East Anglia TWO Offshore Windfarm

Appendix 13.1

Commercial Fisheries Technical Report

Preliminary Environmental Information
Volume 3
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Revision Summary					
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Table of Contents

Glossary of Acronyms

BMM	Brown and May Marine Limited
BWEA	British Wind Energy Association
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFP	Common Fisheries Policy
COLREGS	International Regulations for Preventing Collisions at Sea
CPA	Coastal Protection Act
CRPMEM	Comité Régional des Pêches Maritimes et des Élevages Marins
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DTI	Department of Trade and Industry
EC	European Commission
EEZ	Exclusive Economic Zone
EIFCA	Eastern Inshore Fisheries Conservation Authority
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FEPA	Food and Environmental Protection Act
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
HFA	Harwich Fishermen Association
HP	Horsepower
ICES	International Council for the Exploration of the Seas
IFCA	Inshore Fisheries and Conservation Authority
IFREMER	L'Institut Français de Recherche pour l'Exploitation de la Mer
IMARES	Institute for Marine Resources and Ecosystem Studies
ILVO	Institute for Agricultural and Fisheries Research
LEI	Landbouw Economisch Instituut
MCEU	Marine Consents and Environment Unit
MCA	Maritime Coastguard Agency
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MPA	Marine Protected Area
NFFO	National Federation of Fishermen's Organisations
NPS	National Policy Statement
NtM	Notice to Mariners
PO	Producer Organisation
PEI	Preliminary Environmental Information
SAC	Special Areaof Conservation
SCI	Site of Community Importance
SPA	Special Protection Area
UKFEN	UK Fisheries Economic Network
UKHO	UK Hydrographic Office
VisNED	Dutch Fisherman's Federation
VMS	Vessel Monitoring System

Glossary of Terminology

Applicant	East Anglia TWO Limited
Beam Trawl	A trawl net whose lateral spread is maintained by a beam across its mouth
Beam trawl -Pulse Wing Trawling	Advanced adaptation of conventional beam trawling where the tickler chains and chain mat of the beam trawl are removed and replaced with trailing electrodes
Construction operation and maintenance platform	A fixed structure required for construction, operation and maintenance personnel and activities.
Demersal fish	Fish living on or near the seabed
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
Flatfish	Fish of the order Heterosomata of marine typically bottom-dwelling bony fishes such as soles, place and turbots, that as adults swim on one side of the laterally compressed body and have both eyes on the upper side
ICES rectangle	Spatial unit used for the collection of fisheries statistics which covers an area of approximately 900nm^2, aligned to 30' latitude by 1° longitude
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Longlining	Fishing method that involves setting out short lines carrying hooks, which are attached to a longer main line at regular intervals. The short lines are suspended horizontally at a predetermined depth with the help of surface floats
Monitoring buoys	Buoys to monitor in situ condition within the windfarm, for example wave and metocean conditions.
Offshore cable corridor	This is the area which will contain the offshore export cable between offshore electrical platforms and landfall jointing bay.
Offshore development area	The East Anglia TWO windfarm site and offshore cable corridor (up to Mean High Water Springs).
Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, and export cables from the offshore electrical platforms to the landfall..
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cable	The cables which would bring electricity from the offshore electrical platforms to the landfall, these cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the offshore operation and maintenance platform and the offshore electrical platforms.
Otter trawl	Nets which have otter boards fastened to the sides. When in motion under water, the boards pull away from each other resulting in the net opening up

	in a horizontal direction. Demersal fisheries as well as pelagic fisheries can apply this technique
Pelagic fish	The term pelagic fish covers species found mainly in shoals in midwater or near the surface of the sea
Platform link cable	An electrical cable which links one or more offshore platforms, these cables will include fibre optic cables.
Potting	Fishing method which uses baited traps (posts) to target shellfish species, most commonly lobsters and crabs. Pots have a tapered entrance that makes it easy for shellfish to enter, but very difficult for them to find the way out.
Safety Zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Seine netting	A method of fishing that employs a Seine or dragnet. The net hangs vertically in the water with the bottom edge held down by weights and the top edge buoyed by floats

13.1 Commercial Fisheries Technical Report

13.1.1 Introduction

1. This report has been prepared by Brown and May Marine Limited (BMM) on behalf of the Applicant and describes the existing commercial fisheries baseline in relation to the proposed East Anglia TWO project. The components of the project of relevance to commercial fisheries are the East Anglia TWO windfarm site and the offshore cable corridor. Collectively, these areas are referred to as the Offshore development area.

2. For the purposes of this report, commercial fishing is defined as the legitimate capture of finfish and shellfish to be sold for profit by a licensed fishing vessel. The report is focused on fishing fleets that are active in areas relevant to the Offshore development area, including local inshore vessels and larger vessels that operate further offshore and have homeports in the UK and other European countries.

13.1.2 Study Area

3. The Offshore development area is located within International Council for the Exploration of the Sea (ICES) Division IVc (Southern North Sea). Fisheries data and information within each ICES Division are collected and analysed by ICES statistical rectangle. The study area used for assessment of commercial fisheries activity has therefore been defined with reference to the ICES rectangles within which the Offshore development area falls (***Figure A13.1.1***). These are as follows:

   - ICES rectangle 33F1, where the inshore section of the offshore cable corridor is located, and
   - ICES rectangle 33F2, where the offshore section of the offshore cable corridor and the East Anglia TWO windfarm site are located.

4. The study area defined above has been used to identify fisheries potentially active in the Offshore development area and the levels of fishing that the area sustains. Where relevant, however, data and information have been analysed for wider areas to provide context and describe the full extent of the fishing activity of the fleets identified.

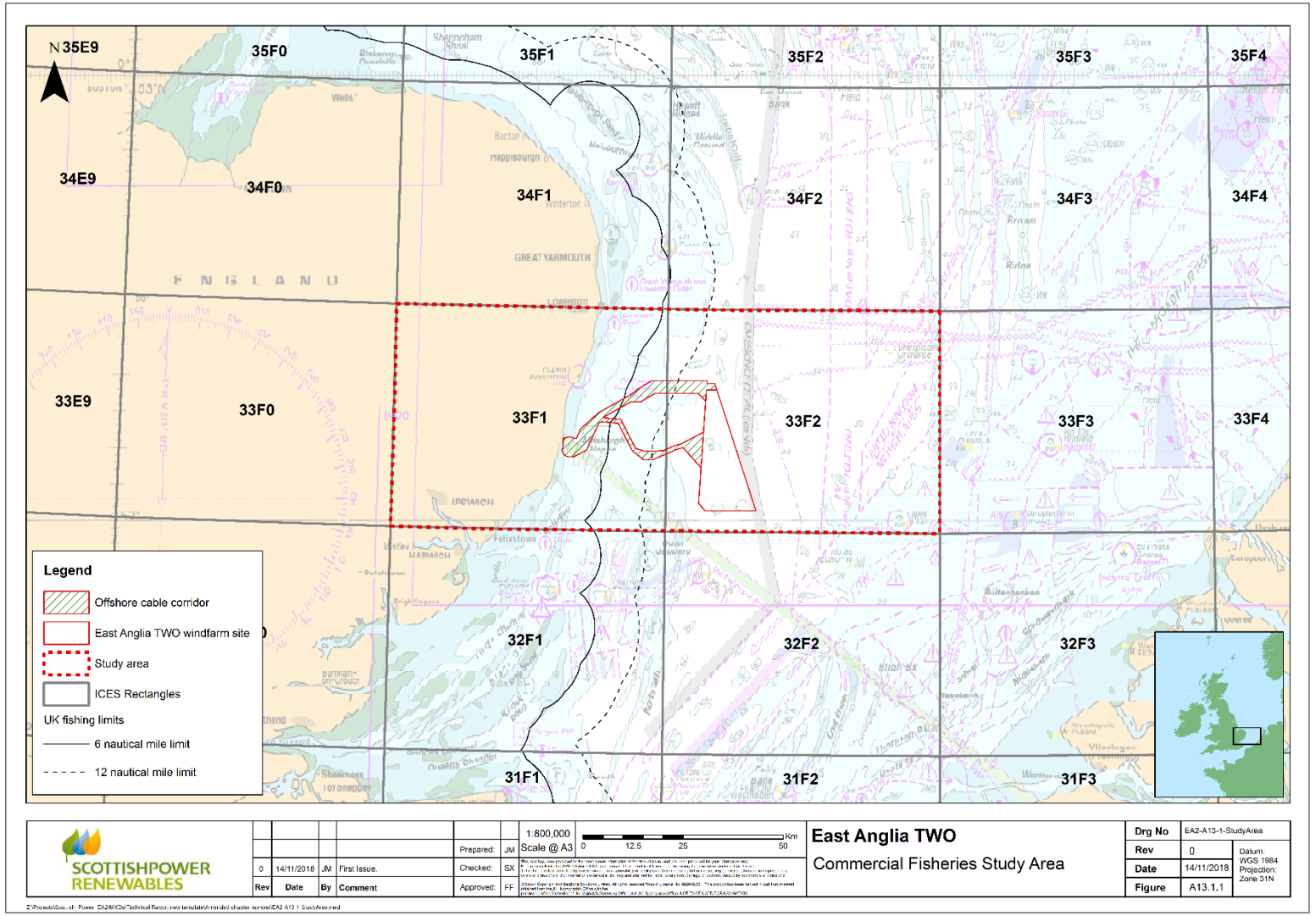


Figure A13.1.1 Study area

13.1.3 Data and Information Sources

5. In order to describe the commercial fisheries existing environment in respect of the study area, data and information from a number of sources have been analysed. The principal sources of information used are outlined in ***Table A13.1.1***. Further detailed information on information and data sources is provided in ***Annex 1***.

Table A13.1.1 Key data sources used

Data	Year(s) analysed	Description
UK Marine Management Organisation (MMO) Fisheries Statistics (landings values and fishing effort data)	2012 to 2016[1]	UK vessel landings into UK and European ports. Non-UK vessel landing into UK ports.
UK MMO Surveillance Sightings	2011 to 2015[2]	Sightings of vessels (all nationalities) by gear type recorded in UK waters on surveillance fly overs. May underestimate total extent of fishing activity due to flyover frequency and timing.
UK MMO Satellite Tracking Vessel Monitoring Systems (VMS) Data	2012 and 2016	VMS data (value and effort) of UK vessels collated in a 0.05 by 0.05 degrees grid (1/200th of an ICES rectangle) for UK vessels. The data is filtered by speed. Current dataset only includes vessels of over 15m in length.
Belgian Institute for Agricultural and Fisheries Research (ILVO) fisheries statistics (landings and effort data)	2010 to 2014	Landings and effort data for Belgian vessels over 10m by method and species
Belgian ILVO VMS data	2010 to 2014	VMS data (effort and value) for vessels over 15m (large vessel sector (> 221 kW) and Eurokotter vessels (< 221 kW)).
Netherlands, Institute for Marine Resources and Ecosystems Sturdies (IMARES) and Landbouw Econmisch Insitituut	2012 to 2016	VMS data (effort and value) for over 15m Dutch vessels in the North Sea. Activity is defined based on 1/16th of an ICES

[1] Data for 2017 are not yet available for public/private release by the MMO and will not be available until Autumn 2018.
[2]Given the limitations of the MMO 2016 surveillance sightings dataset (no sightings recorded in the study area for that year) surveillance sightings data have been analysed only up to 2015 (see Appendix 14.1, Annex 3 for further detail)

Data	Year(s) analysed	Description
(LEI) VMS and integrated Landings data.		rectangle. The data is filtered by speed.
French L'Institut Français de Recherche pour L'Exploitation de la mer (IFREMER) and Comité National des Pêches Maritimes et des Elevages Marins (CNPMEM) VMS	2008, 2014	VMS georeferenced charts provided showing effort in the Central (IVb) and Southern North Sea (IVc) by French vessels.
Danish Ministeriet for Fødevarer, Landbrug og Fiskeri (MFLF)	2011 to 2015	VMS effort data for over 15m Danish vessels. This data is filtered by speed.
German Federal Office for Agriculture and Food VMS data	2007 to 2012	VMS data (density) in the North Sea.

13.1.4 Consultation

6. Consultation meetings were undertaken with fisheries stakeholders between October 2017 and July 2018 to obtain information on fishing grounds and operating practices and to discuss potential concerns relating to the proposed East Anglia TWO project. In addition, information was obtained with regard to vessels and gears specifications. A list of consultees, along with the dates of meetings, is provided in ***Table A13.1.2.***

7. Local UK fishermen who attended consultation meetings confirmed that evidence previously supplied for other offshore windfarm projects in the vicinity of the proposed East Anglia TWO project, such as East Anglia ONE and East Anglia THREE was still applicable and relevant to their current activities. As such, information gathered during consultation for those projects has been used to inform this report, including that obtained in relation to the location of fishing grounds of local fleets.

Table A13.1.2 Consultation carried out with UK and transboundary stakeholders of the proposed East Anglia TWO project

Consultee	Role, Organisation, Country	Consultation Date
Julian Gregory	CEO Eastern IFCA	16/08/2017
Pim Visser	Chief Executive; VisNed, the Netherlands	19/10/2017
Sander Meyns	Project Coordinator; Rederscentrale, Belgium	31/10/2017
Dale Rodmell	Assistant Chief Executive; NFFO, UK	13/11/2017

Consultee	Role, Organisation, Country	Consultation Date
Anthony Viera	General Secretary; CRPMEM, France	12/01/2018
Darren Humphrey	Marine Management Organisation	23/7/2018
Fisherman 1	Sizewell fisherman, UK	7/2/2018; 16/3/2018
Fisherman 2	Aldeburgh fisherman, UK	7/2/2018; 16/3/2018
Fisherman 3	Aldeburgh fisherman, UK	6/4/2018
Fisherman 4	Aldeburgh fisherman, UK	6/4/2018
Fisherman 5	Orford fisherman, UK	6/4/2018
Fisherman 6	Southwold fisherman, UK	6/4/2018
Fisherman 7	Southwold fisherman, UK	6/4/2018
Fisherman 8	Southwold fisherman, UK	6/4/2018
Fisherman 9	Southwold fisherman, UK	6/4/2018
Fisherman 10	Southwold fisherman, UK	6/4/2018
Fisherman 11	Southwold fisherman, UK	6/4/2018
Fisherman 12	Felixstowe fisherman, UK	12/4/2018
Fisherman 13	Felixstowe fisherman, UK	12/4/2018
Fisherman 14	Felixstowe fisherman, UK	12/4/2018
Fisherman 15	Felixstowe fisherman, UK	12/4/2018
Fisherman 16	Felixstowe fisherman, UK	12/4/2018
Fisherman 17	Felixstowe fisherman, UK	12/4/2018
Fisherman 18	Felixstowe fisherman, UK	12/4/2018
Fisherman 19	Felixstowe fisherman, UK	12/4/2018
Fisherman 20	Felixstowe fisherman, UK	12/4/2018
Fisherman 21	Felixstowe fisherman, UK	12/4/2018
Samantha Hormbrey	Marine Science Officer, Eastern Inshore Fisheries Conservation Authority (IFCA), UK	16/4/2018

Consultee	Role, Organisation, Country	Consultation Date
Alan Garnham	Enforcement Officer; Eastern IFCA, UK	16/4/2018

13.1.5 Fisheries Controls and Legislation

8. There are a variety of constraints and legislation applied to the European Union (EU) commercial fishing industry. Fishing activity is directly impacted by many regulatory measures, and therefore so are fishing effort and landings values.

9. The main bodies regulating commercial fishing in English waters are the EU through the Common Fisheries Policy (CFP) and the MMO through national and regional regulations. In addition, within the 6nm limit, Inshore Fisheries and Conservation Authorities (IFCAs) regulate fisheries through the implementation of local byelaws and Regulating Orders. The section of the offshore cable corridor which is located within the 6nm limit falls within the Eastern IFCA District and therefore under its jurisdiction.

10. It should be noted that access to fishing grounds within UK's territorial waters (out to the 12nm) is generally restricted to UK vessels only. There are, however, a number of European countries that can access grounds between the UK's 6 and 12nm limit provided they hold historic fishing rights. As shown in ***Figure A13.1.2*** in areas relevant to the proposed East Anglia TWO project, Belgium and France have historic rights and therefore are allowed to fish between the 6 and 12nm limit.

11. Whilst it is possible that "Brexit" negotiations may result in modifications to the current fishing access rights of EU member states to UK waters, at present the eventual outcome of the negotiations is unknown and it is unclear what changes may be implemented.

12. Further detailed information on existing commercial fisheries legislation in areas relevant to the proposed East Anglia TWO project can be found in ***Annex 2***.

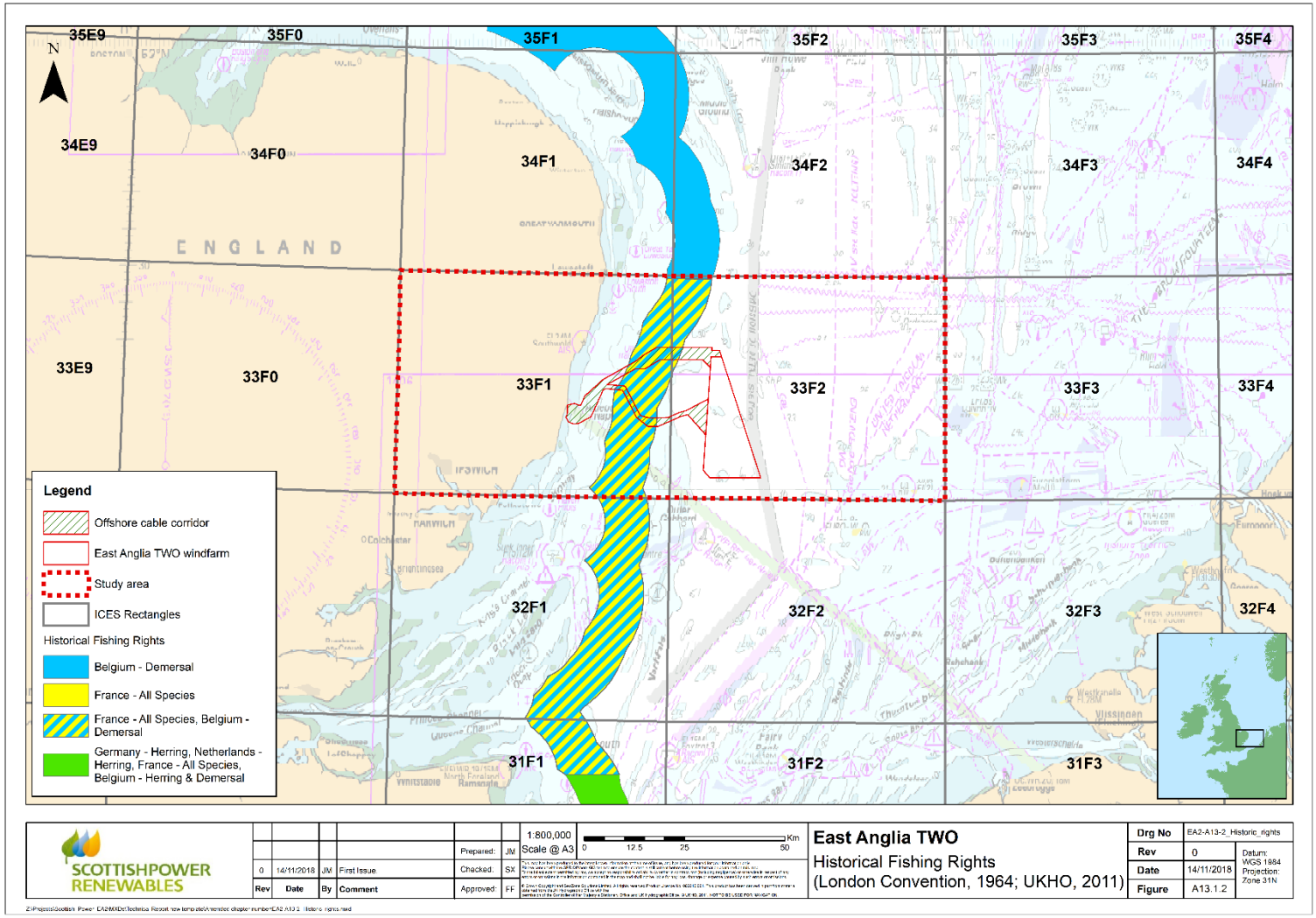


Figure A13.1.2 Historical fishing rights of European nationalities between the UK's 6 and 12nm limit (UKHO, 2011)

13.1.6 Commercial Fisheries Baseline

13.1.6.1 Background

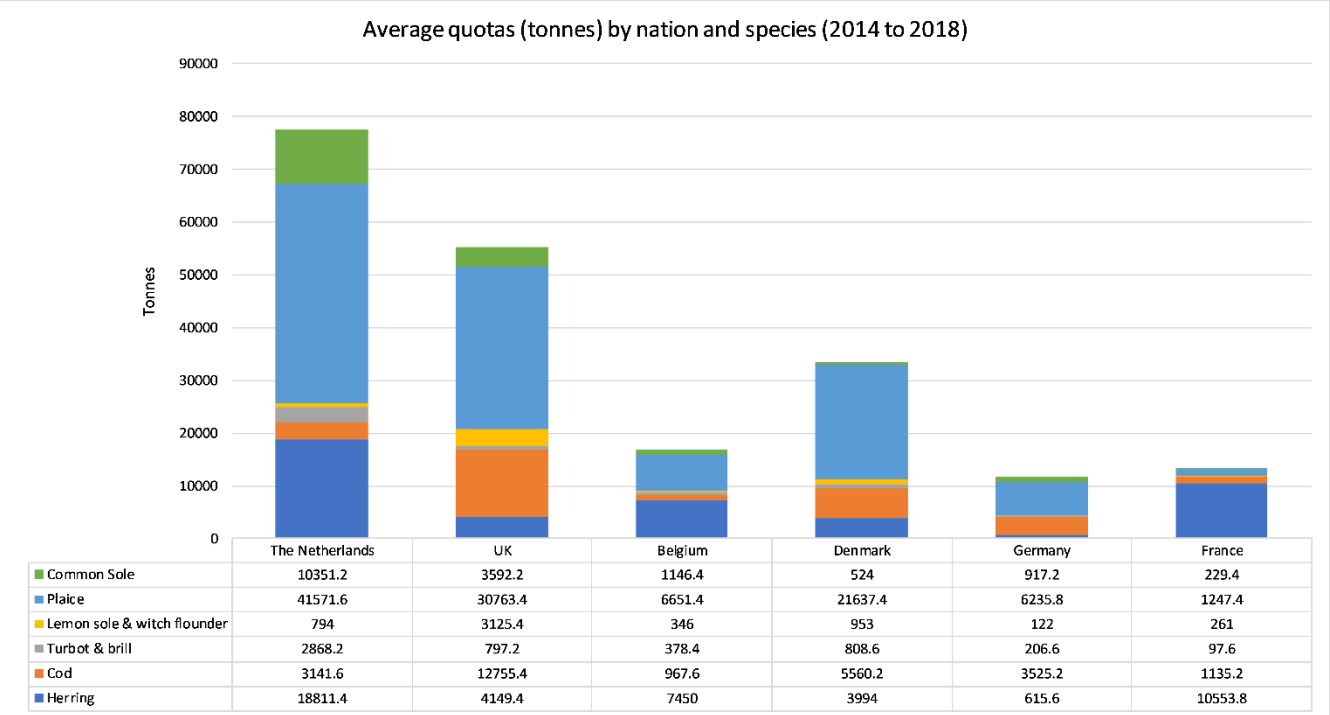
13. The existing commercial fisheries baseline in the Southern North Sea is predominately a result of the historical events outlined below.

14. Following a peak in 1913, the East Anglian Herring fishery dramatically declined until 1996 and as a result, many companies with herring fishing vessels ceased to operate in this region. Another response to this decline was a conversion by many vessels to demersal otter trawling and a refocus of operations to Lowestoft from Great Yarmouth, where they had been largely based during the peak of the herring fishery. In addition, many trawling vessels were converted to oil and gas rig standby duties as a response to the growth of North Sea oil and gas industries. This shift of operations away from fishing along with decreasing landings into Lowestoft contributed to the closure of multiple ports vendors and processors in the region.

15. Another factor influencing commercial fisheries is the EU CFP. This allocates annual national quotas based on Total Allowable Catches (TACs) for pressure stock species which then lead to individual vessel quotas. This national quota calculation is based on the historic record of catch prior to the enactment of the CFP in 1983. As mentioned above, many East Anglian fishing vessels were converted to oil and gas rig operations in the early 1900s, and therefore the quotas allocated to the East Anglian commercial trawling fleet was low due to their low historical catch amounts in the last century. This in turn caused further reduction in the number of East Anglian fishing vessels due to their allowable catches bringing insufficient landings to support running costs.

16. The Dutch beam trawler fleet provided a track record of substantially higher catches of plaice and sole in the North Sea during the reference period and so was allocated considerably larger quotas.

17. As shown in ***Diagram A13.1.1***, the current allocation of plaice and sole remains much larger for Dutch fishing vessels. Furthermore, due to financial insolvencies, most large UK beam trawlers have been sold to Dutch fishing interests. Many of these vessels whilst Dutch owned and operated, are still UK registered and included in UK fisheries statistics.



	The Netherlands	UK	Belgium	Denmark	Germany	France
Common Sole	10351.2	3592.2	1146.4	524	917.2	229.4
Plaice	41571.6	30763.4	6651.4	21637.4	6235.8	1247.4
Lemon sole & witch flounder	794	3125.4	346	953	122	261
Turbot & brill	2868.2	797.2	378.4	808.6	206.6	97.6
Cod	3141.6	12755.4	967.6	5560.2	3525.2	1135.2
Herring	18811.4	4149.4	7450	3994	615.6	10553.8

Diagram A13.1.1 Average quota (tonnes) by nation and species (2014 to 2018)

13.1.6.2 Overview

18. An indication of the principal nationalities and fishing methods active in the study area is given in Figure A13.1.3 and Figure A13.1.4 and Table A13.1.3 based on analysis of MMO surveillance sightings. It should be noted that surveillance sightings do not provide information on the actual levels of fishing activity but give a general indication of the distribution of activity by nationality and gear type.

19. In areas relevant to the offshore cable corridor, within the 6nm limit, the majority of sightings are of UK vessels, primarily potters and to a lesser extent trawlers and netters. Between the 6 and 12nm limit, observations are primarily of UK vessels and Belgian beam trawlers. Further offshore (beyond 12nm limit) most sightings are of Dutch and Belgian beam trawlers (***Figure A13.1.3 and Figure A13.1.4 and Table A13.1.3***).

20. Observations of vessels from other nationalities, particularly French, Danish and German, have also been recorded in the study area, however in comparatively low numbers (***Table A13.1.3)***.

