs and it is suggested they are and as such defined here.

[10] Good Practice Guidance for assessing fisheries displacement by other licensed marine activities: Literature Review

are approximately 900 NM^2 and align to 30° latitude by 1° longitude. Although fishing activity is not evenly distributed across ICES rectangles and effort cannot be determined at finer scales within each rectangle (e.g. as the % overlap of a development with an ICES rectangle), it is suggested that fishing activity is described in relation to the ICES rectangles in which the development is expected to be located and any adjacent ICES rectangles as needed (the study area), with reference to wider sea areas regionally and nationally depending on the operational range of the fleet(s) in question to provide a description of activity in relation to other fishing grounds (i.e. proportional context).

No single source of data can be used to comprehensively describe commercial fishing activity, due to the inherent limitations of each data source, such as, variations in spatial scales, fleet coverage (e.g. under-10 m vessels) or whether the data provides quantified fishing activity or spatial distribution (or both). A robust description of commercial fishing activity therefore must be informed by several data sources, in combination with stakeholder consultation.

This Guidance provides a list of recommended sources intended to be relevant for EIAs for applications across UK waters. In consideration of the locations of OWFs being progressively more offshore, and therefore the commercial fishing fleets which are active within these areas having larger operational ranges, it has been recommended that Marine Management Organisation (MMO) data is used for commercial fisheries baselines to ensure UK wide coverage, relevant to these receptors. It is also verified and publicly available, so provides a consistent data source. Furthermore, this recommendation is also based on standard industry practice by EIA practitioners, however, it should be noted that the data sources used in commercial fisheries impact assessments are dependent on the location of the development and the commercial fisheries receptors identified as being relevant to the development during the EIA process. For instance, for some developments, the use of Marine Scotland data may be valuable to the assessment, either as an additional source or in replacement of some of the MMO datasets. Some regional or local datasets may also be available which could act as an additional data source for the commercial fisheries impact assessment. Further details on other commercial fisheries data sources are provided in Section 5.1.3.

For Welsh and Irish EIAs additional data sources may be required, but this Guidance can be used to inform which types of data would be needed for commercial fisheries assessment in these areas.

The data types and sources which are recommended to be used for conducting commercial fishing impact assessments are provided in Table 5-1. The structure of a commercial fisheries baseline varies depending on the region, but in general it's often easier to present the data by category in the order they are presented below in Table *5-1*.

Box 2 – Study Area

The study area should include the ICES rectangle(s) that overlap(s) with the development and any adjacent rectangles, as needed. A wider study area may be evaluated for certain fisheries. For example, it is often assumed that smaller vessels are more likely to be displaced to the local area (potentially remaining within the same ICES rectangle), with larger vessels potentially being displaced to ICES rectangles further away. It should be noted that fishing vessel operators/owners may choose to change their home port in some instances and so smaller vessels may be displaced to grounds further away than their operational ranges (Seafish & UKFEN, 2012; ABPmer, 2017).

As a basic rule, the study area should consider the areas in which fishing effort may be relocated to. This requires consideration of operational range, attachment to home port and the availability of alternative grounds.

Table 5-1 Recommended data sources to inform assessments of commercial fisheries displacement

Figure number (Section 5.2): Figure 5.1

Source and data: MMO Surveillance Sightings

Description & key use in EIA: Sightings (visual observations) of fishing vessels recorded from aerial and vessel surveillance vessels in UK territorial waters.

Provides an indication of the distribution of fishing activity, fishing methods and nationality, but cannot be used to provide a quantitative assessment of fishing activity.

Limitations: Data is subject to survey effort (typically weekly and during daylight hours). There are also temporal gaps in sightings.

Fishing method and nationality is assigned by sight, and is not confirmed, due to the similarities of fishing vessels when gear is in operation (especially mobile gears), it should be assumed that they are indicative only.

Accessibility: Access via request under the Freedom of Information Act (FOIA) via the MMO master data register: accesstoinformation@marinemanagement.org.uk

Analysis section link: Section 5.1.2.1

Figure number (Section 5.2): Figure 5.2

Source and data: MMO[11] Fisheries Statistics

Description & key use in EIA: Landings by value (£), effort (days) and weight (tonnes) sourced from logbooks, dockside inspections, landings declarations.

Provides fisheries statistics by vessel size, fishing method and species at ICES rectangle scale and can be analysed to determine annual and seasonal variation. These data do not provide any indication of the spatial distribution of fishing value or effort within each ICES rectangle.

The Registered Buyers and Sellers (RBS) Regulation should mean that all registered buyers have to provide sales notes and these data are incorporated into this dataset. These data will not be included if fishermen sell direct to the public and / or at quantities under the excepted limit within the RBS.

Limitations: Although data covers the under-10 m fleet, the monitoring systems for under-10 m vessels are not mandatory and so may not be representative of all activity

[11] Marine Scotland publish fisheries statistics annually (Marine Scotland, 2020) but these do not provide values or effort by fishing method and are for the Scottish Zone only.

Data may misrepresent the fishing activity, depending on the size of the development / project, given the large spatial scale of the landings data.

Accessibility: As above

Analysis section link: Section 5.1.2.2

Figure number (Section 5.2): Figure 5.3 & Figure 5.4

Source and data: MMO Vessel Monitoring System (VMS)

Description & key use in EIA: Provides fishing effort (kW per hour) and value (£) for UK vessels (see limitations) through satellite tracking equipment which is cross-referenced with landings, engine power, and logbook data. The data is anonymised and presented in a 0.05° by 0.05° grid.

VMS data provides quantitative information on the spatial distribution of fishing activity.

Limitations: Rectangles with < 5 transmissions are not included within the dataset. Vessels of < 15 m in length are not represented in the dataset.

There is generally two or more years delay in data being published.

These data do not differentiate between vessels that are fishing or stationary / steaming (although it is filtered to include vessels travelling between 1 and 6 knots to limit the effect this has on the data).

Accessibility: As above

Analysis section link: Section 5.1.2.3

Figure number (Section 5.2): N/A

Source and data: Marine Scotland VMS

Description & key use in EIA: VMS data for demersal trawling, *Nephrops* trawling and dredging. The Marine Scotland VMS data is valuable for developments which overlap with *Nephrops* fishing grounds as there is a dedicated VMS dataset for *Nephrops* trawling, which is a subset of the bottom trawling dataset.

This dataset is a processed version of ICES / OSPAR gridded VMS data (described for Transboundary Data).

Limitations: Dataset includes 3 fishing methods only and is not updated annually. The data is provided in a web layer and so processing is limited and covers a relatively long time period (2009 – 2016 for bottom trawls and dredges and 2009 – 2017 for bottom trawls targeting *Nephrops* and crustaceans).

The limitations that apply to the MMO VMS data are similar to those for the Marine Scotland VMS data, such as only including coverage of vessels >15 m in length.

Accessibility: Available to download via NMPi at: Average intensity (hours) of fishing using ICES VMS data sets | Marine Scotland Information which is available via the National Marine Plan Interactive (NMPi) (Marine Scotland, 2021).

Analysis section link: Section 5.1.2.4

Figure number (Section 5.2): Figure 5.5

Source and data: Information of fishing grounds from consultation with fishing vessel operators / owners

Description & key use in EIA: Consultation is of paramount importance in development of a robust commercial fisheries baseline, in particular for the under-10 m fleets which are not consistently represented through other data sources.

Consultation data may include annotations of printed charts, photographs of on-board GPS plotters (taken or sent to the Fisheries Liaison Officer (FLO)). These data are anonymised and with permission granted prior to the use of the data.

These data provide further information on the distribution of fishing activity by fishing method, key species, seasonal trends and also offers an opportunity to receive early concerns and feedback from fisheries stakeholders.

Limitations: Inaccuracies may arise, as the data may be subject to human error.

Accessibility: Often obtained by the FLO, further information in Section 0

Analysis section link: Section 5.1.2.5

Figure number (Section 5.2): N/A

Source and data: MMO vessel lists

Description & key use in EIA: MMO vessels lists, updated monthly, are available for over-10 m and under-10 m vessels (MMO, 2021a, MMO, 2021b). The lists include details on the administrative port, home port, port letters and number, vessel name, registry and numbers, fish producer organisation, as well as details on vessel parameters including length, tonnage, engine power. The spreadsheet also identifies whether the vessel has a shellfish or scallop licence.

This dataset can be used to obtain information on vessel parameters which can be used to describe the sensitivity of a vessel to displacement (see Section 6.3.1).

Limitations: This dataset cannot be used to describe activity. Vessels may travel several kilometres from their home port and so this should not be used as a proxy for distribution.

Accessibility: Available for download at the following links: Vessel lists over 10 metres - GOV.UK (www.gov.uk) and Vessel lists 10 metres and under - GOV.UK (www.gov.uk)

Analysis section link: N/A

Figure number (Section 5.2): Figure 5.6

Source and data: Automatic Identification System (AIS) data (various sources)

Description & key use in EIA: All EU vessels > 15 m in length are required to have an AIS transponder which transmits details of the vessel's position, speed and course.

These data provide an indication of the spatial distribution of fishing activity.

Limitations: Vessels of < 15 m in length may not be represented in the dataset.

AIS data does not typically provide information on fishing method, and some errors in fishing vessel categorisation may be present.

Accessibility: Available via EMODnet (without the parameters needed to filter for speed) or via private AIS data holders (may incur a cost). AIS tracks and gridded AIS data are also available from the MMO.

Analysis section link: Section 5.1.2.6

Figure number (Section 5.2): N/A

Source and data: Transboundary (non-UK) Data

Description & key use in EIA: Non-UK fisheries statistics, VMS data, AIS data and consultation may be required with non-UK fleets if non-UK fishing vessels are understood to be active in the vicinity of the development and may be potentially sensitive to displacement of fishing activity or to the effects of secondary displacement.

Limitations: Similar limitations for fisheries statistics and VMS data as described above, depending on the source. VMS data from ICES does not provide information on nationality and so needs to be corroborated with another source. Vessels of < 12 m in length are not represented in this dataset.

