Inch Cape Offshore Wind Farm

New Energy for Scotland

Offshore Environmental Statement:
VOLUME 2G
Appendix 18A: Commercial Fisheries Baseline Development Area

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Inch Cape Offshore Wind Farm

Appendix 18A: Commercial Fisheries Baseline Development Area

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Glossary of Terms

12 nm limit	Territorial waters of EU Member States extend to 12 nm. Member States manage these waters exclusively within these limits
6 nm-12 nm limit	Some access to certain EU Member States in identified areas around the UK coast, based upon historic access
6 nm limit	Exclusive access to UK vessels only within 6 nm
Under-10 metre	Category of fishing vessels that are less than 10 metres in length
10 - 15 metre	Category of fishing vessels that are between 10 and 15 metres in length
Over-15 metres	Category of fishing vessels that are greater than 15 metres in length
Creeling	The Scottish designation for potting
Demersal	Activities or species located near or on the sea bed
Pelagic	Activities or species located in the water column
Quota	A measure of the quantity of a species that can legally be landed within a set period

Abbreviations and Acronyms

BMM	Brown and May Marine Limited
BWEA	British Wind Energy Association
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFP	18A.1 Common Fisheries Policy
CSV	Comma separated variable
Defra	Department for Environment, Food and Rural Affairs
DFO	District Fishery Officer
EC	European Commission
EIA	Environmental Impact Assessment

EU	18A.1 European Union
FIN	18A.1 Fisheries Information Network
FIR	Fishing Industry Representative
FMA	18A.1 Fishermen's Mutual Association Ltd. (Pittenweem)
FTOWDG	Forth and Tay Offshore Wind Developers Group
Hp	Horsepower
ICES	International Council for the Exploration of the Sea
IFG	18A.1 Inshore Fisheries Group
MAGP	Multi Annual Guidance Programme
MHW	Mean High Water
MMO	Marine Management Organisation
MPA	Marine Protected Area
NESFP	North East of Scotland Fishermen's Organisation
NFPO	Northern Fisheries Producers Organisation
NM	Nautical Mile
RSS	Registry of Shipping and Seamen
SA	18A.1 Scallop Association
SFF	18A.1 Scottish Fishermen's Federation
SFO	Scottish Fishermen's Organisation
SI	18A.1 Statutory Instrument
TAC	18A.1 Total Allowable Catch
VCU	18A.1 Vessel Capacity Unit
VMS	18A.1 Vessel Monitoring System (satellite tracking data)
UWTV	18A.1 Underwater Television

18A.1 Introduction

This document comprises the commercial fishing assessment for the Inch Cape Offshore Wind Farm development, in the Forth and Tay area. The compilation of this assessment takes into account the requirements of the Marine (Scotland) Act (2010), Department for Environmental, Food and Rural Affairs (Defra) and Centre for Environment, Fisheries and Aquaculture Science (Cefas) as specified in the 2004 Guidelines (Cefas) and British Wind Energy Association (BWEA) 2004 Recommendations (BWEA 2004).

The purpose of this document is to define the current commercial fisheries baseline in the vicinity of the Inch Cape Offshore Wind Farm using all available data and information gathered through consultation with fishing interests. An Environmental Impact Assessment (EIA) will subsequently be undertaken that considers the development relative to any commercial fishing activities that occur within the area, and proposes mitigation strategies, if required.

Currently, there is no single data source or recognised model for establishing commercial fisheries baselines in discrete areas such as offshore wind farm sites. The following baseline has therefore been derived using data and information from a number of sources. In addition to analysis of fisheries statistical datasets, consultation was undertaken with fishermen and their representatives to further describe their activities.

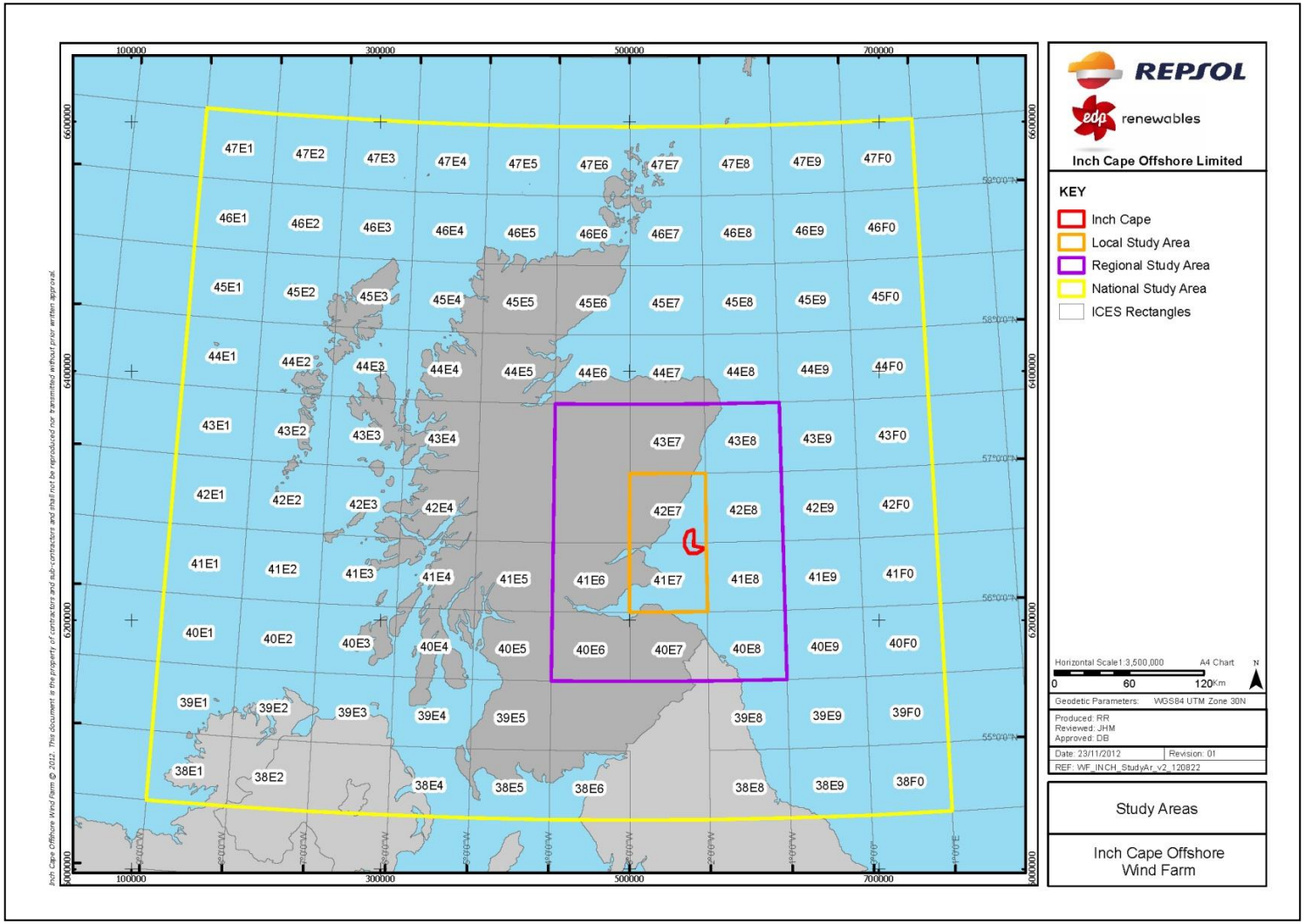
Establishing a fisheries baseline is complicated by the fact that fishing activities are not constant and may change over time. Fluctuations in landings, changes in legislation, economic constraints (fuel costs and crew availability) and environmental restrictions (weather) can contribute to variations in fishing activities and practices as a result.

The regional socio-economic importance of wild salmon and sea trout fisheries, combined with the potential significance of impact from the development is such that they have been separately assessed and the findings covered in an additional report (see Environmental Statement *Appendix 18C*).

18A.2 Study Area

The study area for the assessment of commercial fishing intensity and values is shown in Figure 18A.1 below. The approach has been to provide a national overview allowing fishing grounds in the general area of the development to be described within a national context. The regional study area has been defined to ensure sufficient coverage of those fishing grounds surrounding the site. The local study area is the smallest spatial unit available for the collation of fisheries statistics relevant to the site. Where possible, fishing activities specific to the Development Area have also been described.

Figure 18A.1 Study Areas



18A.3 Data and Information Sources

As mentioned previously, there is no single data source or recognised model for establishing fisheries baselines. Therefore an approach is required that incorporates a number of different data and information sources, each subject to varying sensitivities and limitations, as described below. The aim is to describe in progressive detail commercial fishing activities by building upon the sources and analysis described below.

The principal sources of data and information used were:

- International Council for the Exploration of the Seas (ICES);
- Marine Management Organisation (MMO);
- Marine Scotland;
- Marine Scotland Science (MSS);
- District Fishery Officers (DFOs);
- Scottish Fishermen's Federations (SFF); and
- Fishermen and their representatives.

Consultation with local fishermen was principally undertaken by Brown and May Marine (BMM), in association with the SFF and the Fishing Industry Representatives (FIRs) appointed on behalf of the Forth and Tay Offshore Wind Developers Group (FTOWDG). The FTOWDG was formed, in association with The Crown Estate, by the offshore wind developers in the outer Forth and Tay region of Scottish waters. The developments included in the group are Neart na Gaoithe Offshore Wind Farm, Seagreen (Round 3 Zone) and Inch Cape Offshore Wind Farm. Due to the proximity of these developments to each other, it was deemed appropriate to form the FTOWDG in order to jointly address aspects of project development, consultation and cumulative impact assessment.

It should be noted that in some instances fishing terminology varies by data set. Specifically, the use of static gear to target crustaceans is known as 'potting' in England and 'creeling' in Scotland.

Analysis of the data and information sources are subject to the following qualifications, limitations, sensitivities and gaps.

18A.3.1 International Council for the Exploration of the Sea (ICES)

ICES statistical rectangles are the smallest spatial unit used for the collation of fisheries statistics by the European Commission (EC) and Member States. The boundaries of ICES rectangles align to 1° of longitude and 30' of latitude. As shown in Figure 18A.1 previously, the area of an ICES rectangle is relatively larger than the Development Area, which is situated in ICES rectangles 41E7 and 42E7. Furthermore, the distribution of fishing activity in an ICES rectangle is unlikely to be evenly distributed and analysis of fisheries statistics by ICES rectangles should take into account the small proportion of a statistical area that the development covers and the variation in levels of activity within the development.

18A.3.2 MMO Data

18A.3.2.1 MMO UK Satellite Tracking (Vessel Monitoring System) Data

The MMO has provided satellite tracking data (VMS) for the years 2007 to 2010 for all UK fishing vessels over-15 metres in length. The data set is not broken down by fishing method due to concerns over data protection. A basic 0.05° by 0.05° grid has been cross-referenced with the landings data to provide values in a grid format. The total time (hours) spent by vessels in each grid has also been provided.

Satellite tracking of European Union (EU) registered vessels currently applies to all vessels of over-15 metres in length. A transmitter on-board each vessel transmits the vessel's position approximately

once every two hours via satellite link to the MMO and other national EU control centres. The MMO receives information from all UK vessels, regardless of location, and all non-UK vessels within UK waters. At present however, the MMO is unable to release data on foreign vessels without prior permission from the regulating body of the vessels Member State.

The coordinates of individual vessels are currently unavailable. At present the MMO will only provide the aggregated number of position plots by general vessel type (mobile or static gear). Any rectangles that record less than five transmissions have been removed from the data set by the MMO.

It should be noted that satellite data does not differentiate between vessels steaming and vessels fishing and the data has been speed filtered by BMM with vessels presumed to be fishing if their speed is greater than 0 knots, but less than 6 knots[1]. The disclosure of independent UK vessels' identities is restricted under the Data Protection Act (1998).

18A.3.2.2 MMO Fisheries Statistics

Fisheries statistical data covering a ten year period (2001 to 2010) have been collected and provided to BMM by the MMO. The data include information on landings (weight and value) and effort (days fished). The fisheries statistics have been analysed to identify:

- Species targeted;
- Fishing methods used;
- Vessels by category (under-10 metres, 10-15 metres, over-15 metres and non-UK);
- Annual variations;
- Seasonal variations; and
- Landings values and effort by port.

The MMO collects and collates fisheries data for the whole of the UK by ICES rectangle. The primary data source is the EC daily log sheets that the over-10 metre fleet must complete and submit.

As mentioned previously, it is unlikely that the spread of fishing activities are equal throughout the rectangles and therefore the limitations of this data source should be recognised and taken into consideration.

Vessels under-10 metres in length are not currently required to submit daily log sheets, although voluntary submissions can be made. Local fisheries officers also undertake dockside checks on the under-10 metre fleet. To facilitate further collection of fisheries data from the under-10 metre fleet, two schemes have been introduced: The Shellfish Entitlement Scheme (2004), which is discussed further in *Section 18A.4.4* , and the *'Registration of Buyers and Sellers of First Sale Fish and Designation Auction Site Scheme*' (2005). Due to the relatively recent introduction of these schemes, it should be noted that prior to 2005 the MMO fisheries statistics for the under-10 metre fleet may, to some extent, underestimate the true levels of fishing in the area where a large percentage of the activity is by vessels in this category.

Vessels referred to as 'non-UK' in the MMO fisheries statistics only include foreign vessels landings into UK ports and therefore do not take into account non-UK vessels fishing in the area but landing into non-UK ports. The values given for the non-UK fleet derived from the analysis of this data set should therefore take this into account and not be considered as a true indication of the total foreign activity in this area.

[1] Lee, J., South, A.B. and Jennings, S. (2010) Developing reliable, repeatable, and accessible methods to provide high-resolution estimates of fishing-effort distributions from vessel monitoring system (VMS) data. *2010 International Council for the Exploration of the Sea.*

18A.3.2.3 MMO Fisheries Surveillance Sightings Data

Fisheries surveillance data record sightings of all fishing vessels in UK waters by fishing method and nationality and have been provided by the MMO (2001 to 2010). To manage fisheries legislation, fishery protection boats and aircraft record surveillance sightings of all vessels in UK waters. This data is used to give an indication of the distribution of fishing activity by method and nationality; however it should not be used for quantitative assessments of activity due to the low frequency of flights over an area, which are generally once a week and only during daylight hours.

18A.3.3 Marine Scotland

18A.3.3.1 Satellite (VMS) Data

Marine Scotland has provided satellite tracking data (VMS) for 2009 for all UK fishing vessels over-15 metres in length. Vessel coordinates cannot be released and instead the number of vessels by type is given in a grid of rectangles, each approximately 70 nm². These are then broken down by density of gear type, which was not possible with other data sets. Due to the differences in format, the 2009 data has been analysed independently from the 2007 to 2010 data sets provided by the MMO.

In addition to the 2009 data set, Marine Scotland has provided VMS data for 2007 to 2011. The VMS data was produced by applying VMS records to the Fisheries Information Network (FIN), which is the Scottish Government's sea fisheries database. FIN holds information on voyages (catches, gear and mesh size) and landings (weight, price at sale). Both the VMS records and FIN database use the Registry of Shipping and Seamen (RSS) number, which identifies vessels (this identifier is otherwise protected information) as a common denominator. Logtime (the date and time of each VMS transmission) identifies each vessel's voyage and enables the location of a vessel during each trip to be linked to the gear used and the weight of the landings (Holmes *et. al*, 2011). A collection of weight and value rules separate the data into groups representing key sectors of the UK fishing fleet such as crab, lobster, squid, nephrops (mobile and static), demersal (mobile and static), scallop and pelagic (mackerel and herring) (Kafas *et al.* 2012).

As with the MMO data set the data has been filtered by speed with vessels travelling at speeds of between 1 and 6 knots presumed to be fishing (Lee *et al.*, 2010). As previously stated, VMS records do not capture vessels under-15m and so may not represent the true extent of fishing activities in a given area.

18A.3.4 Fishery Specific Information

Information provided by fishermen and their representatives assists in the identification of the fisheries that occur in the regional and local areas relative to the development, and the vessels that target those fisheries. The information has been collated through ongoing consultation and liaison with fishing organisations, fishermen and their representatives.

18A.3.5 Future Fisheries

Research and consultation were undertaken by BMM in order to identify potential future changes to the existing baseline relevant to the timeframe of the development. It should be recognised that this assessment is limited by the ongoing and proposed changes to the management of commercial fisheries.

18A.3.6 Fishermen and Fishermen's Representatives

Consultation has been undertaken with individual skippers and their representatives. Despite extensive consultation through open and advertised fisheries stakeholder meetings, comprehensive field work, and through the forum of the Inshore Fisheries Group (IFG), it is possible that certain individuals and some unaffiliated stakeholders may not have been included in the assessment. In the

event that additional information is provided before the completion of the EIA, the assessment will be revised to reflect this.

18A.4 Fisheries Controls and Legislation

Whilst the international aspect of European fisheries management, such as the setting of quotas, remains a reserved power, the implementation of fisheries regulations are devolved to the Scottish Government and administrated by Marine Scotland.

18A.4.1 Fishing Vessel Licenses

All fishing vessels must hold a valid license. A fishing license is a permit for the boat to be legally engaged in valid commercial fishing activities (i.e. to be entitled to catch fish and sell for profit). The current licensing scheme is designed to prevent increases in fleet numbers and catching capacities through the use of vessel capacity units (VCUs). Since 1983, the EU Common Fisheries Policy (CFP) has primarily dictated the structure and capacity of the UK and Scottish fishing fleets. Between 1997 and 2002, a Multi Annual Guidance Programme (MAGP) was devised within the CFP to manage fleet structures and fishing by method was restricted by capacity limits and effort reduction targets. When the MAGP ended in 2002, it was replaced by Member State level controls which implement a system of exit/entry restrictions to impose effort level limits. Essentially, a fleet capacity cannot be increased and vessels can only enter the fleet when an equivalent or larger capacity vessel has exited.

The most significant reduction schemes upon the Scottish fleet in recent years have been the successive decommissioning schemes in 2001/2002 and 2003/2004, which removed 165 vessels from the national demersal fleet.

In 2010 the License Parking scheme was introduced by the Scottish Government to assist the fleet in adjusting to current restrictive conditions. The purpose of the scheme is to enable the licenses of multiple vessels to be combined and placed upon one vessel, therefore reducing both the long and short term fixed and variable costs through vessel sharing. The inactive vessels become 'parked', although this process is reversible. There is also the possibility that the effort generated by those vessels wishing to leave the industry can be bought and concentrated on the remaining vessels (this is currently not possible under licensing rules alone). Currently, over 40 vessels have applied and been accepted for the License Parking scheme. Ministers have also introduced a publicly funded (co-funded by the European Fisheries Fund) fleet resilience grant scheme through consultation with industry stakeholders and the Scottish Fisheries Council. This scheme is designed to dispose of those vessels that have been made dormant through License Parking.

18A.4.2 Territorial Limits

The territorial fishing limits of an independent nation extend out to 12 nm. Access within 6 nm of the coast is generally restricted to the vessels of that country. Access to fishing grounds between the 6 nm to 12 nm limit is only granted to vessels from other Member States on the basis of historic rights. In Scotland's 6 nm to 12 nm limit off the east coast, there are no historic rights for other EU vessels. Outside this limit any vessel from the EU could potentially fish the grounds.

18A.4.3 Quota Restrictions

Quota for fish stocks, activities of fishing vessels and fishing effort (days at sea) in Scottish waters are managed and controlled by the Scottish Government[2]. These controls and regulations have direct and indirect impacts on existing and future commercial fishery baselines.