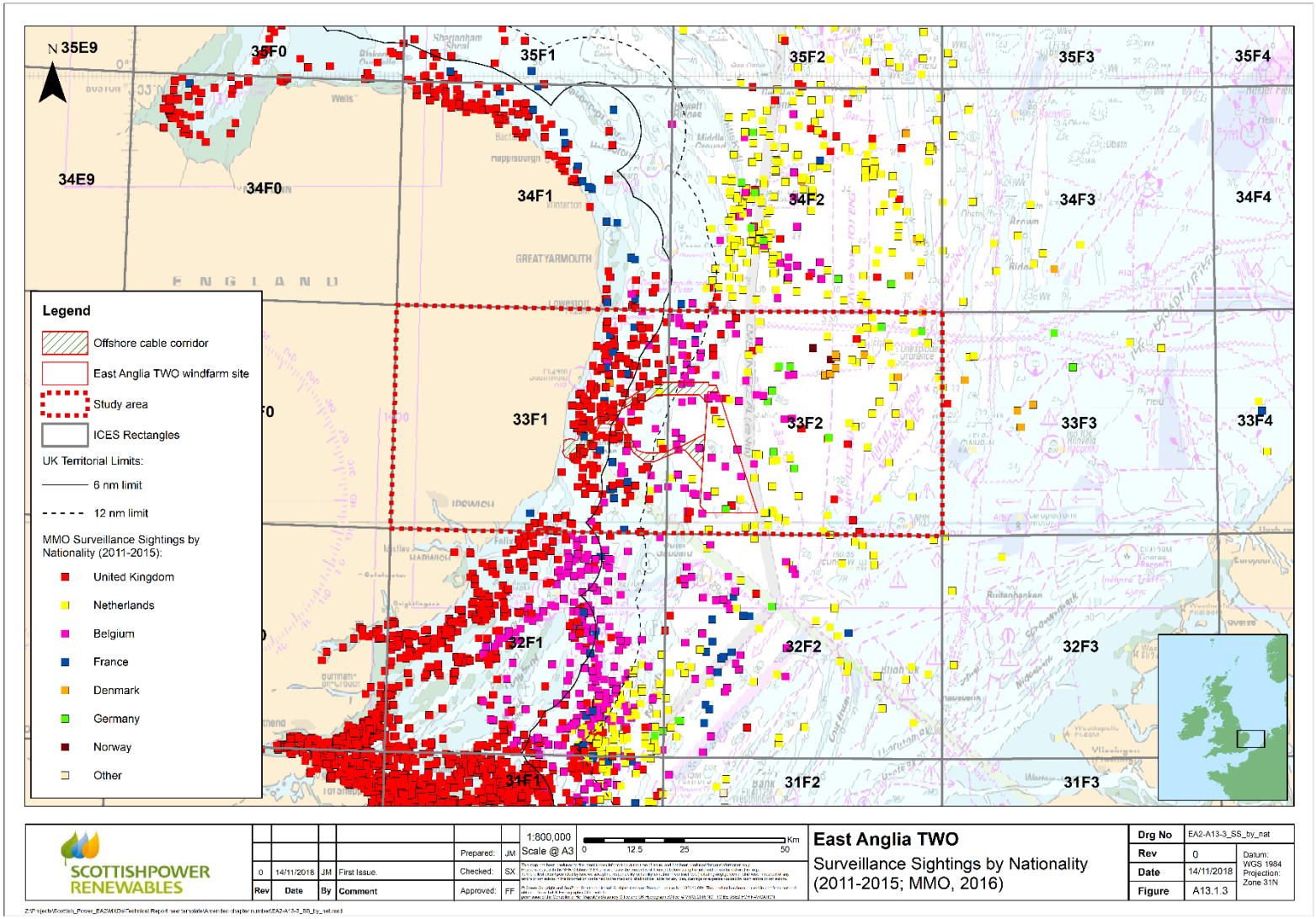


Figure A13.1.3 Surveillance sightings by nationality (MMO, 2018; 2011 to 2015)

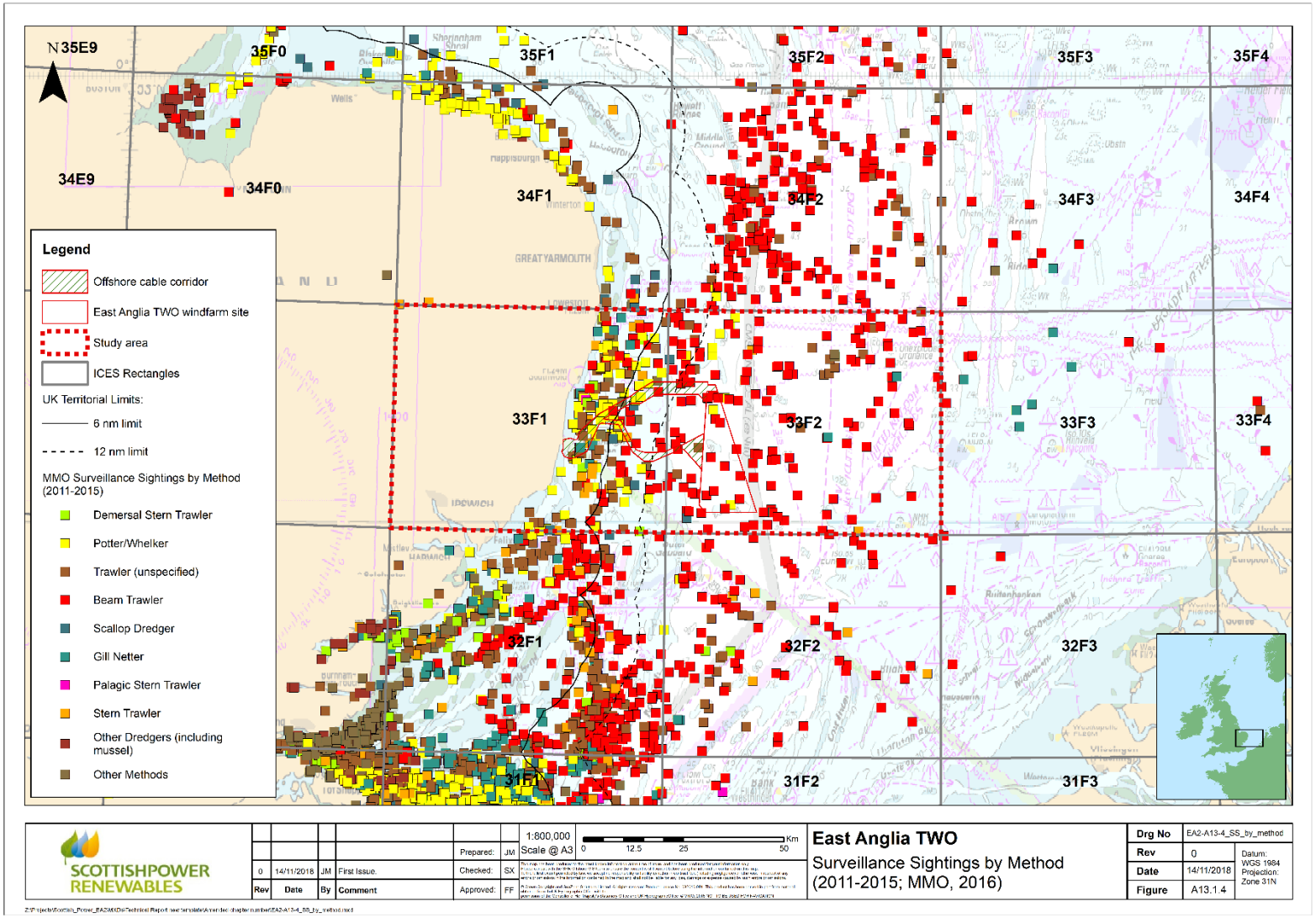


Figure A13.1.4 Surveillance sightings for all nationalities by method (MMO, 2018; 2011 to 2015)

Table A13.1.3 The number of surveillance sightings of vessels by nationality and method and the percentage of the ICES rectangle this constitutes (MMO, 2018; 2011 to 2015)

ICES Rectangle	Nationality	Fishing method	Number of sightings	% of total sightings in ICES rectangle
33F1	United Kingdom	Potter/whelker	59	24.6
		Trawler (all)	37	15.4
		Stern trawler	24	10.0
		Beam Trawler	17	7.1
		Long liner	13	5.4
		Gill netter	11	4.6
		Demersal stern trawler	8	3.3
		Scallop dredger	4	1.7
		Trio Trawler	2	0.8
		Rod and line	1	0.4
		Unspecified	13	5.4
		All methods	189	78.8
	Belgium	Beam trawler	22	9.2
	France	Stern trawler	4	1.7
		Trawler (all)	19	7.9
		All methods	23	9.6
	Netherlands	Beam trawler	4	1.7
	Denmark	Beam trawler	1	0.4
		Suction dredger	1	0.4
		All methods	2	0.8
33F2	Netherlands	Beam trawler	86	40.8
		Trawler (all)	1	0.5
		All methods	87	41.2
	Belgium	Beam trawler	70	33.2
		Unspecified	2	0.9
		Trawler (all)	3	1.4

ICES Rectangle	Nationality	Fishing method	Number of sightings	% of total sightings in ICES rectangle
		All methods	75	35.5
	United Kingdom	Beam trawler	5	2.4
		Potter/whelker	9	4.3
		Scallop dredger	2	0.9
		Stern trawler	2	0.9
		Trawler (all)	3	1.4
		All methods	21	10.0
	Germany	Beam trawler	12	5.7
		Gill netter	6	2.8
		All methods	18	8.5
	Denmark	Gill netter	1	0.5
		Pair trawler (all)	2	0.9
		Trawler (all)	4	1.9
		All methods	7	3.3
	Norway	Trawler (all)	2	0.9
	France	Trawler (all)	1	0.5

13.1.6.3 The Netherlands

13.1.6.3.1Dutch Vessels, Gear and Operations

21. The Dutch fleet is one of the largest fleets operating in the Central and Southern North Sea. Over the last ten years, the fleet has undertaken a progressive conversion from the use of traditional beam trawls to the use of pulse wing trawls. The majority of Dutch beam trawlers operating in the study area use pulse wing gear and are of the larger size category (approx. 40m in length). From consultation with VisNed, it is understood at there are 10 to 15 beam trawlers operating in the area up to 25 hours per week (***Table A13.1.2)***. The majority are based in Texel or are part of the Lowestoft PO. It should be noted that the latter, whilst UK registered, are actually Dutch owned and operated vessels (Anglo-Dutch beam trawlers). An example of a Dutch beam trawler with pulse wing gear is shown in. Examples of the specifications of these vessels are provided in ***Table A13.1.4.***

22. Further details information on pulse trawling and other fishing methods is provided in ***Annex 3***.

Plate A13.1.1 Dutch pulse wing trawler at port (BMM, 2017)

Table A13.1.4 Example of Dutch pulse wing trawler vessels

Vessel Number	**1**	**2**	**3**	**4**
Home Port	**Oudeschildt**	**Oudeschildt**	**Stellendam**	**Stellendam**
Port of Operation	Texel	Texel	Delta Zuid	Delta Zuid
Length	42.35	42.21	41.05	42.37
Beam	8.5	8.5	9	8.5
Draft	5.16	5.15	5.1	5.15
Declared engine HP	1529	1999	1999	1999
Fishing method	Pulse wing	Pulse wing	Pulse wing	Pulse wing
Typical fishing trip	4-5 days	4-5 days	4-5 days	4-5 days
Target species	Sole	Sole	Sole	Sole

23. Pulse wing trawling is not without controversy. Whilst by 2015 the EU had granted 84 exemptions to the EU ban on electric fishing to the Netherlands, on 16th January 2018 as part of the overhaul of EU fishing regulations, and as a consequence of lobbying by French, Belgian and UK fishermen, the European Parliament voted to ban pulse fishing. This ban has however yet to be implemented. Subsequently in recognition of objections from UK East Coast fishermen, a package was negotiated by the European Parliament, European Commission, the UK (NFFO) and the Netherlands (VisNed). It was agreed that from 15th February 2018, a voluntary Interim Spatial Separation Agreement would come into force between Dutch pulse fishermen and the English East Coast inshore fishermen, whereby Dutch fishermen would avoid using pulse methods in three designated areas (area 1 – Ramsgate / Thames; area 2 – Welland Area, Lowestoft; area 3 – East Lowestoft area, Lowestoft). The location of these areas is illustrated in ***Figure A13.1.5.*** As shown, the East Anglia TWO development area is located just to the south of one of these areas.

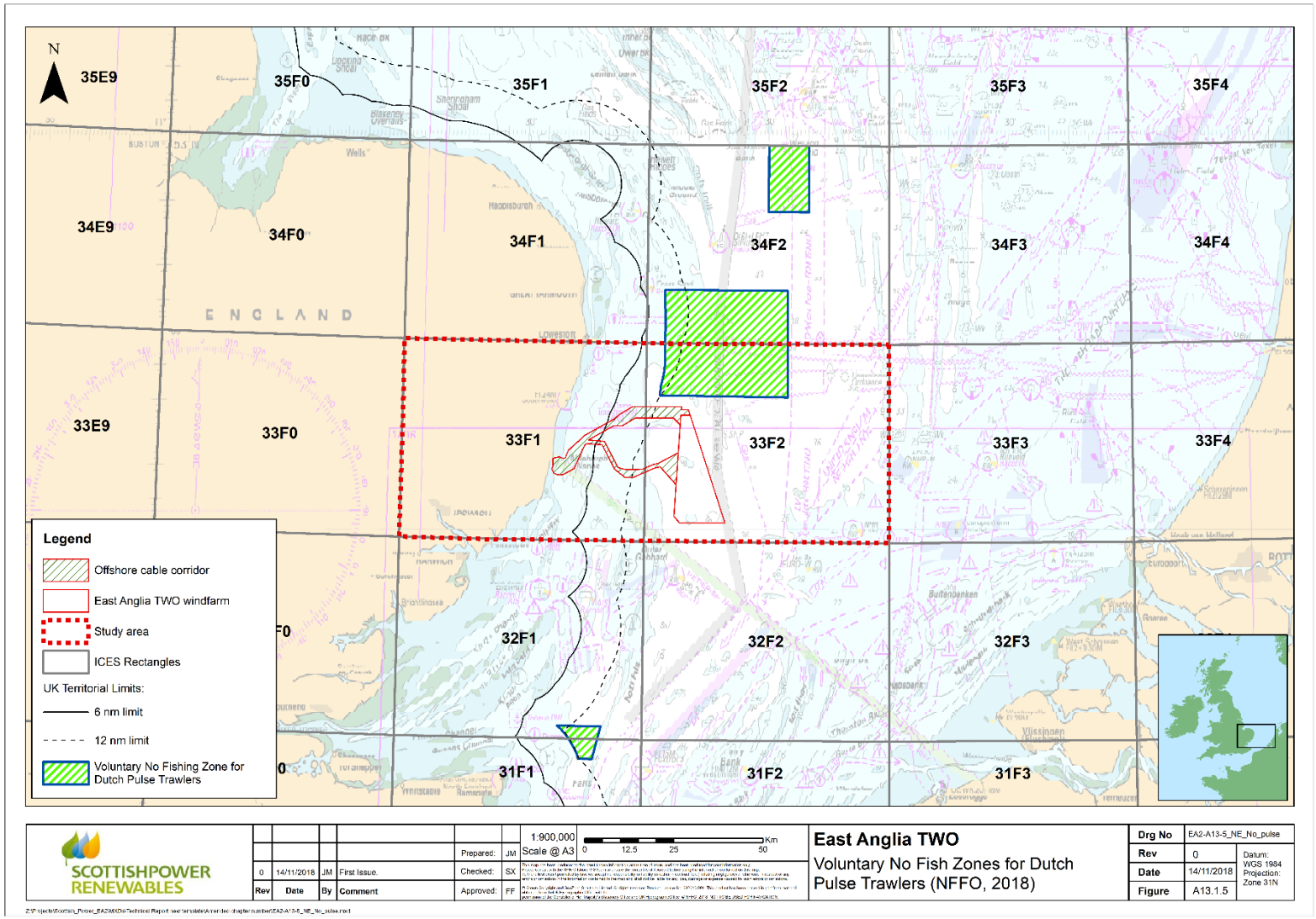


Figure A13.1.5 Voluntary no pulse trawling zones (NFFO, 2018)

13.1.6.3.2 Dutch Landings Values and Effort

24. Analysis of average annual landings values by species ***(Figure A13.1.6)*** indicates that in the study area sole represents the main fish species for the Dutch fleet followed by plaice.

25. In terms of fishing methods, as derived from landings values and effort data (***Figure A13.1.7 and Figure A13.1.8***), beam trawling accounts for the majority of fishing activity in the study area, with seine nets also deployed, however to a much lesser extent.

26. The majority of Dutch activity within the study area takes place in rectangle 33F2, largely due to Dutch vessels not being permitted to fish within 12nm of the UK coast. It should be noted that when compared to other offshore ICES rectangles in the wider region (particularly in rectangles 32F2 and 32F3), landings values and effort in rectangle 33F2 are relatively low (***Figure A13.1.6, Figure A13.1.7 and Figure A13.1.8***).

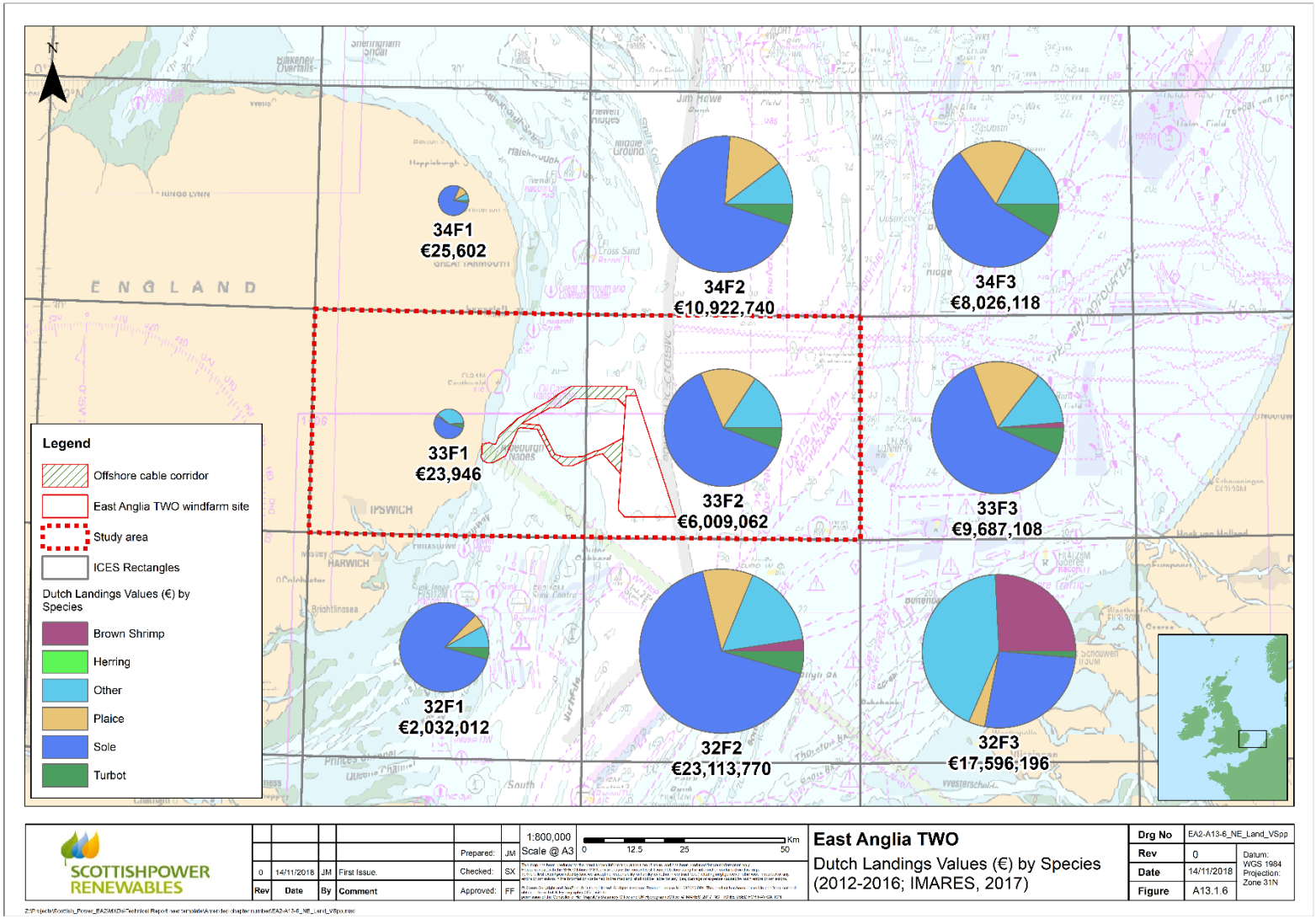


Figure A13.1.6 Average Dutch landings values (2012 to 2016) by species (IMARES, 2017)

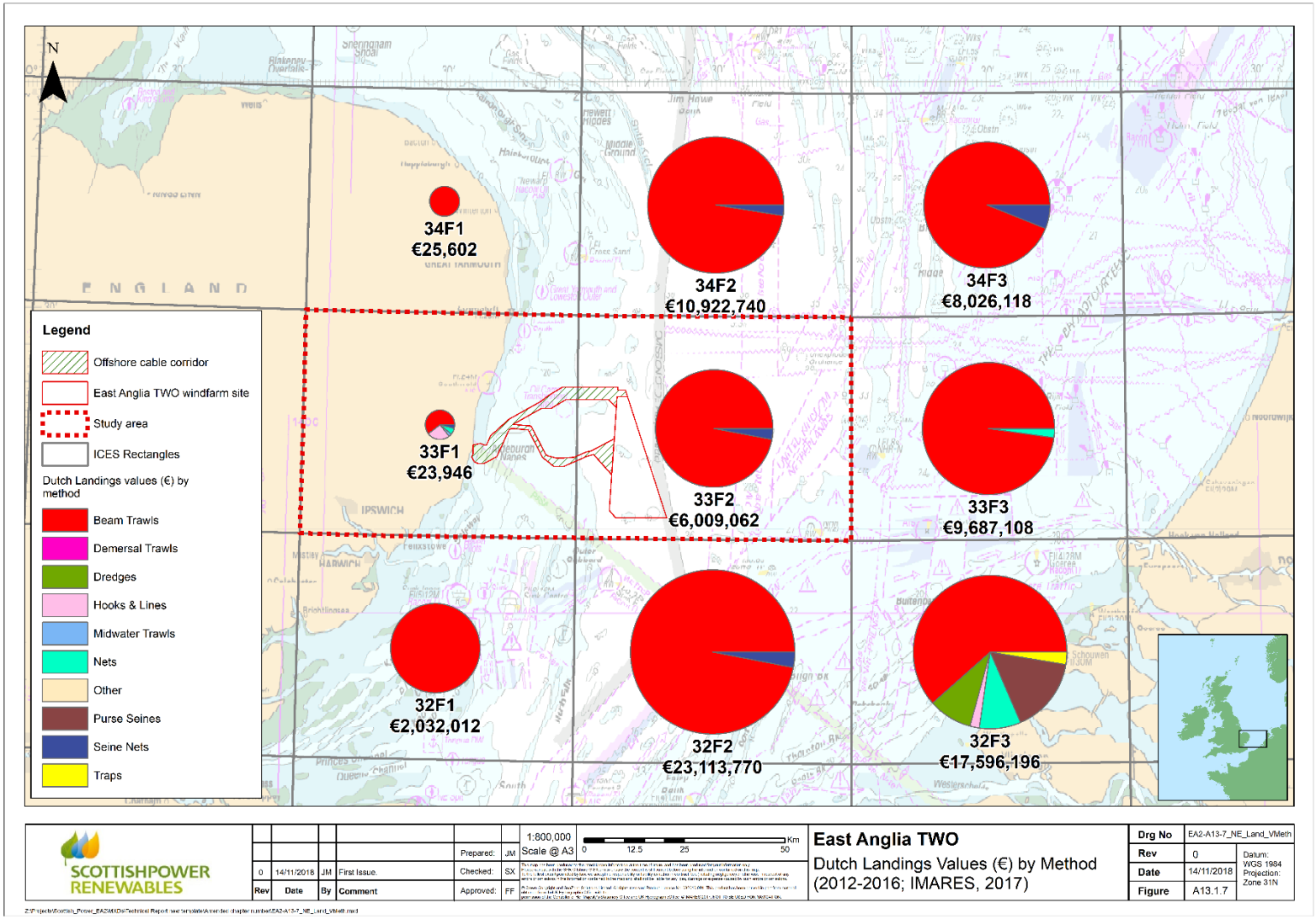


Figure A13.1.7 Average Dutch landings values (2012 to 2016) by method (IMARES, 2017)

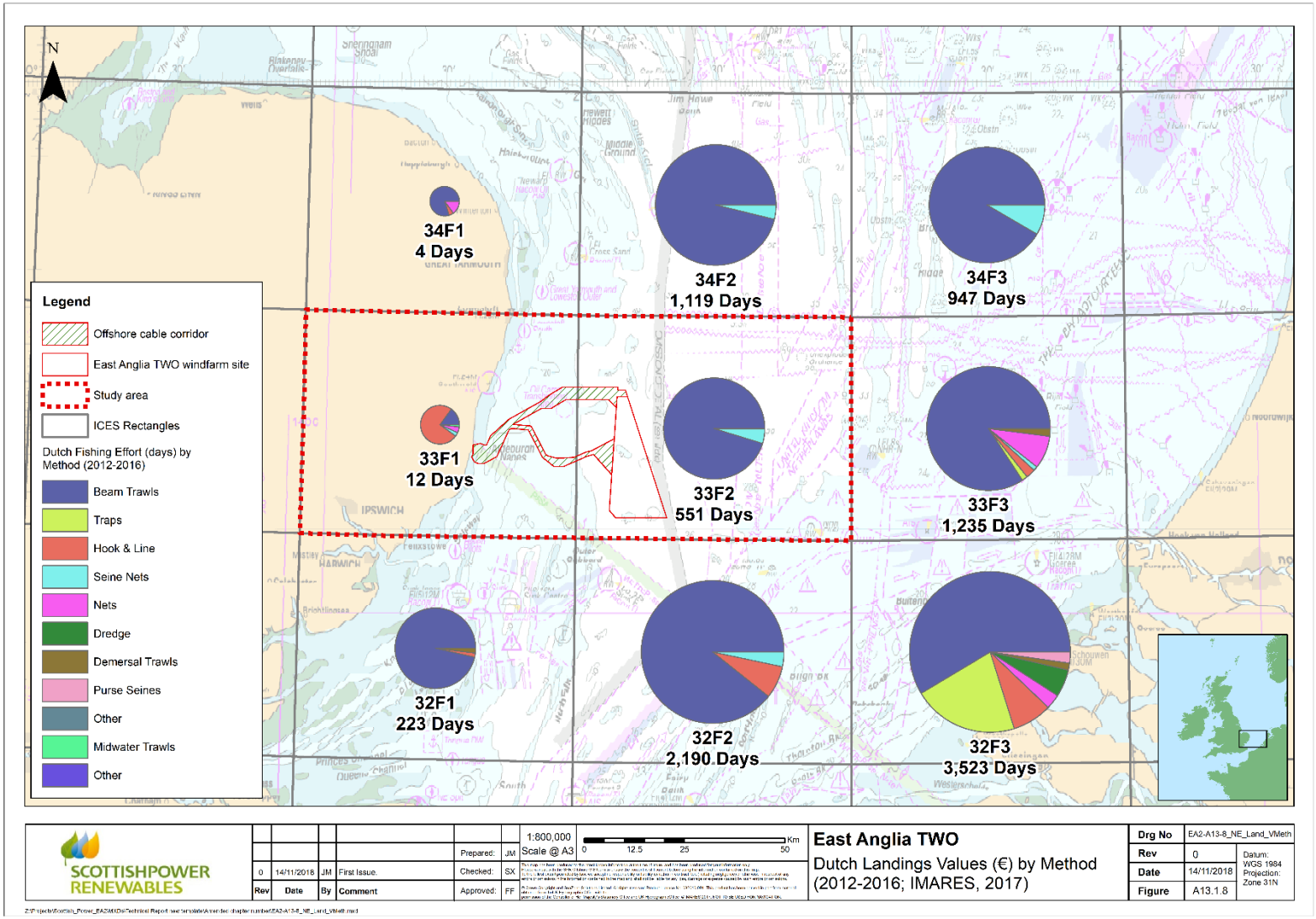


Figure A13.1.8 Average Dutch fishing effort (2012 to 2016) by method (IMARES, 2017)

13.1.6.3.3 Dutch VMS data

27. Analysis of VMS data for the Dutch fleet indicates that beam trawling occurs at relatively high levels across wide areas of the Southern North Sea, particularly in areas immediately north and south of the study area and off the Dutch and Belgian coast. Whilst the Offshore development area supports activity by these vessels, fishing intensity in this area occurs at comparatively lower levels (***Figure A13.1.9 and Figure A13.1.10)***.

28. Dutch seine netters operate over a wide area extending from grounds north west of Denmark to the English Channel and Western Approaches ***(Figure A13.1.11and Figure A13.1.12***). Activity by these vessels within the Offshore development area occurs at very low levels. Patches of high fishing intensity are recorded in grounds north and south of the study area, with highest fishing levels taking place in the English Channel.

29. Fishing activity by other Dutch fishing methods, including pelagic trawlers, demersal otter trawlers, purse seiners, nets, traps and dredgers, occurs at very low or negligible levels within the study area (***Figure A13.1.13 to Figure A13.1.20).***

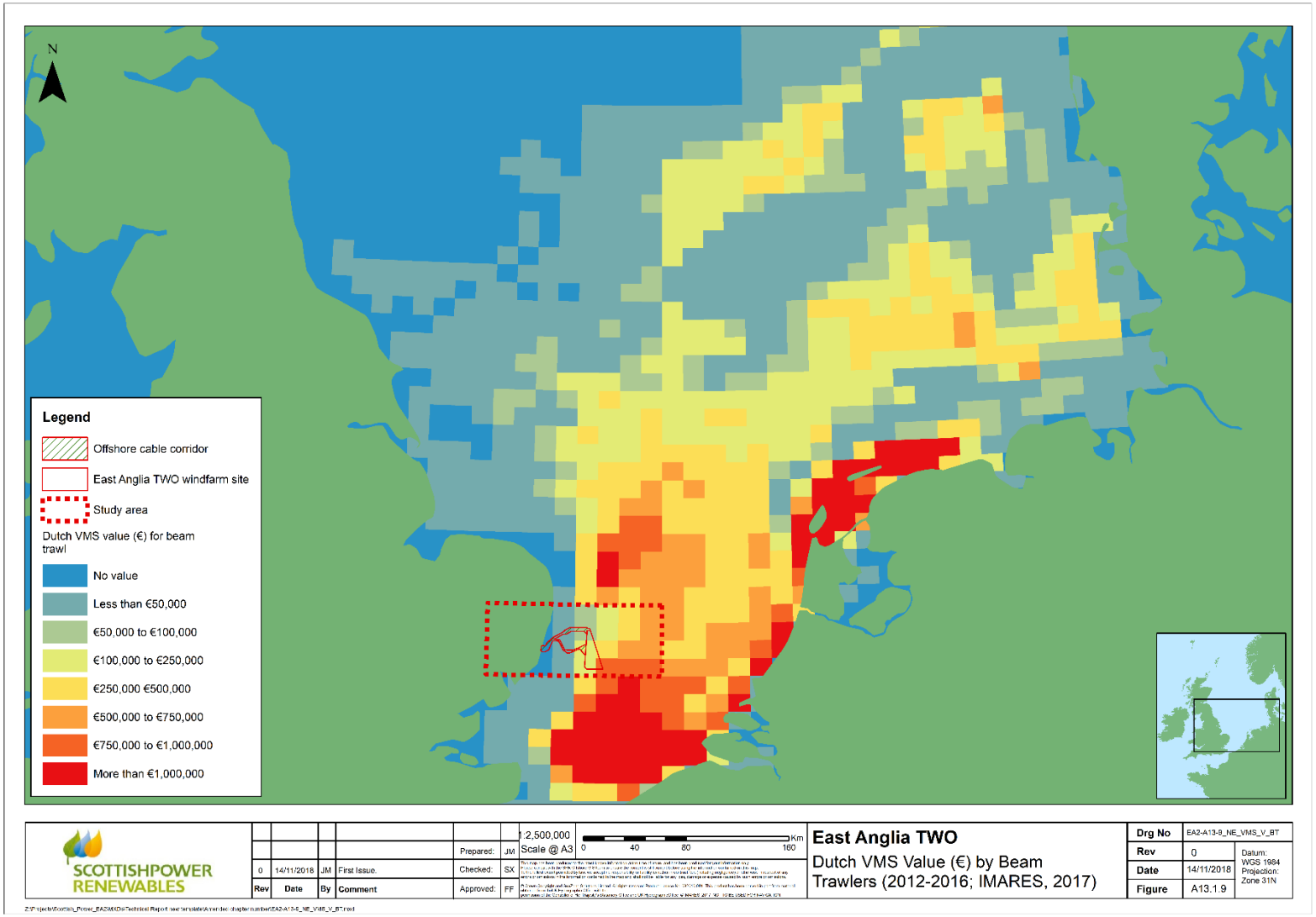


Figure A13.1.9 Average Dutch VMS values (2012 to 2016) by beam trawls (IMARES, 2017)