Accessibility is the main constraint for transboundary data.

Accessibility: VMS effort data is available from ICES for most European fleets by method but not by nationality (i.e. overall fishing activity is shown for each method across the EU)[12].

[12] Publication Reports - ICES.2018.OSPAR-spatial-data-fishing-intensity.zip...

Fisheries management organisations of the relevant non-UK countries should be contacted in order to obtain the most accurate and up to date information on fishing statistics, including landings value and effort and VMS, where available. There can be challenges in obtaining non-UK data, to avoid this it is recommended requests to the relevant organisations and data owners are issued ASAP at the start of the scoping.

Landings data for most EU member states are publicly available through the Scientific, Technical and Economic Committee for Fisheries (STECF)[13] .

Analysis section link: N/A

[13] STECF - European Commission (europa.eu)

5.1.1 Recommendations for data on under-10 m fishing vessels

Monitoring and management of the under-10 m fishing vessel fleet is an area of priority research and focus for Marine Scotland. Less data are available for the under-10 m fleet for commercial fisheries impact assessments when compared with the over-10 m fleet and fishing activity by these vessels is underrepresented. The MMO fisheries statistics include landings for the under-10 m fleet, however, reporting of landings is not mandatory in England for the under-10 m fleet. Also, the systems for tracking activity in Scotland by these vessels are in the process of being updated. Landings are recorded by sales notes, but this may not include detail on fishing methods, area from which catch is caught and therefore some details for monitoring the under-10 m fleet may require fishery officer input (e.g. ICES rectangles from which landings originate). In Scotland, vessels under-10 m that are not a member of a Producer Organisation (PO) also provide weekly Fish1 forms and this provides voyage information. Vessels between 10-12 m or under-10 m vessels in a PO, provide a paper logbook per voyage.

No VMS or AIS data are available for the under-10 m fleet. However, the Marine Scotland ScotMap dataset, available through NMPi[14], presents spatial information on relative value and usage (number of fishing vessels and crew) for vessels under-15 m in length and was collected through face-to-face interviews with vessel owners and operators between 2007 and 2011. The commercial fisheries industry has confirmed that this is not thought to be representative of recent activity and therefore is not recommended for use in commercial fisheries baselines. Despite this caveat, this dataset can provide a starting point for the types of fisheries likely to be present but should not be solely relied upon to inform the commercial fisheries baseline.

As a result of the paucity in consistent quantitative data on recent activity by the under-10 m fleet, it is recommended that obtaining information on the fishing operating practices and fishing grounds (if required) for the under-10 m fleet is a focus of the consultation with national and local fishing organisations and representatives at an early stage of any assessment. Consultation should form a primary source of information for commercial fisheries baselines. In relation to static fishing gear, static fishing gear observation surveys may also be completed by developers to record locations of gear and their activity.

5.1.1.1 Future monitoring of the under-10 m fleet

In Scotland, the Scottish Inshore Fisheries Strategy 2015 aimed to implement an appropriate form of vessel monitoring for inshore vessels (Marine Scotland, 2015). This initiated an expansion of research into monitoring, and the Modernisation of the Inshore Fleet Programme involving vessel tracking and Remote Electronic Monitoring (REM) for inshore fleets, with varying technology being proposed for various fleets in relation to operational range, patterns of activity and

[14] ScotMap - Inshore Fisheries Mapping Project in Scotland | Marine Scotland Information

environmental interactions. Further details on the objectives and commitments for REM monitoring are described in Scotland's Fisheries Management Strategy 2020 – 2030[15]. At the time of writing, REM is currently used on a voluntary basis by the scallop dredge fleet with the aim of this being implemented in legislation in 2022 and for this programme to be expanded to other fishing fleets beyond scallop dredges in subsequent years. 40 creel boats in the Outer Hebrides have also been equipped with low-cost REM technology which reports vessel position[16]. Depending on the accessibility of these data, this may be an additional resource to describe commercial fishing activity.

The data which will be collected as part of this programme may be used to inform commercial fisheries baselines in the future with careful consideration of confidentiality and respect for ground sensitivities. However, as the monitoring programme is currently in its early stages, it is unlikely that the monitoring data would be publicly available at a large enough scale for commercial fishing impact assessments for several years.

5.1.2 Data analysis

Please note there are limitations with each data source, provided in Table 5-1 which must be considered before a source is used to inform baseline. The following section provides recommendations for how to process the various data sources prior to use within an EIA.

For most data spanning across multiple years, it is recommended that at least 5 years of data is analysed for the majority of fishing methods, where available. Data across this 5-year period should then be averaged to identify average fishing patterns which are less likely to be skewed by one particular year. The exception to this is fishing methods which are nomadic in nature with unpredictable fishing patterns, such as nomadic scallop dredges. For these fishing methods, 10 - 15 years of data should be obtained if possible, and 7 years at a minimum. The annual averages per year can also be analysed to determine inter-annual variation and this is especially valuable for fishing methods which are nomadic.

AIS data should cover 12 months to enable analysis seasonal variations.

Box 3 – COVID-19

EIA practitioners should be aware that due to potential impacts of COVID-19 on the fishing industry, data from 2020 and 2021 may not be representative of the commercial fisheries baseline. Use of data from this period alone might not reveal average fishing patterns which are typical for that area or receptor. Data from this period may also be confounded by potential impacts from Brexit.

[15] Scotlands Fisheries Management Strategy 2020-2030

[16] Marine Scotland Launch of inshore fisheries pilot - Marine Scotland (blogs.gov.scot)

5.1.2.1 Surveillance Sightings

These point data can be processed to present the total sightings over the time period provided, by fishing method and by nationality. If there are more than 10 fishing methods and nationalities which are shown in the map extent, just including the top 10 (i.e. in order of the highest number of sightings) with the remaining being categorised as 'all other methods' may improve the clarity of the figure. In the example, some fishing methods were pooled to limit error in classifications (Figure 5.1).

5.1.2.2 MMO Fisheries Statistics

The description of commercial fishing activity if using landings data should be based on an average over time per unit of area. Fisheries statistics are made available annually for the previous year. If using 5 years of data, annual averages by parameters such as vessel length, fishing method, species can be presented in bar graphs or plotted via GIS as shown in Figure 5.2. For species, it may be best to present the top ten (in terms of average value or effort) in the figures. Inter-annual or seasonal variation can also be analysed using the data, presented in bar graphs.

As noted above, for the majority of fishing methods, 5 years of data is sufficient. However, for fishing fleets with more unpredictable patterns of activity such as nomadic scallop dredgers (typically showing a 5-7 year cyclical pattern of activity) 10-15 years of landings data should be obtained, where available, to enable annual averages per year to be shown, and presented in a bar graph (e.g. see Brown and May Marine, 2018).

Box 4 – Marine Scotland Fisheries Statistics

Marine Scotland fisheries statistics can be analysed in a similar way to the MMO fisheries statistics. However, this dataset provides less detailed information on landings value, weights or effort by fishing method. Some ICES rectangles marked as 'disclosive' within the Marine Scotland dataset are also included within the MMO dataset. For the most comprehensive baseline using publicly available data, it is recommended that MMO fisheries statistics are used. This is particularly relevant if the project in question is further offshore than 12 Nautical Miles (NM) where transboundary and larger vessels with wider operational ranges may be present, increasing the overall spatial scale of data which is needed to be considered for coverage and perspective.

The use of MMO fisheries statistics in EIAs for renewables developments is common practice, even for Scottish developments, due to the advantages listed above.

5.1.2.3 MMO Vessel Monitoring System (VMS)

VMS data provide fishing activity data (effort, tonnes landed and value) which are obtained via mandatory satellite tracking to provide monitoring data of all vessels over-12 m in length throughout the EEZ, however, gridded data from the MMO is only available for over-15 m vessels[17]. Prior to the VMS data being released, position information is cross-referenced with logbook data to provide data in values and / or effort (kWh[18]). The tracking data are filtered to remove stationary vessels in port, or those which are transiting (i.e. speeds between 1 and 6 knots are included only). These data are anonymised and provided as a total for each year per grid squares which are 0.05° x 0.05° within ICES rectangles (approx. 4.5 nm^2). Further information on the MMO VMS data can be found on the MMO website[19].

Once obtained following the process outlined above, these VMS data should be averaged to show average activity annually, as presented in Figure *5.3* and Figure *5.4*. For commercial fisheries baselines it is recommended that a combination of value and effort VMS data are shown, with VMS effort being potentially more relevant to fisheries displacement specifically, due to this being associated with a relocation of fishing pressure. VMS data are the most comprehensive source of data on fishing activity by vessels over-15 m in length and should always be included in commercial fisheries baselines which include vessels of this size.

5.1.2.4 Marine Scotland VMS

The VMS data available through the Marine Scotland NMPi can be downloaded directly as separate GIS layers, so can be easily imported to GIS figures.

The key differences between the Marine Scotland VMS and the MMO VMS data are that the MMO VMS data include a greater number of fishing methods and by value and effort. Marine Scotland VMS data are available for *Nephrops* trawling, bottom trawling and dredging, and by effort only.

The Marine Scotland VMS data are valuable in providing a finer scale indication of where *Nephrops* trawling is expected to occur. For example, where *Nephrops* trawling is expected to occur, the Marine Scotland VMS data should be reviewed and compared with the MMO VMS data to identify the areas where *Nephrops* trawling occurs vs demersal trawling for other species.

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[17] As of 2012, EU legislation required all Member State vessels over 12 m in length to have VMS installed. However, there have been delays in the release of this data by MMO and data is only available for vessels > 15 m. Direct data requests can be made to the MMO for 12 – 15 m vessels.

[18] Effort in kilowatt hours: calculated by multiplying the time associated with each VMS report in hours by the engine power of the vessel concerned at the time of the activity.

[19] https://data.gov.uk/dataset/4bd80f1a-4ead-44c5-b3fa-975da1cb4d7d/fishing-activity-for-uk-vessels-15m-and-over-2016.