The primary responsibility of the CFP, since its ratification in the early 1980s, is the long-term conservation of fish stocks in EU waters. The CFP aims to protect pressure stocks (species identified as requiring management) though a system of quotas by ICES area and sub-area. A quota is

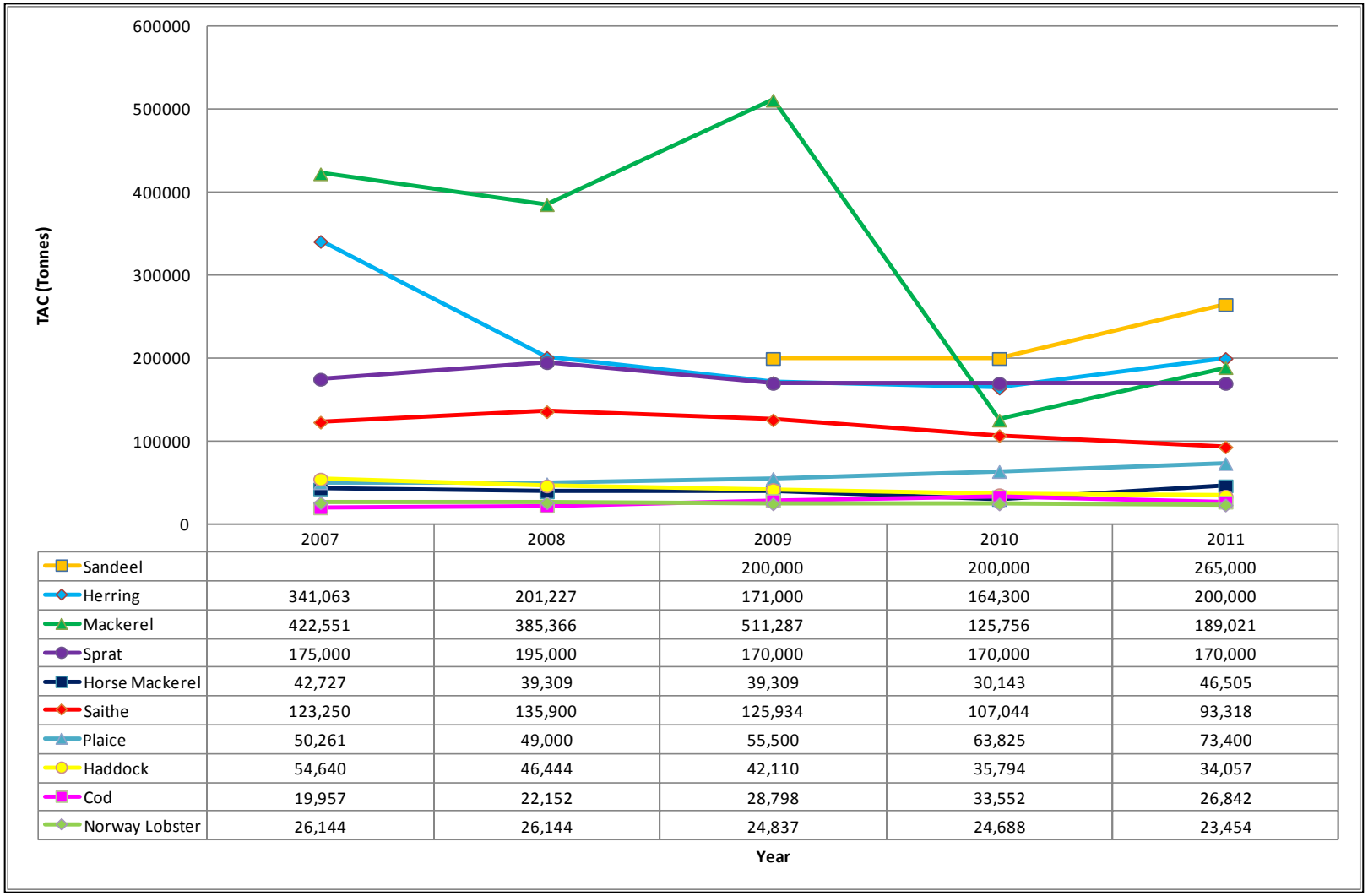
[2] The Scottish Government, Fisheries Section: http://www.scotland.gov.uk/Topics/Fisheries/Sea-Fisheries

measured as the quantity of landed fish and does not count discards. Total Allowable Catch (TACs) are calculated annually and allocated for each pressure stock by area or sub-area.

Figure 18A.2 shows the TACs for ICES area IV (North Sea) for the top ten species (excluding blue whiting) for all countries. Blue whiting has been excluded due to its proportionally high quota allocation. It is targeted in deep, offshore waters and the TAC for this species is not limited to ICES area IV.

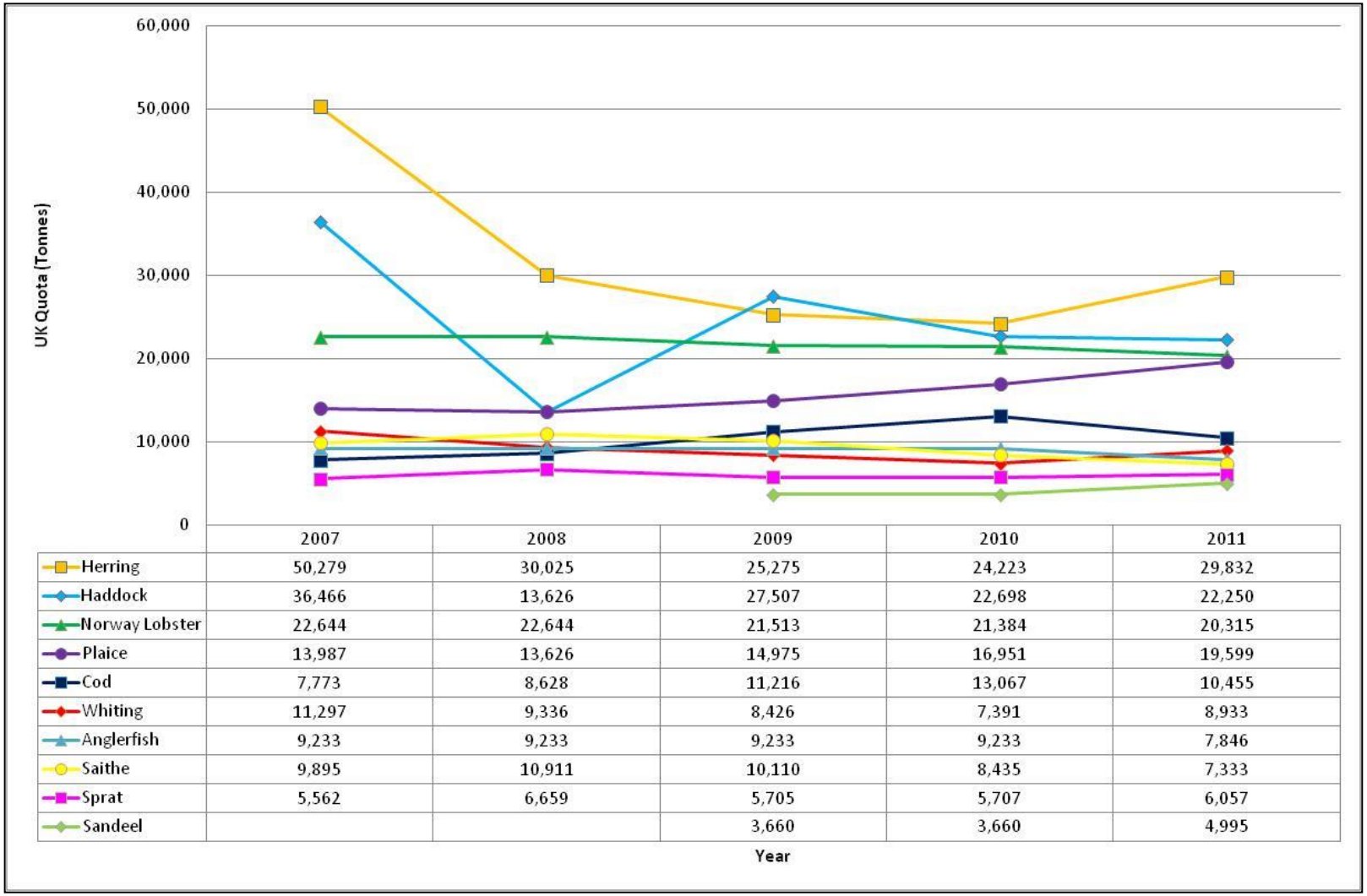
Figure 18A.3 shows the TACs for the UK only in ICES area IV. It can be seen that herring currently has the largest TAC, although it has significantly decreased over the five year period. Demersal species such as haddock, plaice, cod, whiting, anglerfish (monks) and saithe constitute a significant proportion of TACs for the UK. Nephrops, a shellfish, is also a species of national importance in the North Sea.

Figure 18A.2 Combined National TACs (Top Ten Species) in ICES Area IV (North Sea), 2007 to 2011 (Excluding Blue Whiting)



	2007	2008	2009	2010	2011
Sandeel			200,000	200,000	265,000
Herring	341,063	201,227	171,000	164,300	200,000
Mackerel	422,551	385,366	511,287	125,756	189,021
Sprat	175,000	195,000	170,000	170,000	170,000
Horse Mackerel	42,727	39,309	39,309	30,143	46,505
Saithe	123,250	135,900	125,934	107,044	93,318
Plaice	50,261	49,000	55,500	63,825	73,400
Haddock	54,640	46,444	42,110	35,794	34,057
Cod	19,957	22,152	28,798	33,552	26,842
Norway Lobster	26,144	26,144	24,837	24,688	23,454

Figure 18A.3 TACS (Top Ten Species) in ICES Area IV (North Sea), UK only, 2007 to 2011



	2007	2008	2009	2010	2011
Herring	50,279	30,025	25,275	24,223	29,832
Haddock	36,466	13,626	27,507	22,698	22,250
Norway Lobster	22,644	22,644	21,513	21,384	20,315
Plaice	13,987	13,626	14,975	16,951	19,599
Cod	7,773	8,628	11,216	13,067	10,455
Whiting	11,297	9,336	8,426	7,391	8,933
Anglerfish	9,233	9,233	9,233	9,233	7,846
Saithe	9,895	10,911	10,110	8,435	7,333
Sprat	5,562	6,659	5,705	5,707	6,057
Sandeel			3,660	3,660	4,995

The provisional 2012 quota allocations for the UK in ICES area IV are provided in Table 18A.1 . It should be noted that these are subject to change dependent upon the uptake of quota throughout the year.

Table 18A.1 Provisional 2012 UK Quota Allocations

Species	2012 UK Quota (Provisional)
Herring	57,836
Haddock	25,386
Plaice	22,542
Nephrops	18,994
Whiting	10,539
Cod	10,311
Anglerfish	7,455
Saithe	6,318
Sprat	5,383
Horse Mackerel	4,602

The TAC system has been heavily criticised by some in the industry because it is considered that the system encourages the discarding of either undersized or over-quota fish at sea. Due to these concerns, the CFP has been undergoing review since 2009 and therefore fisheries management policies and legislation could change significantly in the future. It is envisaged that the reform proposals will be adopted by the College of Commissioners (who implement new EU laws) in 2012[3]. The proposed changes to the CFP are discussed further in *Section 18A.12*, Future Fisheries.

18A.4.3.1 Over-10 Metre Fleet

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

Over-10 metre vessels are either a member of producer organisations (POs) who will manage quota for a number of vessels, or are non-sector vessels and are allocated quota on the basis of the vessels historic rights.

18A.4.3.2 Effort (Days at Sea) Restrictions

In addition to quota restrictions, the over-10 metre fleet are subject to days at sea restrictions. This is part of the ECs policy which aims to reduce fishing effort in EU waters (one of the foundations of the CFP). The regulation itself (Annex V, EU Regulation 2287/2003) is somewhat complex, relating to gear type, mesh size and elected management periods, but effectively the measures included within the regulation effectively restricts vessels using demersal whitefish gears to the equivalent of 14 to 15 days a month at sea.

18A.4.3.3 Under-10 Metre Fleet

In Scotland over two thirds of the fleet are under-10 metres[4], although the sector only receives approximately 3% of the TAC. The under-10 metre fleet is also subject to sea area and quota restrictions for certain species. Restrictions on the nephrops fishery for the under-10 metre fleet were introduced in 1999 as catch limits. The aim of these restrictions is to maintain the integrity to submit a NEP1 form to the local Fishery Office[5] on a weekly basis if they land more than 12 kg of

[3] Synthesis of the Consultation on the Reform of the Common Fisheries Policy (2010) *European Commission*
[4] Natural Scotland (2010) Scottish Sea Fisheries Statistics 2009. *Scottish Government*
[5] Day to day management of fishing activities is the responsibility of regional Fishery Officers

nephrops (Category A (10 metres and under) License: Conditions (91) Non Sector). Table 18A.2 lists the North Sea under-10 metre quota allocations for the previous four years.

Table 18A.2 Under-10 metre Quota Allocations in the North Sea

Species	2008 quota (tonnes)	2009 quota (tonnes)	2010 quota (tonnes)	2011 quota (tonnes)
Nephrops	1267.2	1078.8	882.0	1028.2
Cod	403.1	561.3	588.0	470.5
Haddock	131.6	80.5	127.9	103.6
Sole	342.1	275.7	110.5	101.2
Plaice	54.2	40.7	40.4	46.6
Whiting	89.8	355.5	321.9	326.6
Skate and Rays	265.1	106.3	103.1	74.1
Lemon Sole and Witches	72.6	23.2	22.2	21.8
Turbot and Brill	17.9	15.0	10.6	4.7
Dab and Flounder	18.7	18.9	19.4	19.0

18A.4.4 Shellfish Entitlements

In 2004, Shellfish Entitlements were issued to owners of licensed vessels with a track record (between 1 January 1998 and 31 March 2004) of landings over a particular weight of these species per year (200 kg lobster and 750 kg crab). This entitlement allowed unrestricted amounts of crab and lobster to continue to be caught. Vessels that are under-10 metres and have a shellfish entitlement must submit weekly log sheets for crab and lobster landings to the local Fishery Office.

18A.4.5 Scallop Dredging Restrictions

The scallop fishery is managed in the main through minimum landing sizes (100mm shell width), restrictions on dredge numbers and seasonal closures. There are currently no other limits in the form of catch or effort quota. Restrictions on the number of dredges that can be used depend upon the distance the vessel is operating from the coast. In Scottish waters, vessels are allowed up to eight dredges per (vessel) side inside 6 nm; ten dredges per side between 6 nm and 12 nm and 14 dredges per side outside 12 nm. In English waters, there are no restrictions outside 6 nm. It is possible that revisions to the number of dredges operated will apply in the future, potentially to align the number of dredges employed in Scottish and English waters (pers. comm. Scallop industry representative, 2012).

18A.4.6 Regional and Local Fishing Restrictions

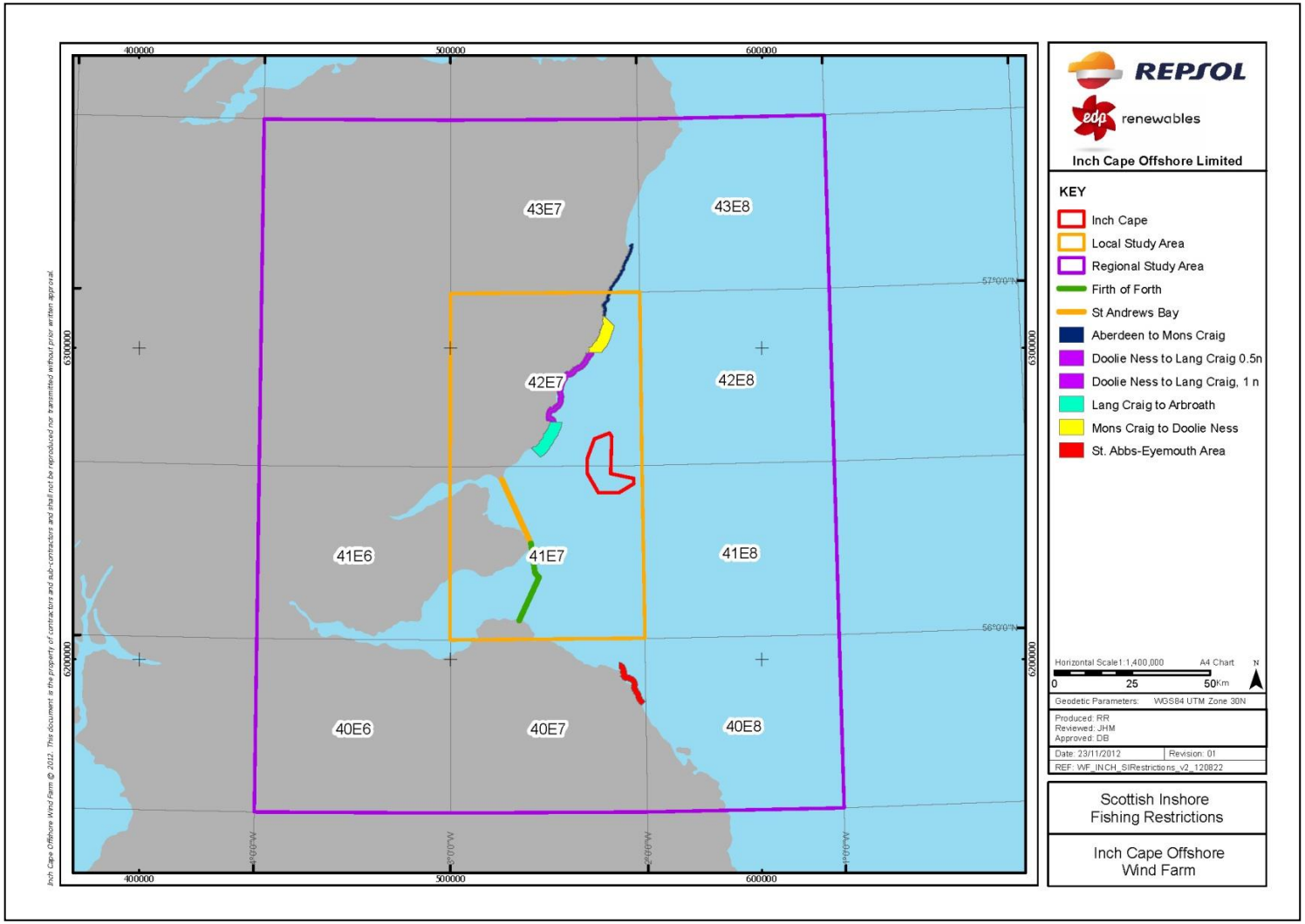
In Scottish waters, in addition to restrictions placed upon fishing activities transposed from EU and UK law, there are Scottish specific legislations, known as Statutory Instruments (SIs). SIs are a form of secondary legislation in Scotland, created by the Scotland Act (1998) and used to exercise devolved powers.

Figure 18A.4 shows the SIs in the regional study area, there are several SIs in the Forth and Tay area. SIs are contained within the Inshore Fishing (Prohibition of Fishing and Fishing Methods) (Scotland) Order 2004, No.276 SI, those of consideration for this regional study are described below:

- The restriction in St. Andrews Bay applies to the area inshore of the line drawn between Buddon Ness and Fife Ness. Use of mobile and active gear is prohibited all year.

- The restriction in the Firth of Forth applies to the area inshore of the line drawn between Fife Ness Lighthouse ad North Ness on the Isle of May, along the coast of the Isle of May to South Ness and on to the mainland at Tantallon Castle. Vessels operating demersal gear with a length of over 16.77 m are prohibited from fishing entirely. Any category of vessel fishing pelagic (midwater) species is permitted.
- All mobile gear is prohibited in the area of water within two miles of the Mean High Water (MHW) mark from Lang Craig to Arbroath. Between Doolie Ness and Lang Craig, all mobile gear is prohibited between 1st October and 31st March each year within one mile of the MHW mark. The use of mobile gear is prohibited all year in the area of water within two miles of the MHW mark, bounded by a line drawn from Mons Craig and Doolie Ness.
- The use of mobile gear is prohibited all year in the area of water within one mile of the MHW mark from St. Abbs Head to the Border.