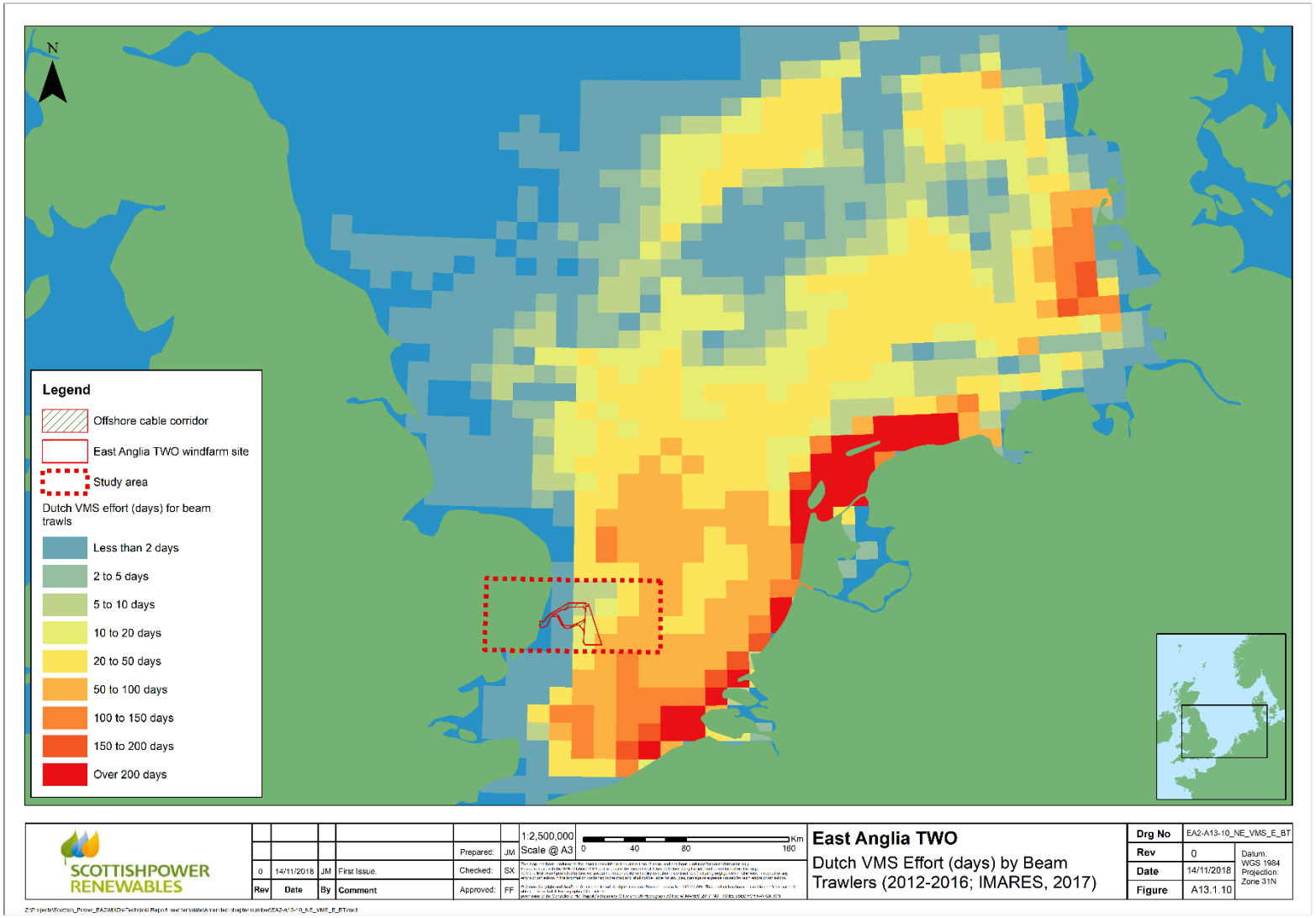


Figure A13.1.10 Average Dutch VMS effort (2012 to 2016) by beam trawls (IMARES, 2017)

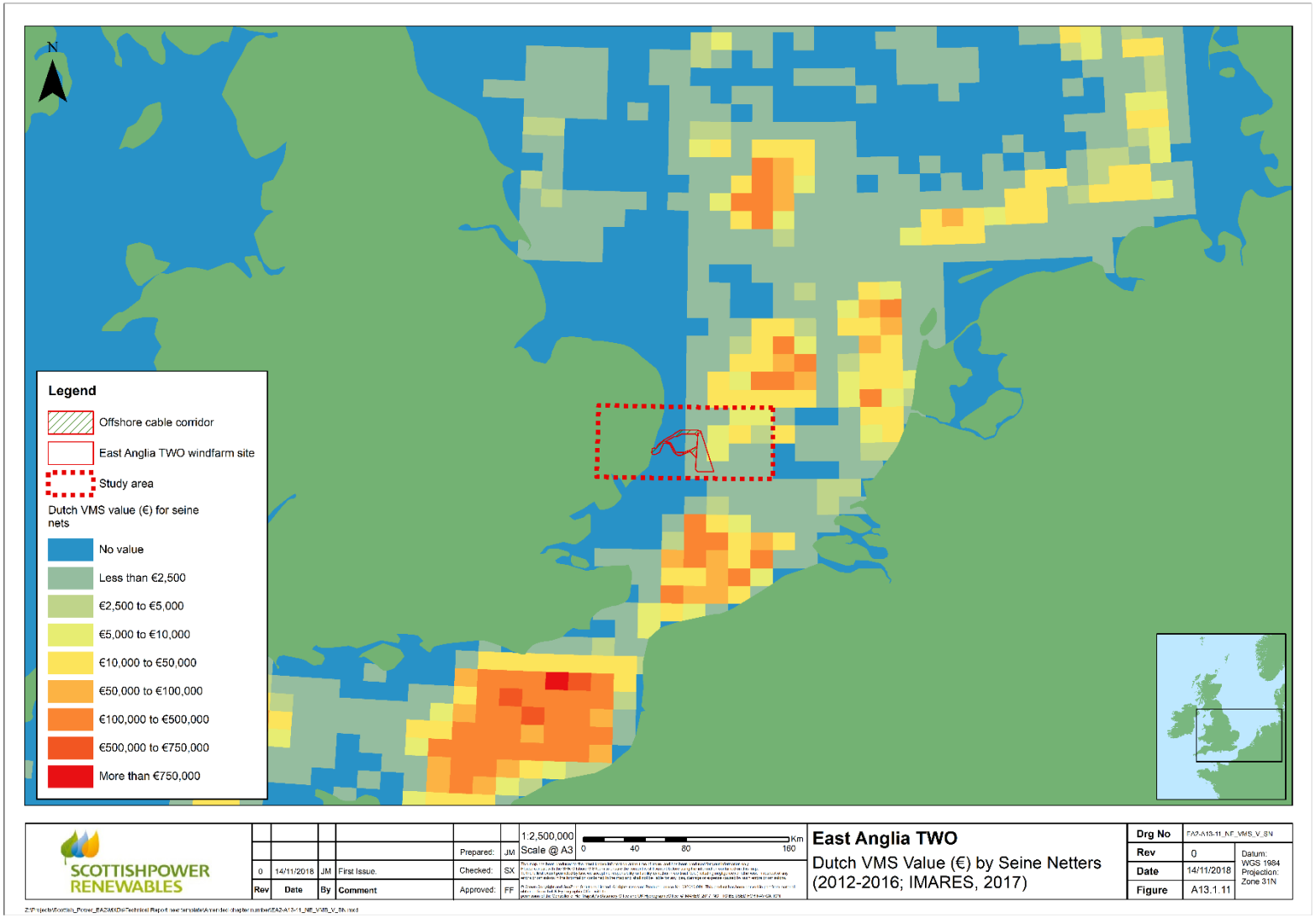


Figure A13.1.11 Average Dutch VMS values (2012 to 2016) by seine net (IMARES, 2017)

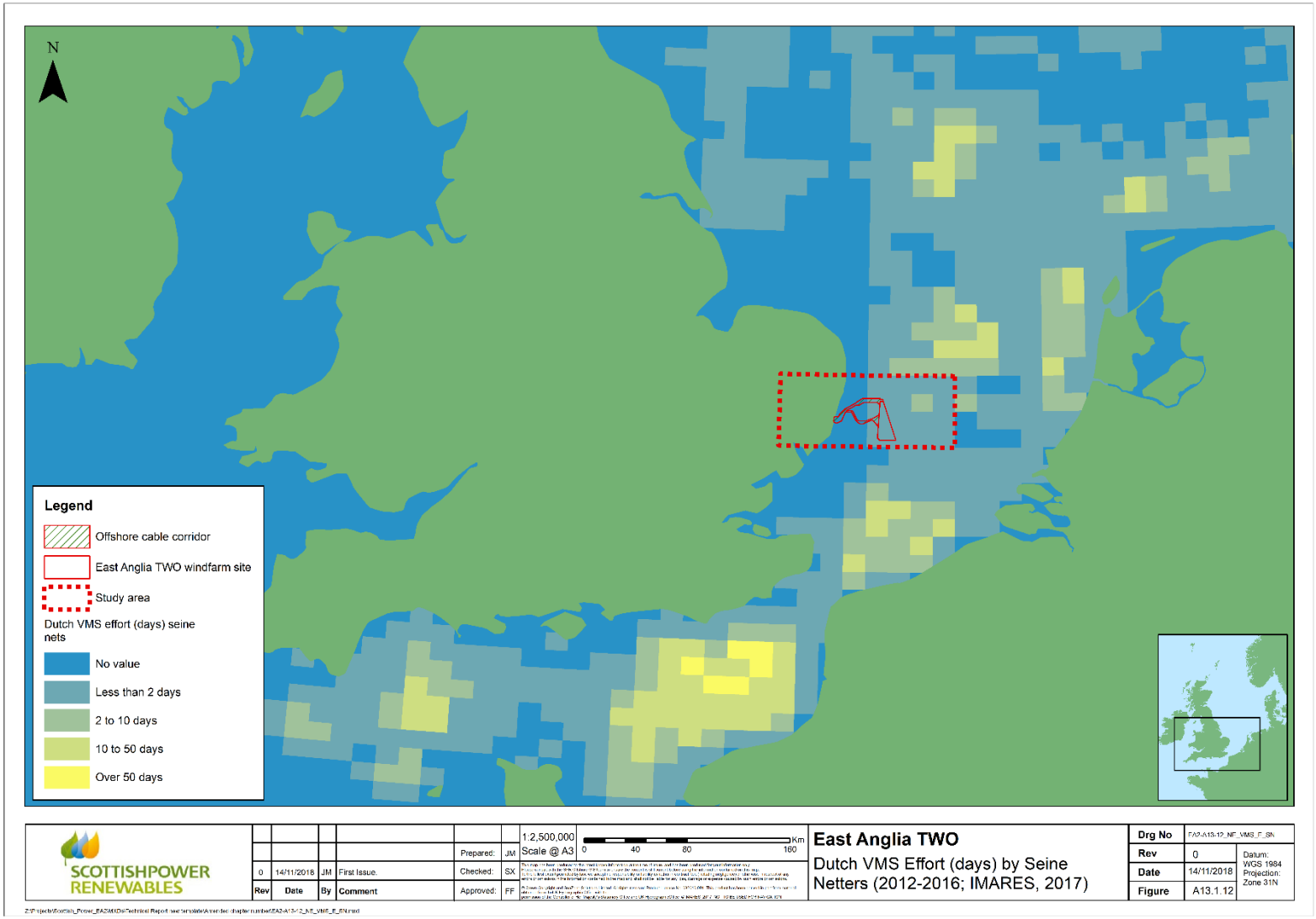


Figure A13.1.12 Average Dutch VMS effort (2012 to 2016) by seine net (IMARES, 2017)

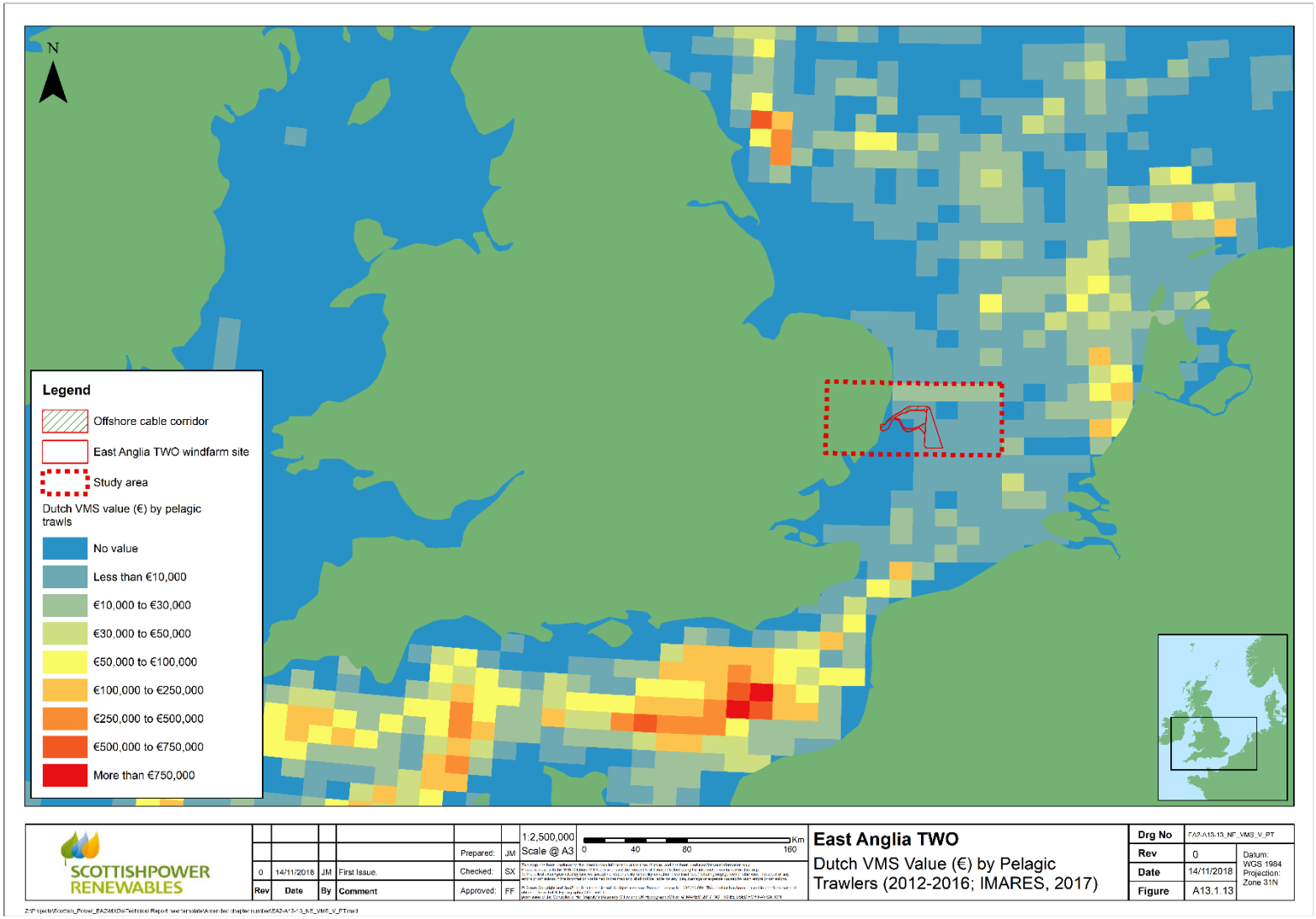


Figure A13.1.13 Average Dutch VMS values (2012 to 2016) by pelagic (midwater) trawl (IMARES, 2017)

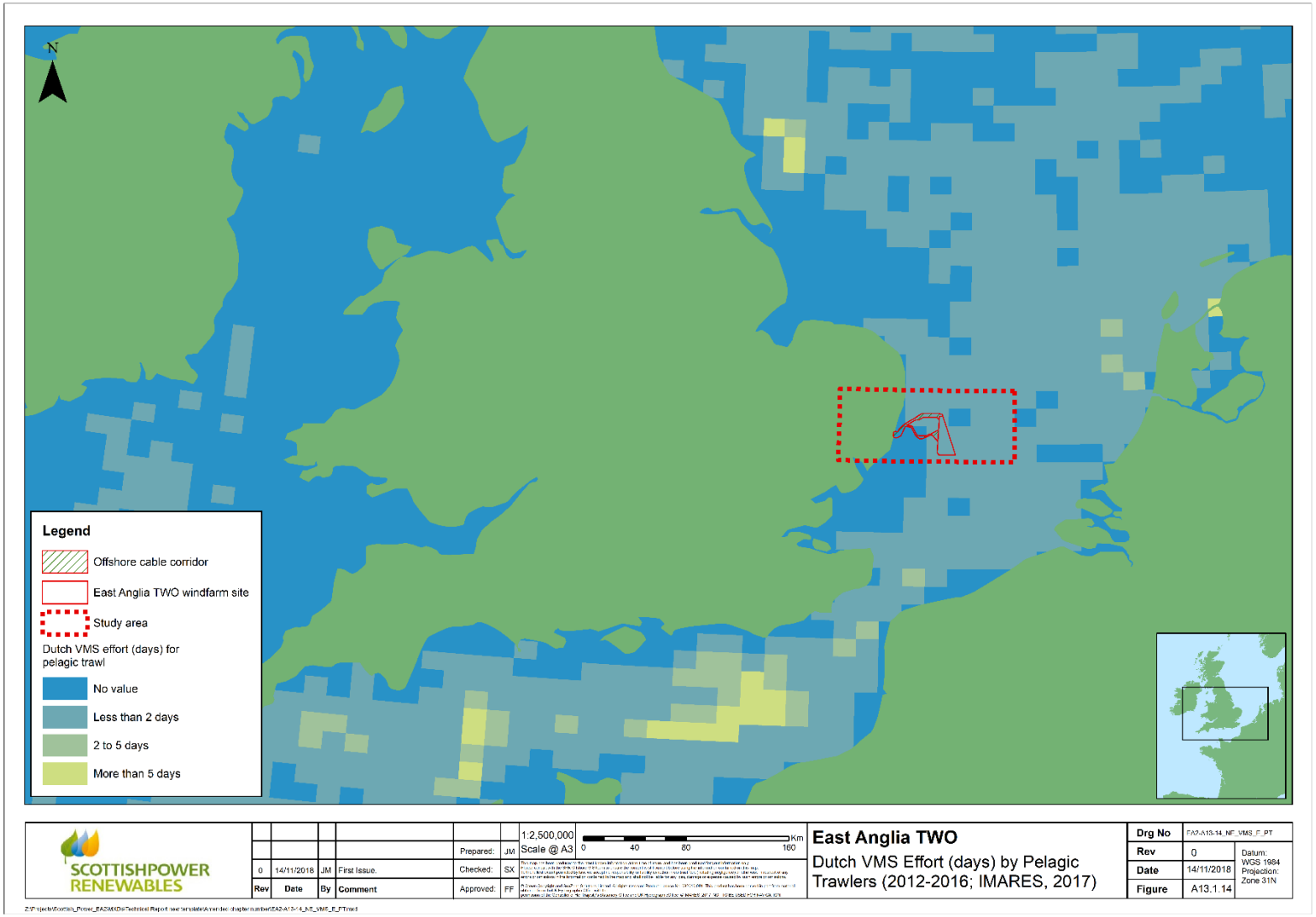


Figure A13.1.14 Average Dutch VMS effort (2012 to 2016) by pelagic (midwater) trawl (IMARES, 2017)

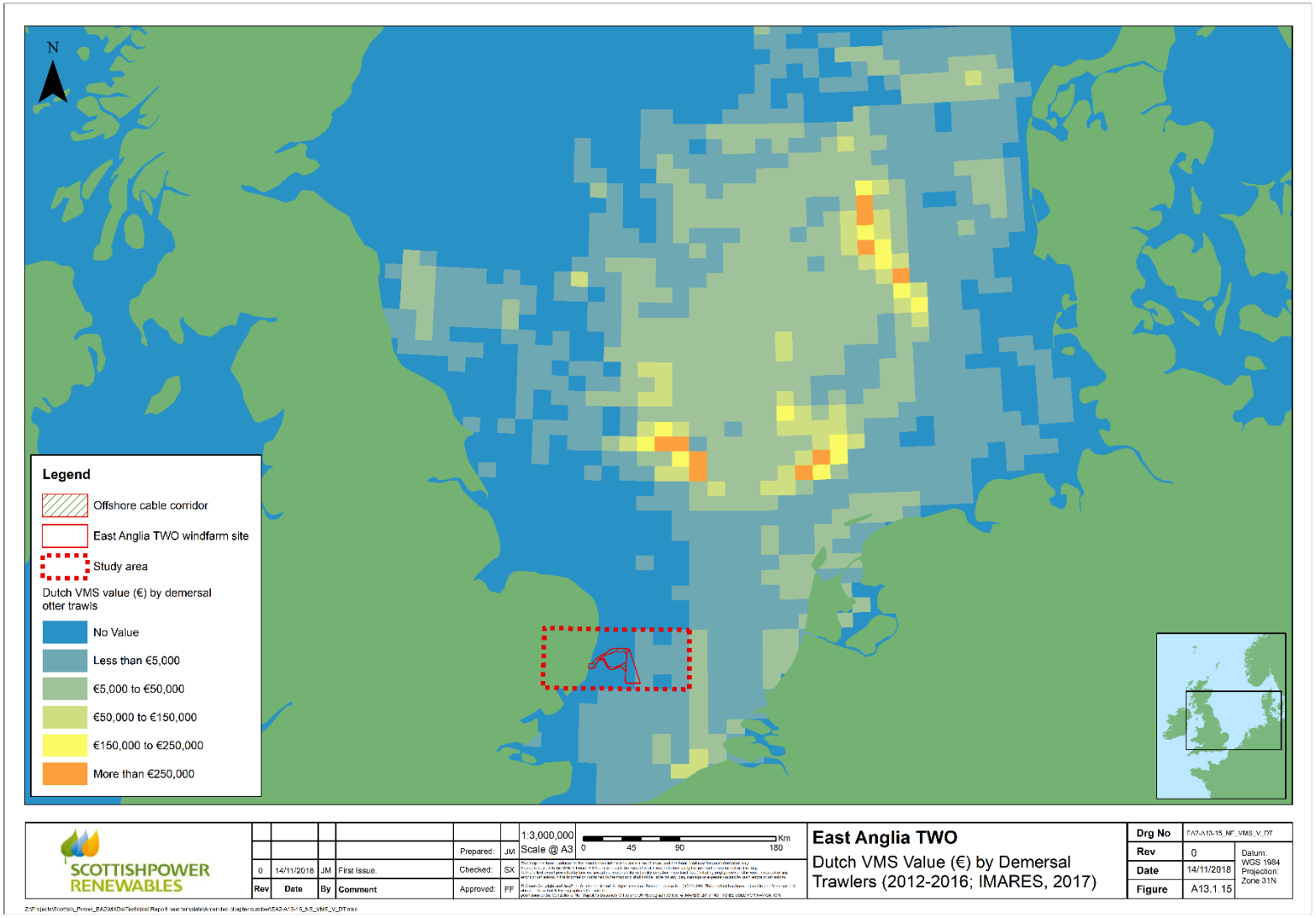


Figure A13.1.15 Average Dutch VMS value (2012 to 2016) by demersal otter trawl (IMARES, 2017)

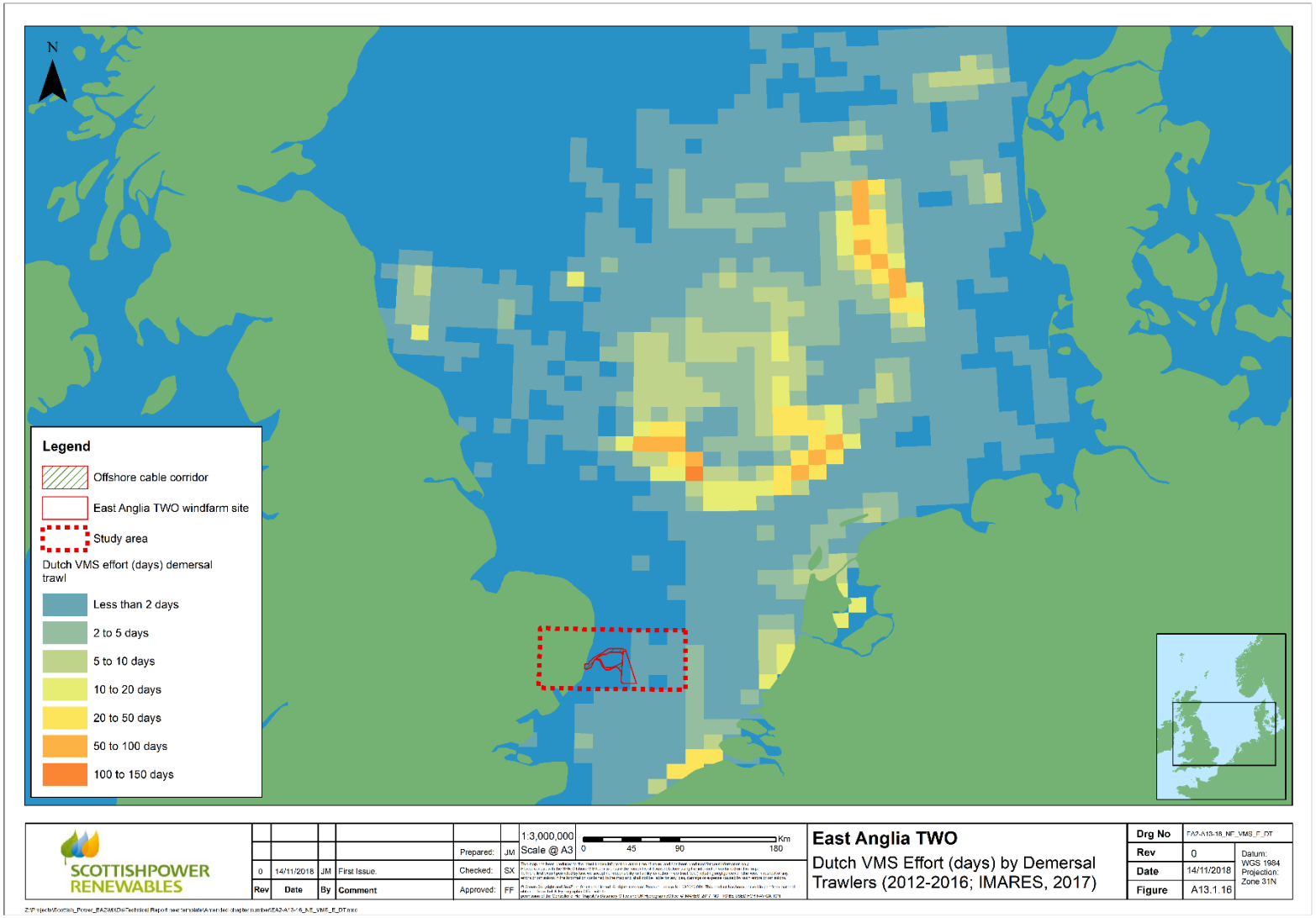


Figure A13.1.16 Average Dutch VMS effort (2012 to 2016) by demersal otter trawl (IMARES, 2017)

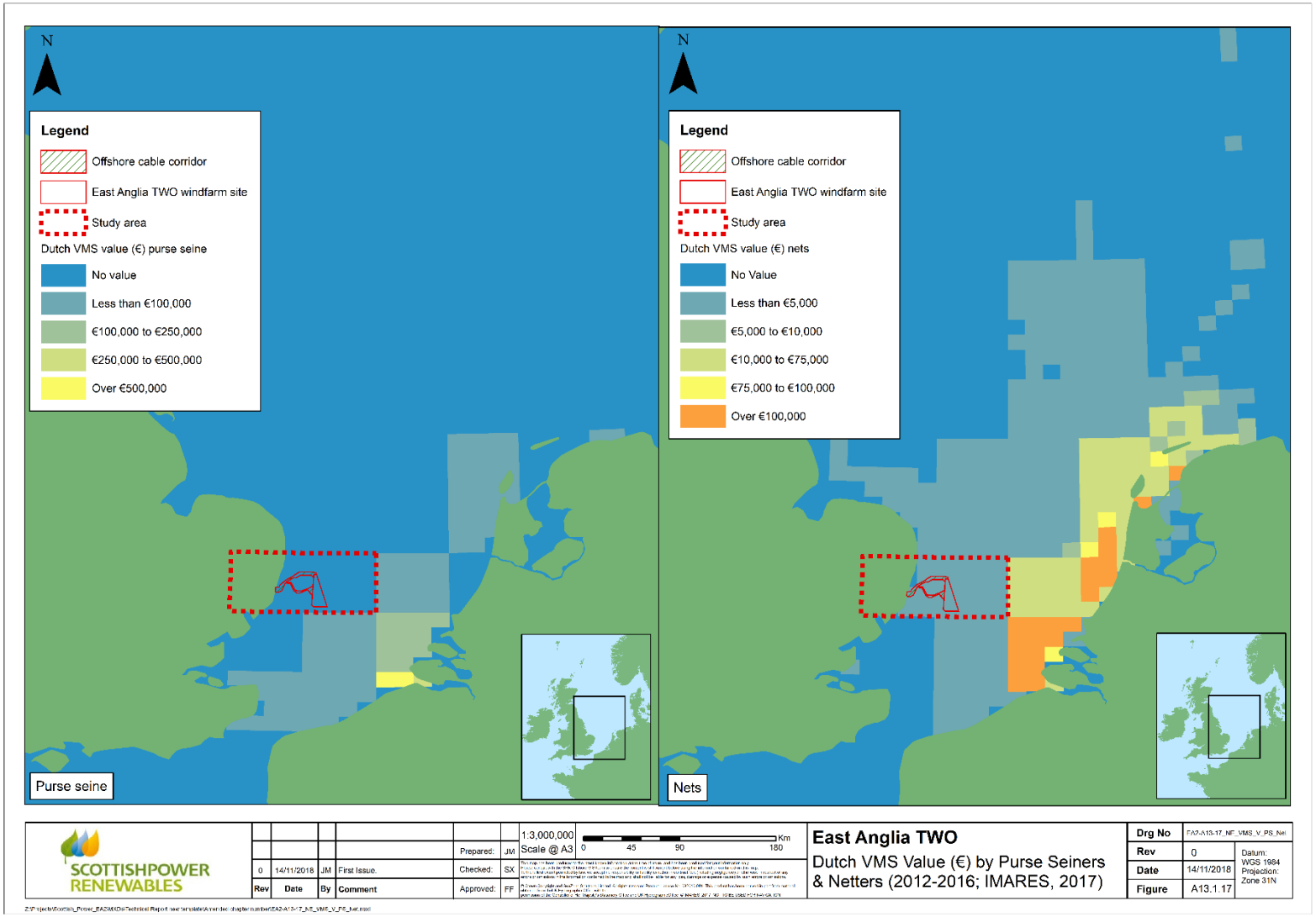


Figure A13.1.17 Average Dutch VMS value (2012 to 2016) for purse seine and nets (IMARES, 2017)