5.1.2.5 Consultation data

The FLO or EIA consultant (sometimes fulfilled by the same person) with expansive knowledge of fishing, with key support from any Fisheries Industry Representatives (FIRs), should carry out consultation as early as possible[20]. FIRs are usually nominated to represent an area by local fishermen and are essential to maintaining relationships and ensuring data coverage is comprehensive. In some instances, the FLO may be involved in the commercial fisheries assessment, however, this varies by project.

The type of consultation data which are provided will depend on the fishing methods which are operated in the study area, and the technology on board the vessels. Consultation data may also allow for the identification of emerging fishing methods.

Further details and recommendations for consultation are provided in Section 6.2.1.

5.1.2.6 AIS data

The International Maritime Organization (IMO) requires all vessels over-15 m to carry and operate an AIS transponder on board, to monitor their position, speed and course.

AIS data provide point data which shows a time series of a vessel's position which can be converted to lines to indicate vessel tracks. The data normally provide vessel categories, enabling just fishing vessels to be selected and shown. AIS data do not provide information on activity values or effort, but provide an indication of where fishing vessels are, and if filtered by speed (between 1 and 6 knots as defined in Lee *et al* (2010) and typically seen in other datasets) can provide some information on the distribution of what is assumed to be fishing activity[21]. It should be noted that AIS data may not provide constant vessel tracks if the transmitter is not permanently switched on.

5.1.3 Other data

As mentioned in Section 5.1, the recommended sources identified above are not exhaustive and represent the key sources of commercial fisheries data which should be drawn on for a commercial fisheries baseline. However, other data sources may be valuable to the assessment, depending on the location, project design parameters and the commercial fisheries present within the study area. These additional sources include but are not limited to:

[20] Further relevant information is available in The Fishing Liaison with Offshore Wind and Wet Renewables Group guidance documents (FLOWW 2014, 2015).

[21] The speed range which is used should be specific to the fishing methods which are present in the study area and are often less than 6 knots.

- Site-specific data, such as static fishing gear observation surveys, which can be used to record locations of gear and their activity and corroborate available information and data;
- National fisheries statistics reports, such as the Scottish Sea Fisheries Statistics 2019[22];
- MMO landings data by port (note these landings cannot be attributed to ICES rectangles);
- Transboundary data or information from the North Sea Advisory Council;
- Regional data reports, such as Shetland Fisheries Statistics 2019[23];
- ICES species stock assessments and survey data; and
- Regional mapped data, for instance the NAFC Marine Centre maps for shellfish creel and dredging grounds in Shetland presented within the Shetland Islands Marine Region State of the Environment Assessment[24] and available to view on NMPi.

Additional sources of data may also be identified through consultation.

5.2 Commercial fisheries data presentation

This section provides examples of how the commercial fisheries data listed in Section 5.1 can be presented. It is recommended where possible that figures are used as opposed to tables or text. The parameters which are selected for use in an EIA and the analysis which is carried out should be relevant to the location and project description of the development and the commercial fishing activity in the area of study (e.g. depending on fisheries characteristics and project design). The Figures shown in Section 5.2.1 are indicative only.

As described in Section 5.1, the data should be presented and described in a logical format and structure, going from a high level of detail to a finer scale. Surveillance sightings and fisheries statistics should be presented and described first. Surveillance sightings data provides an indication of the relative spatial distribution of fishing activity by method and nationality, but cannot be used to provide a quantitative assessment of fishing activity, due to the limitations presented in Table *5-1*. The fisheries statistics provide detail on effort and value by fishing method, vessel length and species and can also be used to determine annual or seasonal variations. However, these data do not provide any indication of the distribution of activity within each ICES rectangle. VMS data, consultation and AIS data should be described to provide an indication of the spatial distribution of fishing effort within the study area and in each ICES rectangle, corroborating the fisheries statistics and surveillance sightings data. It is important that a holistic approach is taken and that all the data are considered together to provide an accurate baseline for commercial fisheries and to clearly understand the receptors that should be considered in the impact assessment.

[22] Supporting documents - Scottish Sea Fisheries Statistics 2019 - gov.scot (www.gov.scot)
[23] Home - UHI Shetland
[24] Home - UHI Shetland

In order to make figures as clear as possible to commercial fisheries stakeholders, mapping outputs should employ the WGS1984 datum and relevant Universal Transverse Mercator (UTM) zone if a projection is used. Whether or not the map is presented in geographic or projected space, coordinates on the grid / graticule should include geographic latitude and longitude values (in WGS1984), presented as either Degrees Decimal Minutes (DDM) or Degrees Minutes Seconds (DMS). For all figures which are presenting commercial fisheries data labeled ICES rectangles, the 6 NM inshore and 12 NM territorial limits, and a NM scale bar should be shown. If possible, an admiralty chart[25] should be used as a basemap, unless this make the data less distinguishable (e.g. for VMS figures).

[25] UK Home Office, Crown Copyright (2021) Information available from ADMIRALTY Maritime Data Solutions

5.2.1 Good Practice Guidance: presentation of commercial fisheries data

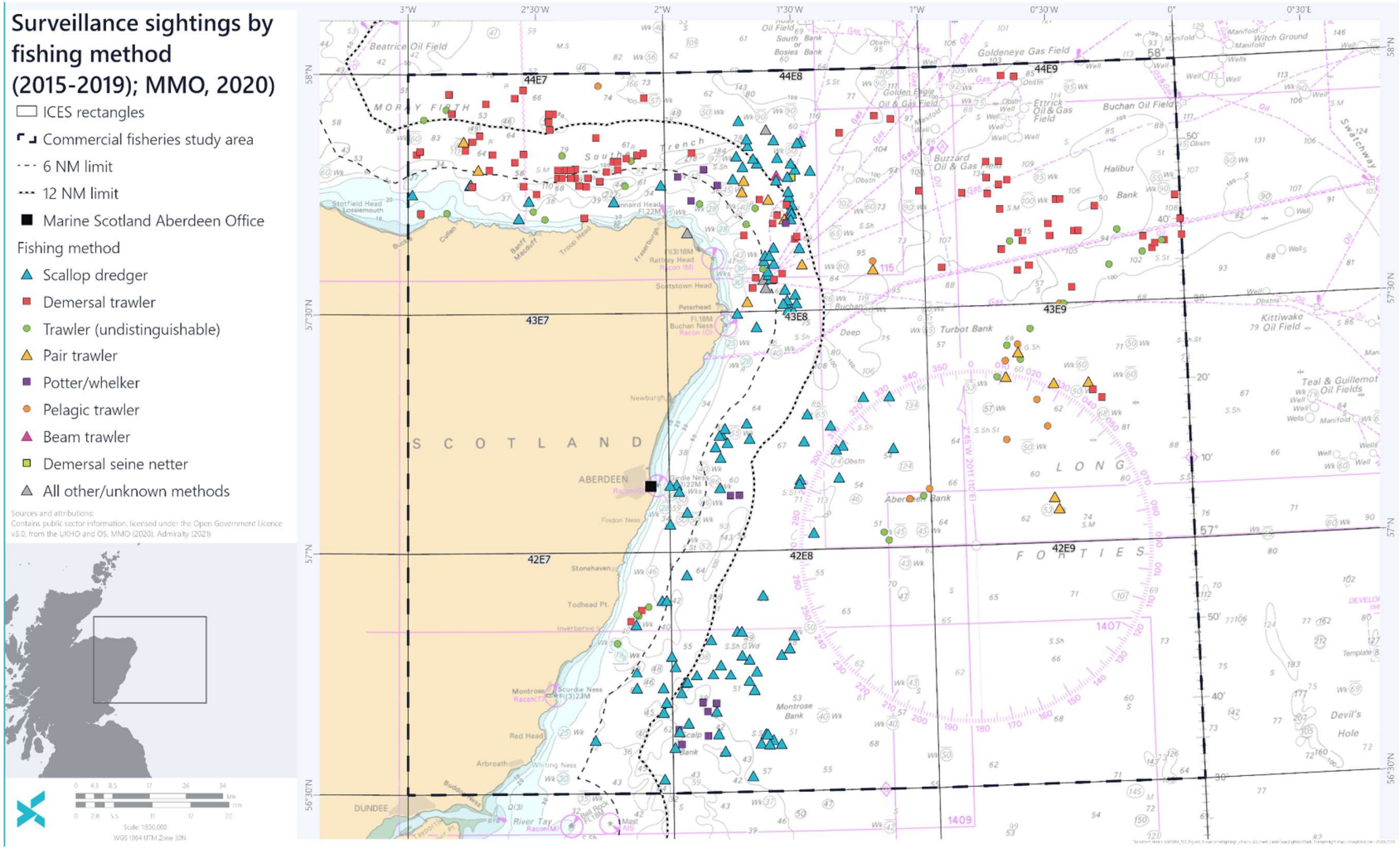

Figure 5.1 Surveillance sightings by fishing method (2015 - 2019) - example figure (MMO, 2020)