Figure 18A.4 Scottish Inshore Fishing Restrictions in the Firth of Forth (Source: The Inshore Fishing Order 2004)



18A.5 MMO Fisheries Statistics (Landings Values and Effort Data Sets)

18A.5.1 Landings Values

18A.5.1.1 National Overview

Figure 18A.5 displays the total landings values (averaged 2001 to 2010) by species in the national study area. The figures demonstrate that ICES rectangles 41E7 and 42E7, within which the development is located, contain fishing grounds that are of moderate importance on a national scale. The majority of landings on 41E7 are comprised of nephrops and lobsters, while the landings in 42E7 are comprised of king scallops and crustaceans, such as lobsters, edible crabs and velvet crabs. Squid is also recorded in both rectangles.

Figure 18A.6 to Figure 18A.9 show the relative landings values of the top species recorded in the local study area on a national scale. ICES rectangles with annual average landings values less than £5,000 have been removed to allow for improved visual display of the data.

Figure 18A.6 shows relative nephrops landings on a national scale. It can be seen that nephrops landings in rectangle 41E7 are comparable to rectangles recorded offshore to the northeast and slightly lower than values recorded on the west coast.

Figure 18A.7 shows relative king scallop landings on a national scale. It can be seen that scallop landings in rectangle 42E7 are comparable to rectangles recording the highest values in the Moray Firth and slightly lower than values recorded on the west coast.

Figure 18A.8 shows relative lobster, edible crab and velvet crab landings on a national scale. It can be seen that shellfish landings in the local study area record values that are comparable to those on the west coast of Scotland and slightly lower than those recorded around the Orkney Islands. The majority of shellfish landings in the local study area are of lobsters.

Figure 18A.9 shows relative squid landings on a national scale. It can be seen that the highest landings values are recorded in the Moray Firth. Moderate squid landings values are recorded in the local study area.

Figure 18A.5 Landings Values by Species (Average 2001-2010) in the National Study Area (Source: MMO)

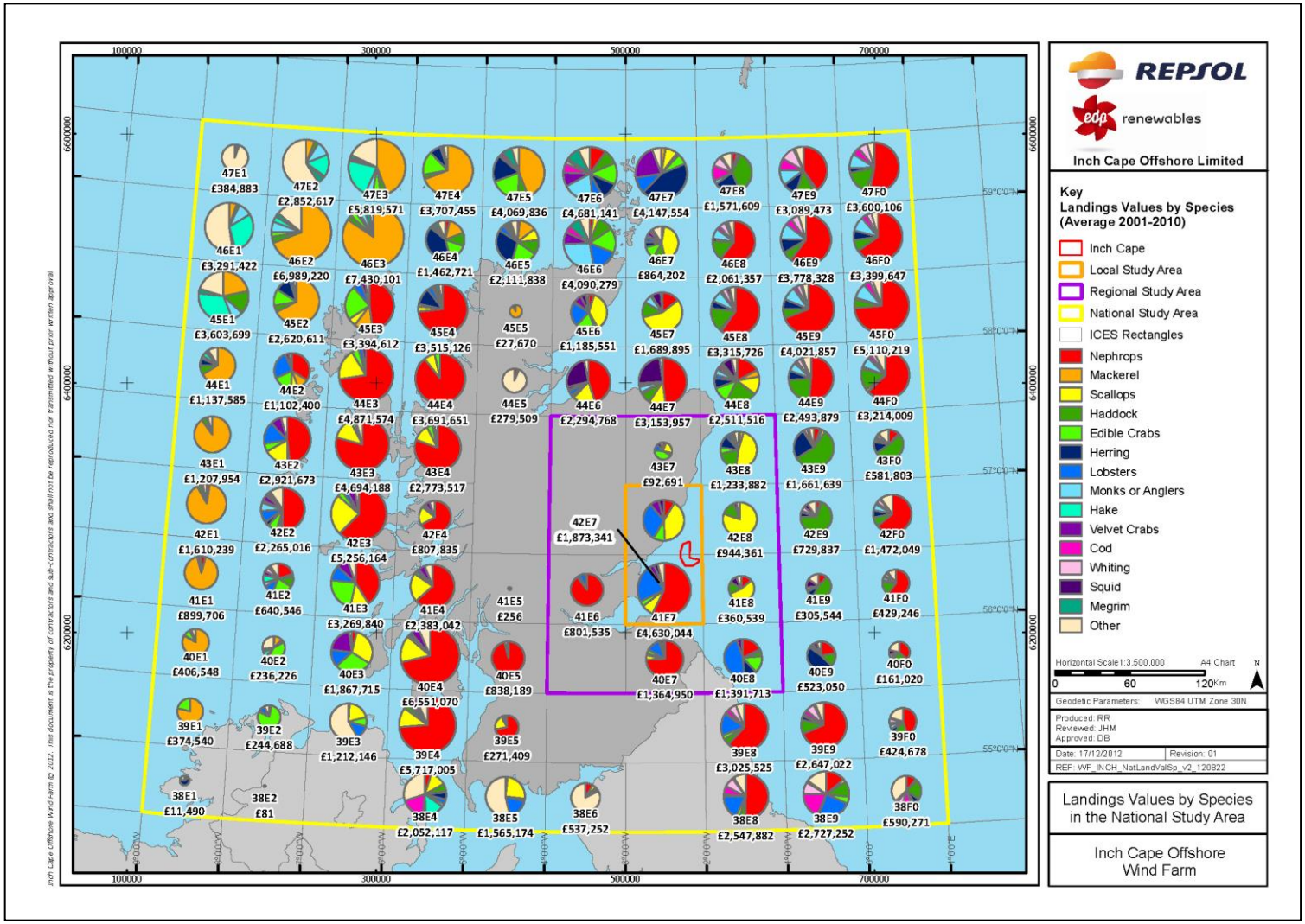


Figure 18A.6 Relative Landings Values by Species, Nephrops only (Average 2001-2010), in the National Study Area (Source: MMO)

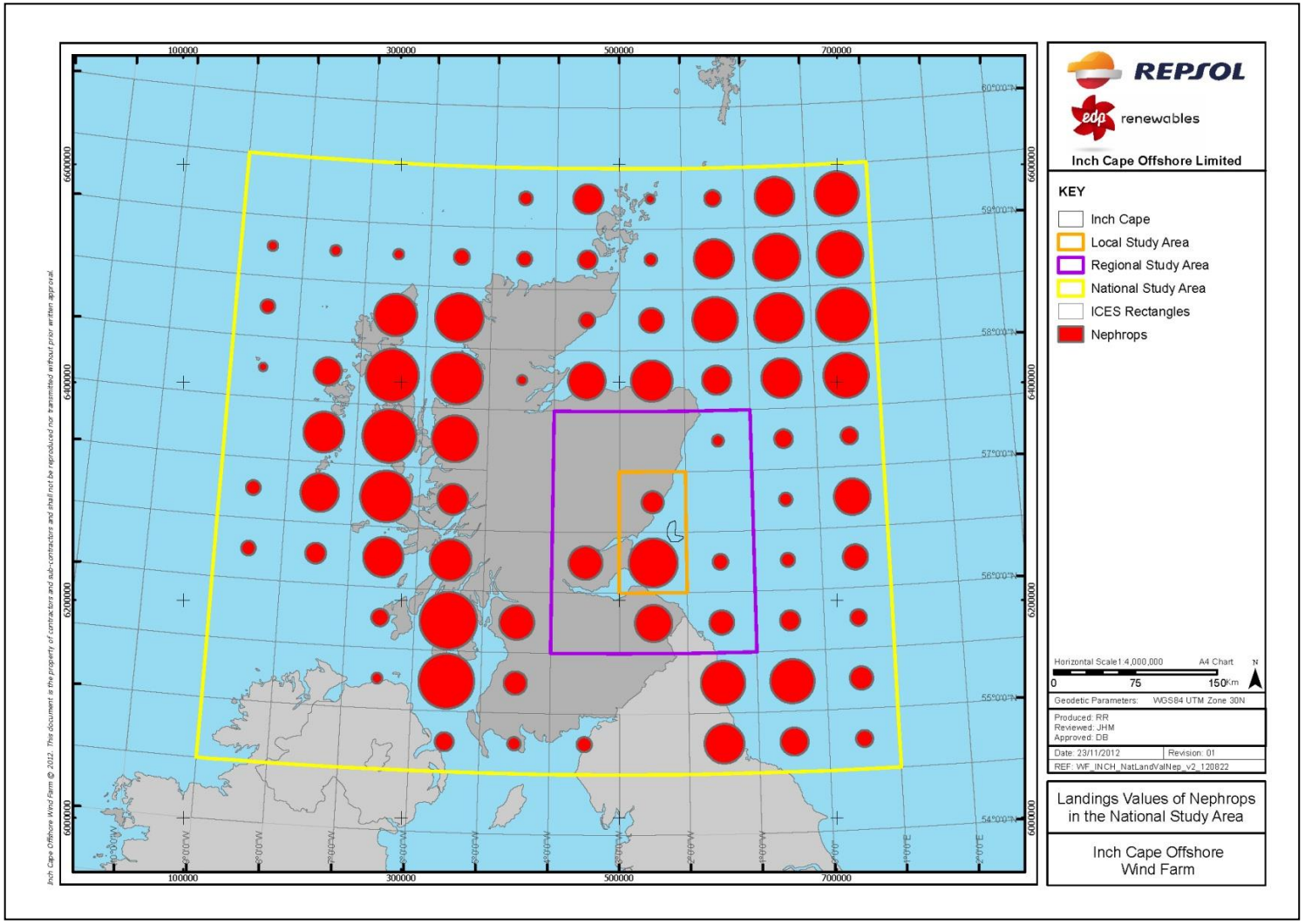


Figure 18A.7 Relative Landings Values by Species, King Scallops only (Average 2001-2010), in the National Study Area (Source: MMO)

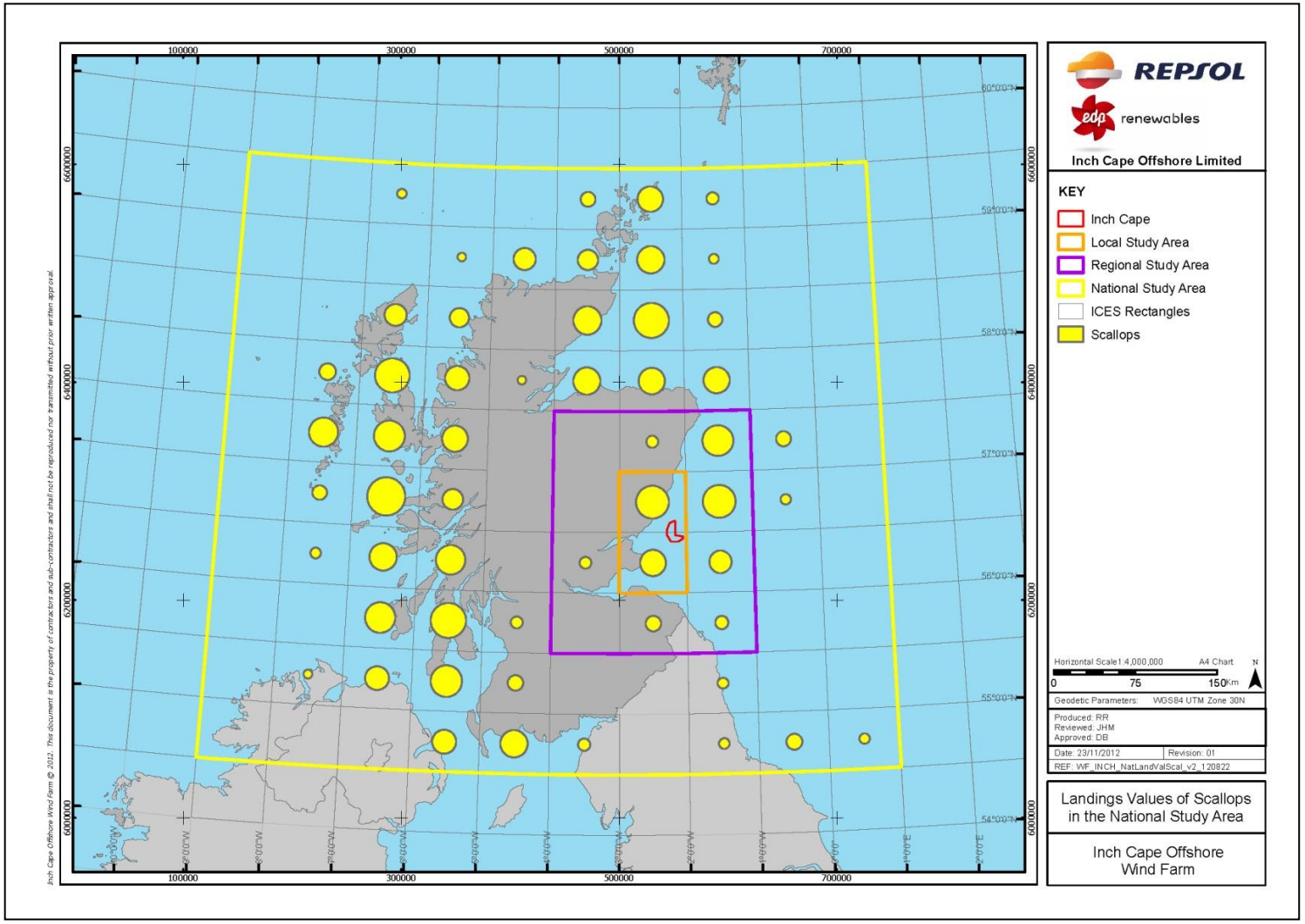


Figure 18A.8 Relative Landings Values by Species, Shellfish only (Average 2001-2010), in the National Study Area (Source: MMO)

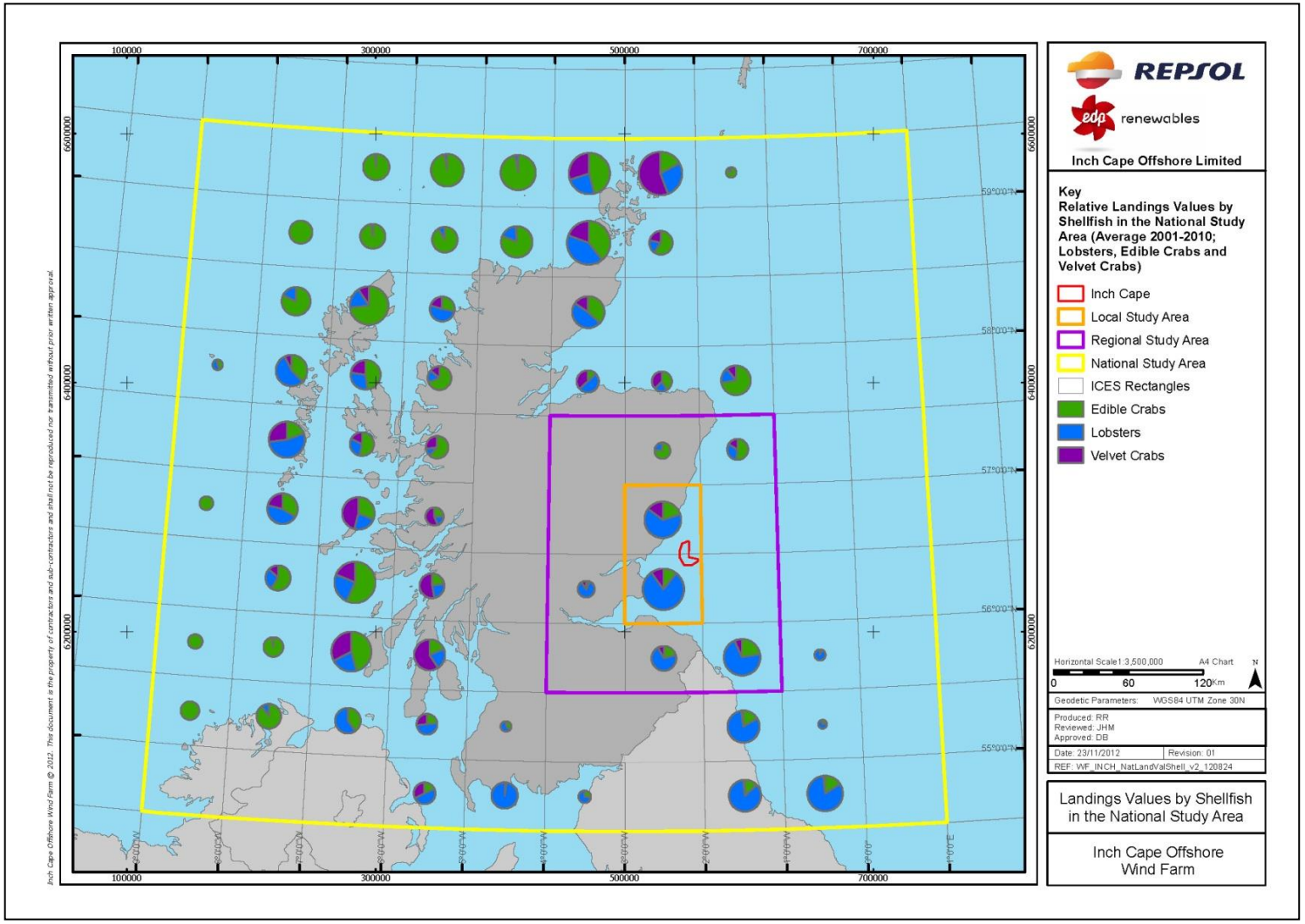
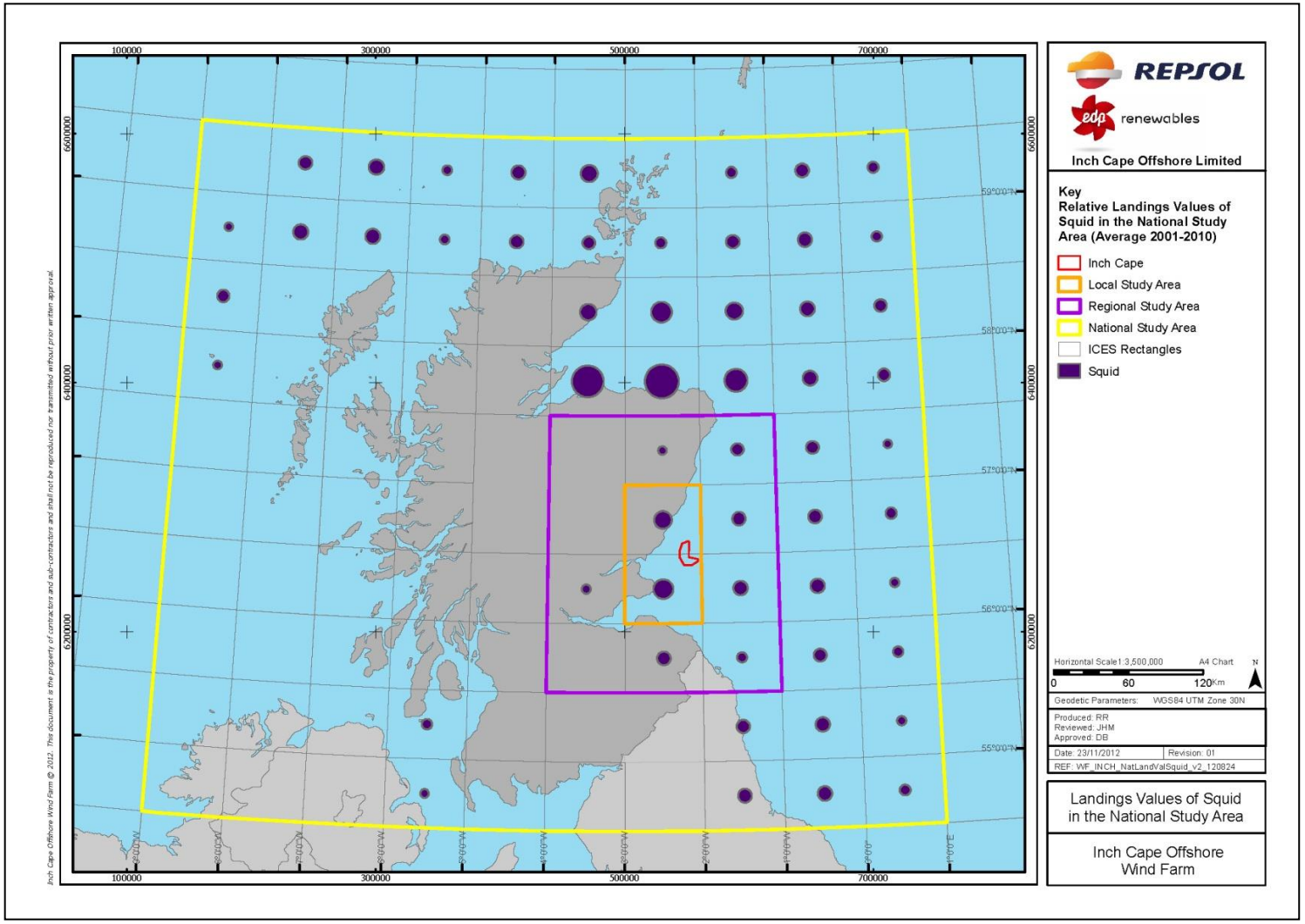


Figure 18A.9 Relative Landings Values by Species, Squid only (Average 2001-2010), in the National Study Area (Source: MMO)



18A.5.1.2 Regional Study Area

Figure 18A.10 and Figure 18A.11 show landings values in the regional study area (averaged 2001 to 2010) by species and method, respectively.