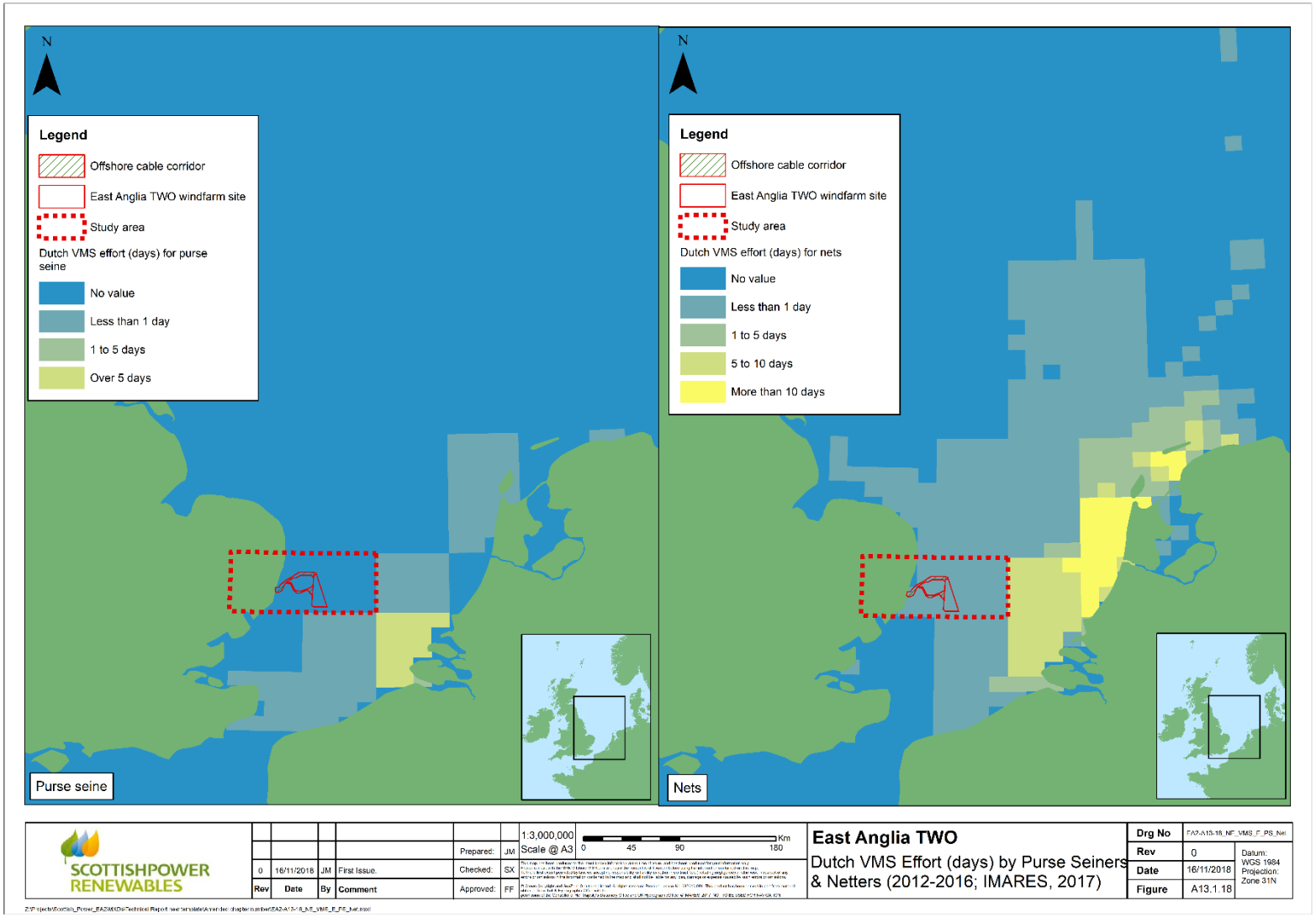


Figure A13.1.18 Average Dutch VMS effort (2012 to 2016) for purse seine and nets (IMARES, 2017)

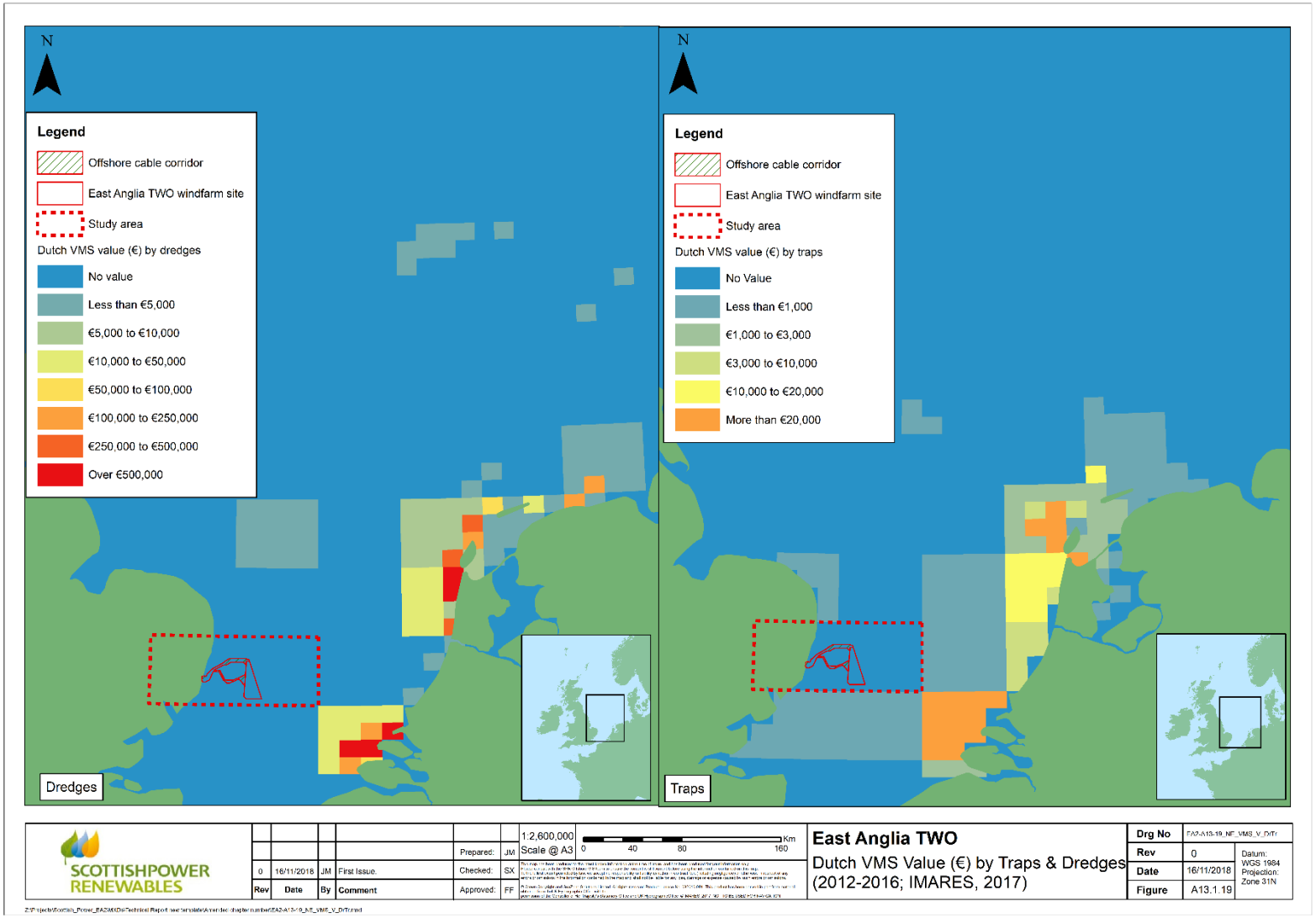


Figure A13.1.19 Average Dutch VMS values (2012 to 2016) for traps and dredges (IMARES, 2017)

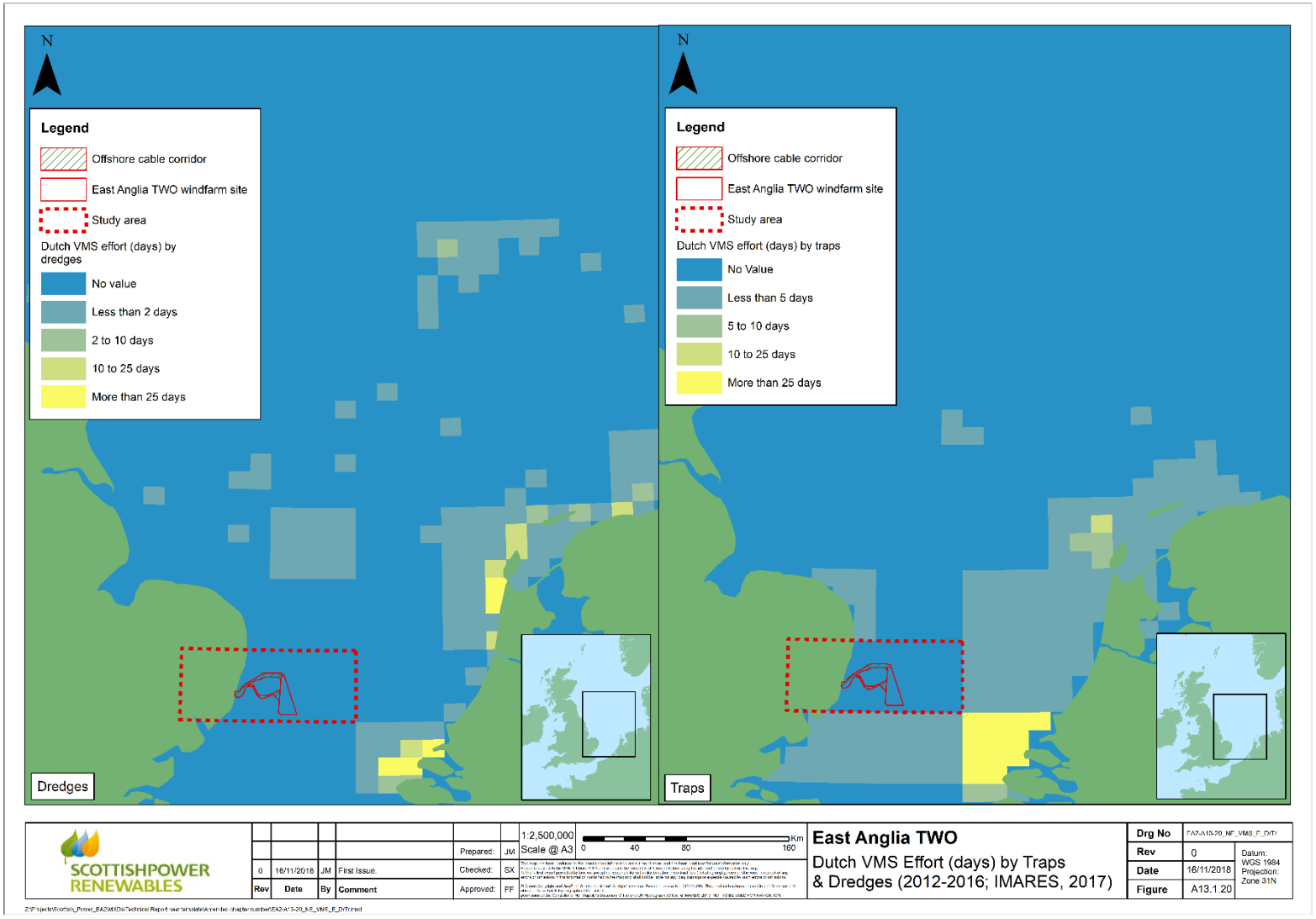


Figure A13.1.20 Average Dutch VMS effort (2012 to 2016) for traps and dredges (IMARES, 2017)

13.1.6.4 Belgium

13.1.6.4.1 Belgian Vessels, Gear and Operations

30. The Belgian fleet comprises of approximately 65 vessels. The majority of these are beam trawlers and to a lesser extent demersal trawlers. It is understood that some vessels are able to operate both beam trawl and otter trawl gears (***Table A13.1.5***).

Table A13.1.5 Numbers of Belgian vessels and which gear type is used

Vessel type	Number of vessels	Percentage of fleet (%)
Beam trawler	47	72.30
Otter trawler	4	6.15
Beam & otter trawler	8	12.31
Static gear vessel	2	3.08
Flyshooter	2	3.08
Seine netter	2	3.08

31. The Belgian fleet has historic fishing rights between the UK's 6 and 12nm limits along the majority of the East Anglian coast. However, fishing in this area is restricted to vessel with engines of less than 300HP. It should be noted that a significant proportion of Belgian vessels are Eurokotters (with engines of under 300HP) (***Plate A13.1.2***) and these are therefore allowed to fish between the UK's 6 and 12nm limits. Most Belgian Eurokotters operate from Oostende. From consultation with Rederscentrale it is understood that in the study area, fishing grounds between the UK's 6 and 12nm limit are of most interest to the Belgian fleet (***Table A13.1.2***).

Plate A13.1.2 Belgian Eurokotter (BMM, 2015)

13.1.6.4.2 Belgian Landings Values and Effort data

32. As for the Dutch fleet, sole comprises the majority of landings values for the Belgian fleet in the study area. In addition, a range of other flatfish species such as plaice, turbot, lemon sole, brill, skates and rays also comprise considerable proportions of these vessels' landings (***Figure A13.1.21***).

33. In terms of fishing methods, as derived from analysis of landings values and effort data, it appears that the majority of activity in the study area is associated with beam trawling and to a much lesser extent demersal otter trawling, the latter particularly in rectangle 33F1 (***Figure A13.1.22 and Figure A13.1.23).***

34. Analysis of effort data by vessel length ***(Figure A13.1.24***), indicates that in rectangle 33F2, where the offshore section of the offshore cable corridor and the East Anglia TWO windfarm site are located, the majority of activity is by the larger class of Belgian vessels (24 to 40m in length). In contrast, in rectangle 33F1, which includes the area between the 6 and 12nm limit, the majority of effort is by smaller vessels (18 to 24m in length), reflecting that fishing in this area is predominantly undertaken by smaller Eurokotters.

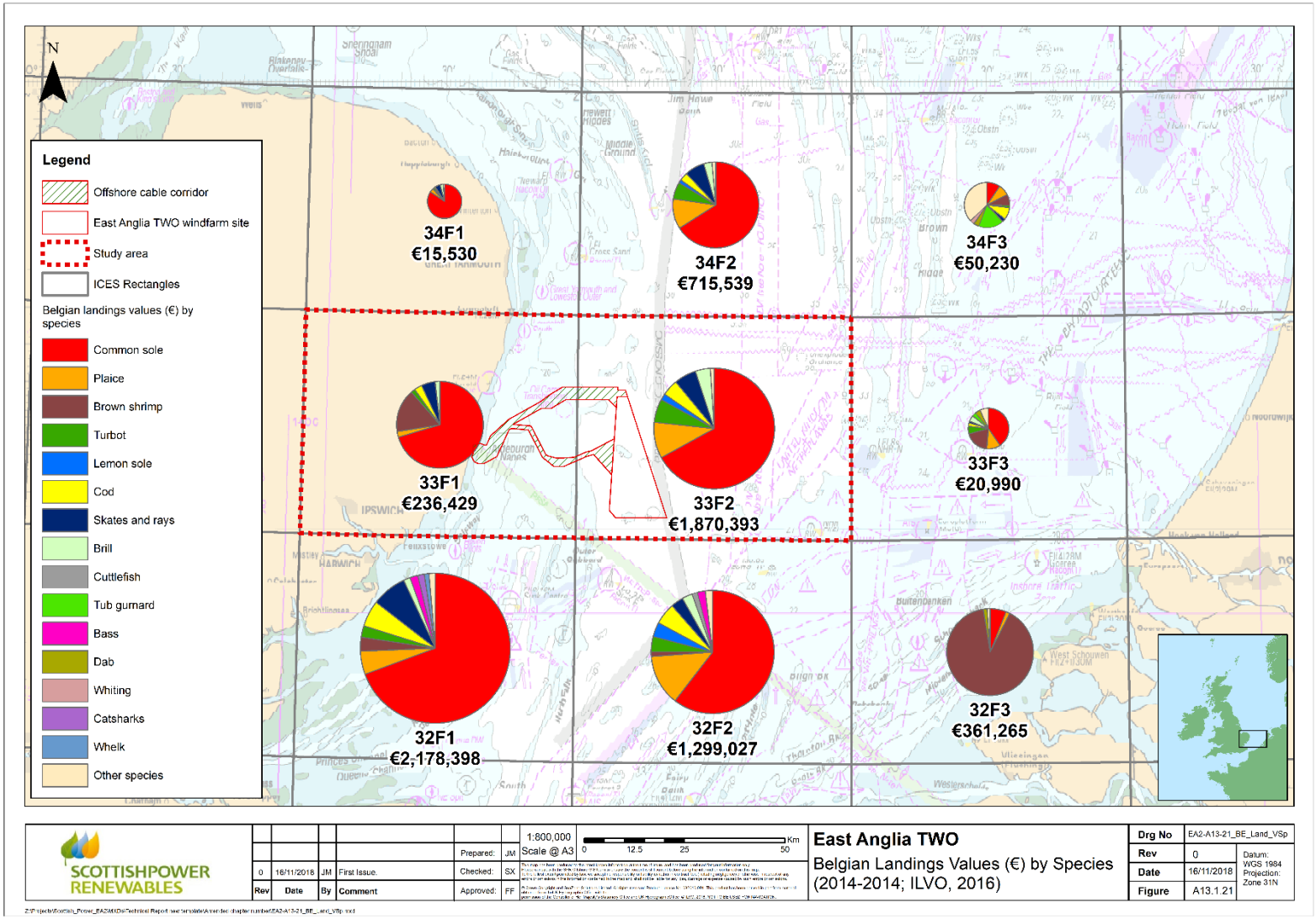


Figure A13.1.21 Average Belgian landings values (2010 to 2014) by species (ILVO, 2016)

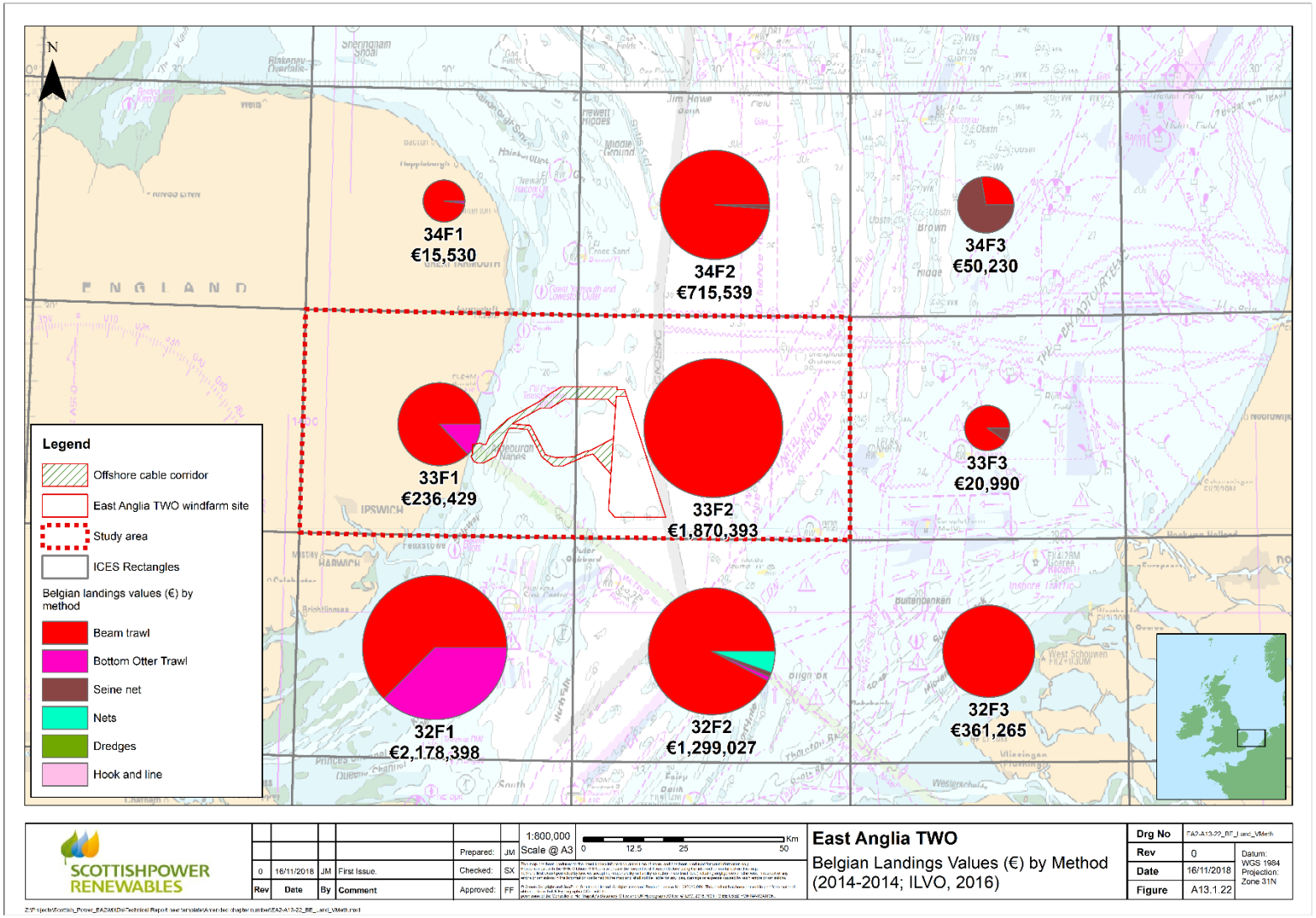


Figure A13.1.22 Average Belgian landings values (2010 to 2014) by method (ILVO, 2016)

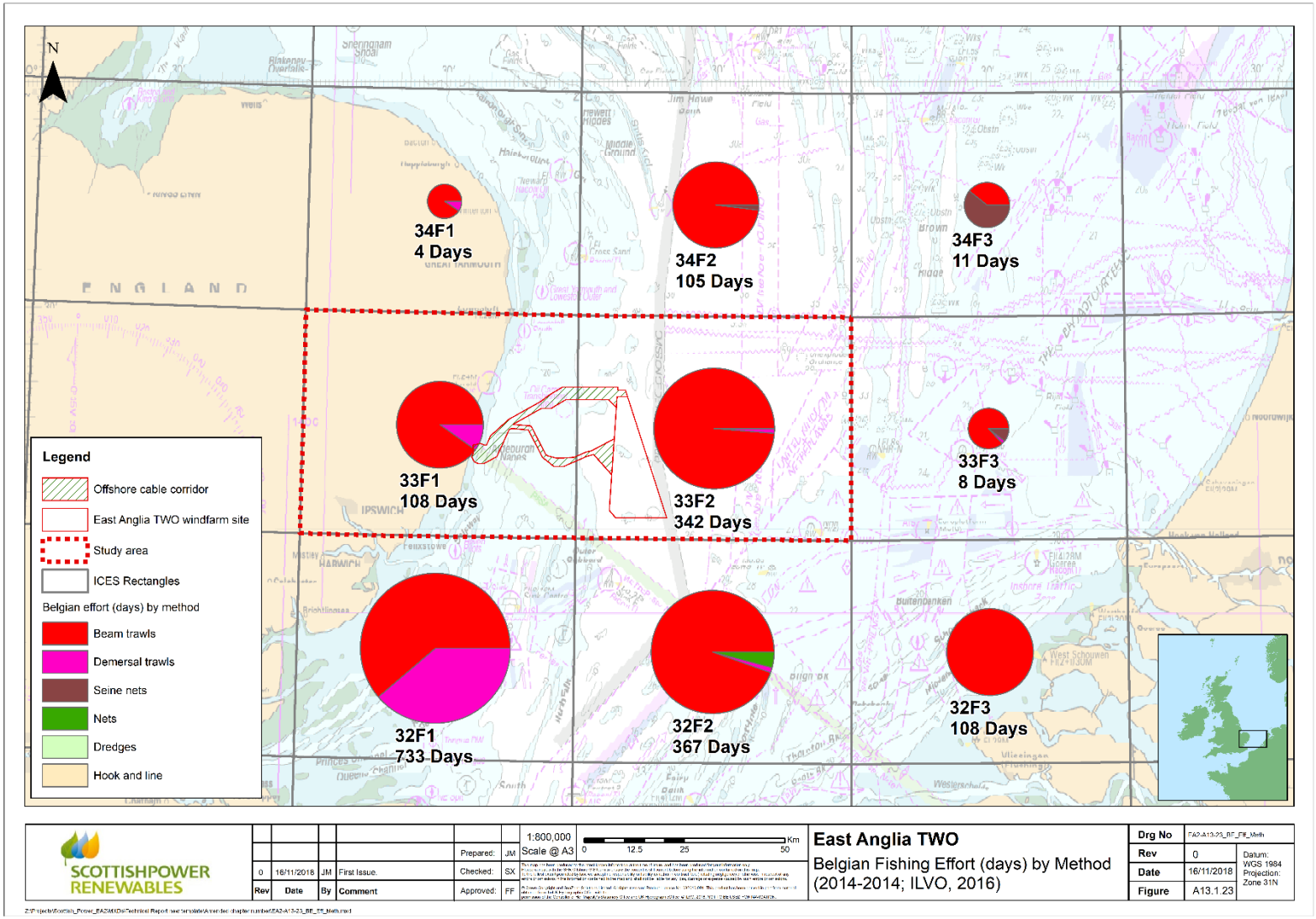


Figure A13.1.23 Average Belgian landings effort (2012 to 2014) by method (ILVO, 2016)

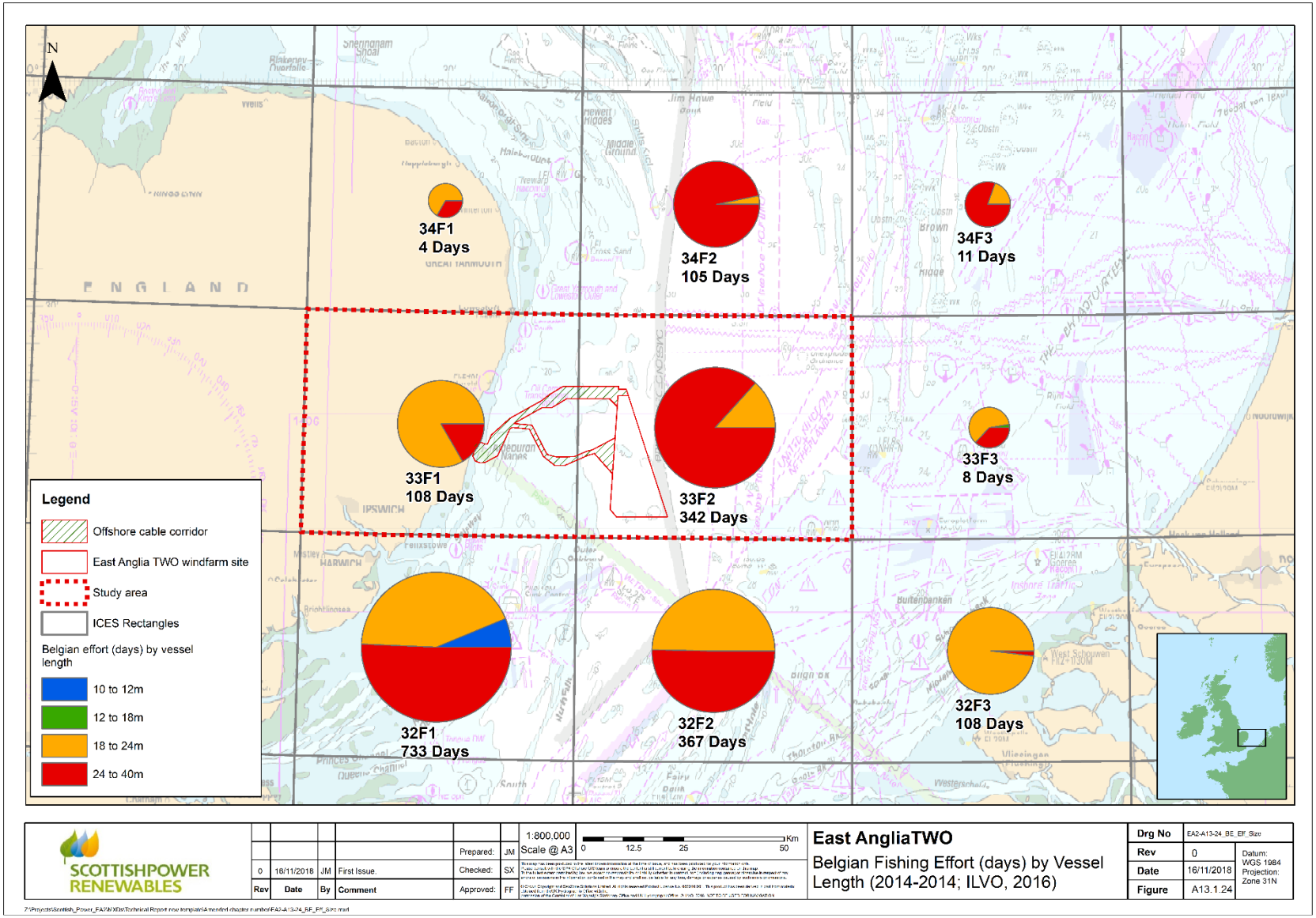


Figure A13.1.24 Average Belgian landings effort (2012 to 2014) by vessel length (ILVO, 2016)

13.1.6.4.3 Belgian VMS data

35. Analysis of VMS data for the Belgian fleet indicates that activity by beam trawlers is spread over a wide area encompassing the Southern North Sea, The English Channel, the Western Approaches, Celtic Sea and to the west of Denmark in the Central North Sea. Although Belgian beam trawling activity occurs within the study area, within the Offshore development area fishing levels are comparatively low with highest fishing levels recorded to the south of the study area and into the English Channel (***Figure A13.1.25*** and ***Figure A13.1.26).***

36. The distribution of Belgian demersal otter trawling broadly reflects that of beam trawling but with a wider distribution of activity in the Central North Sea. In the study area, demersal otter trawling occurs at low levels, including within the Offshore development area (***Figure A13.1.27*** and ***Figure A13.1.28).***

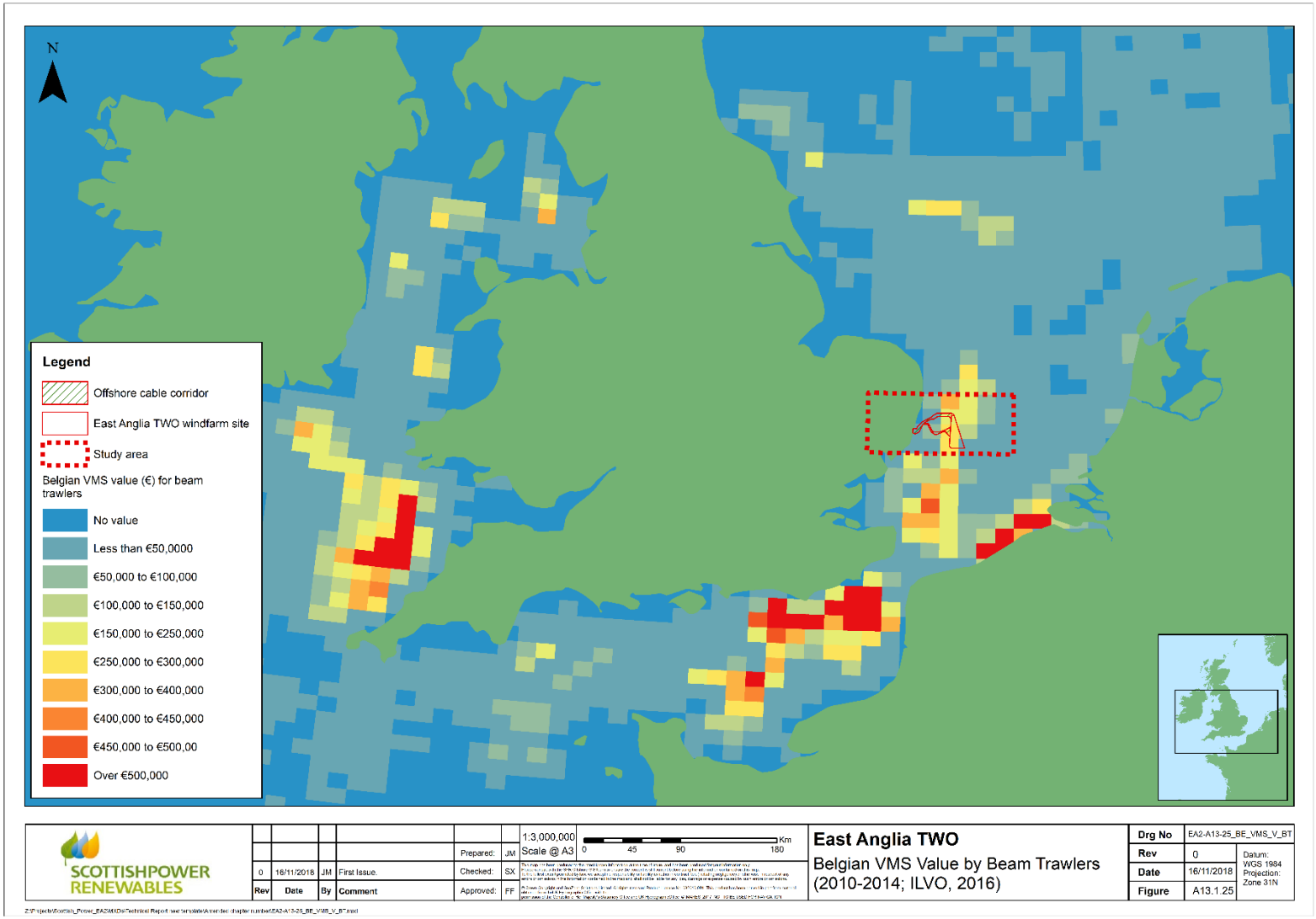


Figure A13.1.25 Average Belgian VMS value (2010 to 2014) by beam trawl (ILVO, 2016)