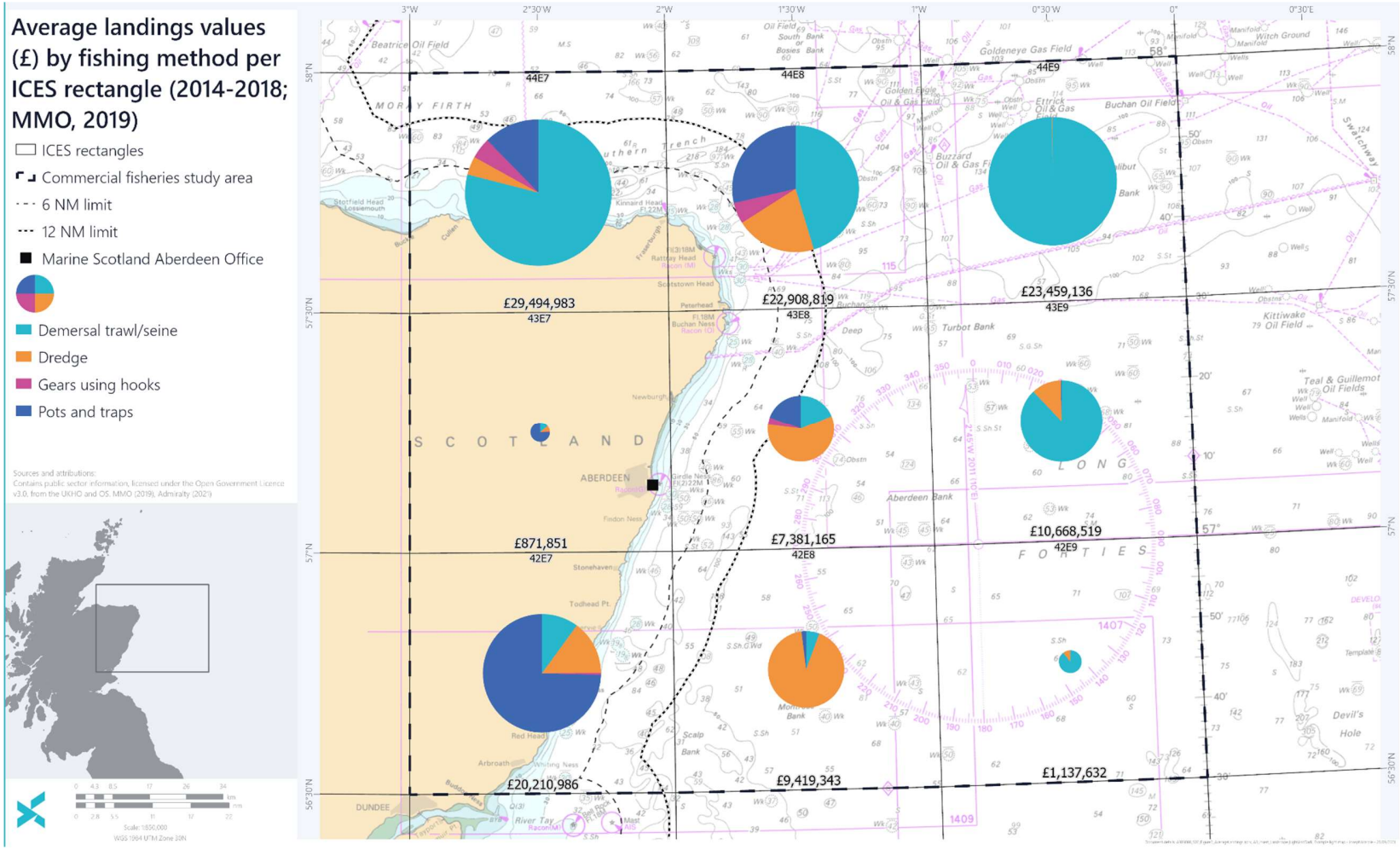

Figure 5.2 Average annual landing values by fishing method (2014 - 2018) - example figure (MMO, 2019). Size of each circle is proportional to the average annual landings values per ICES rectangle. Note that landings by fishing method can be presented as bars charts rather than pies.

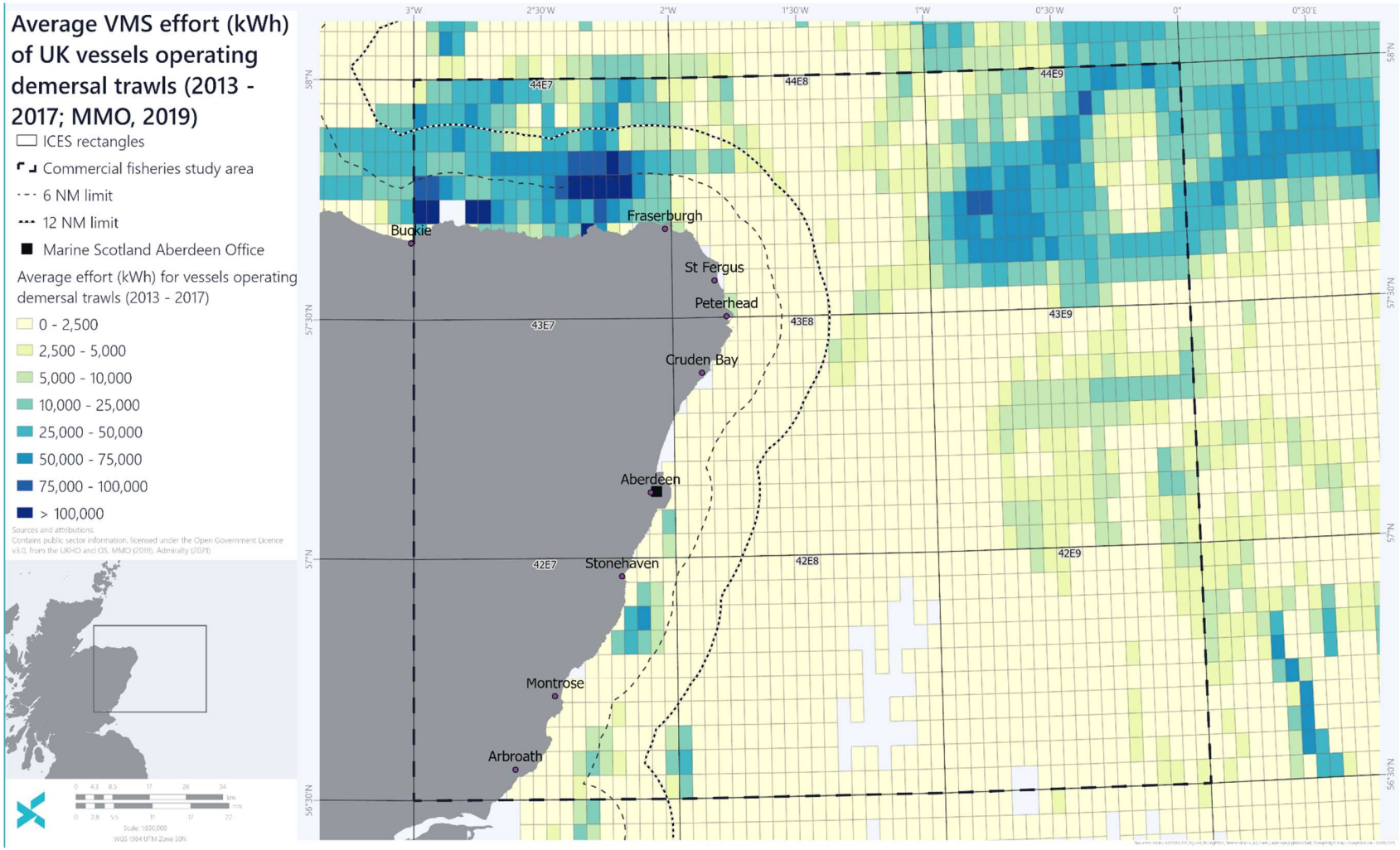

Figure 5.3 Average annual VMS effort (kWh) by demersal trawlers (2013 - 2017) - example figure (MMO, 2019)

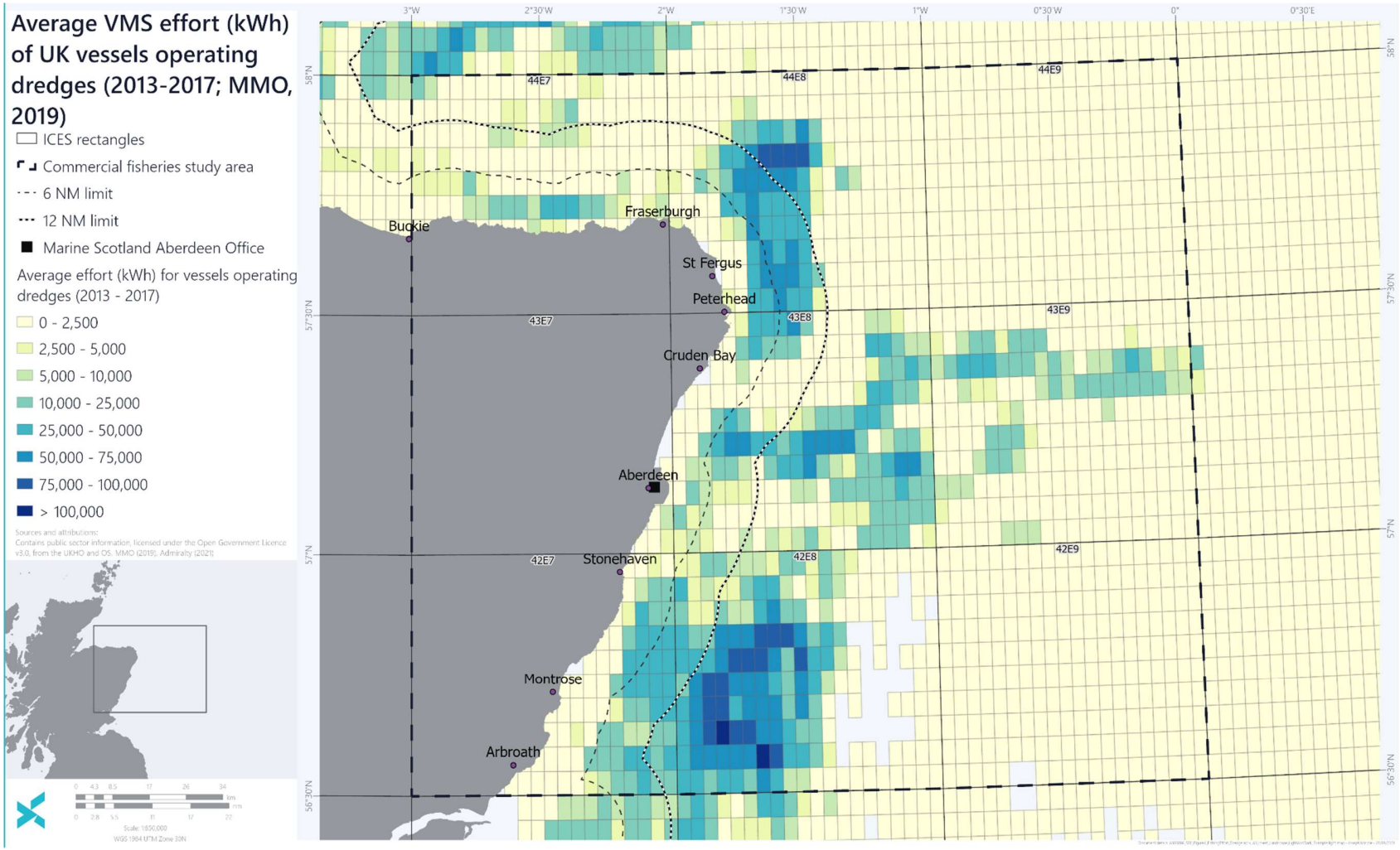

Figure 5.4 Average VMS effort (kWh) by scallop dredgers (2013 - 2017) - example figure (MMO, 2019)