Dredging for king scallops is the principal activity recorded in the north and eastern rectangles.

Landings of nephrops are highest in the southern rectangles of the regional area and are principally targeted by demersal otter trawlers. In the data set provided by the MMO, vessels trawling for nephrops are variously listed as demersal otter trawlers and nephrops trawlers (the same category of vessel), as well as by twin rigs (demersal otter trawlers configured to tow two nets). Static gear vessels operating pots in inshore waters also target nephrops, but this method produces considerably lower recorded levels of landings.

Whitefish, such as haddock and cod, record moderate landings in offshore rectangles. The whitefish fishery is targeted by demersal otter trawlers and Scottish seine netters.

There are relatively high landings of crustaceans targeted by static gear vessels in coastal rectangles, the majority of which comprise of lobster, although edible and velvet crabs are also landed.

Figure 18A.12 shows the distribution of vessels by length category in the regional study area. Larger category over-15 metre vessels are principally recorded in offshore rectangles, and to a lesser extent in coastal areas, vessels under-15 metres (10-15 m and under-10 m) are predominantly recorded in coastal rectangles. Vessels under-15 metres in length are not VMS tracked. There is negligible recorded foreign vessel activity.

Figure 18A.10 Landings Values by Species (Average 2001-2010) in the Regional Study Area (Source: MMO)

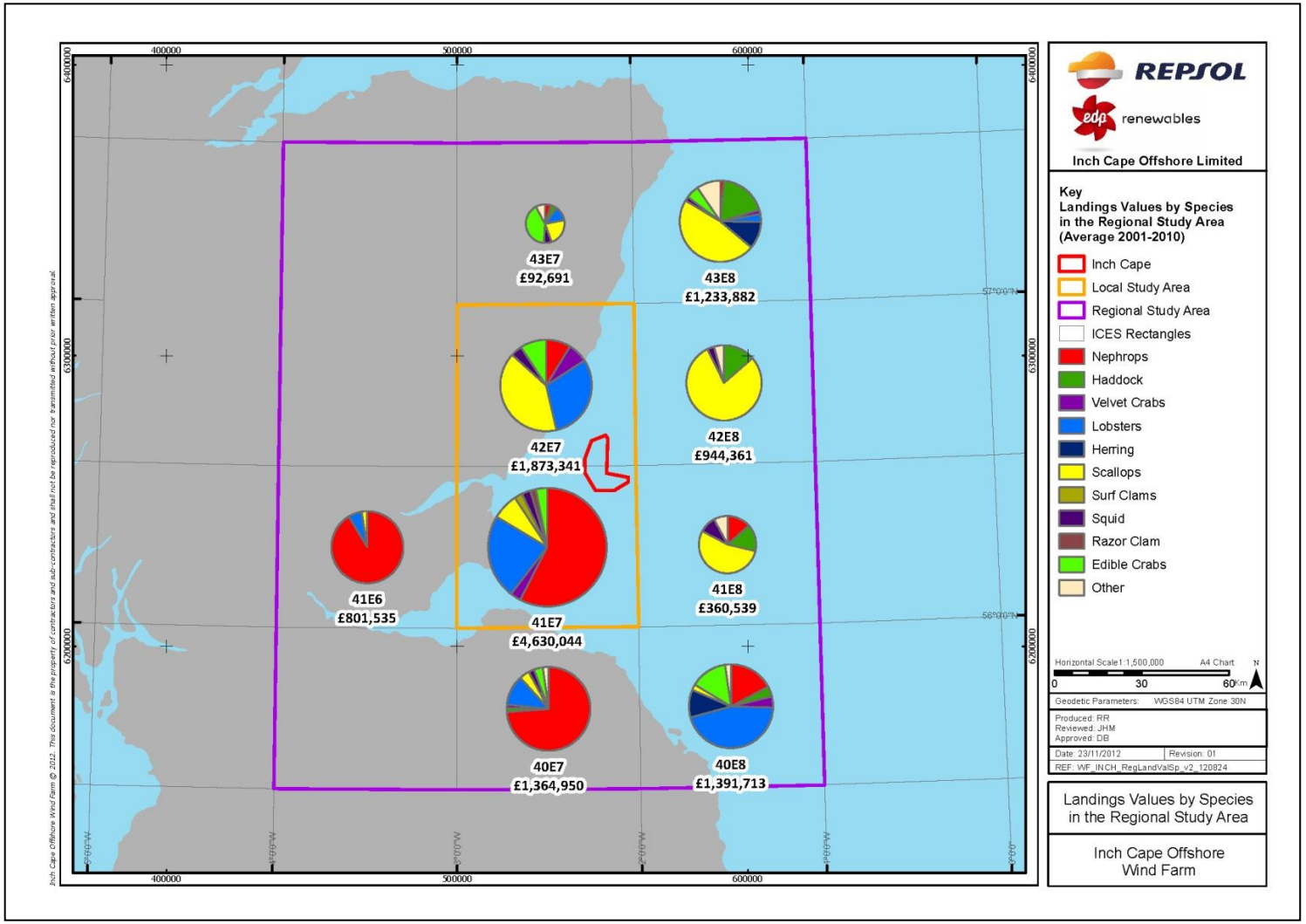


Figure 18A.11 Landings Values by Method (Average 2001-2010) in the Regional Study Area (Source: MMO)

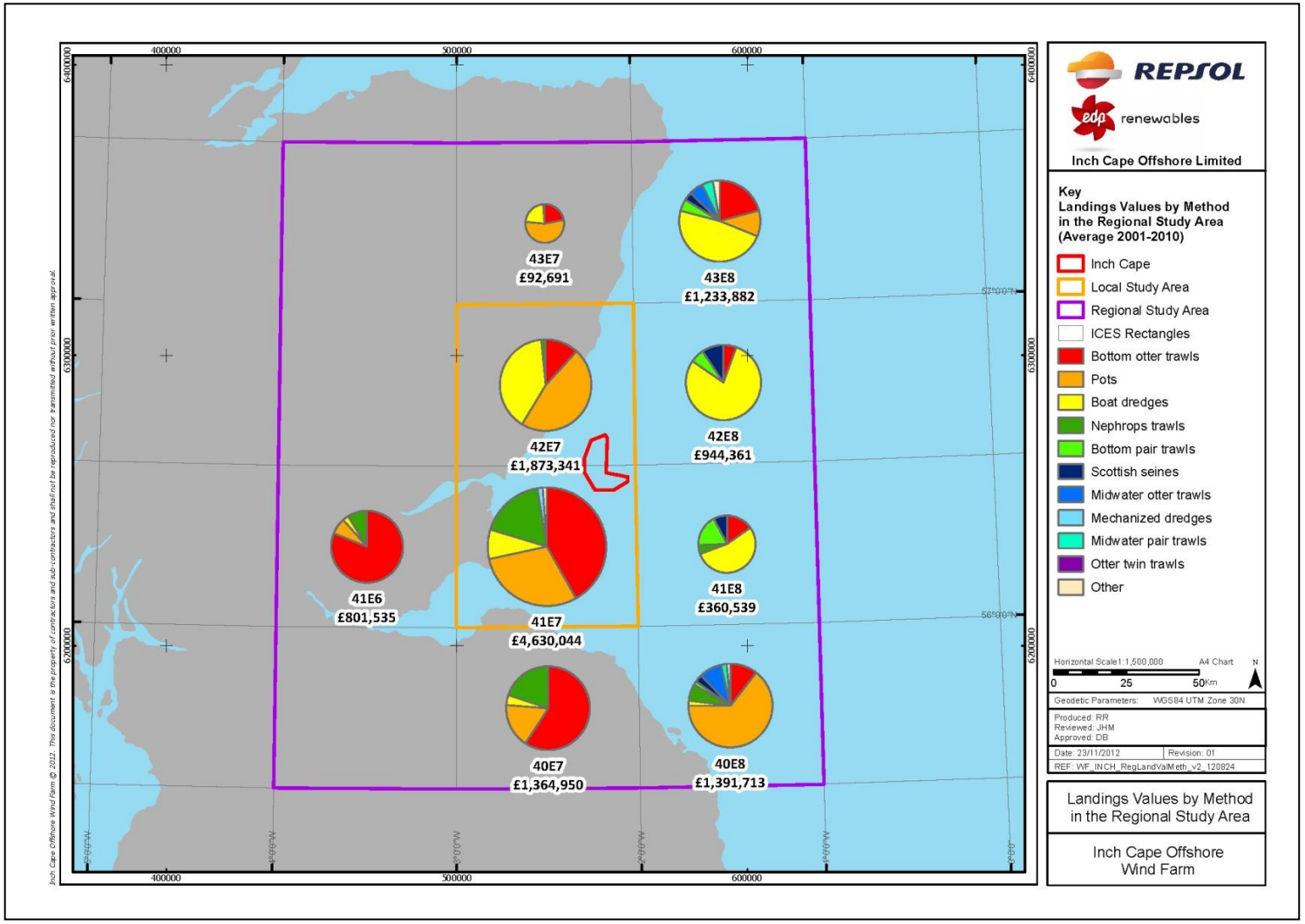
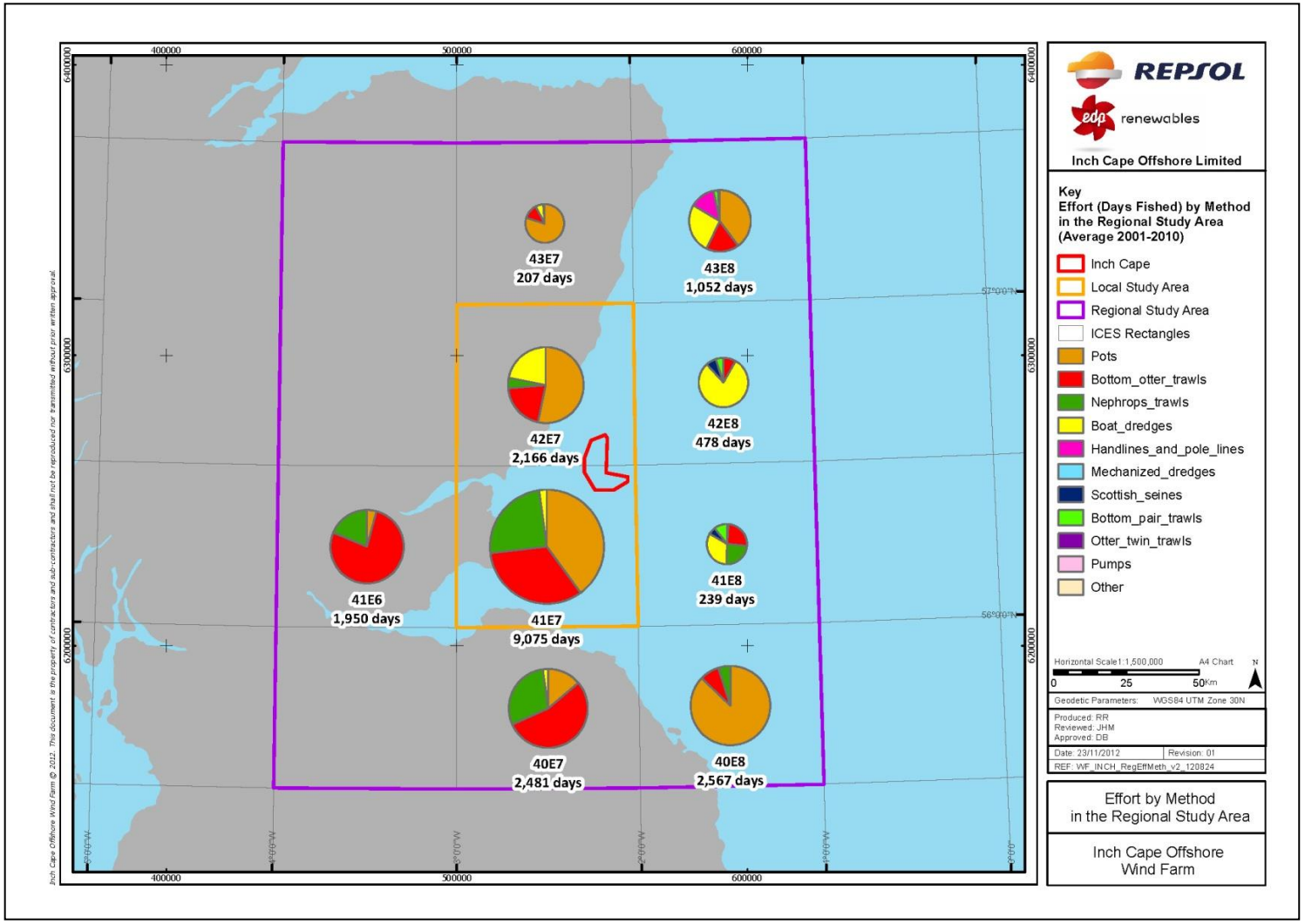


Figure 18A.12 Landings Values by Vessel Category (Average 2001-2010) in the Regional Study Area (Source: MMO)



18A.5.1.3 Local Study Area (ICES Rectangles 41E7 and 42E7)

Figure 18A.13 shows that nephrops represent the highest landings values in rectangles 41E7 (£2,644,374, 57% of the total). Lobsters are also an important species targeted in the rectangle; representing 23% (£1,059,710) of the total average landings values. The remainder of the landings values are principally comprised of scallops (£326,349, 7%), edible crabs (£143,099, 3.1%), velvet crabs (£134,069, 2.9%), squid (£109,235, 2.4%), surf clams (£100,816, 2.2%) and razor clams (£73,591, 1.6%).

Figure 18A.14 shows that scallops represent the highest landings values in rectangle 42E7 (£742,213, 40% of the total). Lobsters are also an important species targeted in rectangle 42E7 and represent 30% (£565,362) of the total average landings values. The remainder of landings values are principally comprised of edible crabs (£172,565, 9%), nephrops (£162,179, 9%), velvet crabs (£129,754, 7%) and squid (£73,830, 3.9%).

Figure 18A.15 and Figure 18A.16 show that boat dredges are the sole fishing method targeting scallops. Crustaceans, including lobster and edible and velvet crabs, are targeted by pots. Bottom otter trawlers (including nephrops trawlers) principally target nephrops and squid. Clams (surf and razor) are principally targeted by mechanized and boat dredges.

Figure 18A.17 and Figure 18A.18 show that the majority of scallop dredgers are over-15 metres in length, although a small percentage are between 10 and 15 metres. Within rectangle 42E7, a negligible proportion of the scallop dredge fleet is recorded as being non-UK. The majority of potters are under-10 metres in length, although a small percentage is between 10 and 15 metres. Figure 18A.17 indicates that demersal trawl vessels in rectangle 41E7 are, in the main, 10 to 15 metres in length, with a smaller percentage being under-10 metre vessels and over-15 metres, respectively. Figure 18A.18 indicates that demersal trawl vessels in rectangle 42E7 are utilised, in the main, by the over-15 and 10 to 15 metre fleets, although a small percentage are employed by the under-10 metre fleet.

Figure 18A.13 Percentage Distribution of Landings Values by Species in ICES Rectangle 41E7 (Source: MMO)

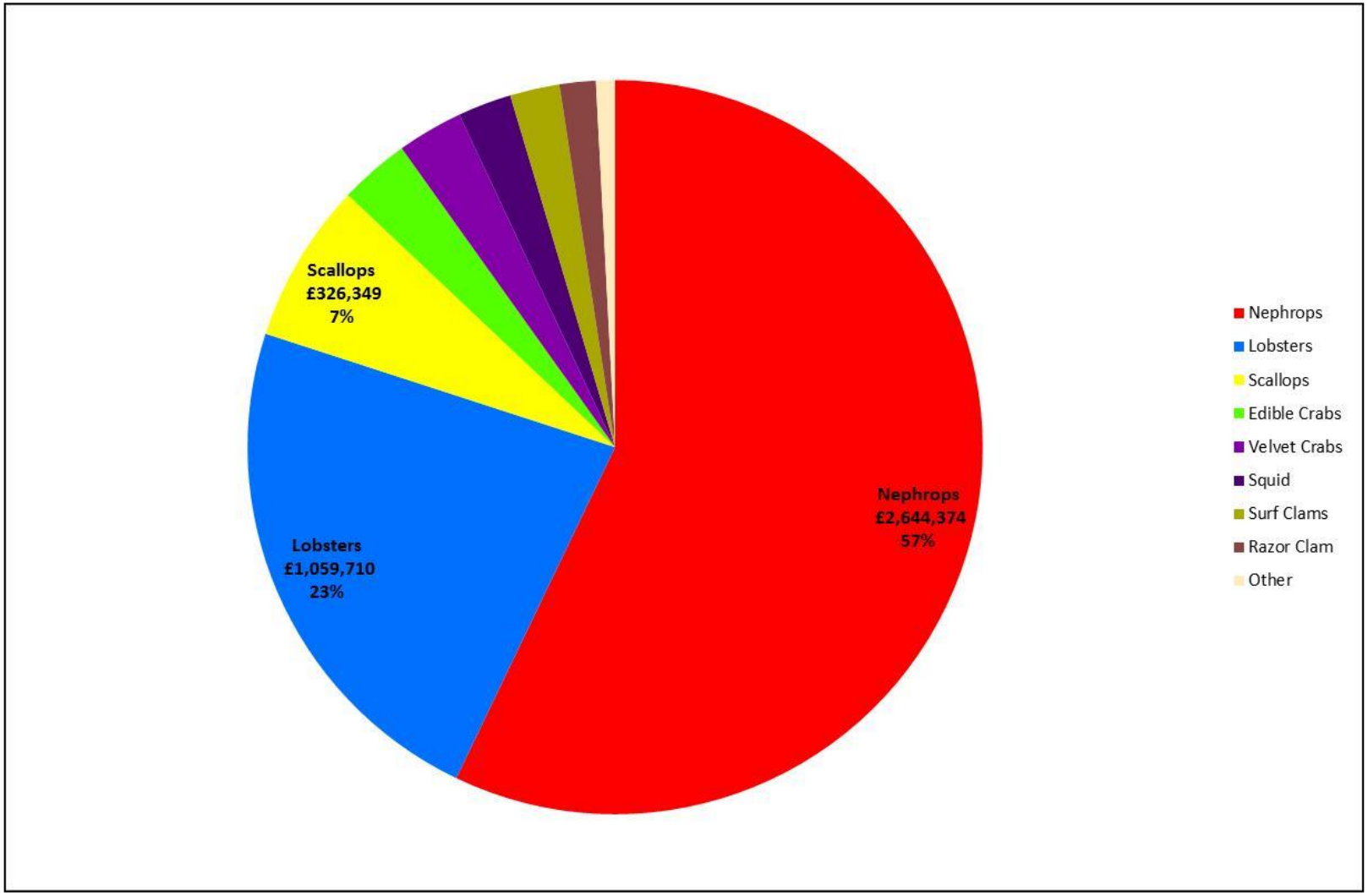


Figure 18A.14 **Percentage Distribution of Landings Values by Species in ICES Rectangle 42E7 (Source: MMO)**