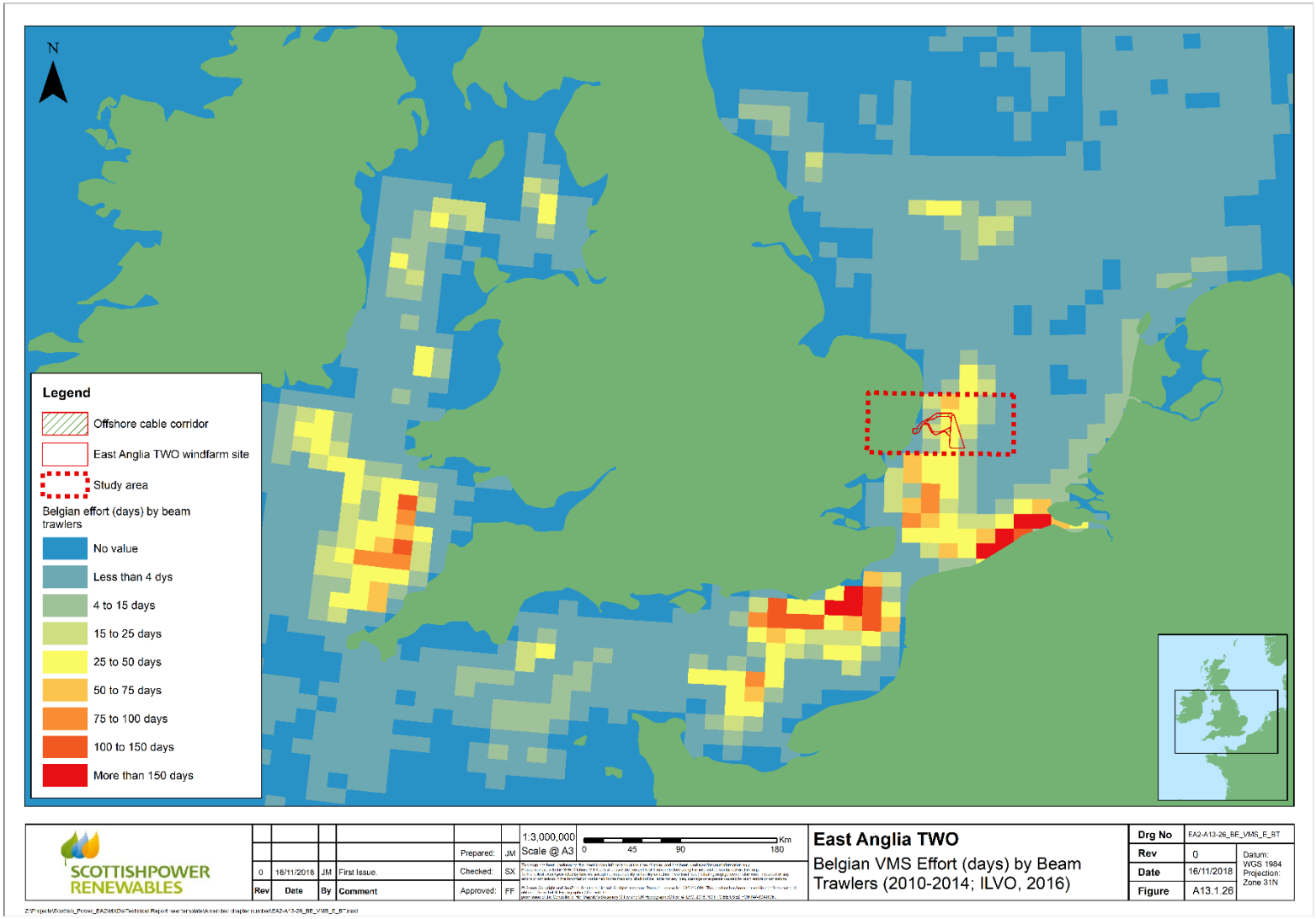


Figure A13.1.26 Average Belgian VMS effort (2010 to 2014) by beam trawl (ILVO, 2016)

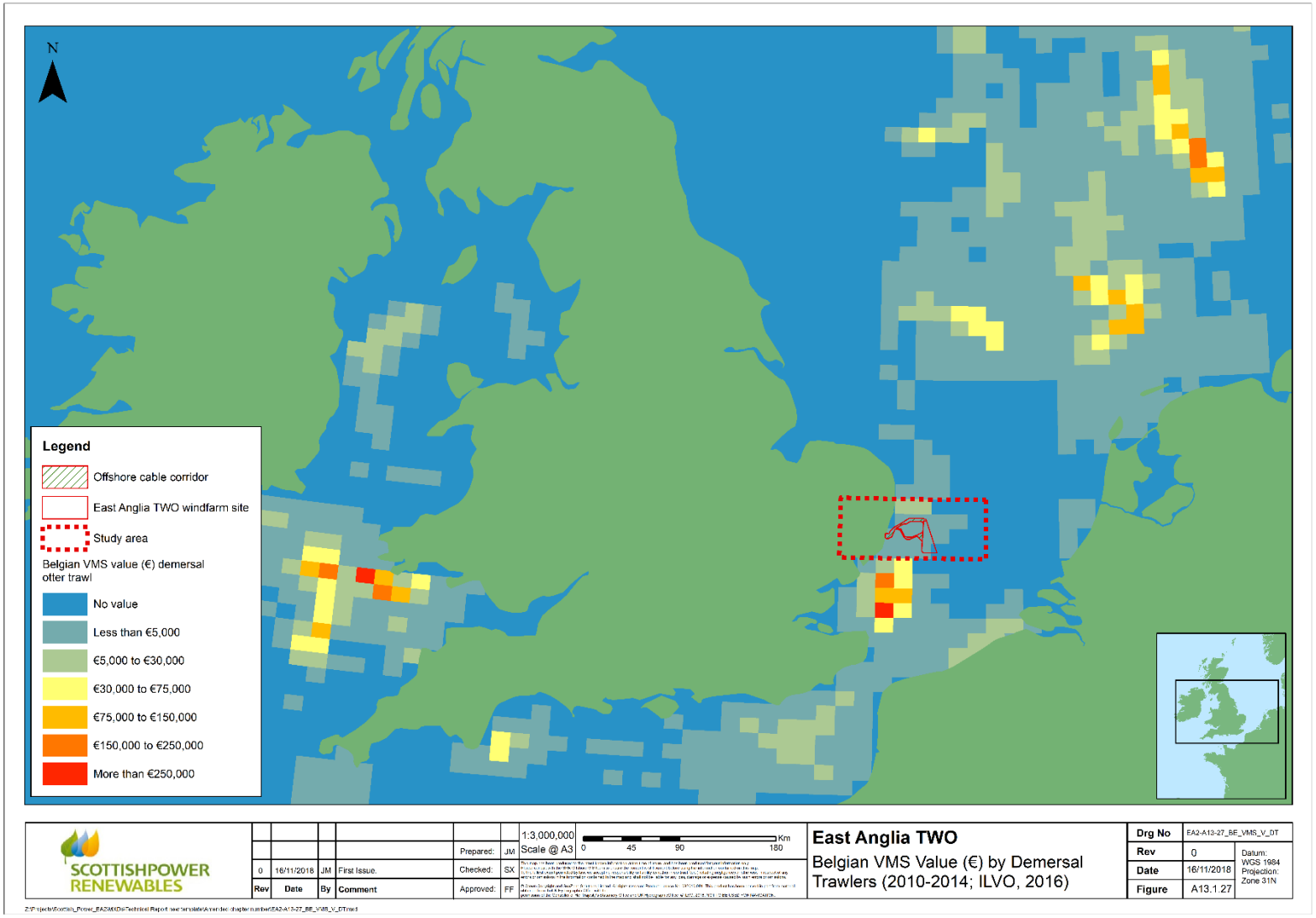


Figure A13.1.27 Average Belgian VMS value (2010 to 2014) by demersal trawl (ILVO, 2016)

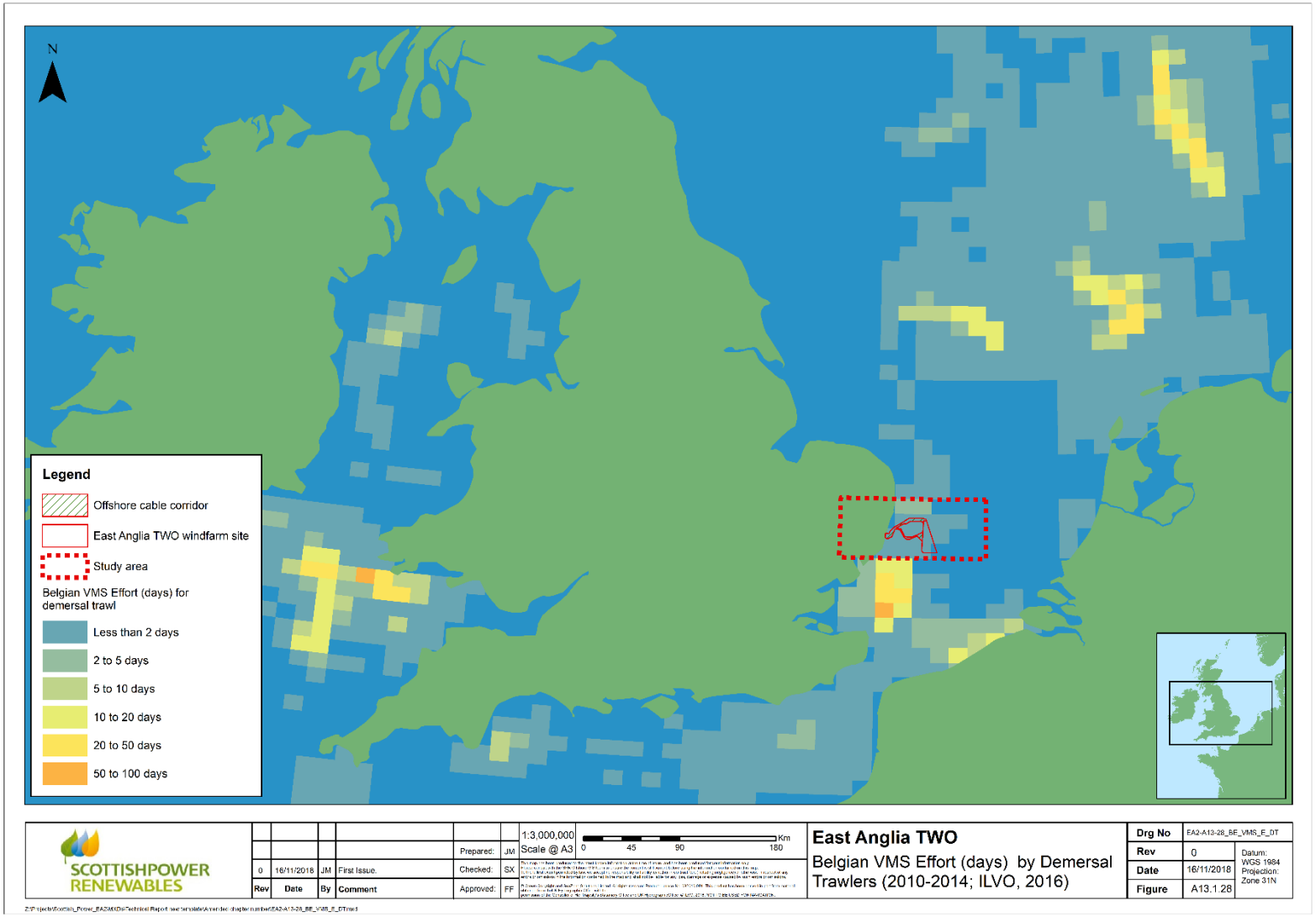


Figure A13.1.28 Average Belgian VMS effort (2010 to 2014) by demersal trawl (ILVO, 2016)

13.1.6.5 United Kingdom

13.1.6.5.1 United Kingdom Vessels, Gear and Operations

37. The MMO monthly vessel lists give an overview of the vessel numbers registered to each port by vessel size category (under 10m and over 10m vessels) (***Table A13.1.6).*** In ports local to the proposed East Anglia TWO project, the majority of vessels registered are under 10m in length with only 4 vessels listed as over 10m.

38. The UK under 10m fleet is numerically larger than the over 10m fleet with the most vessels local to the study area registered at Lowestoft (27), Harwich (18), Felixstowe (17) and Southwold (11). Aldeburgh and Orford have a combined total of 10 registered vessels under 10m.

39. It should be noted that a vessel's port of registration and/or defined home port as specified in MMO vessel lists, does not restrict which port they operate from or where they undertake fishing activities.

Table A13.1.6 Overview of the registered vessels at five main ports in relation to the proposed East Anglia TWO project (MMO, 2018)

Port	Number of <10m vessels registered	Number of >10m vessels registered
Lowestoft	27	4
Harwich	18	0
Felixstowe	17	0
Southwold	11	0
Aldeburgh and Orford (combined)	10	0
Ipswich	5	0
Sizewell	1	0

40. Local vessels from ports such as Aldeburgh, Orford and Sizewell primarily operate within 6nm of the coast close to their home port. In order to respond to seasonal fish availability and legislation, a significant proportion of these vessels are multipurpose, with the capability of deploying multiple gear types. In the case of local trawlers, multipurpose capability is less pronounced.

41. Only one under 10m vessel registered to Lowestoft engages in beam trawling (for shrimp in this case) and principally targets grounds off north Norfolk and within the Wash rather than the Offshore development area.

42. Examples of vessels which operate from local ports are given in ***Plate A13.1.3*** to ***Plate A13.1.6.***

Plate A13.1.3 Otter trawler at Lowestoft (BMM, 2015)

Plate A13.1.4 Southwold vessel with potting and trawling capabilities (BMM 2018)

Plate A13.1.5 Beach launched vessel (potting and netting) at Aldeburgh (BMM, 2018)

Plate A13.1.6 A vessel that operates pots and static nets based in Sizewell (BMM, 2018)

43. Fishing grounds derived from consultation with local fishermen for the principal fishing methods identified in the study area are illustrated in ***Figure A13.1.29 to Figure A13.1.32.***

44. As shown (Figure A13.1.29), activity by local potters extends over a relatively wide area including the area of the offshore cable corridor and to a lesser degree within the East Anglia TWO windfarm site.

45. Long lining takes place primarily in inshore areas (up to the 12nm limit), including areas relevant to the offshore cable corridor and to lesser extent further offshore, including the East Anglia TWO offshore windfarm site (***Figure A13.1.30***).

46. Local netting grounds are more extensive than those of longlining and potting, comprising the nearshore and offshore areas off the East Anglian coast and including both the area of the offshore cable corridor and the East Anglia TWO windfarm site (***Figure A13.1.31***).

47. Trawling activity by local vessels is focussed in the vicinity of the offshore cable corridor, and the southwestern part of the East Anglia TWO windfarm site (***Figure A13.1.32)***.

48. In addition to the methods described above, from the information gathered during consultation with local fishermen, is it understood that some vessels occasionally engage in jigging to target species such as cod, mackerel, pollack and squid.

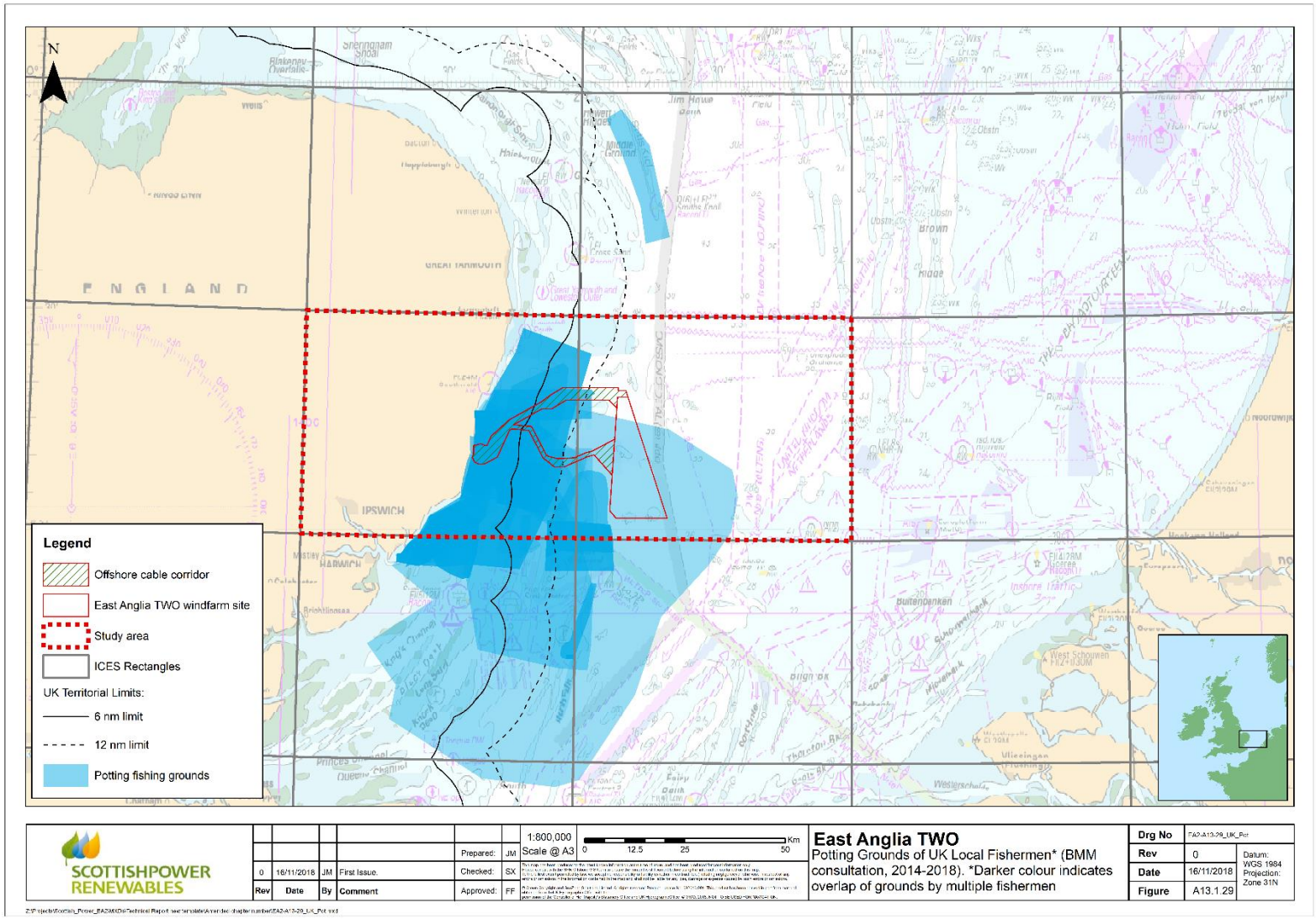


Figure A13.1.29 Potting grounds of UK fishermen identified through consultation (2014 to 2018)

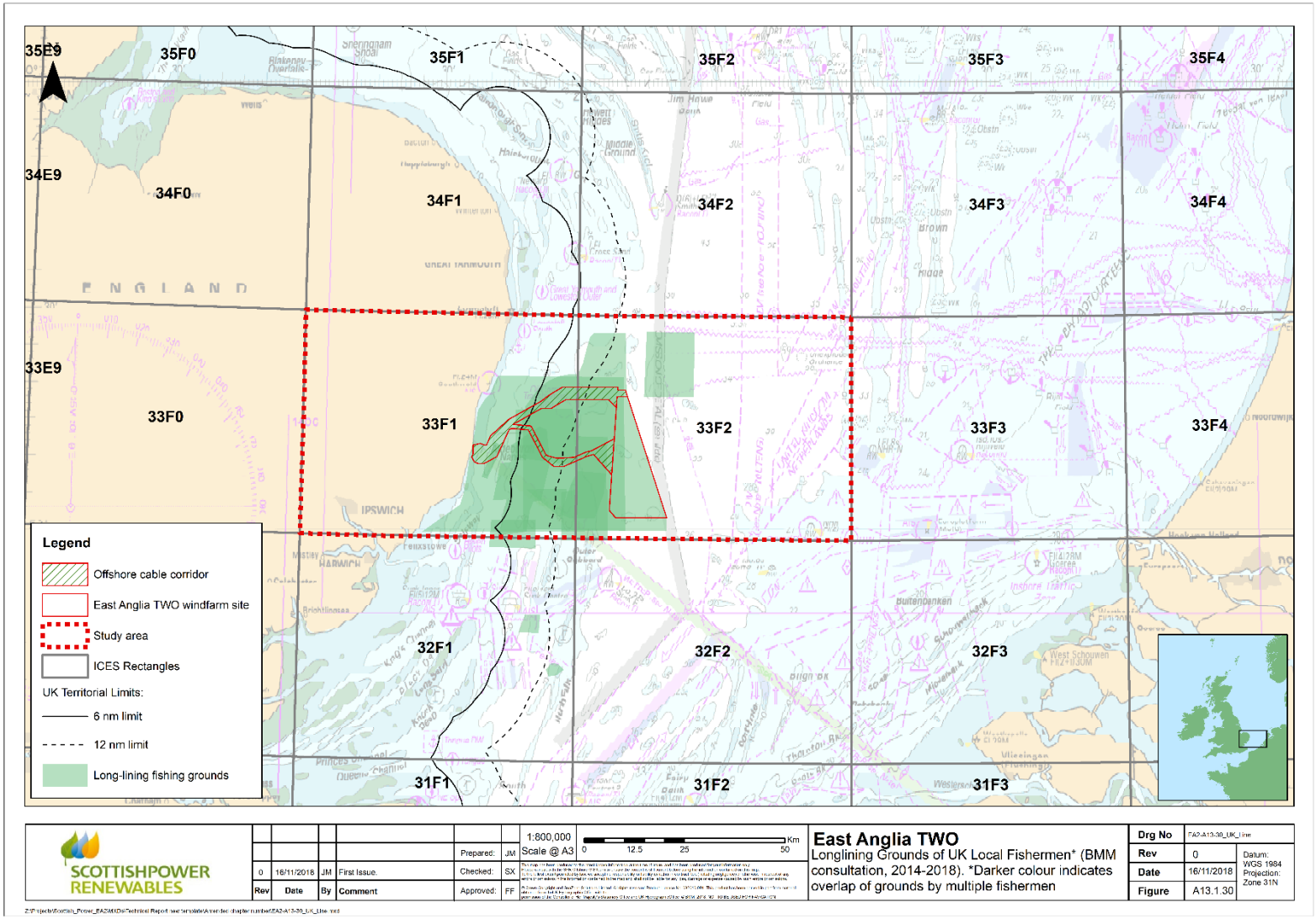


Figure A13.1.30 Longlining grounds of UK fishermen identified through consultation (2014 to 2018)

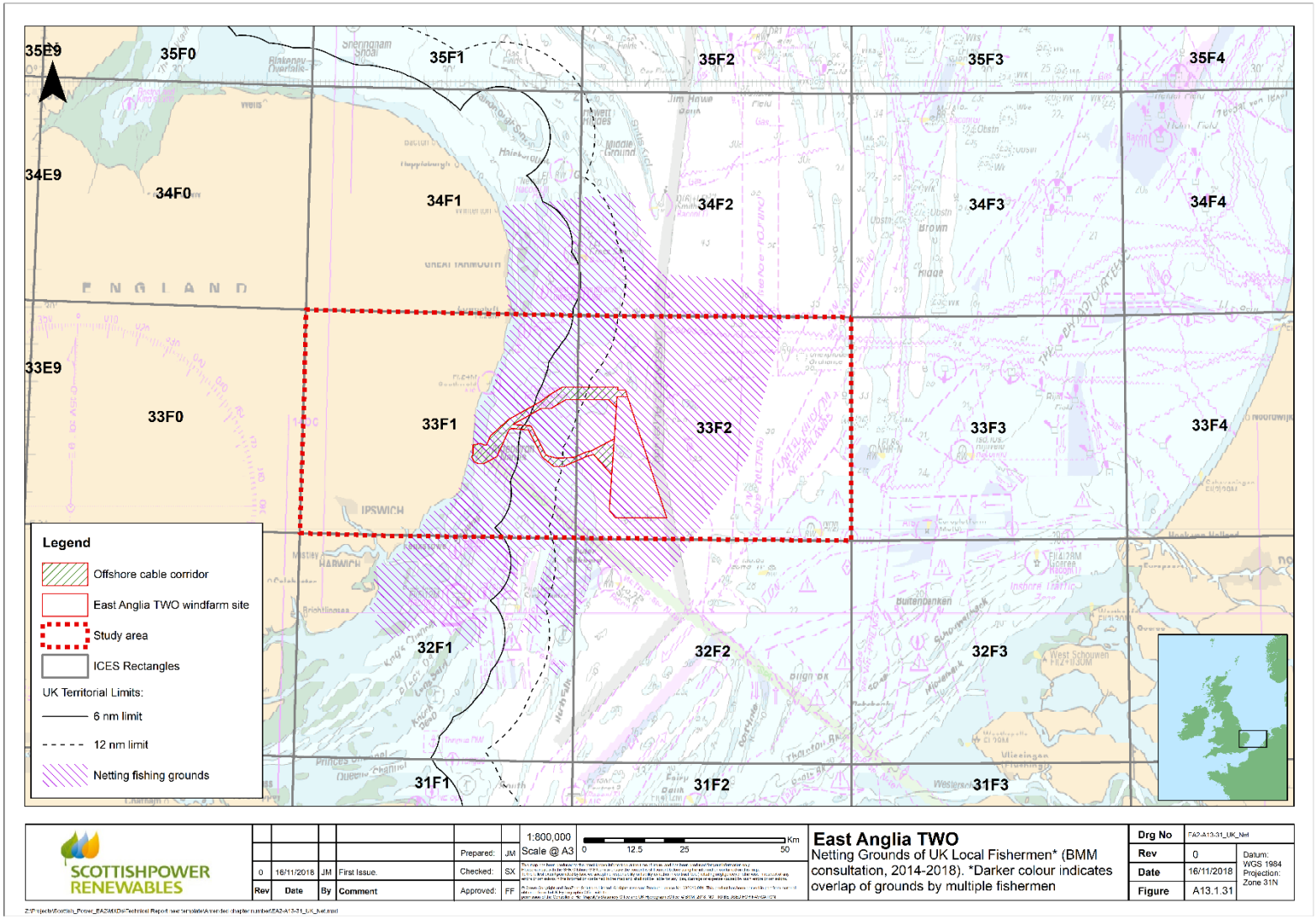


Figure A13.1.31 Netting grounds of UK fishermen identified through consultation (2014 to 2018)

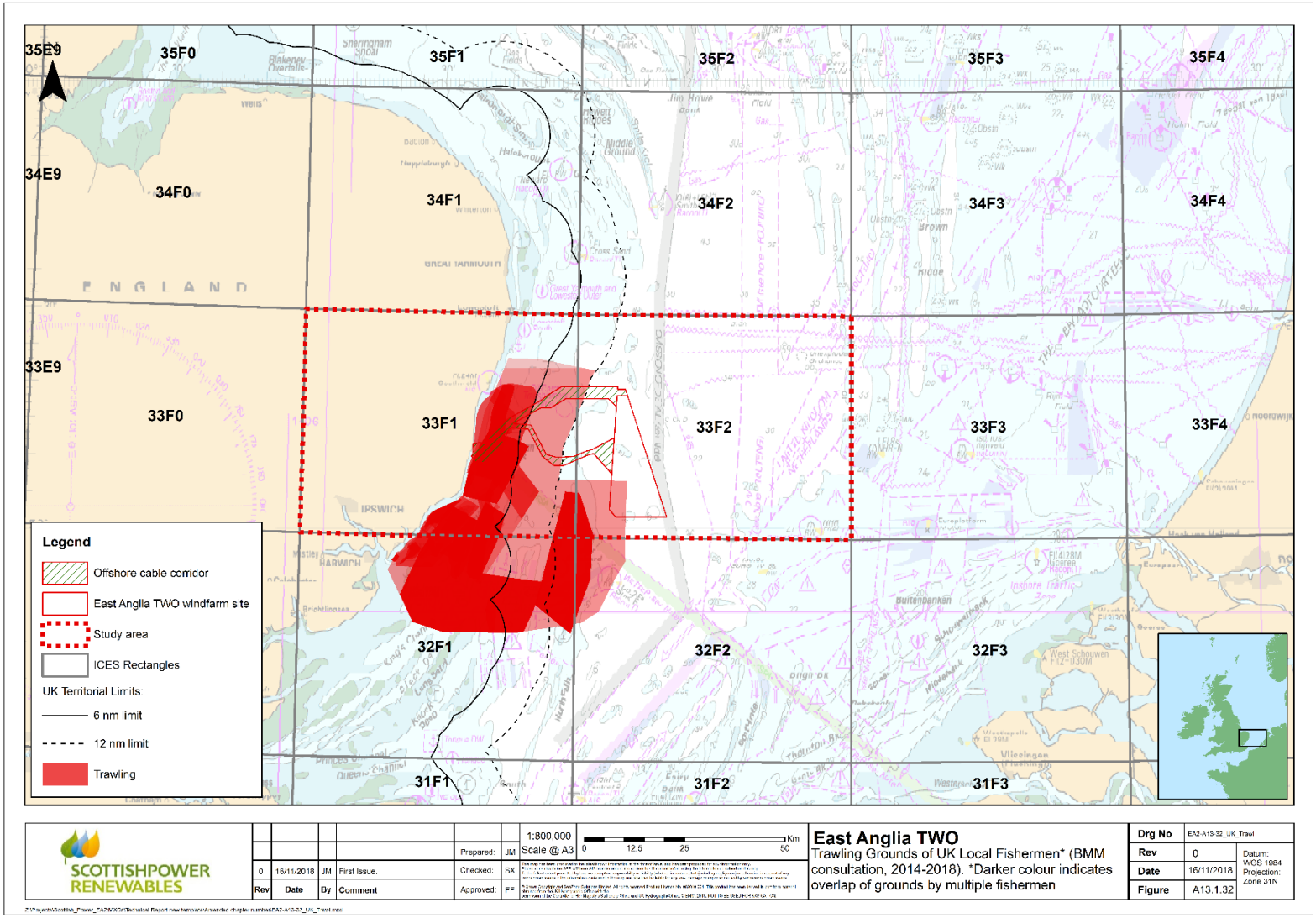


Figure A13.1.32 Trawling grounds of UK fishermen identified through consultation (2014 to 2018)

13.1.6.5.2 United Kingdom Landings Values and Effort

Principal fishing methods and target species

49. Analysis of landings and effort data in the study area indicates that in rectangle 33F1 (where the inshore section of the offshore cable corridor is located) the main methods used are potting, gillnetting, longlining and to a lesser degree trawling (***Figure A13.1.33*** and ***Figure A13.1.34***). The majority of vessels engaged in these fisheries are of the smaller vessel size category (under 10m in length) and target shellfish species (lobster, crab and whelk) as well as fish species such as sole, plaice, rays, cod and bass ***(Figure A13.1.35*** and ***Diagram A13.1.2***). Further offshore, in rectangle 33F2 (where the offshore section of the offshore cable corridor and the East Anglia TWO windfarm site are located), landings values and effort are mostly from beam trawling by over-15m vessels and to a lesser degree potting and longlining by under-15m vessels (***Figure A13.1.33, Figure A13.1.34*** and ***Diagram A13.1.3***). The principal species targeted in terms of landings by value in rectangle 33F2 are sole, plaice turbot and whelks (***Figure A13.1.35***).