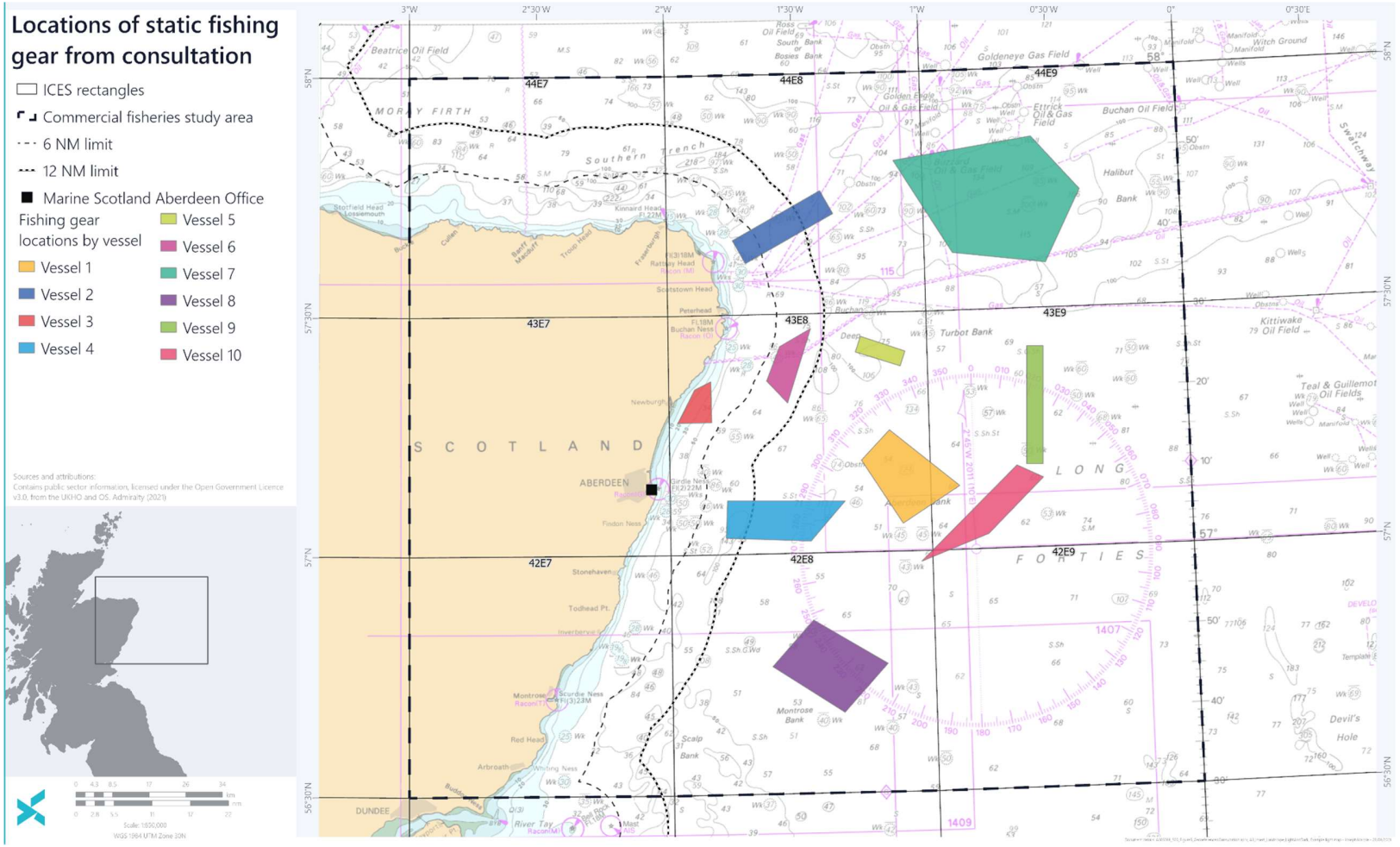

Figure 5.5 Locations of activity by static fishing gear operators (gathered by consultation undertaken March 2021-June 2021). Please note for the purpose of this Guidance, the static gear polygons were not based on real consultation data and are indicative only.

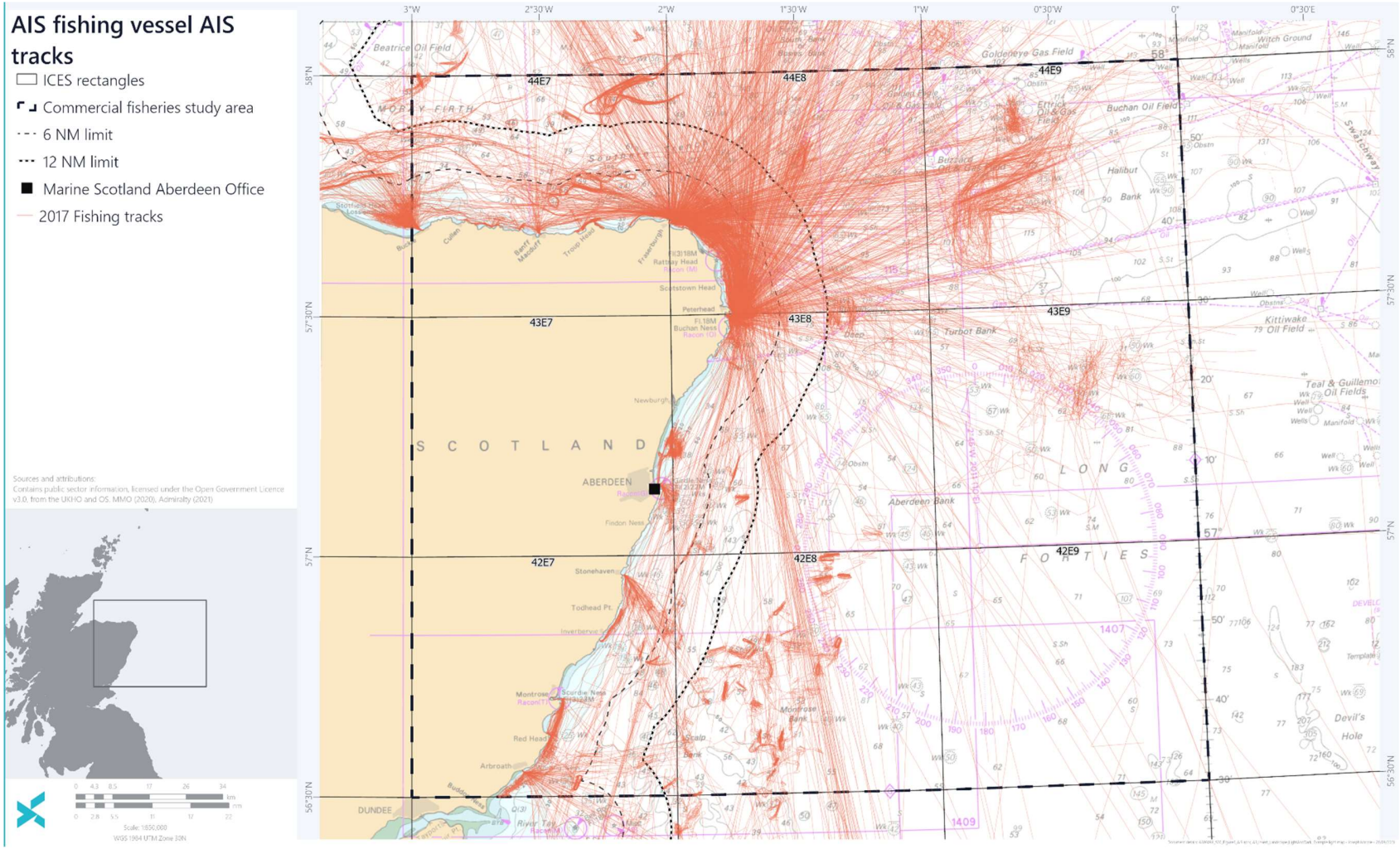

Figure 5.6 AIS tracks of fishing vessels between January 2017 and December 2017 (MMO, 2018)

6 Good Practice Guidance for the assessment of fisheries displacement

6.1 Commercial fisheries EIA methodology

For the purpose of this Guidance, it is assumed that the overall EIA methodology which would be applied during the production of a commercial fisheries chapter of an EIA Report (EIAR) will follow existing guidelines (CIEEM, 2018; SNH, 2018), and regulations (e.g. Marine Works (EIA) (Scotland) Regulations 2017 (as amended) and / or Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[26]). At all times, it is assumed that an EIA practitioner will consider the parameters of an offshore project such as the programme of works, installation methods, infrastructure design and then assess any impacts in relation to the worst case scenario of each project parameter, relevant to commercial fisheries stakeholders. A matrix of receptor sensitivity, magnitude of effect and impact significance is therefore expected to be followed in line with standard commercial fisheries assessment approaches. Further details are provided in Section 6.5.

Practitioners should clearly define and explain the EIA terms, as a 'non-significant' impact may not appear as such to the individual that it is affecting, and this should be clear when referring to displacement impacts. Through the ScotMER evidence map work, it was recommended that a review of EIA criteria for commercial fisheries is conducted, culminating in guidance on assessing magnitude and sensitivity of fisheries (Knowledge Gap FF.04) (Marine Scotland, 2018a). If the standard EIA methodology for commercial fisheries assessments are amended by Marine Scotland or other appropriate authority, it is expected that this would be adopted by EIA practitioners.