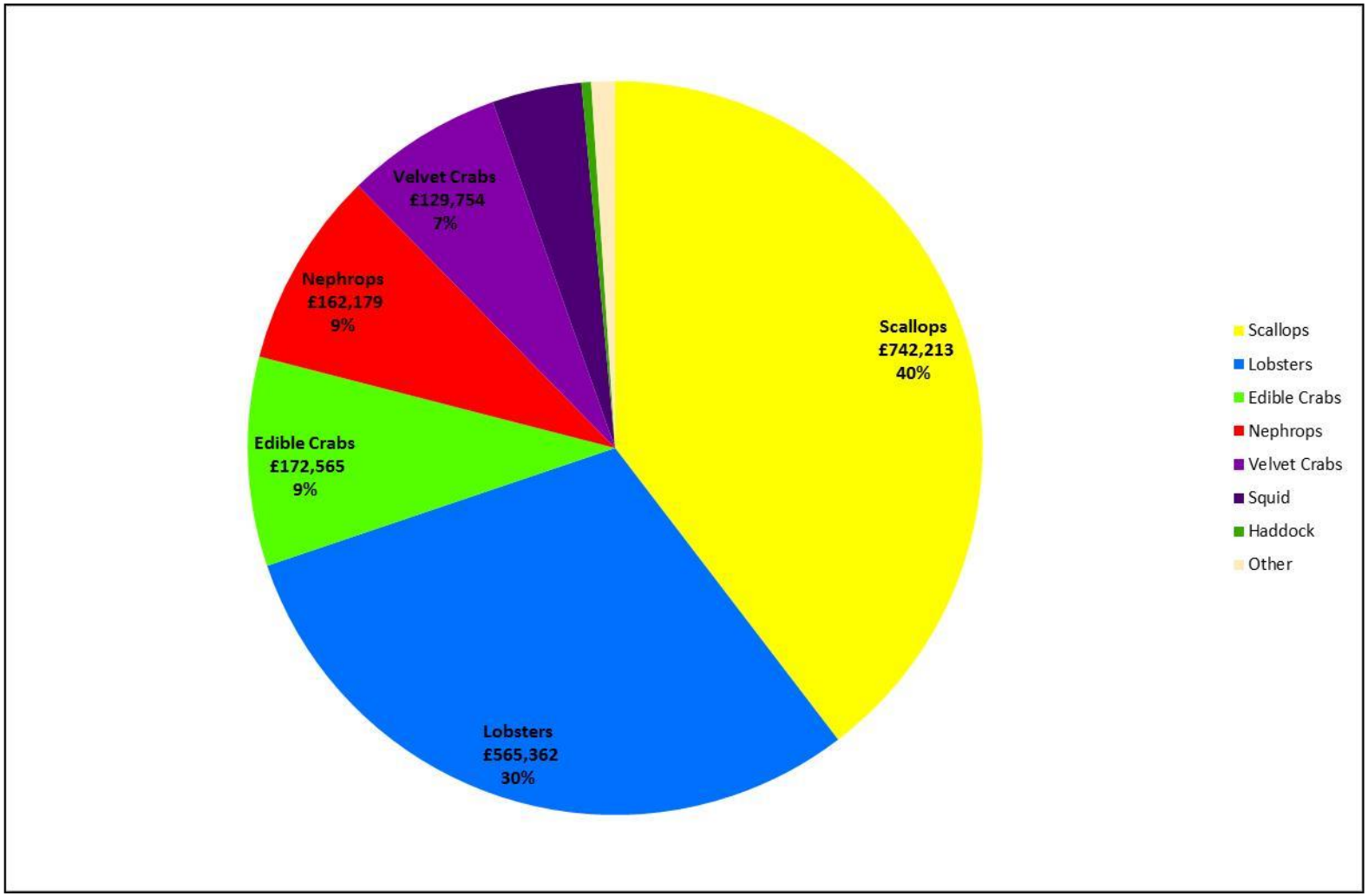
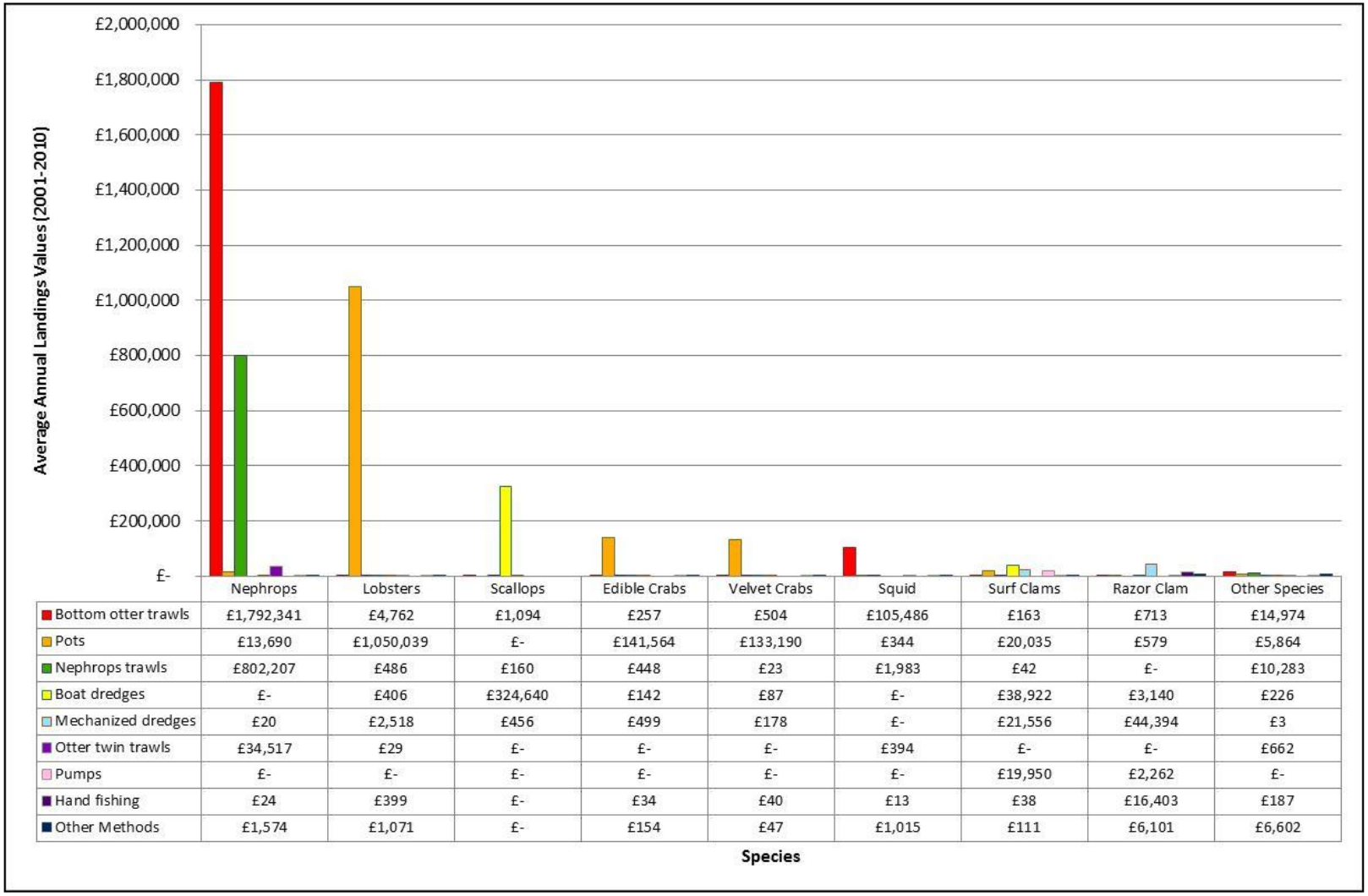
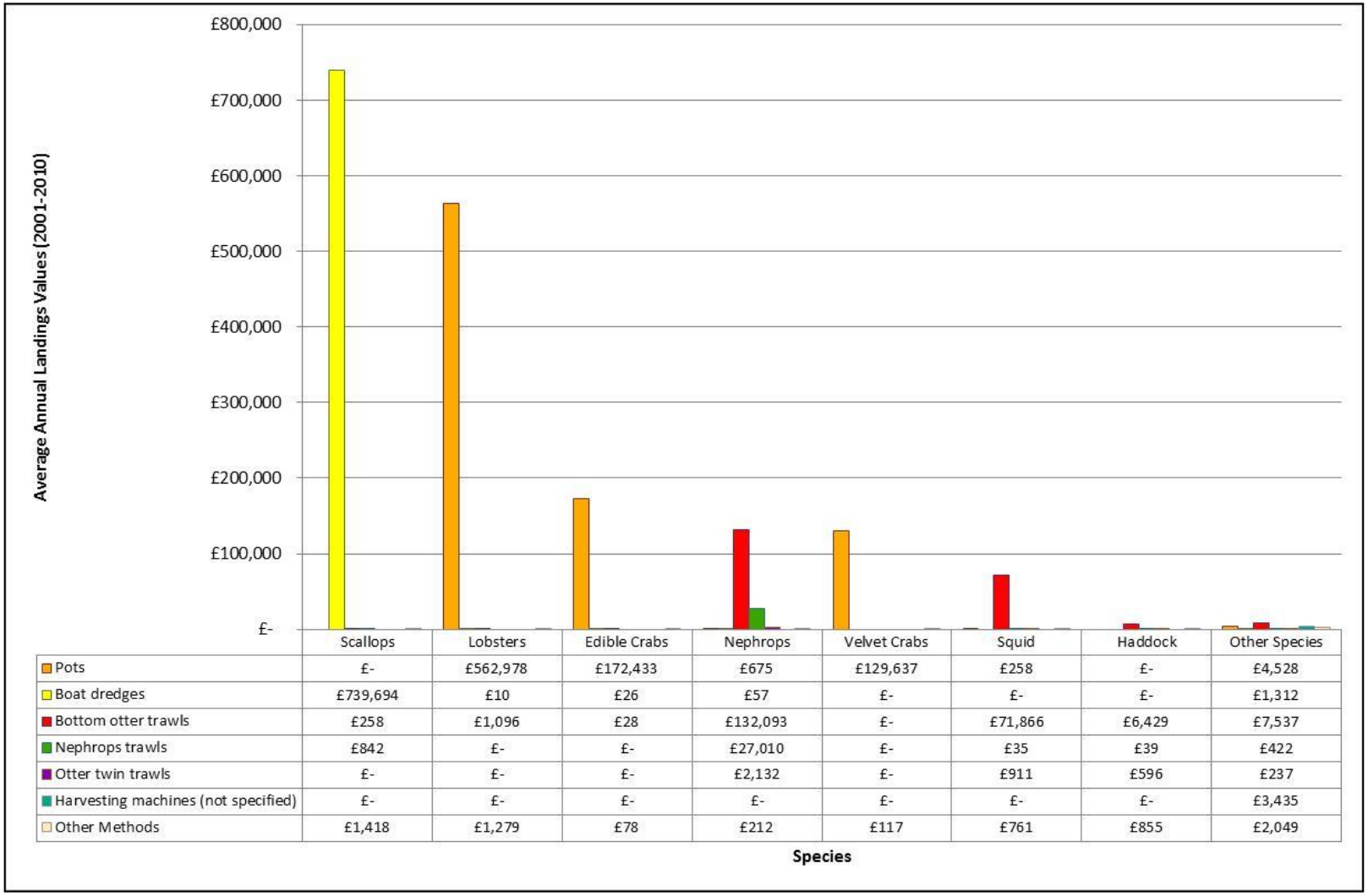


Figure 18A.15 Average Annual Landings Values (2001 to 2010) by Species and Methods in ICES Rectangle 41E7 (Source: MMO)



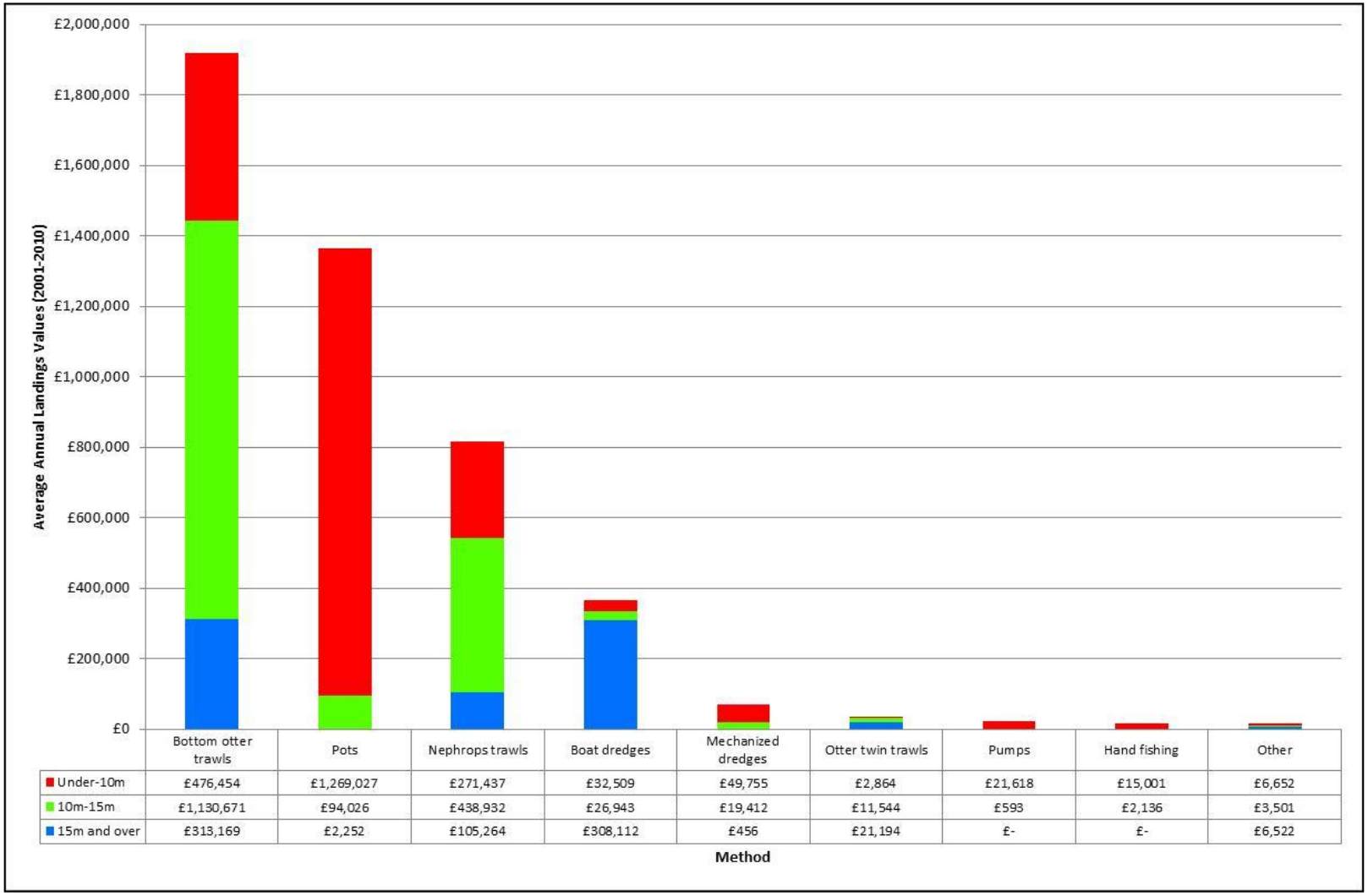
	Nephrops	Lobsters	Scallops	Edible Crabs	Velvet Crabs	Squid	Surf Clams	Razor Clam	Other Species
Bottom otter trawls	£1,792,341	£4,762	£1,094	£257	£504	£105,486	£163	£713	£14,974
Pots	£13,690	£1,050,039	£-	£141,564	£133,190	£344	£20,035	£579	£5,864
Nephrops trawls	£802,207	£486	£160	£448	£23	£1,983	£42	£-	£10,283
Boat dredges	£-	£406	£324,640	£142	£87	£-	£38,922	£3,140	£226
Mechanized dredges	£20	£2,518	£456	£499	£178	£-	£21,556	£44,394	£3
Otter twin trawls	£34,517	£29	£-	£-	£-	£394	£-	£-	£662
Pumps	£-	£-	£-	£-	£-	£-	£19,950	£2,262	£-
Hand fishing	£24	£399	£-	£34	£40	£13	£38	£16,403	£187
Other Methods	£1,574	£1,071	£-	£154	£47	£1,015	£111	£6,101	£6,602

Figure 18A.16 Average Annual Landings Values (2001 to 2010) by Species and Methods in ICES Rectangle 42E7 (Source: MMO)



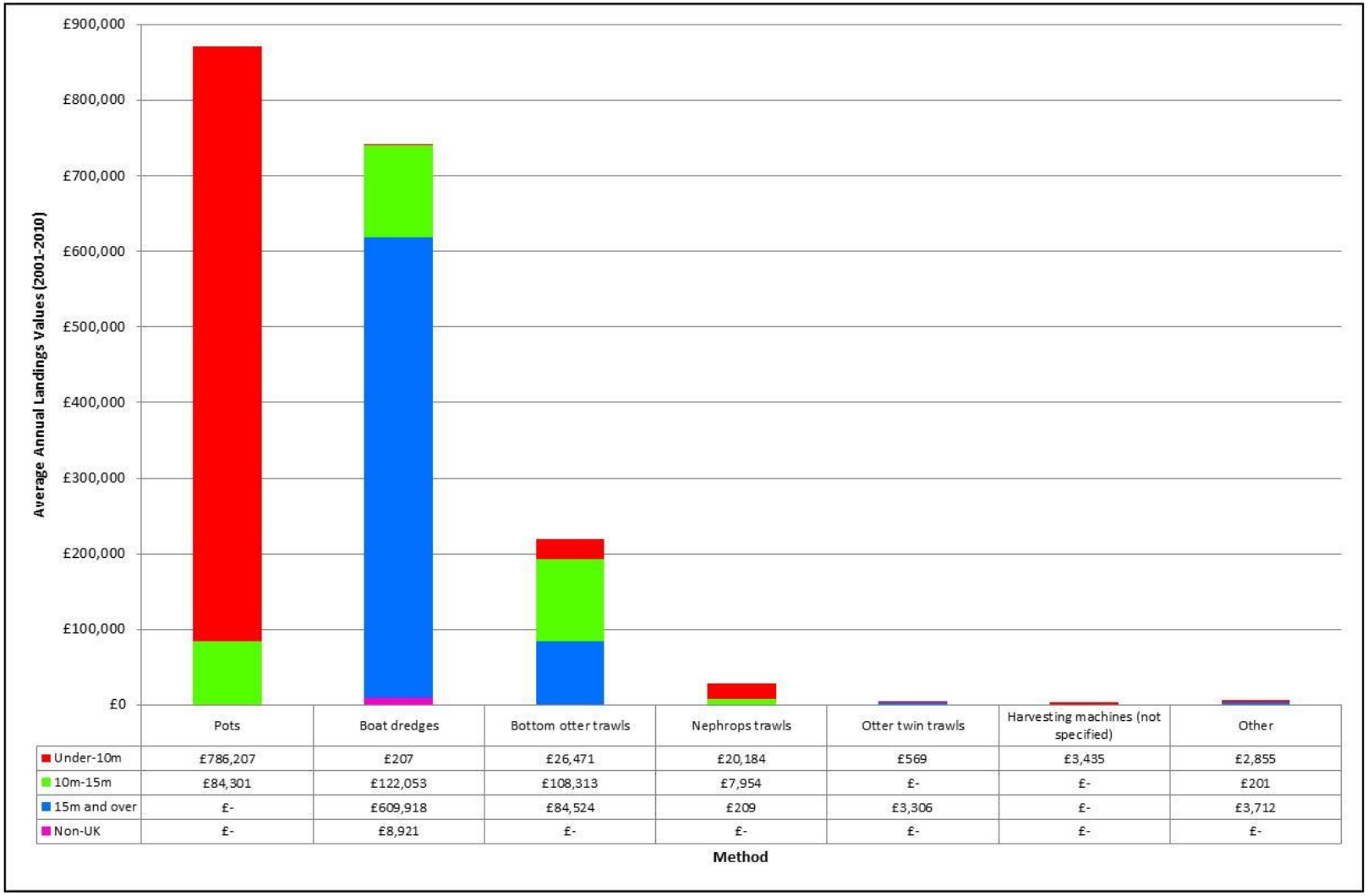
	Scallops	Lobsters	Edible Crabs	Nephrops	Velvet Crabs	Squid	Haddock	Other Species
Pots	£-	£562,978	£172,433	£675	£129,637	£258	£-	£4,528
Boat dredges	£739,694	£10	£26	£57	£-	£-	£-	£1,312
Bottom otter trawls	£258	£1,096	£28	£132,093	£-	£71,866	£6,429	£7,537
Nephrops trawls	£842	£-	£-	£27,010	£-	£35	£39	£422
Otter twin trawls	£-	£-	£-	£2,132	£-	£911	£596	£237
Harvesting machines (not specified)	£-	£-	£-	£-	£-	£-	£-	£3,435
Other Methods	£1,418	£1,279	£78	£212	£117	£761	£855	£2,049