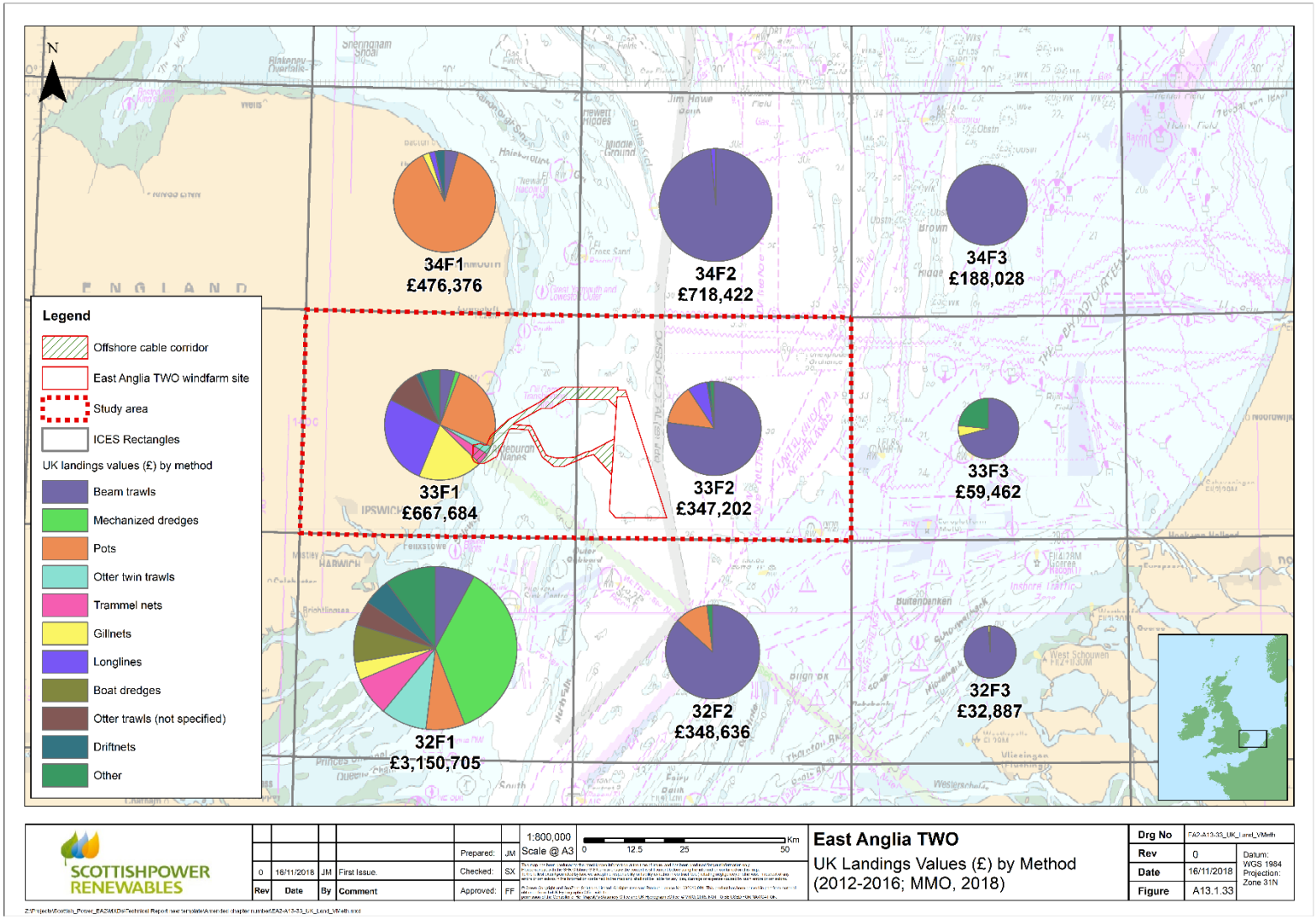


Figure A13.1.33 Average UK landings values (2012 to 2016) by method (MMO, 2018)

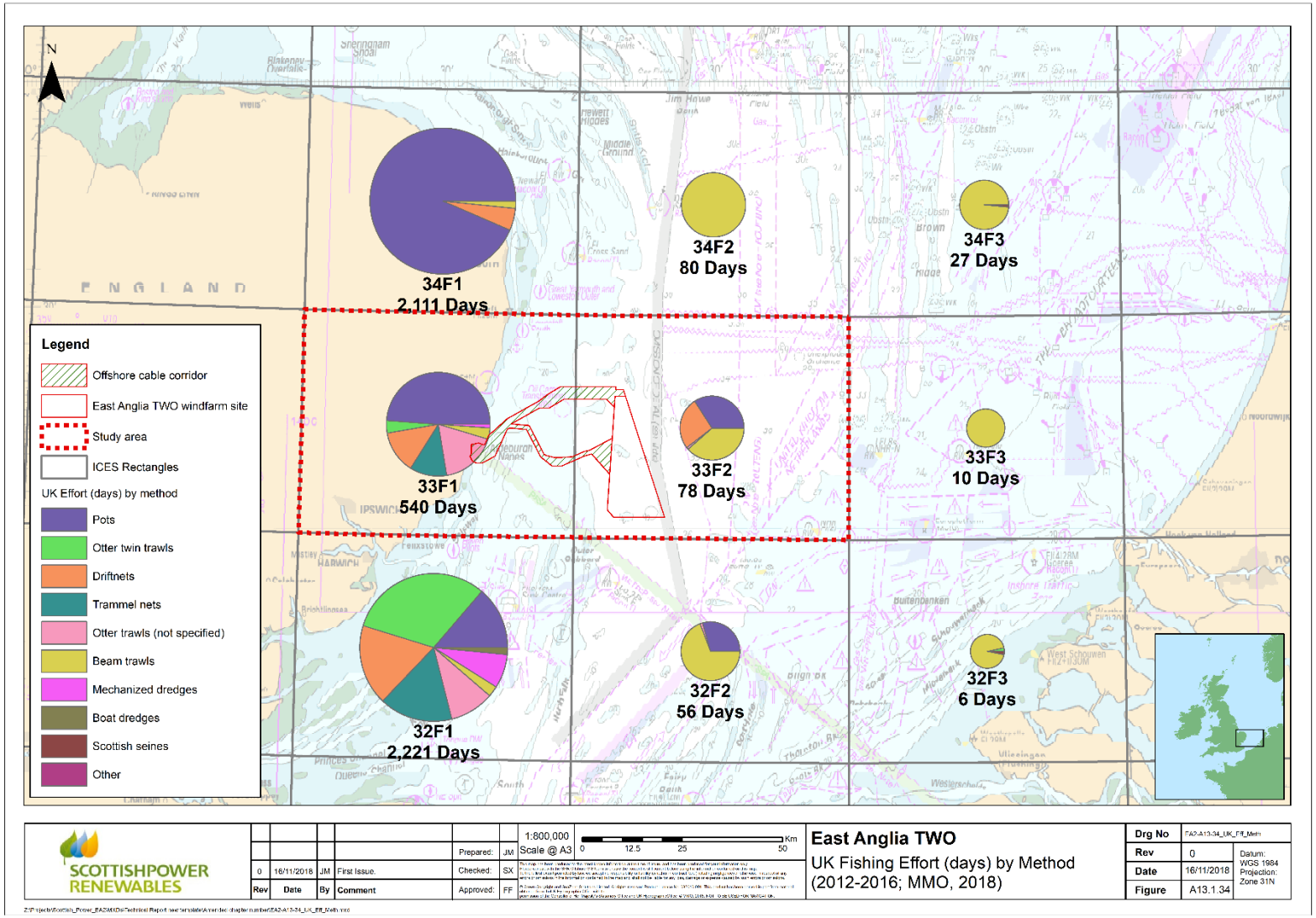


Figure A13.1.34 Average UK fishing effort (2012 to 2016) by method (MMO, 2018)

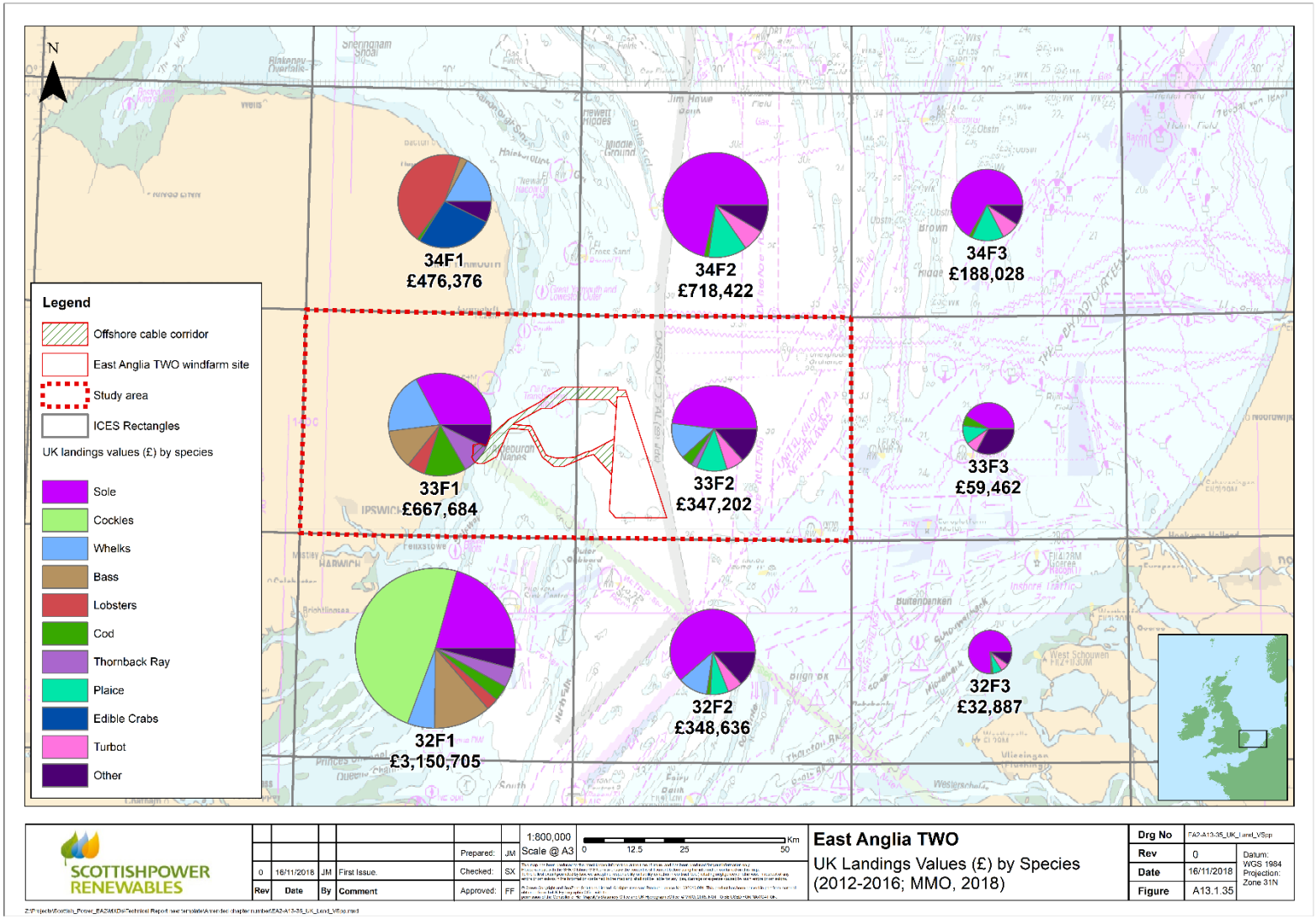
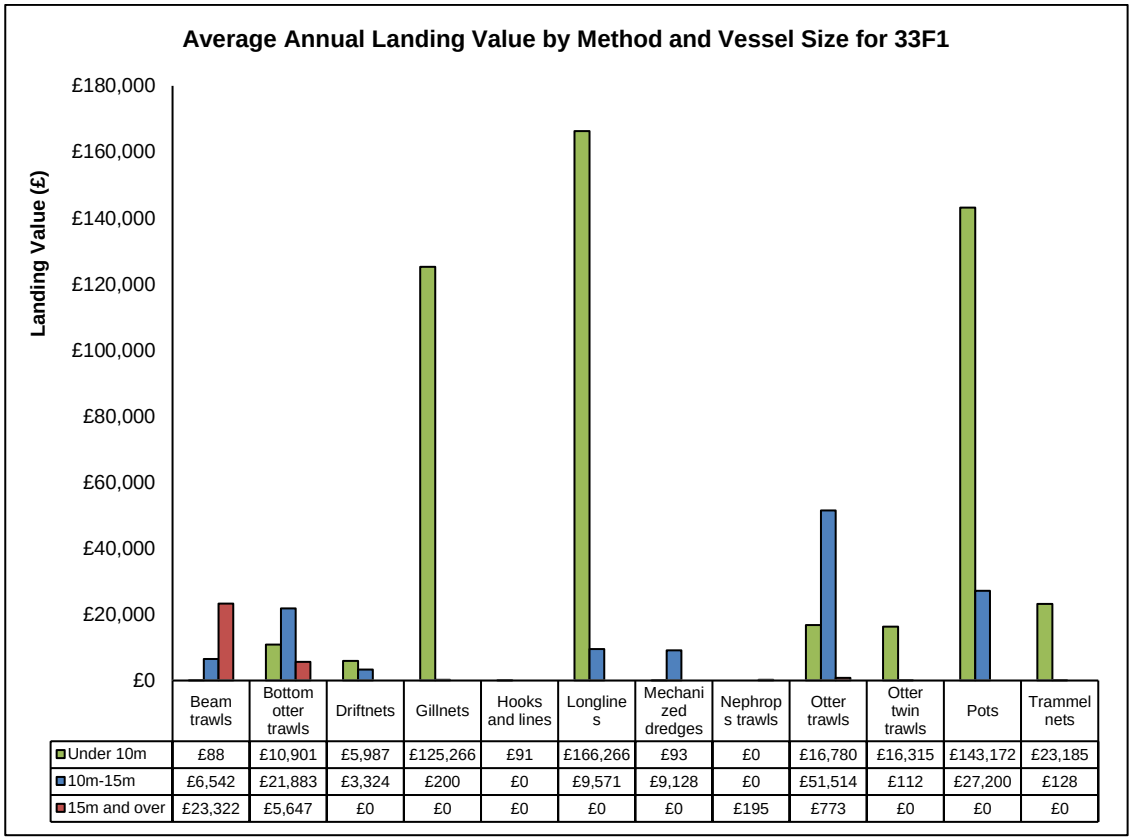
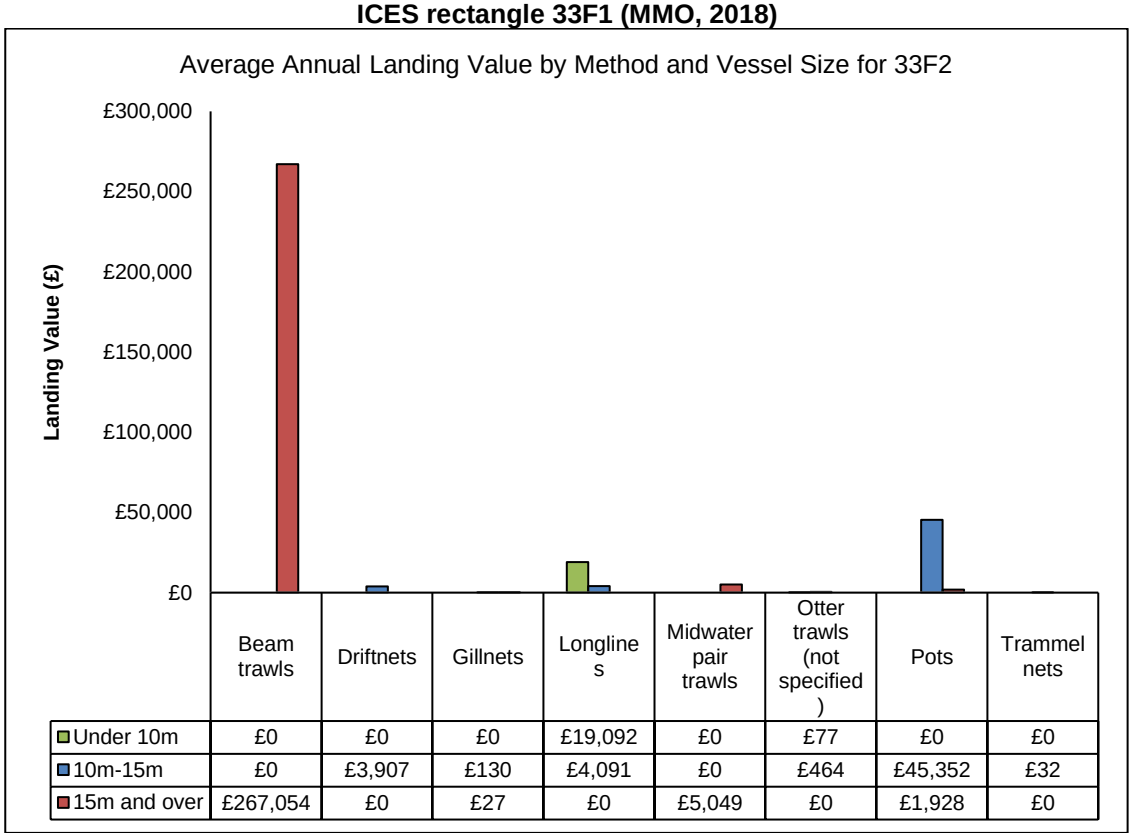


Figure A13.1.35 Average UK landings values (2012 to 2016) by species (MMO, 2018)



	Beam trawls	Bottom otter trawls	Driftnets	Gillnets	Hooks and lines	Longlines	Mechanized dredges	Nephrops trawls	Otter trawls	Otter twin trawls	Pots	Trammel nets
Under 10m	£88	£10,901	£5,987	£125,266	£91	£166,266	£93	£0	£16,780	£16,315	£143,172	£23,185
10m-15m	£6,542	£21,883	£3,324	£200	£0	£9,571	£9,128	£0	£51,514	£112	£27,200	£128
15m and over	£23,322	£5,647	£0	£0	£0	£0	£0	£195	£773	£0	£0	£0

Diagram A13.1.2 Average UK landings values (2012 to 2016) by method and vessel length in ICES rectangle 33F1 (MMO, 2018)



	Beam trawls	Driftnets	Gillnets	Longlines	Midwater pair trawls	Otter trawls (not specified)	Pots	Trammel nets
Under 10m	£0	£0	£0	£19,092	£0	£77	£0	£0
10m-15m	£0	£3,907	£130	£4,091	£0	£464	£45,352	£32
15m and over	£267,054	£0	£27	£0	£5,049	£0	£1,928	£0

Diagram A13.1.3 Average UK landings values (2012 to 2016) by method and vessel length in ICES rectangle 33F2 (MMO, 2018)

Landings by Port

50. A large proportion of landings from rectangle 33F1 (where the inshore section of the offshore cable corridor is located) are into Lowestoft (55.7%) followed by Southwold (17.6%) and Aldeburgh/Orford (14.8%). As shown in ***Table A13.1.7***, landings from rectangle 33F1 account for a considerable proportion of the total annual landings in these ports. In addition, in the case of Sizewell, landings from this rectangle account for the totality of the port's annual landings values.

Table A13.1.7 Average UK landings values (2012 to 2016) by port for ICES rectangle 33F1 (MMO, 2018)

Port of Landing	Average annual landings value from rectangle 33F1	% of total average annual landings from rectangle 33F1	Total average annual port landings value	% of total average annual landings port value that 33F1 represents
Lowestoft	£371,916	55.7	£785,805	47.3
Southwold	£117,443	17.6	£182,246	64.4
Aldeburgh and Orford	£99,126	14.8	£163,711	60.5
Sizewell Beach	£10,839	1.6	£10,839	100.0
Ipswich	£9,917	1.5	£52,194	19.0
West Mersea	£7,102	1.1	£488,162	1.5
Scarborough	£6,944	1.0	£4,832,915	0.1
Whitby	£5,123	0.8	£2,549,957	0.2
Shoreham	£4,736	0.7	£7,182,091	0.1
Hartlepool	£3,655	0.5	£1,748,594	0.2

51. With regards to rectangle 33F2 (where the offshore section of the offshore cable corridor and the East Anglia TWO windfarm site are located), the majority of landings are into Dutch ports (Ijmuiden and Scheveningen) (***Table A13.1.8***). This is understood to be associated with fishing activity by Dutch owned and operated but UK registered beam trawlers (Anglo-Dutch vessels).

Table A13.1.8 Average UK landings values (2012 to 2016) by port for ICES rectangle 33F2 (MMO, 2018)

Port of Landing	Average annual landings value from rectangle 33F2	% of total average annual landings from rectangle 33F2	Total average annual port landings value	% of total average annual landings port value that 33F2 represents
Ijmuiden	£175,155	50.4	£13,465,259	1.3
Scheveningen	£83,138	23.9	£5,934,373	1.4
Lowestoft	£61,641	17.8	£785,805	7.8
Southwold	£13,966	4.0	£182,246	7.7
Stellendam	£10,239	2.9	£91,639	11.2
Great Yarmouth	£3,035	0.9	£82,516	3.7
Grimsby	£27	0.0	£4,047,322	0.0

13.1.6.5.3 UK VMS data (over 15m fleet)

52. As identified from landings and effort data (***section 13.1.6.5.2),*** in addition to activity by local smaller vessels, the study area, particularly rectangle 33F2 (where the offshore section of the offshore cable corridor and the East Anglia TWO windfarm site are located), supports beam trawling activity by over-15m vessels, the majority of which are understood to be Anglo-Dutch vessels.

53. UK owned and operated beam trawlers from ports in the south west of the UK such as Brixham, Penzance and Newlyn, may also fish occasionally in the study area. However, these vessels for the most part target grounds in the Celtic Sea, Western Approaches and English Channel rather than in areas relevant to the proposed East Anglia TWO project.

54. In order to provide an indication of the distribution and level of fishing activity undertaken by over-15m UK registered beam trawlers, VMS data has been analysed and is presented in ***Figure A13.1.36*** and ***Figure A13.1.37.*** As shown, fishing within the study area, including within the Offshore development area occurs at relatively low levels, with activity extending over wide areas of the Southern and Central North Sea and recording highest intensity in the English Channel and Western Approaches (***Figure A13.1.36*** and ***Figure A13.1.37***). Activity in the latter areas is understood to be primarily undertaken by vessels form the south coast, rather than by the Anglo-Dutch fleet.

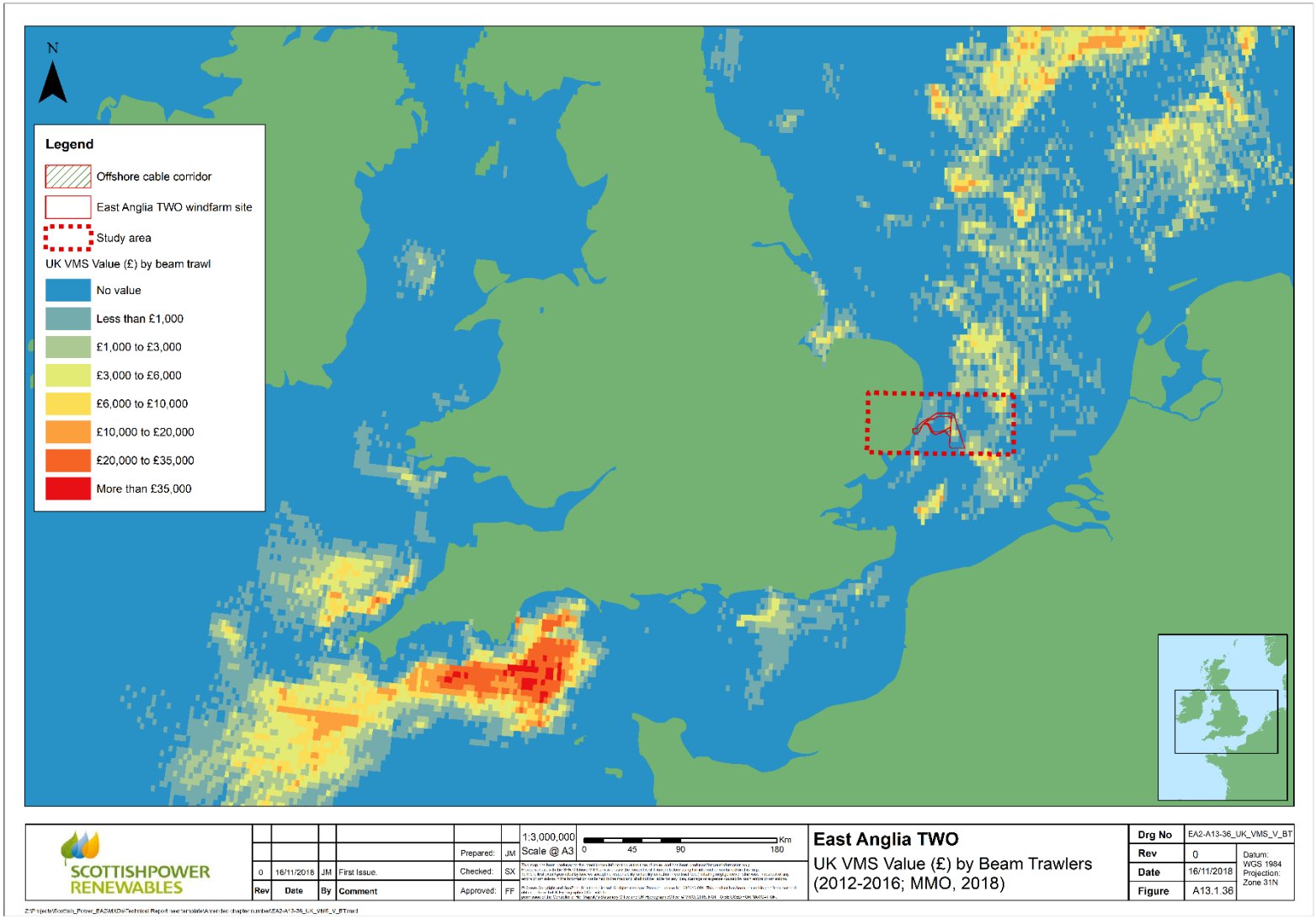


Figure A13.1.36 Average UK VMS values (2012 to 2016) for beam trawl (MMO, 2018)

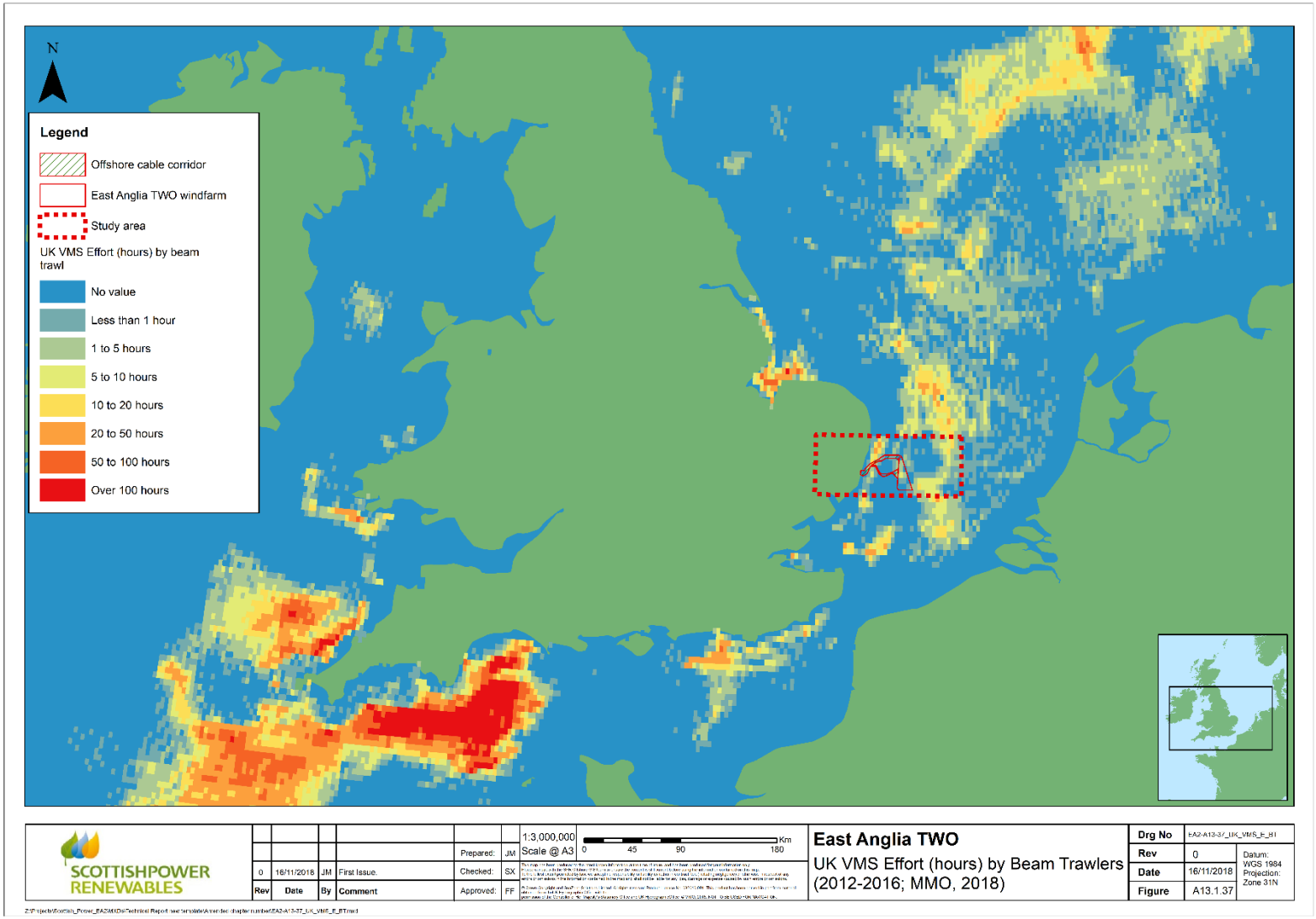


Figure A13.1.37 Average UK VMS effort (2012 to 2016) by beam trawl (MMO, 2018)

13.1.6.6 France

55. In the study area, French vessels have fishing rights to fish between the UK's 6 and 12nm limit within the study area (***Figure A13.1.2***).