Further details on EIA methodology relevant to this Guidance can be found in the Literature Review (Section 4.1.1). The commercial fisheries displacement assessment will be included within the commercial fisheries impact assessment chapter in an EIAR as a potential impact of the development (if scoped in).

6.2 Overall guidance for commercial fisheries displacement assessments

As part of the Literature Review, several published EIAs for a variety of offshore developments were studied, in order to identify existing methodologies which have been used for commercial fisheries displacement assessments. The review focused on published EIAs for UK OWFs, however, EIAs for other development types (e.g. oil and gas, cables, wave) were also reviewed, as well as non-UK developments. This process, along with extensive consultation with the FFSRG has highlighted methodologies and processes which, based on the available information, may be most effective for commercial fisheries displacement assessments.

[26] Other regulations apply in England, Wales and Ireland.

In summary, the most effective assessment should use a method which enables clear identification of receptors, quantification of the spatial and temporal effects of displacement and also provides proportionate embedded or additional mitigation measures, where necessary, such as the Fisheries Management and Mitigation Strategy (FMMS), engagement and liaison, communication plans, use of guard vessels, employment of a company FLO and a project FIR. It is recommended that the following key points are considered during the development of assessments of commercial fisheries displacement:

1. Clear understanding of the commercial fishing 'receptors' for which impacts will be assessed, the fishing methods which are operated in the study area, including the areas where fishing activity may be relocated to (Section 5);
2. Identification of the likely maximum distance of displacement by the receptors, and the potential spatial extent of displacement effects for the fishing vessels which are already operational in the area which vessels are displaced to;
3. Identification of potential impacts on displaced commercial fisheries from the area that vessels are initially displaced from;
4. Identification of potential impacts on any fishing vessel operators / owners which are already active in the area in which vessels are displaced to and the potential for competition for space;
5. Establishing the sensitivity of each commercial fisheries receptor to displacement, with reference to the specifications detailed in Section 6.3.1;
6. If possible, a quantitative assessment of magnitude (e.g. taking account of spatial extent, duration, fishing effort, number of vessels) (e.g. Section 6.4); and
7. Consideration of primary and secondary displacement where applicable.

6.2.1 Recommendations for effective consultation

Accessibility to individual fishing grounds and permission from the vessel operators for their data to be used within an EIA requires early, extensive engagement and liaison with fishing vessel operators / owners, along with fisheries associations, local fishery offices and the Regional Inshore Fisheries Groups[27] (particularly relevant for cable routes in inshore waters between 0 – 6 NM[28]). It should be noted that the majority of small vessel operators may not be represented by associations and so 1-1 consultation is essential.

Ideally, meetings should be arranged with fisheries stakeholders during the screening / scoping stage. MS-LOT can initially advise on national and regional fisheries organisations that should be consulted with. Individual vessel operators

[27] More information on the Regional Inshore Fisheries Groups is available here: https://rifg.scot/
[28] The remit of Regional Inshore Fisheries Groups is 0 – 6 NM or 0 – 12 NM where there are marine planning partnerships. More information available here: Inshore Fisheries – Regional Inshore Fisheries Groups (RIFGS) Topic Sheet

/ owners can be identified through local knowledge from harbour masters, fishery officers and local Fisheries Industry Representatives (FIRs).

A representative sample of fishermen should be consulted with as part of the scoping and EIA process. Please note that consent from fishermen to release contact details will be required.

Assuming COVID-19 restrictions are lifted, consultation is often more productive when done via in-person meetings at an appropriate location and time (in consideration of factors such as the weather to predict if a fishing vessel operator / owner may be at sea) which is accessible to the fishing vessel operator / owner. Videoconference calls and telephone calls suffice if in-person meetings are not possible.

Consultation will provide information on the distribution of fishing activity by fishing method, key species, seasonal trends and also offers an opportunity for fisheries stakeholders to voice any concerns and feedback. It should also focus on understanding fishing vessel parameters and operating practices to help assign commercial fisheries receptor sensitivity to displacement (Section 6.3). This information will be key to inform the commercial fisheries displacement assessment.

In Scotland, the ScotWind Plan Option (PO) areas, were consulted on extensively by commercial fisheries stakeholders to minimise the potential overlap of offshore windfarms and areas of high fishing activity as much as possible, and to ensure involvement of fisheries at an early stage[29]. The PO areas were relocated and redesigned in multiple locations to accommodate concerns from fisheries stakeholders. Sectoral and regional consultation was undertaken as part of the Sectoral Marine Plan, such as fisheries organisations and the Inshore Regional Fisheries Groups. Early, collaborative approaches to consultation such as the ScotWind PO consultation process can reduce major impacts to commercial fisheries stakeholders from offshore developments, prior to project design. For offshore developments more localised and individual vessel operator consultation must be included.

During the EIA process, as well as following applicable Pre-Application Consultation (PAC) Regulations, there are national guidance documents published by The Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) which provide recommendations for fisheries liaison, including consultation and mitigation measures which should be referred to by developers and their contractors during the production of any commercial fisheries assessment (i.e. FLOWW, 2014; FLOWW, 2015). Consultation is normally conducted by the FLO with the support FIR, who should have extensive information on the local fishing industry.

[29] Sectoral Marine Plan for Offshore Wind Energy | Marine Scotland Information

The FLOWW committee is in the process of finalising a revised guidance document which is due to be published in 2021 and should be referred to once publicly available.

6.3 Assigning commercial fisheries receptor sensitivity to displacement

The displacement of fishing activity and a receptor's sensitivity to displacement may be affected by factors such those highlighted in the Literature Review in Sections 2.1.1 and 6.1.

In consideration of these factors, the findings of the Literature Review and following consultation with the FFSRG, the following parameters must be considered when assigning sensitivity of a commercial fisheries receptor to displacement:

1) Availability of alternative grounds, taking consideration of existing fishing methods which are used and the species which are typically targeted, how mobile the species are and the existing infrastructure / activities in the area;
2) Knowledge of alternative grounds;
3) The individual operating practices, strategies and preferences of the fishing vessel operator(s) / owner(s) including their perception of risk and experience level;
4) Distance from home port of the alternative grounds i.e. the operational range of the fleet which is often directly correlated with vessel size, and steaming time to alternative grounds;
5) The type and level of fishing activity already present in the area to which fishing is displaced, and subsequent potential for competition for space; and
6) Fishing rights and quotas. Consideration needs to be had for any implications of the withdrawal of the UK from the EU.

It should be noted that Marine Scotland is planning to produce a commercial fisheries sensitivity mapping tool which will provide guidance on assigning sensitivity criteria to commercial fisheries receptors.

Box 5 – Determining the availability of grounds

The Literature Review identified several different tools which are utilised to determine where fishing is likely to be relocated to as a result of displacement. However, most involve complex behavioural models which require several assumptions to be made with potential inaccuracies in the results.

As an alternative to determining where fishing effort is likely to be relocated to, a qualitative estimation of the availability of alternative grounds can be made. The availability of alternative grounds will influence the sensitivity of a receptor to displacement and can also be used to assess the potential for increased competition or gear conflict.

The availability of alternative grounds should be determined by considering the following factors:

- Location of established fishing grounds - determined primarily through VMS, but also potentially through other commercial fisheries data sources (e.g. surveillance sightings, consultation data and AIS);
- Operational range of vessels (using vessel size as a proxy – smaller vessels have smaller operational ranges);
- Attachment to home port;
- Availability, mobility and distribution of target species;
- Seabed type / habitat (where relevant);
- Regulations which limit the availability of grounds (e.g. restrictions on vessel size); and
- Existing infrastructure / activities in the area as well as any other spatial management measures (e.g. within an MPA) which could limit the availability of grounds for that fleet.

6.3.1 Vessel parameters and sensitivity

The specifications of a fishing vessel can vary widely depending on the fishing method which is being operated. The following key vessel parameters, have been identified as main factors in defining the sensitivity of a fishing vessel to displacement:

1) Vessel length, engine power and overall maneuverability;
2) In relation to trawlers / dredgers, the length, width and material of the net and rig and subsequent minimum spacing required for hauling, deploying and operating gear;
3) Seabed penetration depth of the component which is in seabed contact (the groundline, dredge teeth);
4) Versatility, for example multipurpose vessels which may switch from *Nephrops* to rockhopper trawl gears; and
5) The adaptability of the fishing method or ability to switch to another fishing method e.g. only suitable for sandy ground vs able to trawl over mixed and

uneven ground. Consultation with the fishing industry has indicated that larger vessels are less likely to be adaptable.

For offshore wind farms, details on vessel parameters may help to understand the potential for co-existence between certain fishing fleets and the offshore wind farm, dependent on the project design parameters, and this can feed into the assessment of displacement during the operational phase. For instance, once the minimum spatial requirements for deploying and hauling gear and the manoeuvrability of a vessel is known, this can be compared with the minimum spacing between turbines to ascertain whether fishing *could* resume within the wind farm area, once operational. Whether fishing activity *does* resume, will however, be dependent on each individual skipper and their perception of risk, and this should always be noted within a commercial fisheries displacement assessment. Liability for any damage to offshore wind farm infrastructure and associated cabling is also another consideration in assessing whether or not fishing may resume after construction of a wind farm. Research and guidance on existing legal frameworks with regard to fishing within wind farms is a knowledge gap that has been identified by stakeholders on the ScotMER Fish & Fisheries evidence map.

6.3.1.1 Fisheries specific sensitivities

Indicative vessel parameters for each of the priority research area fishing methods (as identified in Section 6.3.1 in this Guidance and Section 2.1.1 in the Literature Review) which are relevant fisheries displacement are provided in Sections 6.3.1.1.1 to 6.3.1.1.4.