Figure 18A.17 Average Annual Landings Values (2001 to 2010) by Methods and Vessel Category in ICES Rectangle 41E7 (Source: MMO)



	Bottom otter trawls	Pots	Nephrops trawls	Boat dredges	Mechanized dredges	Otter twin trawls	Pumps	Hand fishing	Other
Under-10m	£476,454	£1,269,027	£271,437	£32,509	£49,755	£2,864	£21,618	£15,001	£6,652
10m-15m	£1,130,671	£94,026	£438,932	£26,943	£19,412	£11,544	£593	£2,136	£3,501
15m and over	£313,169	£2,252	£105,264	£308,112	£456	£21,194	£-	£-	£6,522

Figure 18A.18 Average Annual Landings Values (2001 to 2010) by Methods and Vessel Category in ICES Rectangle 42E7 (Source: MMO)



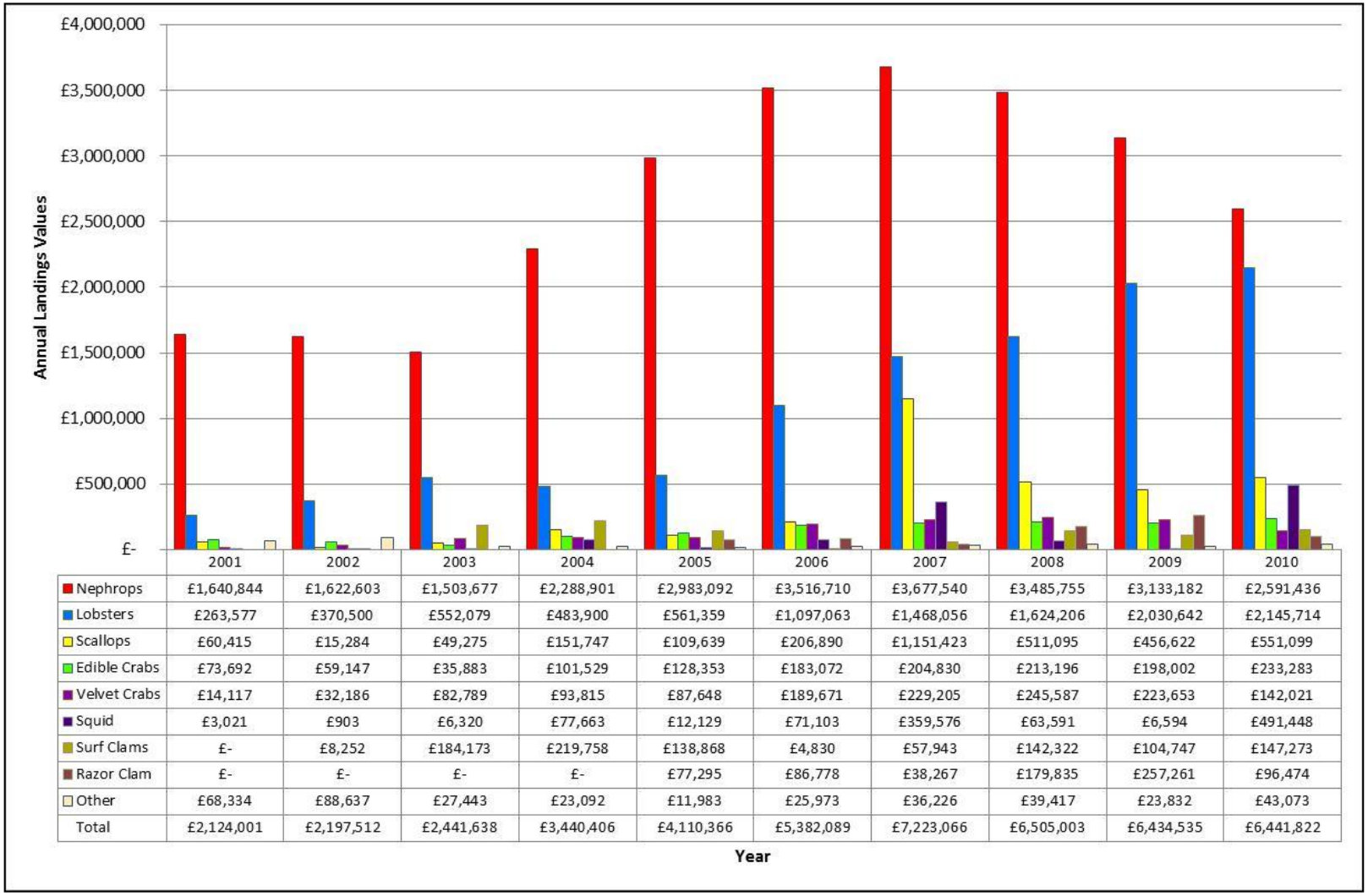
	Pots	Boat dredges	Bottom otter trawls	Nephrops trawls	Otter twin trawls	Harvesting machines (not specified)	Other
Under-10m	£786,207	£207	£26,471	£20,184	£569	£3,435	£2,855
10m-15m	£84,301	£122,053	£108,313	£7,954	£-	£-	£201
15m and over	£-	£609,918	£84,524	£209	£3,306	£-	£3,712
Non-UK	£-	£8,921	£-	£-	£-	£-	£-

18A.5.1.3.1 Annual Landings

Figure 18A.19 shows the annual variations in landings values by species in rectangle 41E7. Values have generally increased over the ten year period, largely due to the increase in nephrops and lobster landings. Nephrops landings values increased from £1,503,677 in 2003 to £3,677,540 in 2007. In recent years landings values have shown a slight decline. Landings of lobsters show a pattern of significantly increased values since 2006, likely as a result of regulations introduced to record landings for the under-10 metre fleet. Landings values of scallops increased in 2007 from £206,890 (2006) to £1,151,423; although levels have since fallen to slightly lower values, with £551,099 recorded in 2010. Edible crab landings have shown an overall pattern of increase over the ten year period, with £73,692 recorded in 2001 and £233,283 recorded in 2010. Landings of velvet swimming crab have shown an increase, from £14,117 in 2001 to £245,587 in 2008. Squid landings have recorded substantial variations in values, from £903 (2002) to £491,448 (2010). Surf clam landings values have varied over the ten year period, with no landings recorded in 2001 and £219,758 in 2004. Razor clams were not recorded in the area until 2005, since when landings values have varied, with £36,267 recorded in 2007 and £257,261 recorded in 2009.

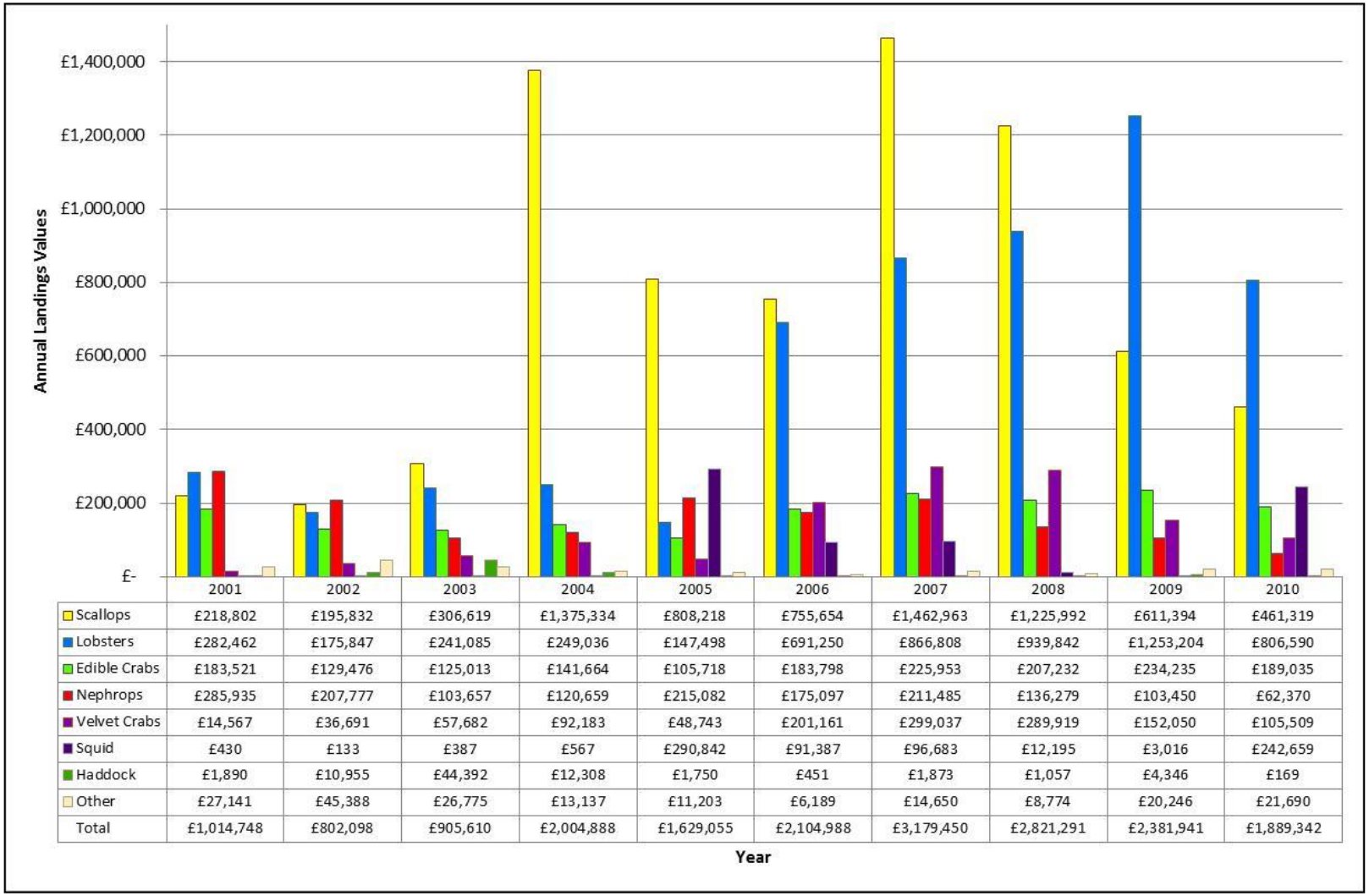
Figure 18A.20 shows the annual variations in landings values by species in rectangle 42E7. Since 2004, the values for the majority of commercial species landed from rectangle 42E7 have increased. Landings of scallops increased in 2004, although since then the landings values have varied significantly, from £1,462,963 in 2007 to £461,319 in 2010. Landings of lobsters show a pattern of significantly increased values since 2006, again likely as a result of introduced under-10 metre regulations. Landings values of edible crabs have remained relatively stable over the ten year period, with a slight decline between 2002 and 2005. Landings of velvet swimming crab have shown an increase, from £14,567 in 2001 to £299,037 in 2007. Since 2005 squid landings have recorded substantial variations in values, from £290,842 in 2005 to £3,016 in 2009. Landings of nephrops and haddock have remained relatively stable over the ten year period.

Figure 18A.19 Annual Variations in Landings Values of Species in ICES Rectangle 41E7 (Source: MMO)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Nephrops	£1,640,844	£1,622,603	£1,503,677	£2,288,901	£2,983,092	£3,516,710	£3,677,540	£3,485,755	£3,133,182	£2,591,436
Lobsters	£263,577	£370,500	£552,079	£483,900	£561,359	£1,097,063	£1,468,056	£1,624,206	£2,030,642	£2,145,714
Scallops	£60,415	£15,284	£49,275	£151,747	£109,639	£206,890	£1,151,423	£511,095	£456,622	£551,099
Edible Crabs	£73,692	£59,147	£35,883	£101,529	£128,353	£183,072	£204,830	£213,196	£198,002	£233,283
Velvet Crabs	£14,117	£32,186	£82,789	£93,815	£87,648	£189,671	£229,205	£245,587	£223,653	£142,021
Squid	£3,021	£903	£6,320	£77,663	£12,129	£71,103	£359,576	£63,591	£6,594	£491,448
Surf Clams	£-	£8,252	£184,173	£219,758	£138,868	£4,830	£57,943	£142,322	£104,747	£147,273
Razor Clam	£-	£-	£-	£-	£77,295	£86,778	£38,267	£179,835	£257,261	£96,474
Other	£68,334	£88,637	£27,443	£23,092	£11,983	£25,973	£36,226	£39,417	£23,832	£43,073
Total	£2,124,001	£2,197,512	£2,441,638	£3,440,406	£4,110,366	£5,382,089	£7,223,066	£6,505,003	£6,434,535	£6,441,822

Figure 18A.20 Annual Variations in Landings Values of Species in ICES Rectangle 42E7 (Source: MMO)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Scallops	£218,802	£195,832	£306,619	£1,375,334	£808,218	£755,654	£1,462,963	£1,225,992	£611,394	£461,319
Lobsters	£282,462	£175,847	£241,085	£249,036	£147,498	£691,250	£866,808	£939,842	£1,253,204	£806,590
Edible Crabs	£183,521	£129,476	£125,013	£141,664	£105,718	£183,798	£225,953	£207,232	£234,235	£189,035
Nephrops	£285,935	£207,777	£103,657	£120,659	£215,082	£175,097	£211,485	£136,279	£103,450	£62,370
Velvet Crabs	£14,567	£36,691	£57,682	£92,183	£48,743	£201,161	£299,037	£289,919	£152,050	£105,509
Squid	£430	£133	£387	£567	£290,842	£91,387	£96,683	£12,195	£3,016	£242,659
Haddock	£1,890	£10,955	£44,392	£12,308	£1,750	£451	£1,873	£1,057	£4,346	£169
Other	£27,141	£45,388	£26,775	£13,137	£11,203	£6,189	£14,650	£8,774	£20,246	£21,690
Total	£1,014,748	£802,098	£905,610	£2,004,888	£1,629,055	£2,104,988	£3,179,450	£2,821,291	£2,381,941	£1,889,342

18A.5.1.3.2 Seasonality

Figure 18A.21 illustrates the seasonal trend of landings for all species in rectangle 41E7. It can be seen that total landings are broadly highest in late summer, between July and September, with the highest values recorded in August (£724,826). Moderate values are recorded for the remainder of the year, with the lowest values recorded in May (£211,460).

Figure 18A.22 to Figure 18A.24 show the seasonal variations in landings values for the top three species recorded in rectangle 41E7; nephrops, lobsters and scallops.

Figure 18A.22 shows that nephrops record the highest landings during the summer months (July and August). Landings are lower for the remainder of the year, with the lowest landings values recorded in May (£84,796).

Figure 18A.23 shows the average seasonality of lobsters. High landings values are recorded during the summer and early autumn (July to October), with values in the rest of the year being comparatively lower.

Figure 18A.24 illustrates the average seasonality of scallops. Landings values are high between April and September, with values for the remainder of the year comparatively lower. The lowest landings values are recorded in January (£119).

Figure 18A.25 illustrates the seasonal trend of landings for all species in rectangle 42E7. Total landings are generally highest in late summer, between July and September, with the highest values recorded in August (£324,185). Moderate values are recorded for the remainder of the year, with the lowest recorded in January (£91,737).

Figure 18A.26 to Figure 18A.28 show the seasonal variations in landings values for the top three species recorded in rectangle 42E7; scallops, lobsters and edible crabs.

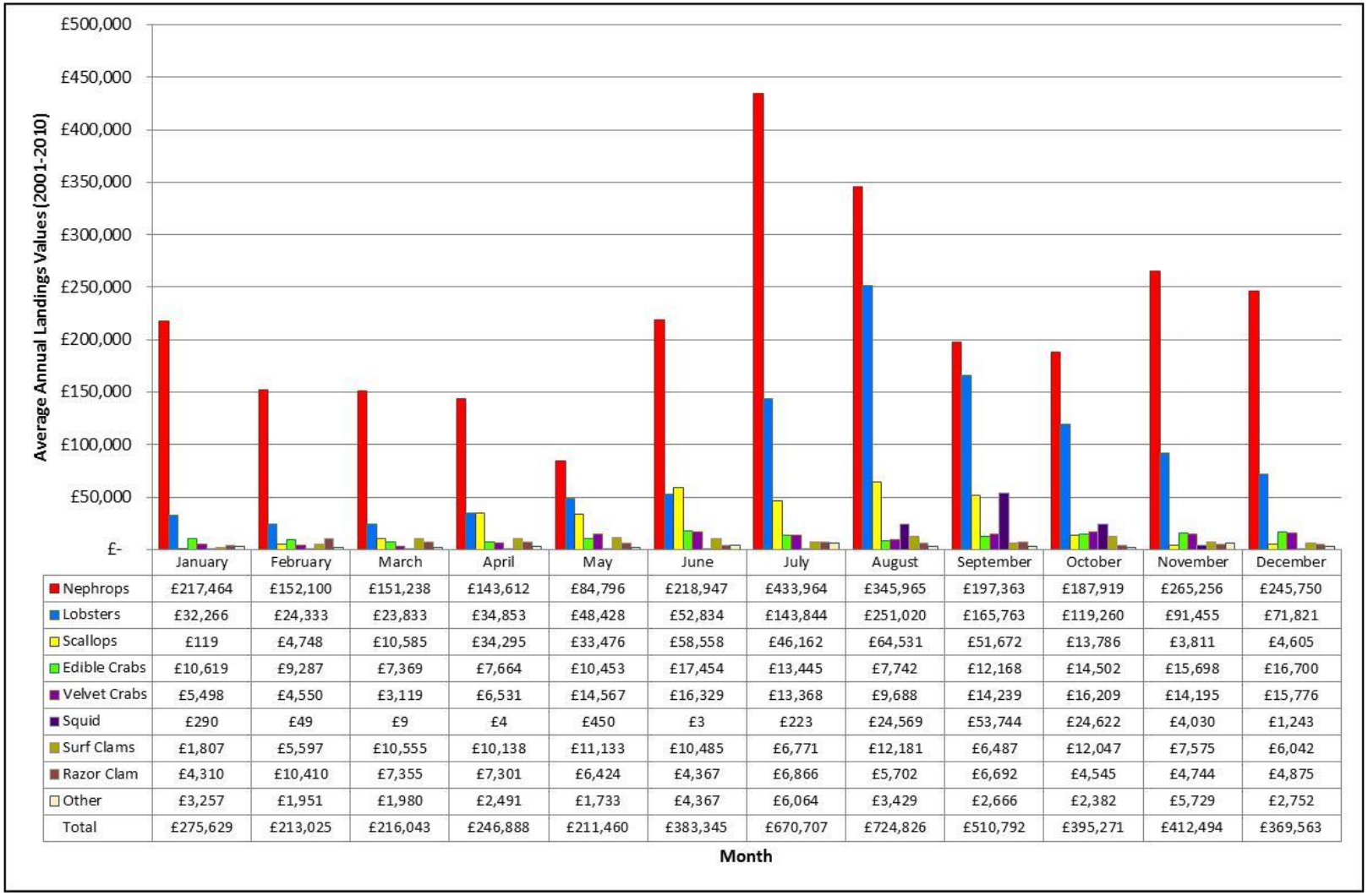
Figure 18A.26 shows that scallop landings values fluctuate slightly throughout the year. Lower values are recorded during late autumn (October and November). Landings values are highest during September (£88,550), with moderate values recorded in the remainder of the year.