56. During consultation with the Comité Régional des Pêches Maritimes et des Elevages Marins (CRPMEM) Hauts de France (***Table A13.1.2***), however, it was noted that French fishing activity levels in the Offshore development area are relatively low, with between 1 and 10 vessels operating in the area, mainly in areas relevant to the offshore cable corridor. All vessels coming from the Haut de France area are demersal otter trawlers, a proportion of which also carry pelagic gear to target mackerel. These vessels are primarily based in Boulogne and Etaples and fish in this area in spring for one or two months, targeting mainly whiting and squid. There are also pelagic freezer trawlers based in Fecamp (Normandie), which target grounds in the area.

57. It was also noted during consultation that some vessels steam through the area to target grounds further north.

58. In line with the above, analysis of available VMS data for demersal and pelagic French trawlers (***Figure A13.1.38 to Figure A13.1.41***) suggest that the Offshore development area sustains relatively low levels of French fishing, with the majority of activity concentrating in areas south of the proposed East Anglia TWO project towards the English Channel.

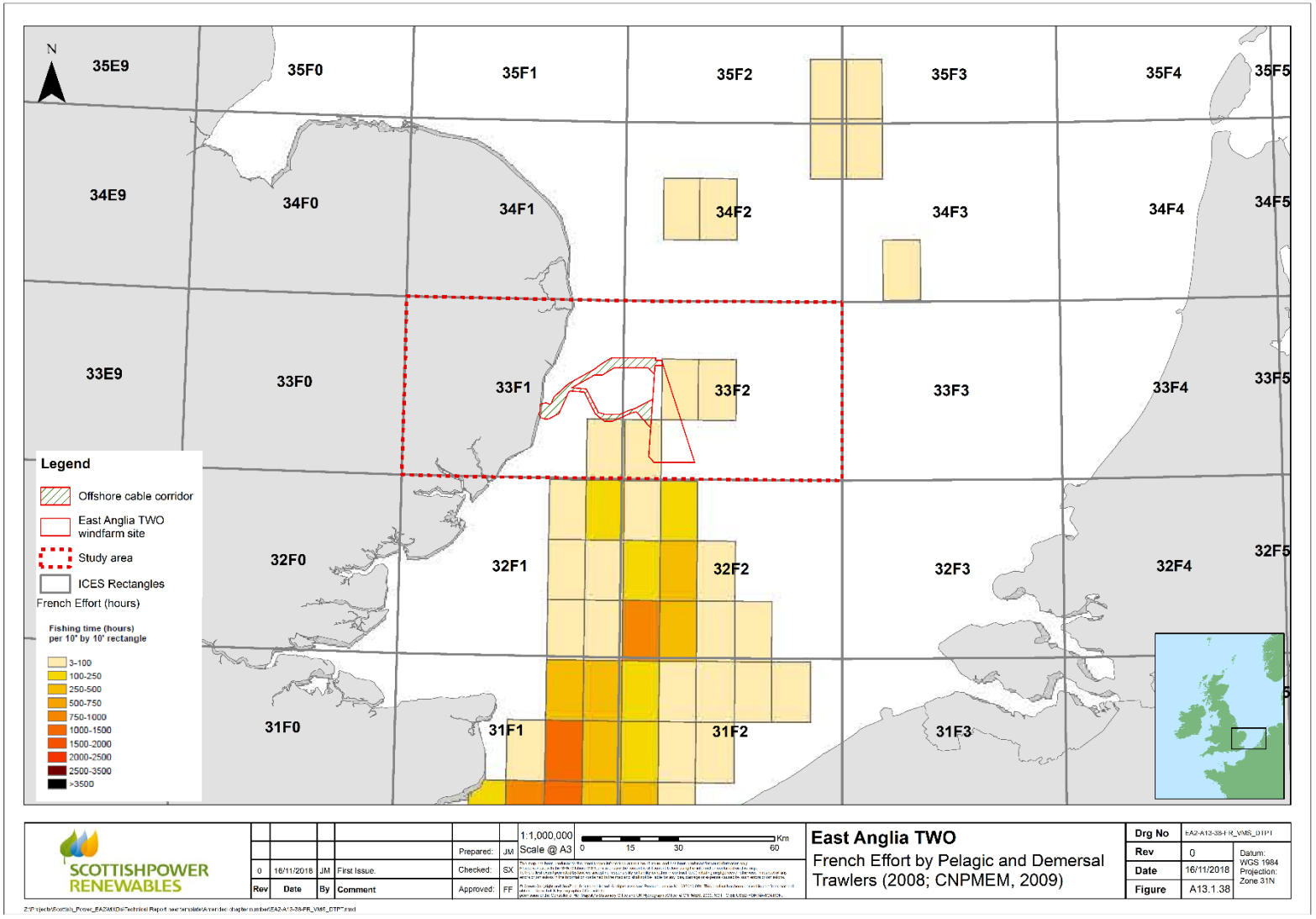


Figure A13.1.38 French fishing effort in 2008 by demersal trawlers and pelagic trawlers (CNPMEM, 2009)

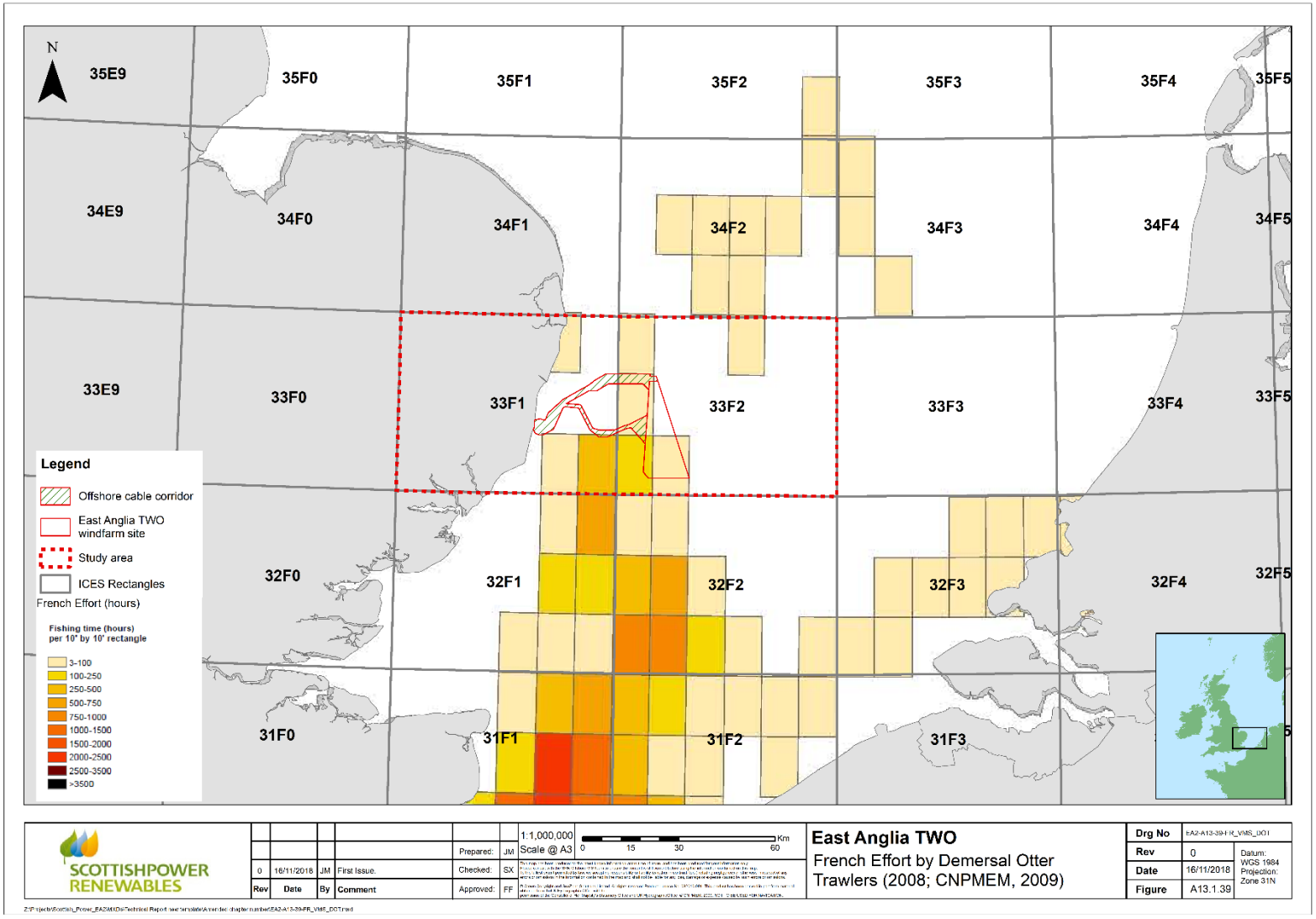


Figure A13.1.39 French fishing effort in 2008 by bottom otter trawlers (CNPMEM, 2009)

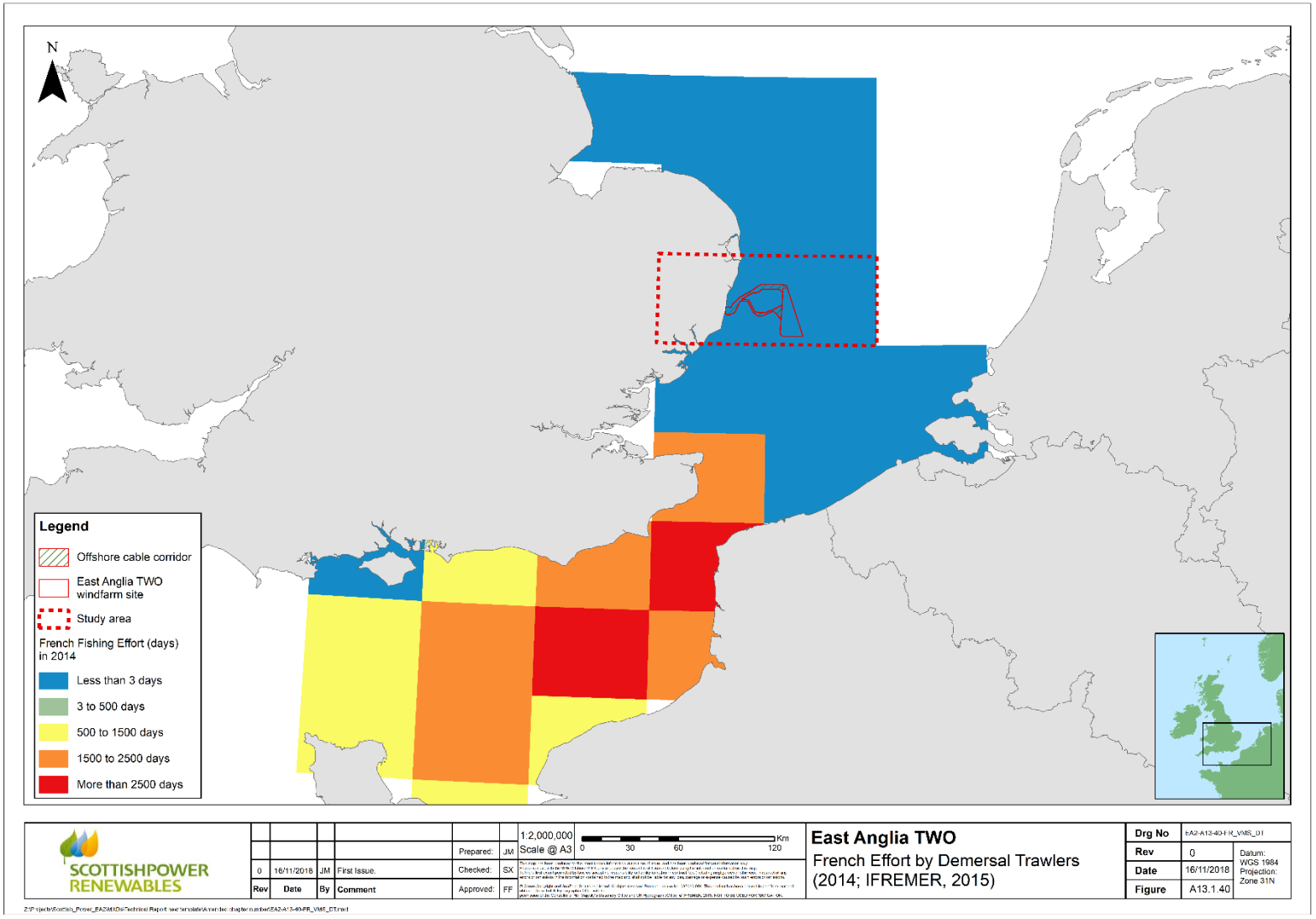


Figure A13.1.40 French fishing effort in 2014 by bottom otter trawlers (IFREMER, 2015)

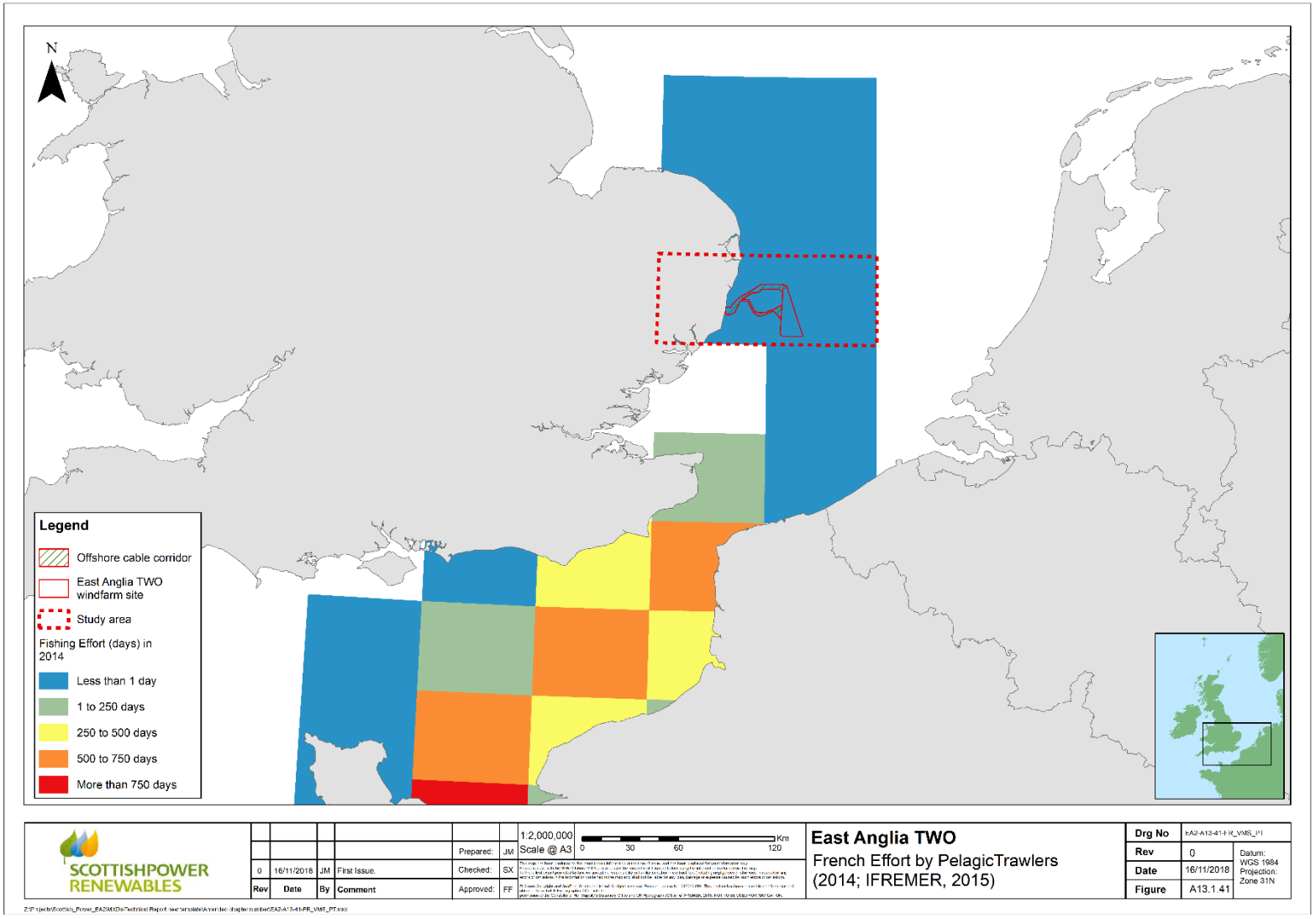


Figure A13.1.41 French fishing effort in 2014 by pelagic trawlers (IFREMER 2015)

13.1.6.7 Other nationalities: Denmark and Germany

13.1.6.7.1Denmark

59. In the vicinity of the proposed East Anglia TWO project, Danish fishing activity is primarily by trawlers, including industrial sandeel trawlers and pelagic trawlers (***Table A13.1.3***).

60. Analysis of VMS data for the sandeel fleet (***Figure A13.1.42)*** suggests that activity by sandeel industrial trawlers is mainly concentrated in areas such as the Dogger Bank (Central North Sea) and the Norwegian coast (Northern North Sea). Although not restricted to these areas activity is considerably lower in the Southern North Sea. In the East Anglia TWO study area activity by these vessels occurs at negligible levels.

61. Similarly, activity by pelagic trawlers also concentrates north of the Offshore development area in the Central North Sea, particularly off the coast of Denmark. As for industrial sandeel trawlers, activity by pelagic trawlers in the East Anglia TWO study area occurs at negligible levels (***Figure A13.1.43***).

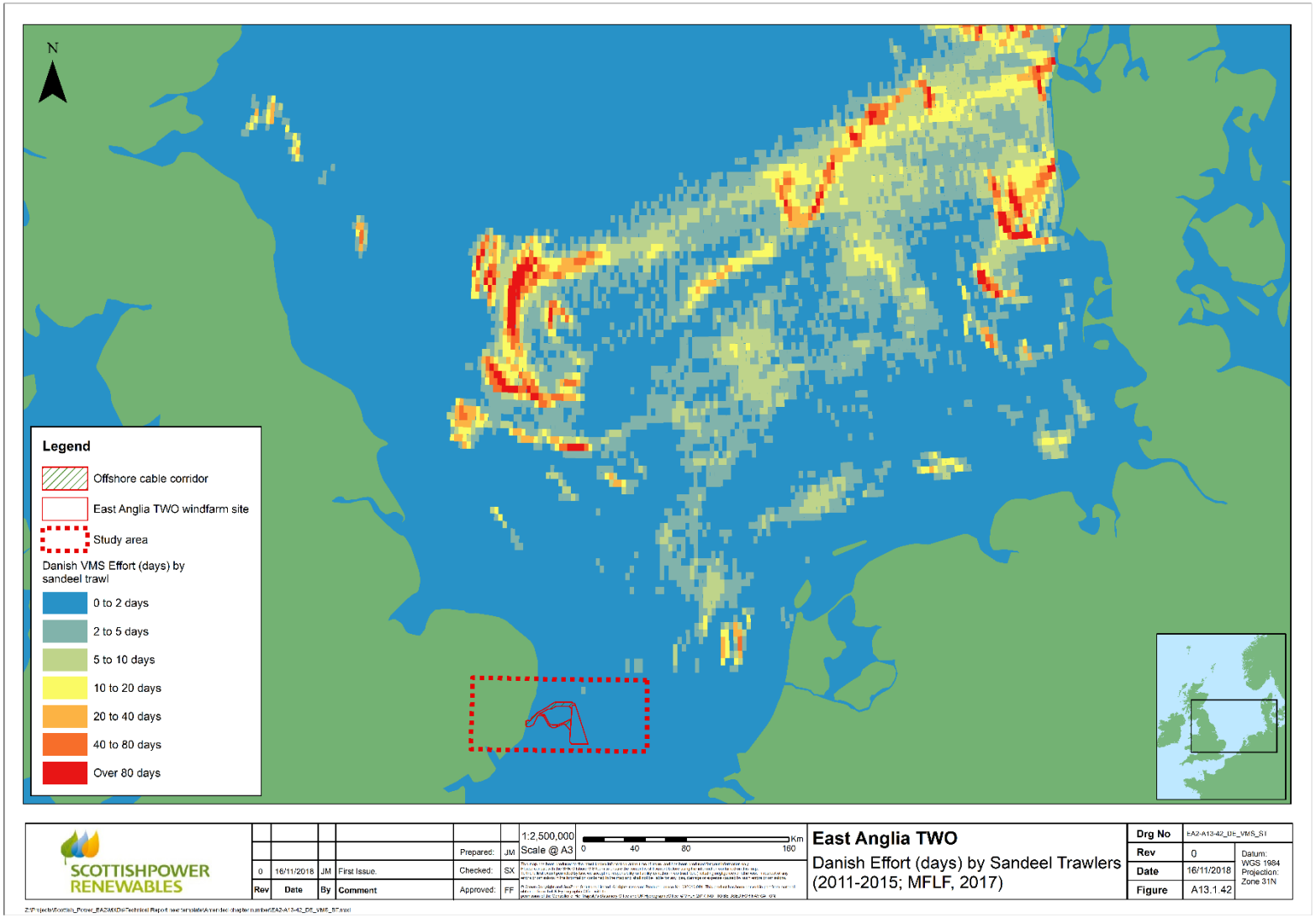


Figure A13.1.42 Average Danish VMS effort (2011 to 2015) for sandeel trawl (Ministeriet for Fødevarer, Landbrug og Fiskeri, 2017)

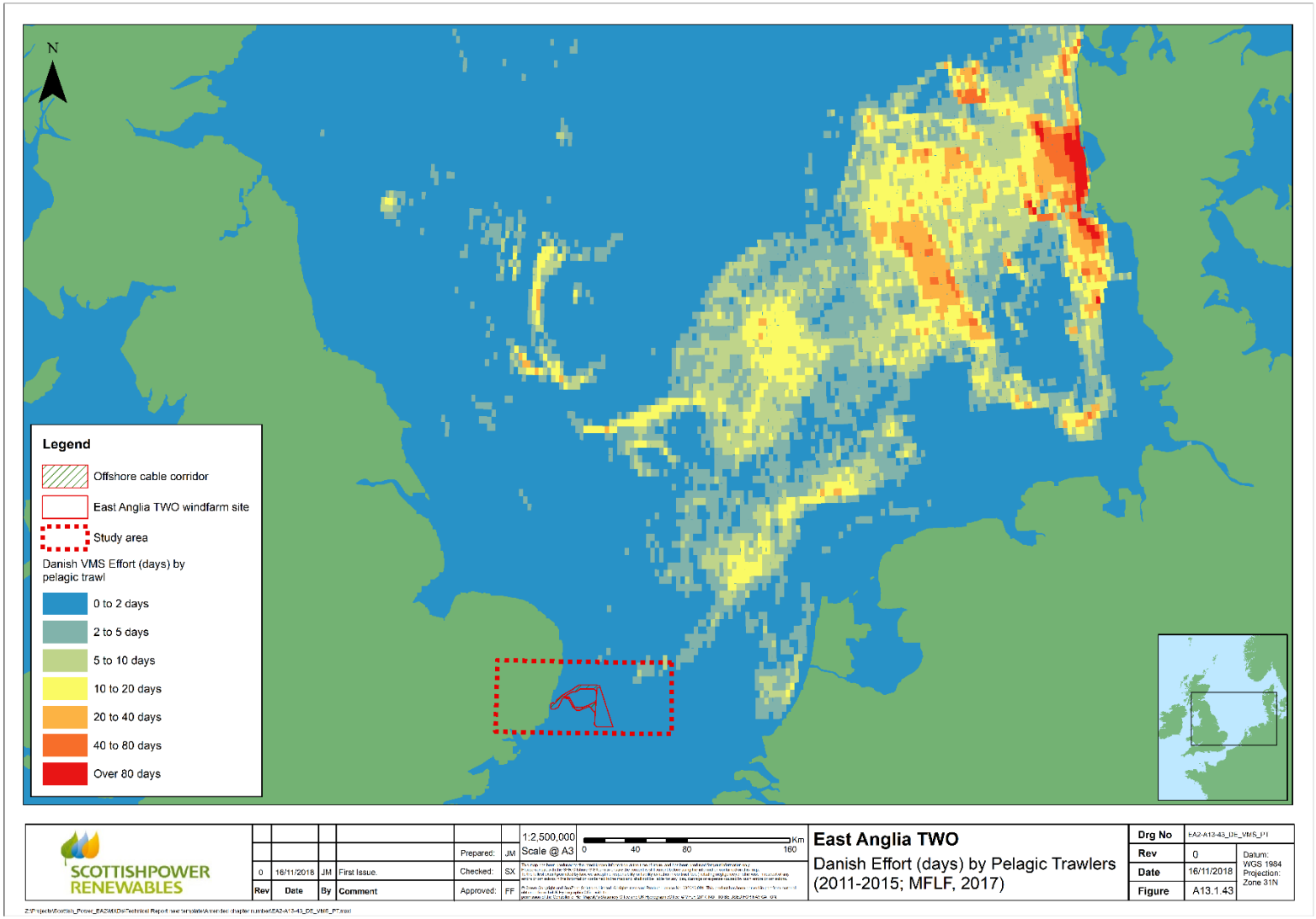


Figure A13.1.43 Average Danish VMS effort (2011 to 2015) for midwater (pelagic) trawl (Ministeriet for Fødevarer, Landbrug og Fiskeri, 2017)

13.1.6.7.2 Germany

62. In areas in the vicinity of the proposed East Anglia TWO project, sightings of German vessels are primarily of beam trawlers (***Table A13.1.3***). It is understood, that a number of these, similar to Anglo-Dutch vessels, whilst German registered, are actually Dutch owned and operated.

63. Analysis of available VMS data for the German fleet (***Figure A13.1.44)***, suggests that activity by German vessels occurs at very low levels in the Offshore development area. As shown in, the majority of the fishing activity concentrates in the Central North Sea in areas off the German, Dutch and Danish coasts.

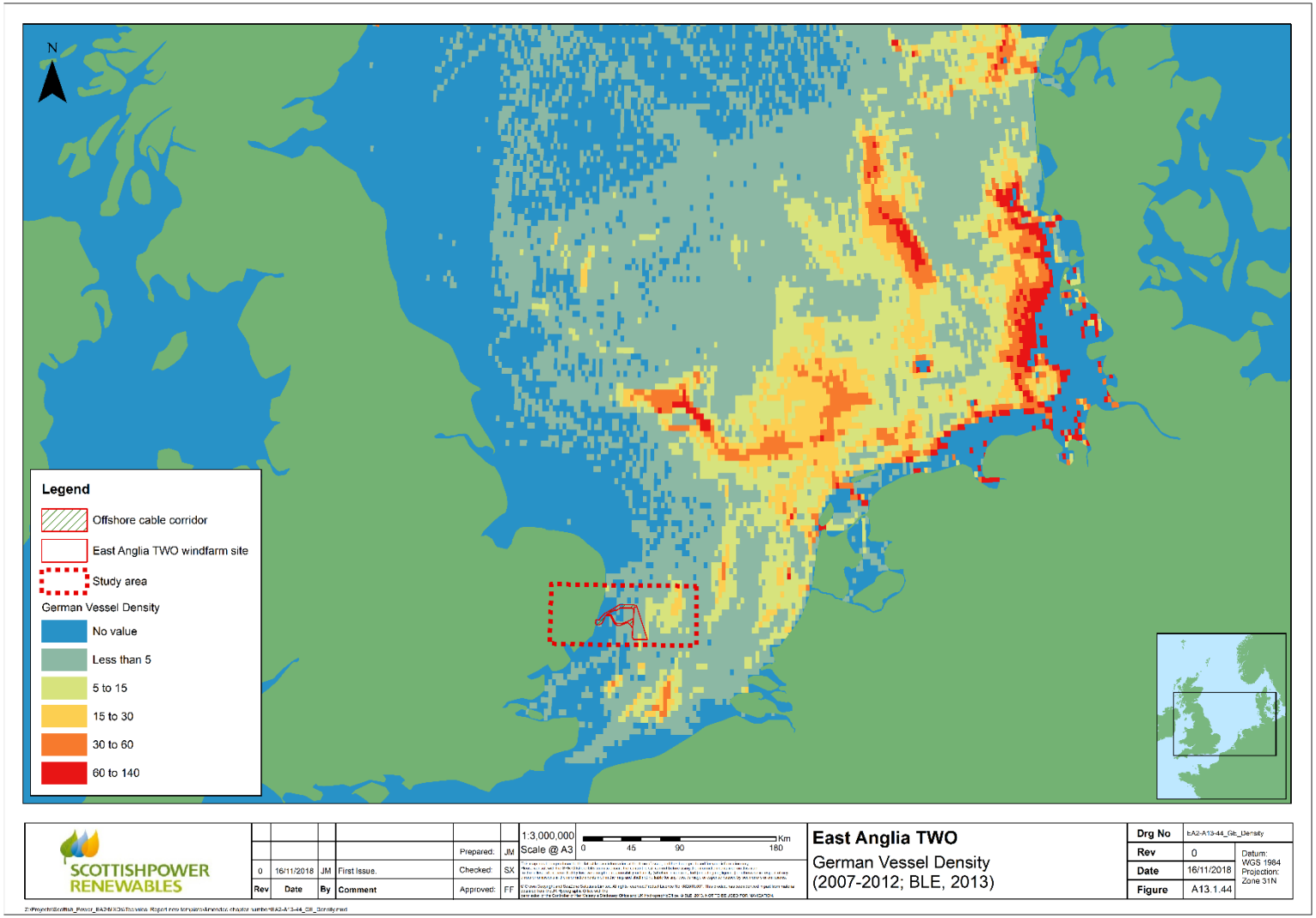


Figure A13.1.44 Average German VMS vessel density (2007 to 2012) (German Federal Office for Agriculture & Food, 2013)

13.1.7 Future Fisheries

64. Commercial fisheries baselines are subject to change over time due to a wide range of factors. These include modifications in quota allocations, status of the stocks, limitations in effort, closed areas and gear restrictions amongst other factors.