The vessel parameters which are provided are based on anonymised vessels which are known to operate each of the fishing methods. The vessel parameters have been taken from typical vessels within each category from the MMO vessel lists (MMO, 2021a; MMO, 2021b), from data from the SFF and SWFPA and through consultation with the SFF and SWFPA[30] (SFF, 2020). Please note that seabed penetration depth has not been listed within these tables as this will depend on several factors, including the gear being operated, its interaction with the seabed and the ground conditions present in the area. This has been identified as a potential area of future research within the Literature Review.

The parameters which are provided are based on typical values obtained through consultation and publicly available data on each fleet. The specific parameters which should be used for an assessment must be obtained by project-specific consultation and data sourcing.

[30] Please also note that the SFF also received information from a representative at Seafish to inform this guidance.

Box 6 – ScotMER Evidence Gap FF.14 – Co-existence

Defining the minimum spatial operational range and seabed penetration depth of fishing methods has also been identified as a knowledge gap for coexistence as part of the ScotMER evidence work (Knowledge Gap FF.14). If any studies or guidance on this topic become available as part of the ScotMER work, this could be referred to as part of the displacement assessment. However, due to the variability in the spatial requirements of fishing vessels, consultation should also be used to inform this aspect.

6.3.1.1.1 The Scottish King Scallop fishery

Example receptor – a large, nomadic scallop dredger, home port in Peterhead, Brixam, Peterborough etc, operational range is most scallop grounds in the UK.

Vessel length: 30.3 m

Vessel breadth: 7.3 m

Engine power: 750 kW

Gear operated: Scallop dredge

Number of rigged towed gears: 8-10 dredges per beam (16)

Minimum spatial requirements for deploying and hauling gear: Within 12 NM, the tow bar is a maximum length of 7.5 m with a maximum of 8 dredges per side. Beyond 12 NM limit, there is no restriction on tow bar length, but only 14 dredges per side are permitted. Distance between the vessel and the tow bar varies with weather conditions, seabed habitat and water depth, with no specific limits stipulated in legislation.

Towing speed: 2 – 3 knots

Typical duration of tow / dredge: 1-2 hours

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing: Low

Availability of other grounds: Depends on scallop populations at other grounds, but potential UK-round. May depend on seabed type and water depth.

Adaptability of vessel: To be added by EIA practitioner following project-specific consultation.

6.3.1.1.2 The Demersal trawl fishery

6.3.1.1.2.1 Single demersal trawler

Example: over-10 m demersal trawler based in Fraserburgh, Buckie etc targeting squid

Vessel length: 18.3 m

Vessel breadth: 6.5 m

Engine power: 750 kW

Gear operated: Demersal trawl net

Number of rigged towed gears: 1 single net

Operational area needed when gear in use (spread of gear on seabed): Dependent on water depth and target species. Average distance from boat to net is approximately 400 – 600 m, with the net a further 70 – 90 m from the cod end. This may be longer for fishing vessels operating in deeper waters or when vessels operate with a longer distance between the wing end of the net and the trawl doors (bridle). The distance between the trawl doors varies between 30 and 120 m.

Towing speed: 2-4 knots

Typical duration of tow / dredge: 1-2 hours

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing: Low

Availability of other grounds: To be added by EIA practitioner following project-specific consultation.

Adaptability: Can switch to other kinds of trawled gears to target other species such as *Nephrops.*

6.3.1.1.2.2 Pair Trawling

Example: Pair trawlers based in Peterborough targeting whitefish in North Scotland

Vessel length: 29 m

Vessel breadth: 8 m

Engine Power: 670 kW

Gear operated: Demersal trawl net towed by 2 vessels.

Number of rigged towed gears: 1 net

Operational area needed when gear in use (spread of gear on seabed): Vessels operate approximately 200 – 500 m apart and the distance between the net and the vessel ranges from 200 – 600 m. The net is a further 80 – 100 m from the wing ends of the net to the cod end.

Towing speed: 3 – 4 knots

Typical duration of tow / dredge: 1-2 hours

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing: Low

Availability of other grounds: To be added by EIA practitioner following project-specific consultation.

Adaptability: To be added by EIA practitioner following project-specific consultation.

6.3.1.1.2.3 Nephrops trawling

Example: over-10 m *Nephrops* trawler based in Dunbar, Pittenweem etc operating in the Forth and Tay region.

Vessel length: 11 m

Vessel breadth: 4 m

Engine power: 90 kW

Gear operated: *Nephrops* demersal trawl net

Number of rigged towed gears: 1 single net

Operational area needed when gear in use (spread of gear on seabed): 280 – 500 m between the vessel and trawl doors and a further 40 - 70 m to the cod end. The distance between the trawl doors is approximately 20 – 70 m.

Towing speed: 1.5 – 4.5 knots

Typical duration of tow / dredge: 2 – 4 hours

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing**:** Low / medium

Availability of other grounds: Specific to *Nephrops* grounds typically located in sandy and muddy sediments. May depend on quota availability.

Adaptability: Can switch to other kinds of trawled gears to target other species (e.g. to rockhopper trawl nets with different mesh sizes during squid season)

6.3.1.1.3 Scottish Seine Net fleet

Example: over-10 m vessel based in Fraserburgh operating in and around the Moray Firth.

Vessel length: 24 m

Vessel breadth: 6 m

Engine power: 559 kW

Gear operated: Scottish seine net

Number of rigged towed gears: 1 single net

Operational area needed when gear in use (spread of gear on seabed):Seine netters operate with 3600 m of rope on each side, shot in a triangle shape. Therefore, the net can be as far as 2,800 m from the boat and 1,400 m wide when the net is first hauled. There is a further 80 – 100 m back to the cod end.

Towing speed: To be added by EIA practitioner following project-specific consultation.

Typical duration of tow / dredge: To be added by EIA practitioner following project-specific consultation.

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing: Low

Availability of other grounds: Depends on the availability of sandy soft sediments / clear ground which is typically operated.

Adaptability: Seine net vessels can switch over to demersal or other trawling methods and have been known to do so over the last decade.

6.3.1.1.4 Static fishing gear (creels)

Example: under-10 m potting vessel operating out of Buckie.

Vessel length: 7 m

Vessel breadth: 3 m

Engine power: 40 kW

Gear operated: Pots and traps

Operational area needed when gear in use (spread of gear on seabed): Depends on the number of creels which are worked.

Typical soak time: 1 - 2 days

Seasonality: To be added by EIA practitioner following project-specific consultation.

Manoeuvrability when fishing: Low when hauling or setting gear.

Availability of other grounds: Depends on the proximity of the grounds to the creeler, as well as quality of the grounds as they are often more restricted in operational range.

Adaptability: Some smaller vessels may have the capability to operate other fishing methods, and are sometimes multipurpose with several methods worked at different times of year (e.g. mackerel jigging).

6.4 Magnitude of effect for displacement

The magnitude of effect of the displacement of commercial fishing activity should be defined on the basis of project-specific factors including the duration, spatial extent and the characteristics of the project which may cause displacement. As with any commercial fisheries impact, the magnitude of effect should be defined separately for each development phase (e.g. pre-construction surveys / seabed preparation, construction, operation and maintenance, decommissioning) and separately for each receptor. Additionally, all aspects of a development should also be considered. For instance, for an OWF and the electrical transmission infrastructure should both be considered. Often, displacement from the wind farm area and the export cable are considered as separate impacts within an EIA.

The duration, spatial extent and characteristics of the project will depend largely on the type of development, which is further detailed in Section 6.2.1.1 of the Literature Review. In defining the magnitude of effect, EIA practitioners would be expected to identify mitigation measures which could be implemented either as part of the project design or during the activity, to reduce any significant impacts. These would be captured within the projects FMMS or equivalent consent plan (e.g. Fisheries Liaison and Coexistence Plan) and should be steered by the project FLO and the relevant consent condition requirements.

A summary of the key parameters of developments which are of particular relevance to commercial fisheries displacement and categorisation of magnitude of effect are listed below:

- Duration of different project activities / phases, including pre-construction surveys, construction, operations and maintenance and decommissioning activities;
- Number of work vessels active on site during any phase at any time and vessel management such as shelter areas, indicative transit plans, safety zones;
- Layout, design and installation methods for infrastructure such as the minimum spacing between OWF turbines (tends to increase with increasing power capacity) and orientation;
- Whether the project is floating or fixed to the seabed;
- The overall area of subsea structures and any subsidiary infrastructure;
- Expected depth of burial, and % of cables which will be buried, the type of design, installation and inspection processes of any mechanical protection; and
- Mitigation measures such as the FMMS, engagement and liaison, communication plans, use of guard vessels, employment of a company FLO and a project FIR.

To determine the magnitude of impact, the factors above should be placed in the context of the level of fishing that occurs within the displaced area and the relative importance of the area for each receptor when considering the availability of alternative grounds.

Additionally, as displacement specifically refers to the redistribution of effort, it is important to consider whether alternative grounds are able to 'absorb' the displaced effort or whether competition for space or gear conflict is likely to arise. It cannot be assumed that fishing vessels will always relocate to established fishing grounds in the vicinity of the displaced area. For example, some vessels may choose to relocate to new fishing grounds or grounds which are operated by other fishing fleets (e.g. static fishing gear vessels relocated to areas operated by demersal trawls). Therefore, there is the potential for conflict and competition to arise within and between fleets.

The factors that should be considered when determining the potential for conflict or increased competition within and between fishing fleets are:

- The levels of effort that occur within the area from which vessels have been displaced from and the spatial extent and duration of the impact;
- Availability of alternative grounds for the displaced vessel (i.e. potential for effort to be dispersed across a wide area and reduce the potential for conflict and / or competition); and
- The potential for overlap between the available grounds for different fleets. For instance, for fishing fleets that require specific habitat conditions for target species (e.g. *Nephrops*), there may be limited potential for overlap with grounds for fishing methods which do not operate in the same conditions.

It is important that for each receptor, the fisheries displacement assessment considers the potential for primary and secondary displacement impacts.

6.5 Assessment criteria and determining significance

Standard commercial fisheries EIA methodology involves assigning a sensitivity (e.g. negligible, low, medium or high) and magnitude (e.g. negligible, low, medium, high) for each identified receptor and utilising a significance criteria matrix to determine the potential significance of each impact. Commercial fisheries sensitivities and magnitude cannot be easily categorized and will largely require a qualitative assessment relying on expert judgement.