Figure 18A.27 shows the average seasonality of lobsters. High landings values are recorded during the summer and early autumn (July to October), with values throughout the rest of the year being comparatively lower.

Figure 18A.28 illustrates the average seasonality of edible crabs. It is of note that catches are more consistent throughout the year than that of lobsters. The highest landings values are recorded during late summer and into autumn (August to November, inclusive). The lowest landings values are recorded during February and March, with moderate values recoded in the remainder of the year.

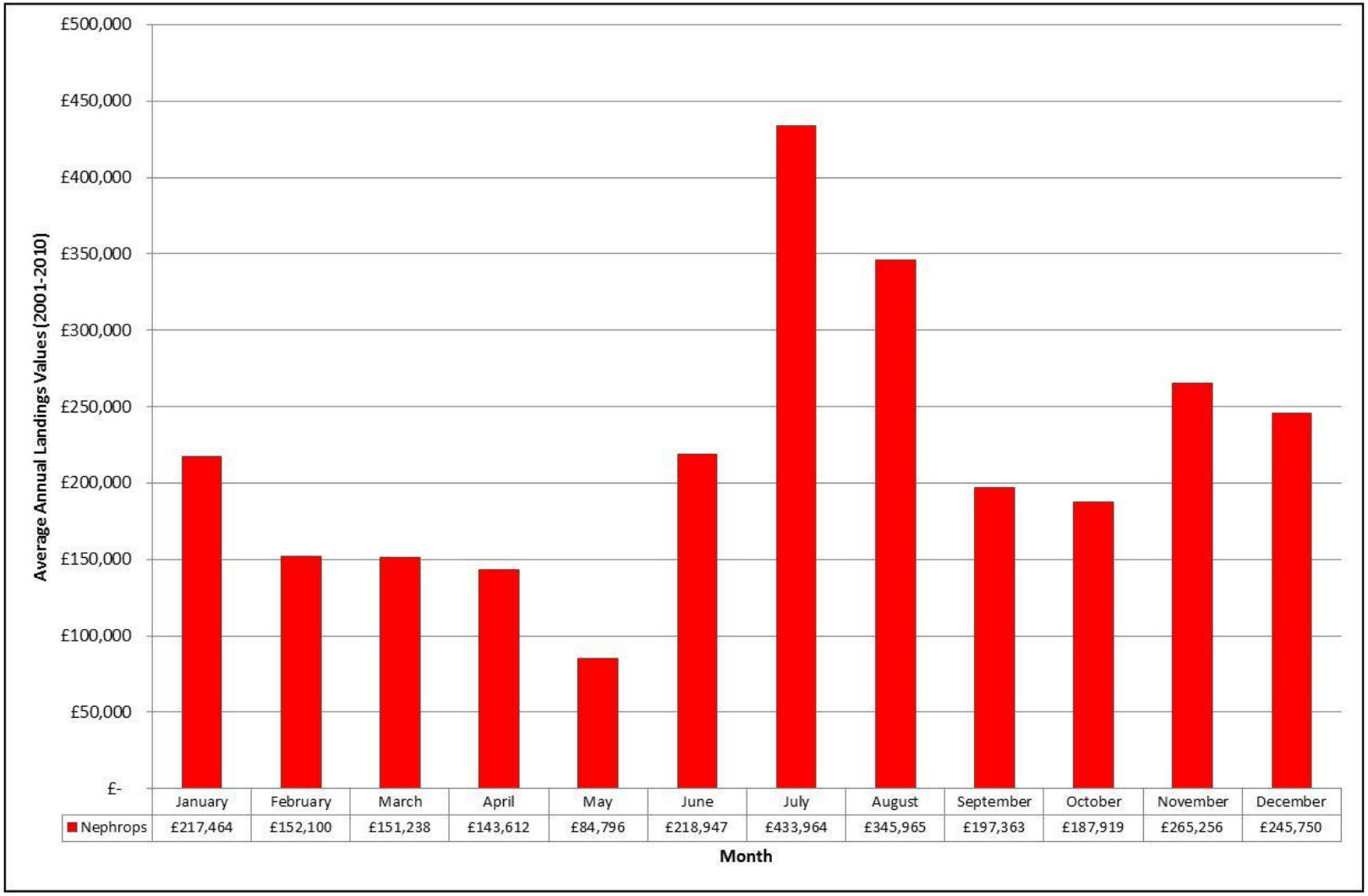
Due to the increasing importance of squid in the Forth and Tay area, Figure 18A.29 shows the average seasonality of squid in both rectangles during 2010 only. It can be seen that the majority of landings values are recorded between August and October, with negligible values recorded for the remainder of the year.

Figure 18A.21 Average Annual (2001 to 2010) Seasonality of Species in ICES Rectangle 41E7 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Nephrops	£217,464	£152,100	£151,238	£143,612	£84,796	£218,947	£433,964	£345,965	£197,363	£187,919	£265,256	£245,750
Lobsters	£32,266	£24,333	£23,833	£34,853	£48,428	£52,834	£143,844	£251,020	£165,763	£119,260	£91,455	£71,821
Scallops	£119	£4,748	£10,585	£34,295	£33,476	£58,558	£46,162	£64,531	£51,672	£13,786	£3,811	£4,605
Edible Crabs	£10,619	£9,287	£7,369	£7,664	£10,453	£17,454	£13,445	£7,742	£12,168	£14,502	£15,698	£16,700
Velvet Crabs	£5,498	£4,550	£3,119	£6,531	£14,567	£16,329	£13,368	£9,688	£14,239	£16,209	£14,195	£15,776
Squid	£290	£49	£9	£4	£450	£3	£223	£24,569	£53,744	£24,622	£4,030	£1,243
Surf Clams	£1,807	£5,597	£10,555	£10,138	£11,133	£10,485	£6,771	£12,181	£6,487	£12,047	£7,575	£6,042
Razor Clam	£4,310	£10,410	£7,355	£7,301	£6,424	£4,367	£6,866	£5,702	£6,692	£4,545	£4,744	£4,875
Other	£3,257	£1,951	£1,980	£2,491	£1,733	£4,367	£6,064	£3,429	£2,666	£2,382	£5,729	£2,752
Total	£275,629	£213,025	£216,043	£246,888	£211,460	£383,345	£670,707	£724,826	£510,792	£395,271	£412,494	£369,563

Figure 18A.22 Average Annual (2001 to 2010) Seasonality of Nephrops in ICES Rectangle 41E7 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Nephrops	£217,464	£152,100	£151,238	£143,612	£84,796	£218,947	£433,964	£345,965	£197,363	£187,919	£265,256	£245,750

Figure 18A.23 Average Annual (2001 to 2010) Seasonality of Lobsters in ICES Rectangle 41E7 (Source: MMO)

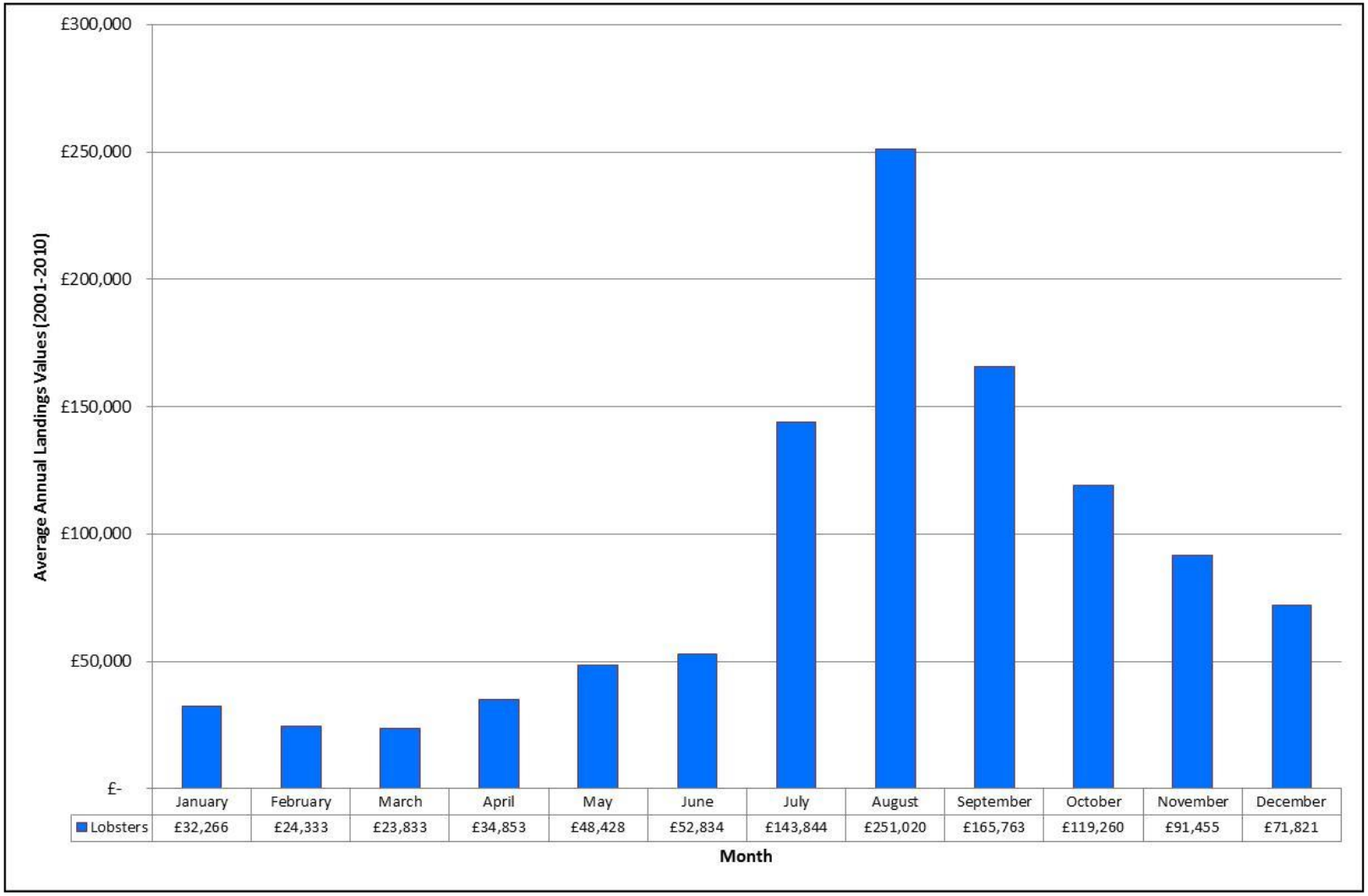


Figure 18A.24 Average Annual (2001 to 2010) Seasonality of Scallops in ICES Rectangle 41E7 (Source: MMO)

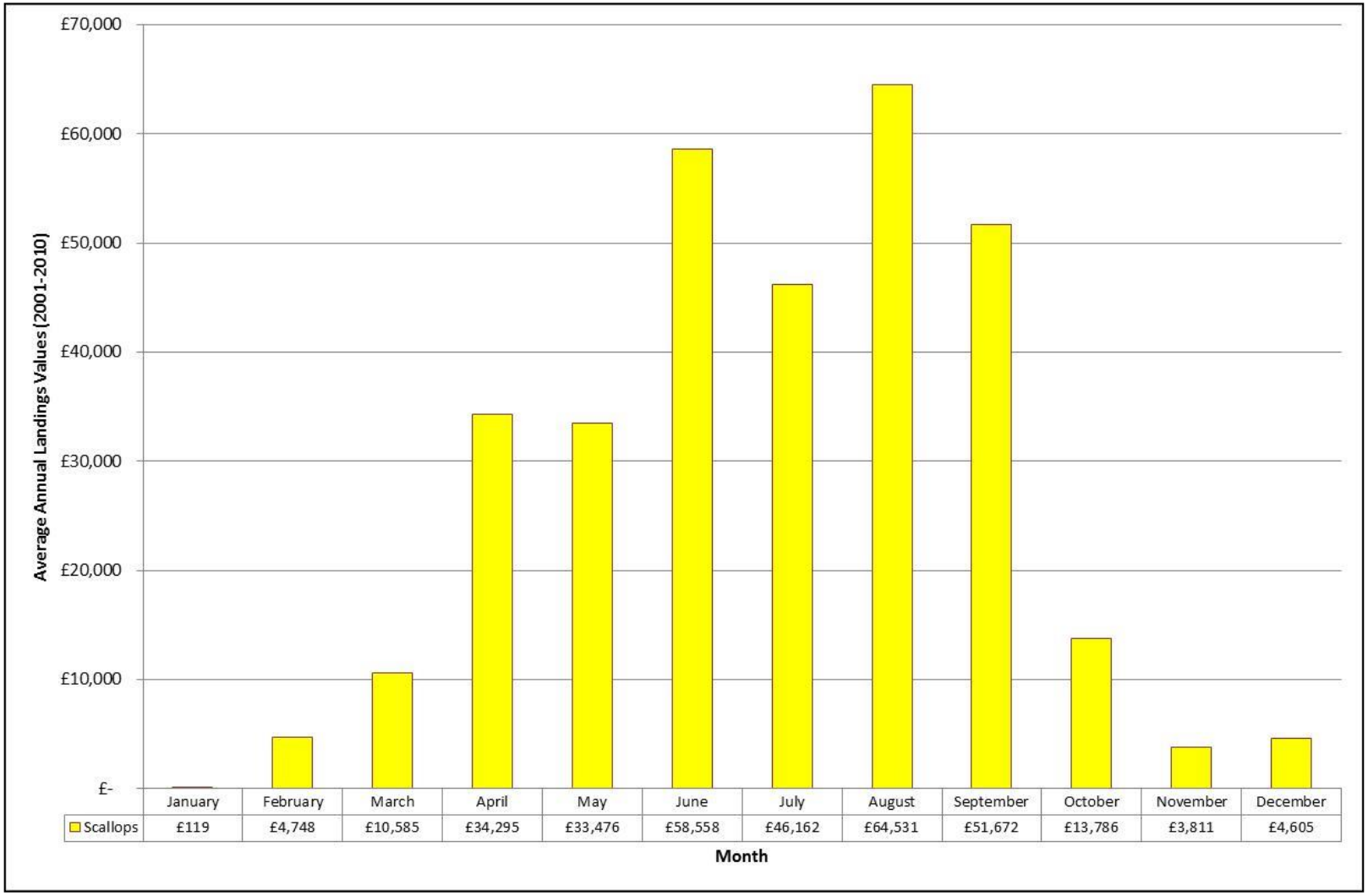
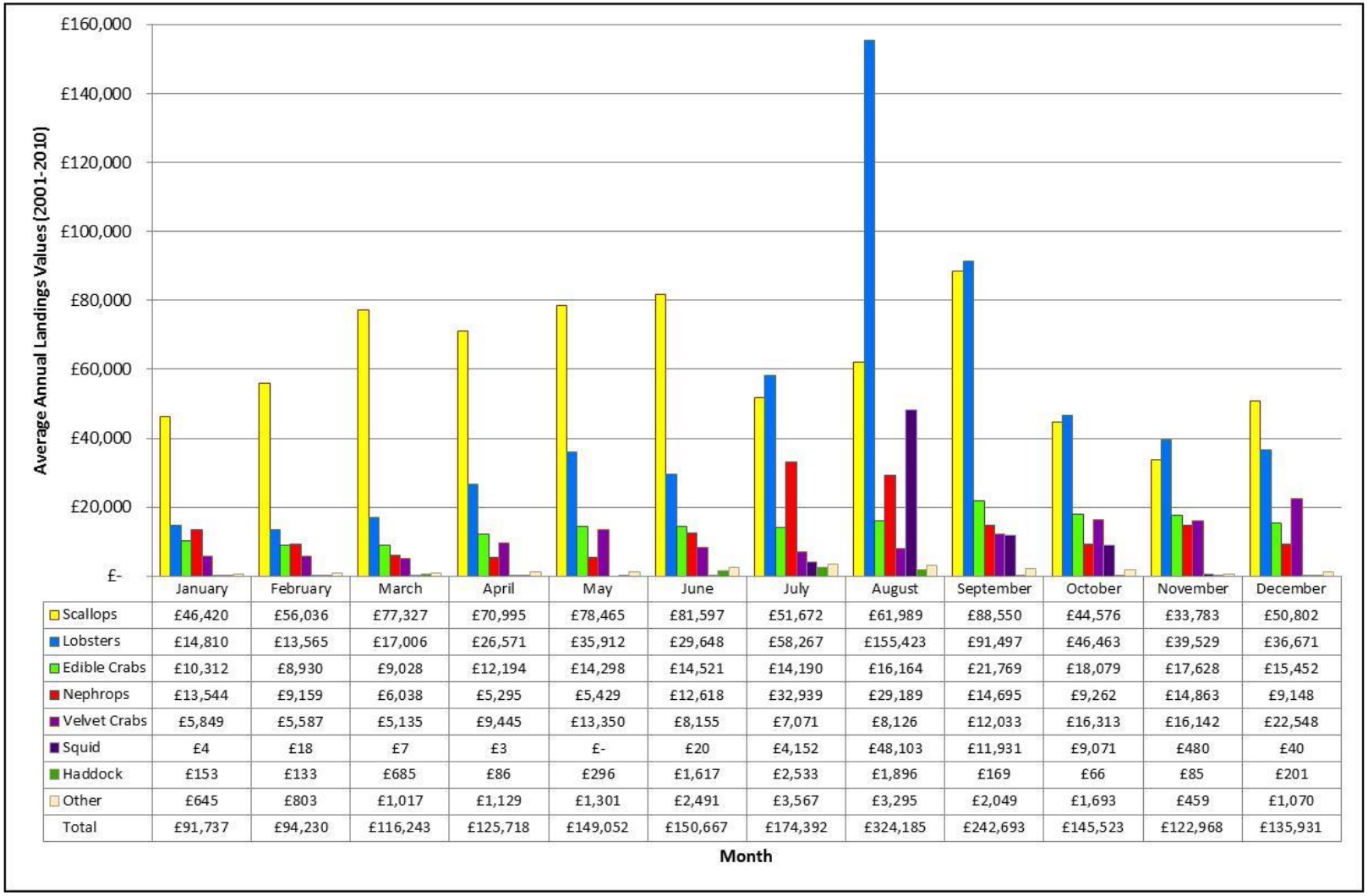


Figure 18A.25 Average Annual (2001 to 2010) Seasonality of Species in ICES Rectangle 42E7 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Scallops	£46,420	£56,036	£77,327	£70,995	£78,465	£81,597	£51,672	£61,989	£88,550	£44,576	£33,783	£50,802
Lobsters	£14,810	£13,565	£17,006	£26,571	£35,912	£29,648	£58,267	£155,423	£91,497	£46,463	£39,529	£36,671
Edible Crabs	£10,312	£8,930	£9,028	£12,194	£14,298	£14,521	£14,190	£16,164	£21,769	£18,079	£17,628	£15,452
Nephrops	£13,544	£9,159	£6,038	£5,295	£5,429	£12,618	£32,939	£29,189	£14,695	£9,262	£14,863	£9,148
Velvet Crabs	£5,849	£5,587	£5,135	£9,445	£13,350	£8,155	£7,071	£8,126	£12,033	£16,313	£16,142	£22,548
Squid	£4	£18	£7	£3	£-	£20	£4,152	£48,103	£11,931	£9,071	£480	£40
Haddock	£153	£133	£685	£86	£296	£1,617	£2,533	£1,896	£169	£66	£85	£201
Other	£645	£803	£1,017	£1,129	£1,301	£2,491	£3,567	£3,295	£2,049	£1,693	£459	£1,070
Total	£91,737	£94,230	£116,243	£125,718	£149,052	£150,667	£174,392	£324,185	£242,693	£145,523	£122,968	£135,931