65. In addition, it should be noted that Brexit may have a substantial impact on quotas and accessibility to UK waters for EU fleets, However, at the time of writing the outcome of Brexit negotiations in respect of commercial fishing is unknown. Changes to the current quota system and access for non-UK fleets or the implementation of similar control measures to those currently in place are potential scenarios following the Brexit transition phase.

13.1.8 References

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Annex 1: Data sources, methods and limitations

Marine Management Organisation (MMO) Surveillance Sightings Data

66. As a means of fisheries protection and to ensure the fishing industry complies with UK and EU law, aircraft and surface vessels are used to compile surveillance sightings of fishing vessels in UK waters. The data has been used to give a relative spatial distribution of fishing activity by method and nationality within a given area. It should be noted that due to the low frequency of flight surveillance in an area, which are generally weekly and only occur during daylight hours, sightings data gathered should not be used to give a quantitative assessment of fishing activity. The MMO has provided vessel and flight surveillance sighting data for all fishing vessels in UK waters by nationality and method between 2007 and 2016.

67. It should be noted that data released in 2017 does not include all data points and so no sightings in the study area were recorded in 2016 and this year was removed from the analysis in this baseline. Therefore, the surveillance sightings from 2011 to 2015 were included.

MMO Fisheries Statistics (Landings and effort data)

68. Landings and effort data are collected by the MMO by ICES rectangles for all UK and non-UK vessels landing into UK ports. Landings and effort datasets have been analysed to identify:

- Species targeted;
- Fishing methods used;
- Vessel length categories (under 10m, 10 to 15m and over 15m); and
- Landings values by port.

69. The main source of fisheries landing data is the EC daily log sheets that all vessels over 10m must complete and submitted to the MCA. Fishing vessels under-10m in length are not required to submit daily log sheets, although skippers can choose to do so. Dockside inspections are made on vessels in the under-10m fleet by local fisheries officers. The Shellfish Entitlement Scheme (2004) and the ‘Registration of Buyers and Sellers of First Sale Fish and Designation Auction Site Scheme’ (2005) further facilitate collection of fisheries data from the under-10m fleet. It should also be recognised that under these schemes, fishermen are required only to identify the ICES sub-area within which catch was taken and not the specific ICES rectangle. Local MMO officers, however, allocate catches, effort and values by the under-10 m fleet into ICES rectangles on the basis of best estimate.

Vessel Monitoring System (VMS) Data

United Kingdom

70. VMS data from the MMO is the most comprehensive fisheries data set currently available which shows the intensity of over-15 m fishing vessel activity in the vicinity of the East Anglia ONE North offshore development area. Since January 2005, all EC vessels over-15 m in length have been fitted with satellite tracking equipment which transmits the vessels' position at a minimum of every two hours to the relevant Member States' fisheries authority. The MMO monitors all UK vessels irrespective of location, and all foreign vessels within the UK Exclusive Economic Zone (EEZ). Information regarding non-UK vessels can only be disclosed by the MMO with prior permission from the vessels national regulating body.

71. The satellite data has been cross-referenced with landings and effort data to give values in a 0.05° by 0.05° grid for the years 2012 to 2016. The disclosure of independent UK vessels' identities is restricted under the Data Protection Act (1998) and the coordinates of individual vessels are only available with permission from the vessels skipper/owner. Any rectangles that contain less than five transmissions, or vessels that are stationary in port are assumed not to be fishing and so are not included in the data set. VMS data does not differentiate between vessels fishing and steaming. As a result, the data has been filtered by speed, with only vessels travelling at speeds of between 1 and 6 knots included (Lee et al., 2010).

72. As of 2012, EU legislation required all Member State vessels over-12m in length to have VMS installed. The current MMO VMS dataset, however, only includes information on vessels over-15m in length.

The Netherlands

73. Landbouw Econmisch Instituut (LEI) and the Institute for Marine Resources and Ecosystem Studies (IMARES) have provided comprehensive VMS datasets from 2012 to 2016. The grid used in this dataset is larger than that utilised by the MMO. A grid is defined based on 1/16th of an ICES rectangle. IMARES have combined VMS with logbook data and information on fish value. Logbook data are added to VMS records to indicate those records that are associated with fishing activity. The data have also been filtered by speed.

Belgium

74. The Belgian Institute for Agricultural and Fisheries Research (ILVO) provided BMM with VMS data for Belgian vessels for the period 2010 to 2014. The data have been filtered by speed with all speeds of less than 1kt removed. This VMS dataset only includes records of vessels over-15m in length.

France

75. In 2012, the Comité Nationale des Pêches Maritimes et des Élevages Marins (CNPMEM) produced a paper, also in association with IFREMER: “Components of Activity of French Vessels in 2008 to 2009 Near the East Anglia Offshore Wind farm Project Zone”.

76. The stated objective of the CNPMEM (2009) report was to assess the socio-economic impact of the developments on French fishing activity. The results and charts produced are based on speed filtered VMS data and sales registered at French fish auctions. The data used however, were not made available nor were details given of the modelling methodology, although reference was made to the use of algorithms. The charts were used to georeference this VMS data from 2008. A more recent source of data is from IFREMER (2015) in which French fishing effort recorded in days for over 18 m vessels is given, but this VMS data was also georeferenced as actual datasets have not been shared.

77. BMM have submitted requests to the French government data holders in August 2016 and March 2017 without success. In addition, discussion has occurred with CNPMEM, who have suggested obtaining their own Valpena data. However, this data would only provide a selective picture as it covers an unspecified percentage of the fleet and is therefore not suitable for robust analysis. A request for more recent and detailed data was sent to IFREMER on 22/2/2018 but no response or data has since been received

Denmark

78. Ministeriet for Fødevarer, Landbrug og Fiskeri (Ministry of Food, Agriculture and Fisheries) has provided VMS density data between 2011 and 2015, in all waters. The data has been collected and averaged as previously described and split into gear categories.

Germany

79. VMS dataset for German vessels were provided by the Federal Office for Agriculture and Food, Germany (Bundesanstalt für Landwirtschaft und Ernährung, BLE) for 2007 to 2012. Only density has been calculated, filtered by speed with vessels travelling at speeds of between 1 and 6 knots presumed to be fishing (Lee et al., 2010).

Annex 2: Fishing legislation

European fishing legislation

The Common Fisheries Policy (CFP)

80. The main method the EU uses to manage fishing activity in European waters is the CFP. The CFP provides a management strategy for fishing activities in order to prevent overfishing and provide economic and social stability to fishing communities.

81. The UK government remains a reserved power with regard to European fisheries negotiations, such as the setting of quotas. The implementation of fisheries regulations is undertaken by the Scottish Government in Scottish waters, the MMO in English waters and the Welsh Assembly Government in Welsh Waters.

82. As of 2009 the CFP has been under review and changes to the Policy came into legislation in 2014. The proposals are wide-ranging and cover all aspects of fisheries management and objectives. The key priorities of this reform are to ban discards, fish at sustainable levels and decentralise decision making, allowing Member States to agree the measures appropriate to their fisheries. A ban on discarding pelagic fisheries (such as mackerel and herring) started on 1st January 2015, with a ban on discards in all other fisheries to be phased in between January 2016 and 2019.

Quota Restrictions

83. In European waters, quotas in the form of Total Allowable Catches (TACs) are allocated to EU Member States by ICES sub-area based on historic fishing rights. A quota is a permission to catch quota stocks that are allocated between non-sector vessels (those who own quota), producer organisations (who manage quota for their members) and the inshore fleet. The UK quota management system aims to ensure that the quota is shared fairly amongst the UK fishing industry and that fishing activity is managed to ensure that these quotas are not exceeded.

UK specific regulations

Fishing licences

84. For a vessel to commercially fish (i.e. to catch and sell fish for profit) it must hold a valid licence. The current vessel licensing scheme was introduced to stabilise fleet numbers and reduce catching capacity through the use of vessel capacity units (VCUs). Successive decommissioning schemes have also reduced the size of UK and several other Member States' fleets over the past 20 years.

Regional and Local Fishing Restrictions

85. The areas of the East Anglia ONE North offshore development area located within the 6nm limit falls within the jurisdiction of the Eastern Inshore Fisheries and Conservation Authority, which enforces the local byelaws. Byelaws include:

- Minimum Landing Sizes (MLS) for fish and shellfish species;
- Maximum vessel sizes;
- Limits on certain fishing methods for shellfish;
- Seasonal closures;
- Closed areas for specific fishing gears; and
- Fishing permits for shellfish species.

Over-10 Metre Fleet

86. National, regional and individual quotas for the over-10 m fleet are assigned on the basis of historic rights. Vessel quotas are tangible assets which are eligible to be sold or leased, and national quotas may be exchanged between Member States.

Under-10 Metre Fleet

87. Vessels from the under-10m in length represent 65% of the UK's fishing fleet and are allocated 4% of the UK's fishing quota. Half of the under-10m fleet have uncapped licences allowing them to catch more than 300 kg of quota species per year (NUFTA, 2018).

Effort (Days at Sea) Restrictions

88. In addition to quota restrictions, the over-10 m fleet is subject to days at sea restrictions. This is part of the EC policy of reducing fishing effort in EU waters. The regulation controlling days at sea (Annex V, EU Regulation 2287/2003) is complex and takes into consideration species targeted, gear type, by-catch, mesh size and elected management periods. In essence, vessels using demersal whitefish gears are restricted to the equivalent of 13 to 14 days a month (vessels catching less than 5% cod by-catch gain an extra 2 to 3 days). Pelagic vessels are not effort restricted, being subject only to quota limits.

Shellfish Entitlements

89. National shellfish entitlement licences were introduced in 2004 for vessels targeting crabs and lobsters. The licence allows an unrestricted quantity of crab and lobster to be caught by vessels which have a historic record in the fishery. Vessels that are under-10 m and have a valid shellfish licence must submit weekly log sheets for crab and lobster to the local Fishery Officer.

Marine Protected Areas

90. The aims of Marine Protected Areas (MPAs) are to protect species and habitats of EU and national importance through the management of sea areas. As part of their management, in some instances, closed areas for certain fishing methods are enforced. In the UK, there are various types of MPAs. These are listed below.

- Special Areas of Conservation (SACs) - designated to protect species and habitats under the EC Habitats Directive both inshore and offshore;
- Special Protection Areas (SPAs) - areas where birds and their habitats are given protection under the EC Wild Bird and Habitat Directive. SPAs have little or no impacts on the commercial fisheries sector; and
- Marine Conservation Zones (MCZs) – designed to protect species and habitats of national importance under the Marine and Coastal Access Act (2009).

Brexit

91. Negotiations are currently underway due to Britain leaving the EU. In July 2019 Britain's waters will no longer fall under the jurisdiction of the EU, and therefore fisheries legislation and access rights may change. This may include a modification on non-UK fleet access rights within 6-12nm of the UK coast, and other measures such as changes in quota allocations.

Annex 3: Gear Types and Operating Practices

Potting

92. Potting and trapping for crab, lobster and whelks occurs throughout the southern North Sea although the design of pots may vary depending on region and target species. In general, all pots have one or more “funnel” shaped entrances for the shellfish to enter.

93. Whelks are generally harvested using a purpose designed pot or, more often, a modified and weighted 25 litre plastic drums. The number of whelk pots in a string can be higher than for crab and lobster, with up to 80 pots per string. Strings are generally similar lengths to those used for crab and lobster potting but can be longer.

94. Parlour pots ***(Plate A13.1.7***) are generally used for the capture of crabs and lobster with pots baited, usually with fish. Pots are rigged in fleets of between 10 and 50 pots per string depending upon the vessel size and the area to be fished. Ramsgate fleet deploys around 20-25 lobster pots per string due to smaller vessel size. Lengths of a string of pots may range from 100 to 500 metres, anchored at each end with either an anchor or chain clump weights. A variety of surface markers are used to indicate the presence of pots including flagged dhans (marker flags), buoys and cans. Soak times, the time between baiting and deployment to emptying and harvesting, varies from approximately 12 hours to two days, although this can be longer during periods of adverse weather.

95. Vessels engaging in potting are generally under-10 m in length, with crew members varying from one to three.

Plate A13.1.7 Whelk pots (left) and parlour pots (right) (source, BMM 2016, 2013)

Gillnetting

96. Gillnets ***(Diagram A13.1.4***) which can be either fixed or drifting, are a series of monofilament nets joined together to form fleets which can be up to 1200 m in length. As with fleets of pots, at each end of the fleet of nets are surface marker buoys. Gillnets can either be single panels of monofilament nets, which are also called tangle nets, or trammel nets which comprise of a smaller mesh inner net with larger mesh net panels either side of it. Fixed nets are set either in line with the tidal flow or across it and are normally only deployed on neap tides. Drift nets are deployed across the tide and left for a period of normally three to six hours to drift over the seabed with the tidal current.

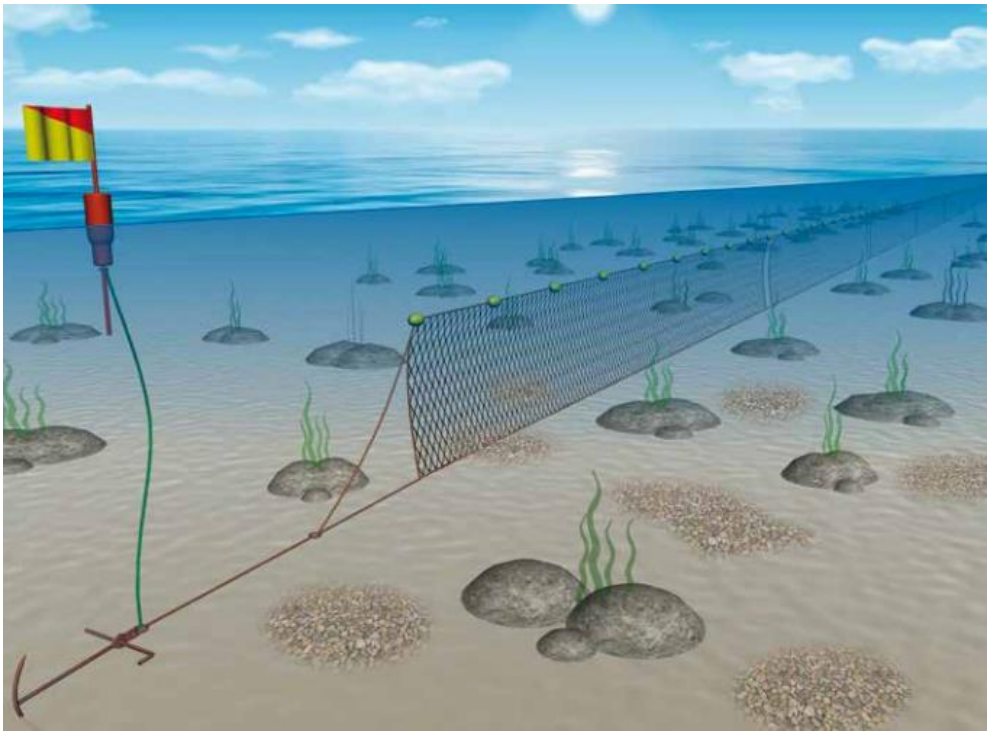

Diagram A13.1.4 Gill net (source: Seafish, 2015)

Trammel Netting

97. Trammel nets are similar to gillnets but contain three layers of nets to better trap fish. They contain two outer layers of nets with a larger mesh size and a sheet of smaller mesh net in between them (***Diagram A13.1.5***).

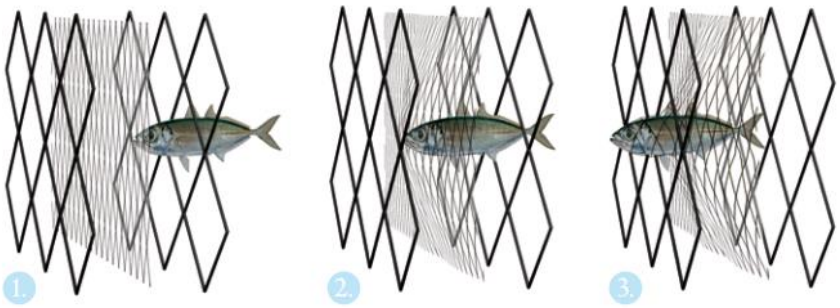

Diagram A13.1.5 Trammel net catching method and net design (source: Seafish, 2015)

Beam Trawling

98. Traditional beam trawls comprise a steel beam held above the seabed by shoes at each end, onto which a net is attached (***Plate A13.1.8*** and ***Diagram A13.1.6***). The beam is towed using chain bridles that attach to the shoes and gear and is towed from outrigger booms on either side of the vessel.

99. Tickler chains disturb fish to rise off the seabed to be caught in the net. When operating in areas of hard, rocky substrate, chain mats made of a lattice of chains attached to the beam across the mouth of the net are also used.

100. Beam trawls can range in length from four to twelve metres. Fully rigged (in air) weights of beam trawls used in the area can vary from four to six tonnes, although recently there has been effort made to reduce weights and therefore drag in light of increasing fuel costs.

101. Towing directions are influenced by a number of factors such as seabed contours, tidal flow direction, weather and the need to avoid snagging and entanglement.

Plate A13.1.8Traditional beam trawl net with tickler chains and chain mat (BMM, 2012)

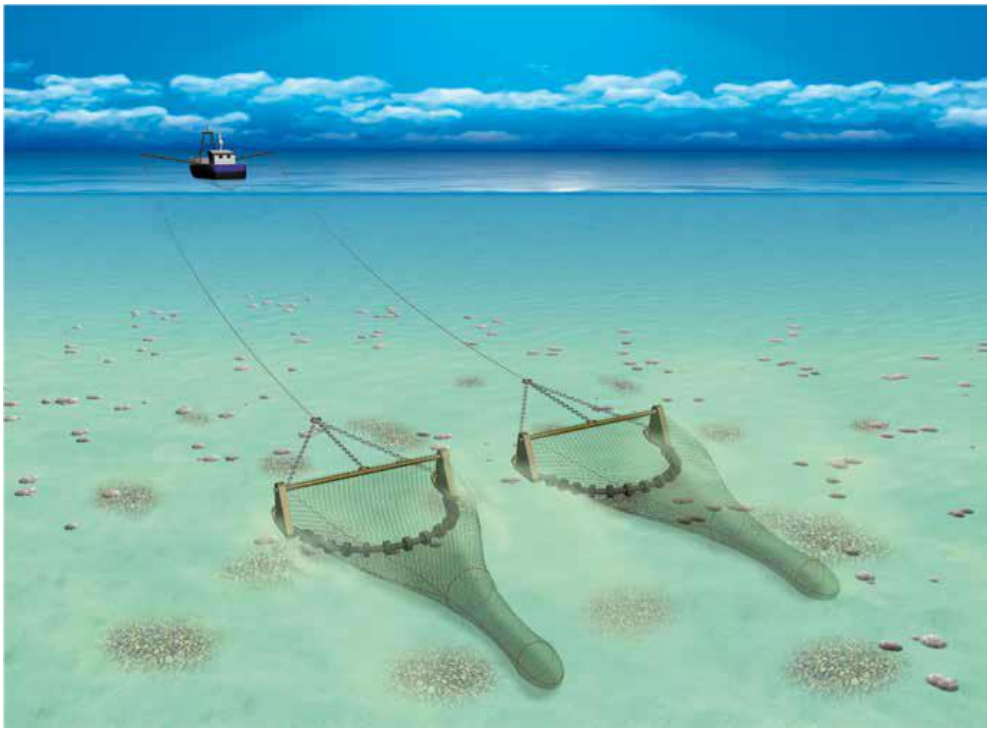

Diagram A13.1.6 Beam trawler with twin rigs (Seafish, 2015)

Pulse Beam Trawling

102. Pulse beam trawls are adapted beam trawls involving a series of electrodes to emit short electric pulses that stun fish. The shoes and beam of a traditional beam trawl are replaced with a hydrofoil type wing onto which the net is attached. The central towing point of the hydrofoil, known as the nose, determines the height above the seabed at which the wing travels.

103. With pulse wings, as the tickler chains and chain mats are replaced with trailing electrodes (***Plate A13.1.9***) the drag of the gear is significantly lower. It is also understood from VisNed that the fuel consumption of vessels deploying pulse wings is 40% lower than for vessels deploying conventional beam trawls (Seafish, 2015).

Plate A13.1.9 Dutch fishing vessel with a pulse wing trawl (Eayrs & Suuronen, 2013)

Demersal Otter Trawling

104. Demersal otter trawls consist of a funnel shaped net towed over the seabed, with the fish being retained within the cod end (***Diagram A13.1.7***). The horizontal opening of the net is achieved by a combination of the hydrodynamic and ground sheer forces acting on the trawl doors. The vertical opening of the net is maintained by a series of floats along the net headline and the base of the net kept on the seabed by the weighted ground line, which for fishing over rough ground can be fitted with a series of rubber disks known as “rock hoppers”. The effective gear width of demersal otter trawls is the distance between the trawl doors which can range from 25m for smaller vessels and up to 65m for larger vessels. Towing speeds are between 2.5 and 3.5 knots, depending on tidal state, seabed conditions and weather. The net can be towed along the seabed (termed benthic otter trawling) or just above the benthic zone (termed demersal otter trawling).

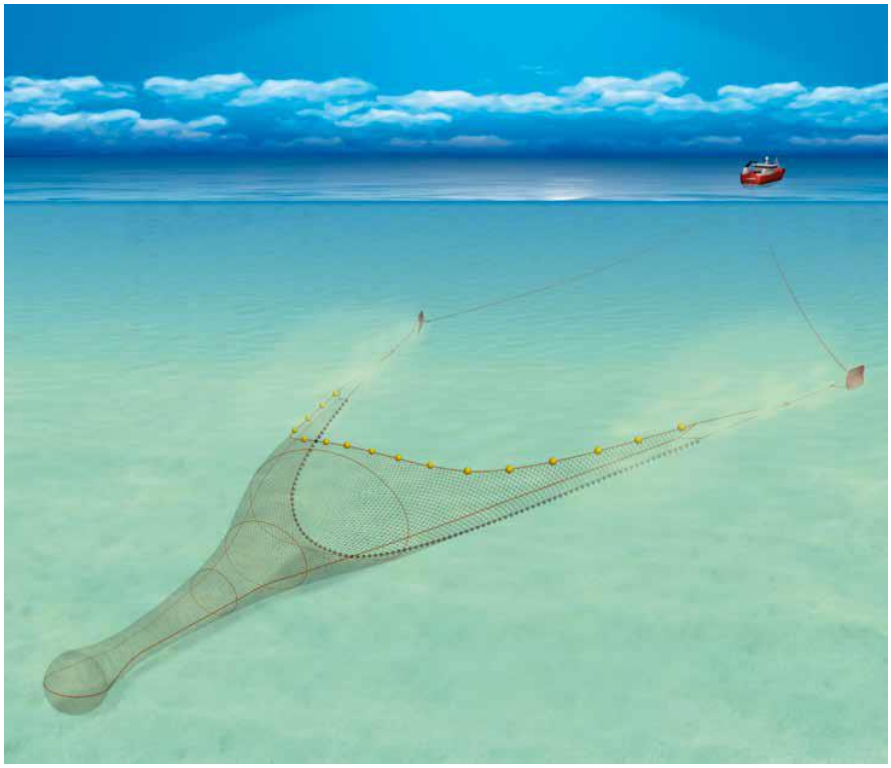

Diagram A13.1.7 Single rig otter trawl (Source: Seafish, 2015)

Pelagic Otter Trawling

105. Pelagic otter trawling is very similar to Bottom Otter Trawling, but the mouth of the trawl is larger and is towed in the mid water column with little seabed contact (***Diagram A13.1.8***). This method is commonly used to target mackerel, herring, sprat.

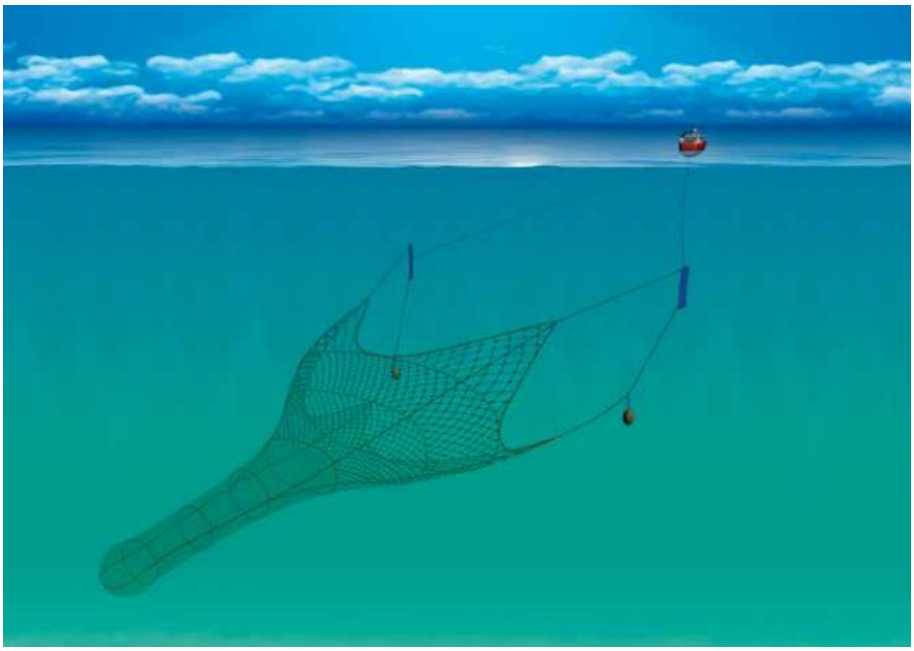

Diagram A13.1.8 Midwater otter trawl (pelagic) (source: Seafish, 2015)

Seine Netting (Single and Pair)

106. Seine nets are deployed over clean, obstruction-free seabed for the capture of a range of whitefish species. Single or multiple seine nets can be operated. As shown by ***Diagram A13.1.9 t***he seine ropes are laid on the seabed in a triangular pattern with the net located in the middle of the base of the triangle. The initial hauling phase involves the winching in of the seine ropes so they are pulled together, which exploits the reaction of the fish to swim ahead of the ropes moving over the seabed. Once the ropes are approximately parallel, the hauling speed is increased and the net is hauled over the seabed capturing the fish that have been herded within its path. It is understood that the maximum lengths of ropes deployed each side of the net by the largest of the Dutch seine netters, can be as much as 3km (Pers. comm: P. Visser, 11/04/2018).

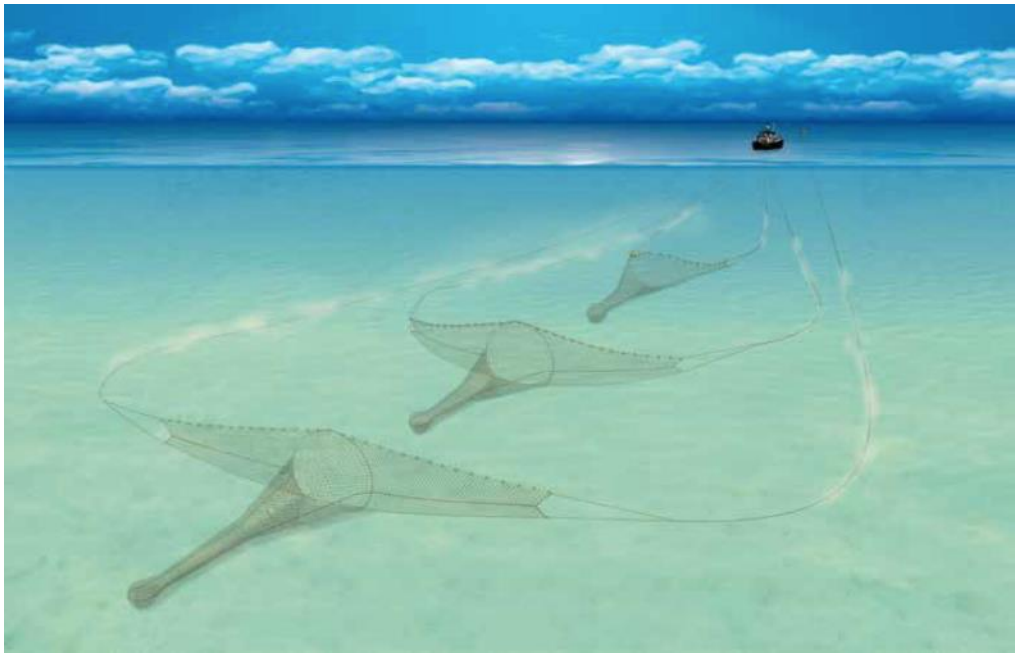

Diagram A13.1.9 Seine nets (seafish, 2015)

Long-lining

107. Long lining involves a main line onto which are attached a series of baited hooks via snoods attached at set intervals (***Diagram A13.1.10***). Long lines can be anchored or drifting and used to target demersal or pelagic species.

Diagram A13.1.10 Longlines (source: Seafish, 2015)

Jigging

108. The hand jigging undertaken in the vicinity of the Offshore development area involves the use of coloured hooked lures which as the name suggests are jigged up and down in the water column in order to attract and hook mainly pelagic species such as mackerel and squid. (**Diagram A13.1.11**). A form of rod jigging can also be undertaken, particularly over wrecks to catch cod.

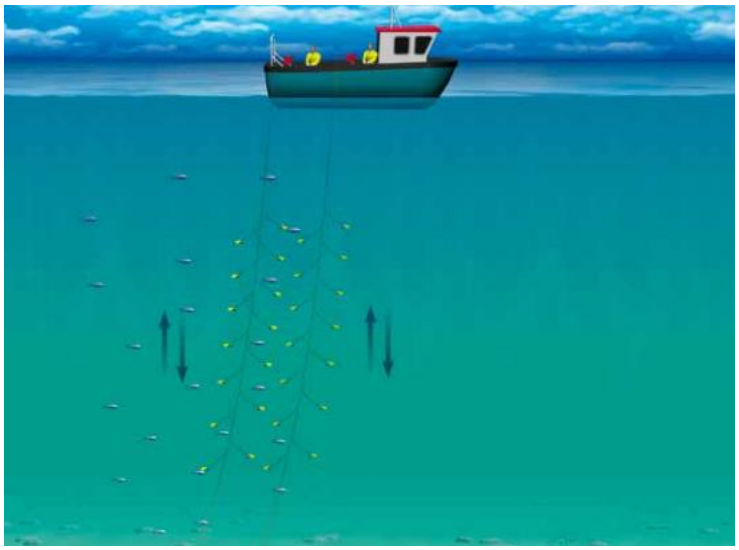

Diagram A13.1.11 Jigging (source: Seafish, 2015)