It is standard industry practice to include overarching sensitivity and magnitude criteria within an assessment methodology / criteria sub-section within the commercial fisheries EIA chapter. However, due to the number of impacts requiring consideration within a commercial fisheries EIA, it is difficult to apply standard definitions consistently across all impacts. These standard definitions for sensitivity usually include aspects such as availability of alternative grounds, operational range, adaptability / versatility in terms of fishing method and / or target species, and dependence on fishing grounds overlapping development area. The standard definitions for magnitude of effect usually consider the level of fishing effort / value in the development area, the spatial extent of the impact (in terms of overlap of the receptor's fishing grounds) and the duration of the impact. These standard definitions are useful to generally guide the assessment, however, the

factors listed within this guidance should form the basis for assigning sensitivity and magnitude for a fisheries displacement assessment.

As is the case for all impacts considered within a commercial fisheries EIA chapter, the fisheries displacement assessment should include separate sensitivities and magnitudes for each phase of the project (construction, operation and maintenance and decommissioning) and for each receptor being considered.

The key factors requiring consideration when assigning sensitivity and magnitude are described in Sections 6.3 and 6.4. These should be used by EIA practitioners and stakeholders to assign sensitivities and magnitude in order to determine the significance of the impact (e.g. negligible, minor, moderate or major).

As an example, a receptor may have a higher sensitivity to displacement if they have one or all of the following attributes:

- Low availability of alternative fishing grounds;
- Low versatility / adaptability in terms of fishing method or target species;
- Small vessel length with a smaller operational range;
- Fishing methods with operating practices which are more vulnerable to gear conflict – typically this includes static fishing gear which is left unattended on the seabed; and / or
- Fishing methods with a low potential for co-existence with a development, considering vessel parameters and sensitivity listed in Section 6.3.1 and the potential for health and safety risks of returning to fish within a development. Note this will be dependent on the project-specific design parameters.

Furthermore, the magnitude of effect may be greater under the following scenarios:

- Long-term or permanent duration;
- The area affected sustains high levels of activity by the fishery;
- The impact occurs over a large spatial extent which covers a large proportion of the receptors fishing grounds;
- The distance between each OWF turbine is small, meaning fishing is highly unlikely to resume within the development area;
- Aspects of the project design pose a potential health and safety risk to the fishing activity;
- There is a low potential for cable burial;
- The displaced fishing activity has a low availability of fishing grounds, with the potential for displaced vessels to be redistributed to fishing grounds operated by other fishing fleets (e.g. static gear displaced into waters operated by mobile operators).

Please note that the lists above are not exhaustive and that each receptor and development should be considered on a case-by-case basis. A holistic approach should be taken when assigning sensitivity and magnitude, by considering all factors listed within Section 6.3 and 6.4, respectively. The EIA practitioner or stakeholder should consider how each of these factors *together* influence the

sensitivity of the receptor and the magnitude of effect, rather than focusing on each factor individually. As described previously, when determining significance, displacement impacts should be considered in terms of the receptor being displaced directly by the other licensed marine activity (primary displacement) but also the receptor being indirectly impacted by the other licensed marine activity through secondary displacement.

Notably, fisheries displacement will likely form one of several impacts which are assessed within a commercial fisheries EIA. The fisheries displacement assessment will closely link to the impact assessment for temporary or permanent loss or restricted access to fishing grounds as this has a direct influence on the anticipated levels of displacement. The assessment methodologies for loss or restricted access to fishing grounds often incorporate several factors which are relevant to displacement, such as the fleet characteristics which determine the sensitivity to this impact (e.g. the operational range (often correlated with vessel size), availability of fishing grounds and target species, and adaptability / flexibility of gear). Aspects of the impact that determine the magnitude of effect, such as the spatial extent and duration of the assessed activities, and the value and effort of fishing activity within the grounds that overlap with the impact area compared to the overall operational range or grounds available are also relevant to the assessment of displacement.

6.6 Summary of assessment of displacement process

Based on the information provided in Sections 5 to 6.4, the following diagram provides a summary of the approach which is advised to be used when assessing fisheries displacement. The primary step which should be taken in all cases is to obtain an overview of the current fishing activity from desk-based sources and consultation, and to identify the key receptors to displacement impacts.

Consultation (occurs throughout)

- Project FLO and FIR
- Engage with fisheries stakeholders during scoping, EIA and post- consent
- Transparent process for assessment
- Obtain key data on fleets, operating practices and fishing grounds
- Consultation following application

Pre-application
Step 1: Identification of sensitive fleets / vessels

1) Issue irrelevant FOI requests for surveillance sightings, VMS data, fisheries statistics and other data sources, as necessary (Table 5-1)
2) Analysis and presentation of commercial fisheries data to describe the existing environment (Section 5)
3) Consultation to understand fisheries distribution (especially 10 m and under vessels) and to identify stakeholder concerns (Section 5 and 6.2.1)
    a. Use of FLO/ FIR

b. Fisheries associations and working group

4) Identify receptors which are sensitive to the different phases of the development
5) Consultation and desk-based review (e.g. Seafish website) to understand typical operating practices for receptors

Step 2a: Designate sensitivity

1) Review of desk-based sources to understand availability of alternative grounds and other factors which influence sensitivity to displacement for each receptor (Section 6.3)
2) Consultation to obtain information on vessel parameters (Section 6.3)
3) Assign sensitivities to displacement for each receptor fishery (Section 6.5)

Step 2b: Determine magnitude of effect

1) Identify relevant embedded mitigation measures
2) Describe the spatial extent and duration of displacement for each phase
3) Consider the project design parameters which will influence the level of displacement likely to occur for each phase (Section 6.4)
4) Identify the potential for conflict and increased competition to result from displacement occurring from each project phase (Section 6.4)
5) Assign the magnitude of effect for each receptor and phase of the project (Section 6.5)

Step 3: Determine significance using standard EIA methodology (Section 6.5)

Step 4 : Mitigation Measures
1) Identify relevant mitigation measures

Post-application
Step 5: Post Consent
1) Production of FMMS and other post-consent plans and documentation
2) Discharge of consenst conditions (e.g. commercial fisheries monitoring)

6.7 Cumulative and in-combination assessment

The assessment of cumulative and in-combination effects (see Box 7) is an integral aspect of EIA, and as such, displacement impacts must also be considered in this context. It is recommended that the cumulative and in-combination impacts which are included follow the current approaches from commercial fisheries EIA methodologies, taking into account projects and activities which may occur at the same time (e.g. concurrent construction phases) or within the same area (relative to the commercial fisheries receptor's operational range and sensitivity). It is recommended that all offshore developments / activities are considered for

inclusion in the cumulative effects assessment, and not just developments of the same type. These should be identified through sources such as Marine Scotland Information, Crown Estate Scotland / The Crown Estate and through consultation with Marine Scotland (or equivalent) as needed. Any management measures in MPAs which could act cumulatively should also be considered.

Box 7 – Cumulative and in-combination impacts

For the purposes of this guidance, the definitions of cumulative and in-combination impacts provided within the Marine Scotland (2018b) offshore wind, wave and tidal energy applications: consenting and licensing manual. The Marine Scotland (2018b) guidance also highlighted that cumulative and in-combinations impacts should both be considered in a cumulative effects assessment. The definitions for cumulative and in-combination impacts are as follows:

> "Cumulative effects can occur on a local, regional or global basis and can be additive, combined or synergistic. They are described as effects that result, or are likely to result, from additive effects caused by other past, present or reasonably foreseeable actions (e.g. in scoping), together with the plan, programme or project itself. More specifically, they are defined as pressures of the same type acting on the same receptors across defined spatial areas and temporal periods."
>
> "In-combination effects are defined as pressures of a different type but acting on the same receptors."

The factors which influence displacement sensitivity, and the direct effect on the displaced fishery will directly influence the probability of a cumulative effect occurring. If potential significant impacts could be caused during the operational phase of a project, it is recommended that the cumulative effects are considered during operation as well as construction / decommissioning, and that a more holistic approach to this component of the assessment is carried out. Each potential activity or project which is identified as having the potential to result in a cumulative effect should be reviewed to determine the spatial and temporal scales of the potential cumulative impact. The status of the other projects and activities being considered within the displacement assessment (e.g. consented, operational, decommissioning), construction timelines (if appropriate) and project design parameters should also be considered within the cumulative assessment.

The relevant area for consideration for cumulative effects should consider the operational range of the impacted receptor, and this may be large (e.g. a nomadic scallop dredger with large operational range which is displaced from a floating windfarm). Characteristics of the fishing activity and target species should form the core base to the assessment, with reference to the sensitivity factors given in Section 6.3 along with the comprehensive baseline defined using the sources provided in Section 5.1. The magnitude of the cumulative and in-combination impact should be specific and proportionate to each identified receptor fishery.

The cumulative effects assessment should consider the following:

- Sensitivity of each receptor to displacement using the methods laid out in Section 6.3;
- The potential overlap of the fishing effort by the receptors relevant to the project itself with the projects / activities identified as part of the cumulative and in-combination assessment;
- Consider the interactions of different impacts acting on a receptor (in-combination impact);
- The project design parameters of the projects / activities identified as part of the cumulative and in-combination assessment (for MPAs this would consider any fisheries management measures in place); and
- The spatial and temporal overlap of the other projects / activities with the project itself and assess how this could result in cumulative displacement impacts.

7 Concluding statement

This Guidance has been produced alongside an accompanying Literature Review in order to address the need to better assess fisheries displacement impacts. It represents a significant step forward in the standardisation of the assessment of fisheries impacts as part of EIA. The work undertaken has highlighted the importance of progressing other related work scopes identified through the ScotMER fish and fisheries evidence map, alongside the need for additional research and studies. Due to the evolving nature of fisheries EIA, this Guidance document will need to be regularly reviewed and updated in order to ensure it represents the best available Guidance.

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