Figure 18A.26 Average Annual (2001 to 2010) Seasonality of Scallops in ICES Rectangle 42E7 (Source: MMO)

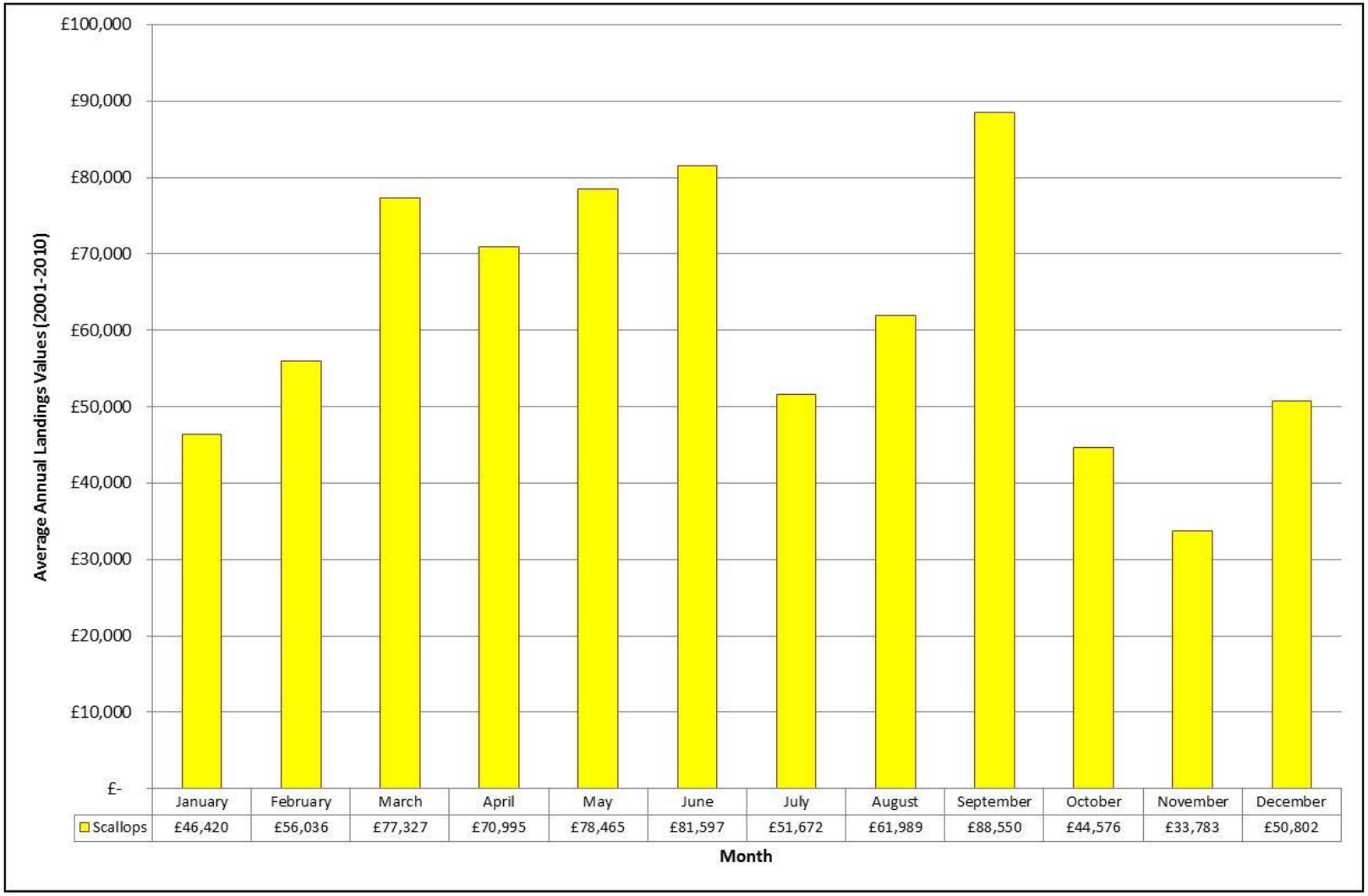


Figure 18A.27 Average Annual (2001 to 2010) Seasonality of Lobsters in ICES Rectangle 42E7 (Source: MMO)

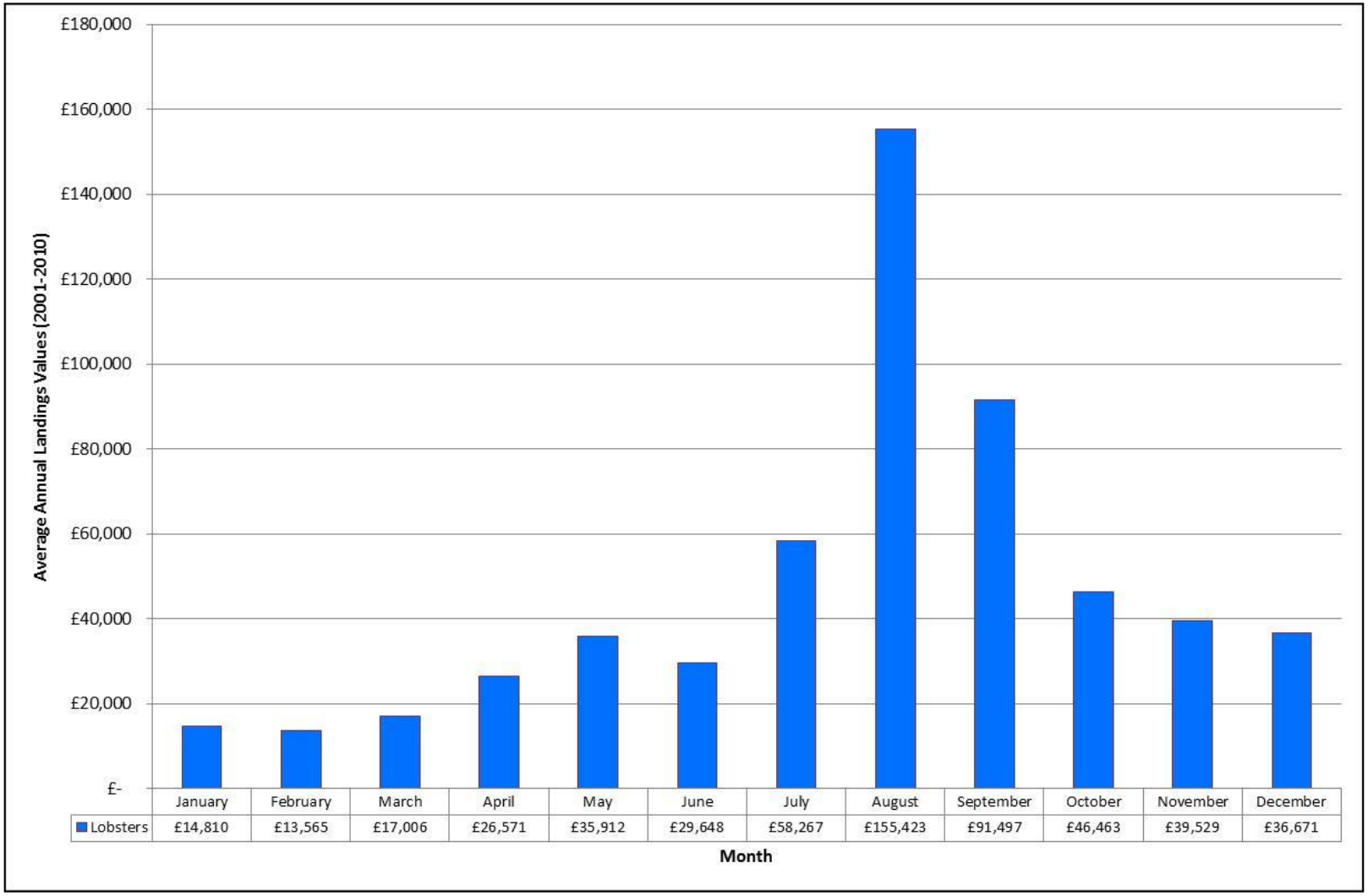


Figure 18A.28 Average Annual (2001 to 2010) Seasonality of Edible Crabs in ICES Rectangle 42E7 (Source: MMO)

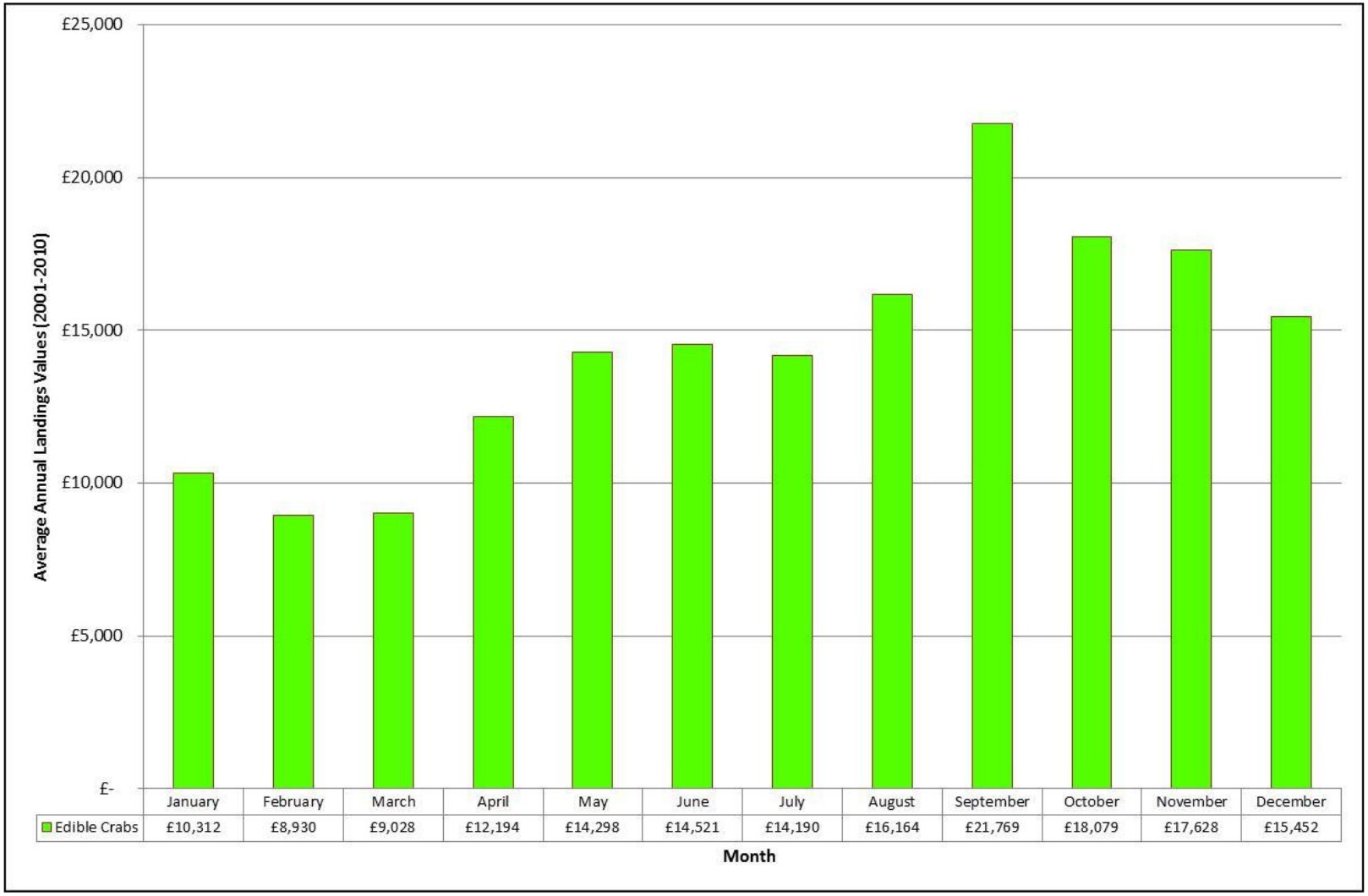
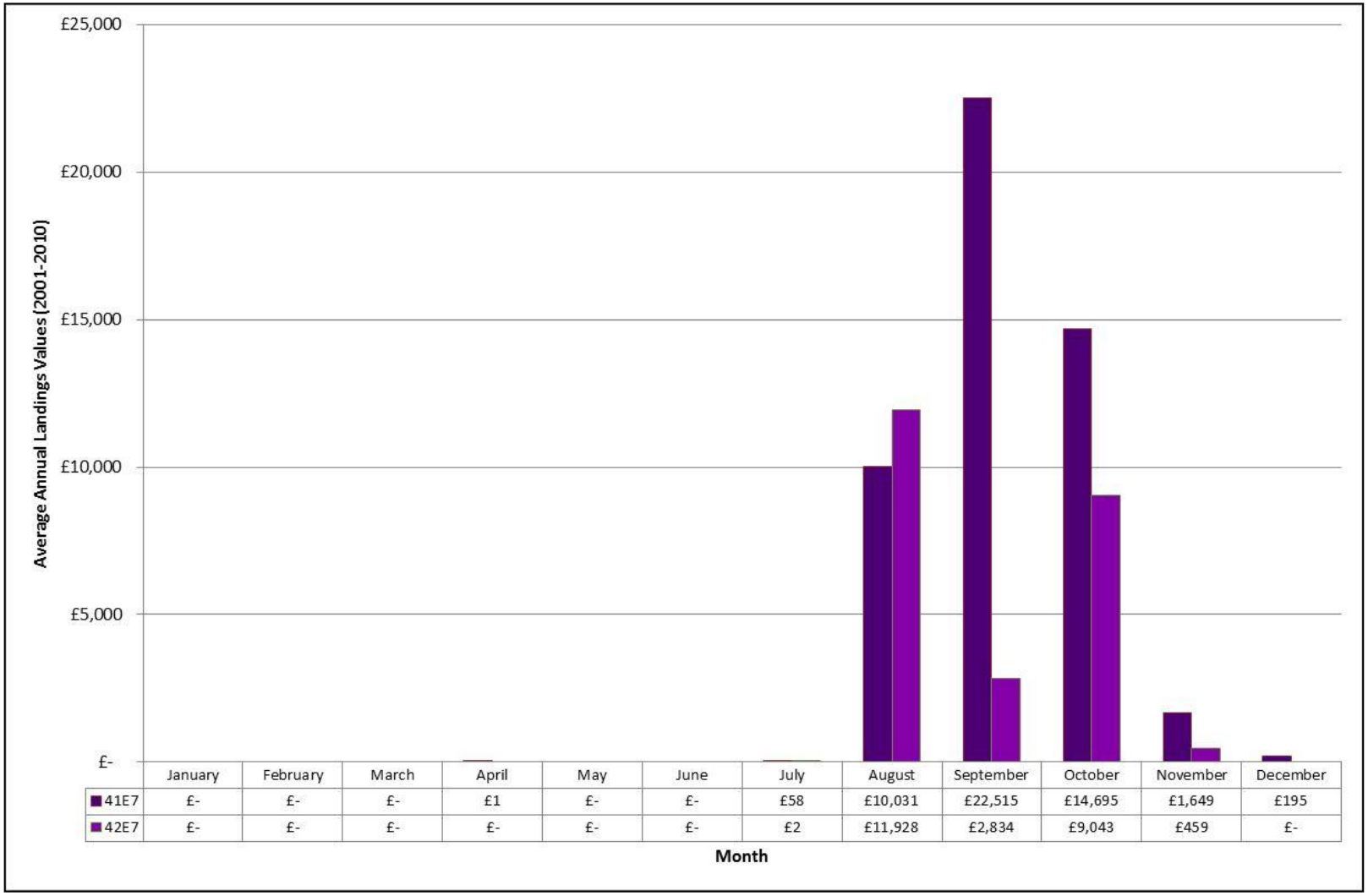


Figure 18A.29 Seasonality of Squid in ICES Rectangles 41E7 and 42E7 during 2010 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
41E7	£-	£-	£-	£1	£-	£-	£58	£10,031	£22,515	£14,695	£1,649	£195
42E7	£-	£-	£-	£-	£-	£-	£2	£11,928	£2,834	£9,043	£459	£-

18A.5.1.3.3 Landings Values by Port

Table 18A.3 and Table 18A.4 list the top 20 ports by landings values in 41E7 and 42E7, respectively, and the percentage of each port's total income that this represents (percentages have been rounded to the nearest one decimal place).

Table 18A.3 shows that the highest percentage of landings from 41E7 are into the port at Pittenweem (50.9%) which represents 95.4% of the port's total annual income. Dunbar recorded the second highest percentage of landings from 41E7 with 12.3% which represents 85.7% of the port's total annual income. The ports of Crail, Methil and Leven, St. Andrews, Anstruther, Granton, North Berwick, Cove, Burntisland, St. Monance, Newhaven and West Wemyss record lower percentages of the total landings values from 41E7 (5.8%, 5.0%, 2.8%, 2.6%, 0.9%, 0.9%, 0.7%, 0.7%, 0.7%, 0.4% and 0.1%, respectively) but landings from this rectangle contribute 99.6%, 95.8%, 99.1%, 99.5%, 77.6%, 87.1%, 52.4%, 68.1%, 74.4%, 63.3% and 100.0% of their total average annual values, respectively.

Table 18A.3 Top 20 Ports by Landings Values from ICES Rectangle 41E7 (Source: MMO)

Port	Average annual landings values (£) in the local study area	% of average annual values in the local study area	Total average annual port value	% of total average annual port value that the local study area represents
Pittenweem	£2,358,241	50.9%	£2,471,441	95.4%
Dunbar	£571,090	12.3%	£666,335	85.7%
Eyemouth	£320,798	6.9%	£3,525,875	9.1%
Crail	£268,241	5.8%	£269,437	99.6%
Methil and Leven	£232,361	5.0%	£242,488	95.8%
Aberdeen	£181,441	3.9%	£10,608,148	1.7%
St Andrews	£129,795	2.8%	£131,028	99.1%
Anstruther	£122,288	2.6%	£122,888	99.5%
Arbroath	£81,654	1.8%	£888,830	9.2%
Montrose	£45,054	1.0%	£283,802	15.9%
Granton	£42,893	0.9%	£55,275	77.6%
North Berwick	£42,617	0.9%	£48,905	87.1%
Port Seton	£36,729	0.8%	£756,326	4.9%
Cove	£33,470	0.7%	£63,917	52.4%
Peterhead	£32,964	0.7%	£92,541,652	0.0%
Burntisland	£32,161	0.7%	£47,200	68.1%
St Monance	£31,664	0.7%	£42,550	74.4%
Newhaven	£19,893	0.4%	£31,438	63.3%
Fraserburgh	£13,305	0.3%	£42,443,828	0.0%
West Wemyss	£6,202	0.1%	£6,202	100.0%

Table 18A.4 shows that the highest percentage of landings from 42E7 are into the port at Arbroath (32.5%) which represents 70.9% of the port's total annual income. Aberdeen records the second highest percentage of landings from 42E7 with 27.5%; however this only represents 4.9% of the port's total average annual values. The ports of Gourdon, Stonehaven, Johnshaven, Cove and Catterline however, record lower percentages of the total landings values from 42E7 (14.1%, 4.7%, 4.7%, 0.2% and 0.1%, respectively) but landings from this rectangle contribute 93.4%, 91.8%, 94.1%, 91.0% and 100.0% of their total average annual values, respectively.

Table 18A.4 Top 20 Ports by Landings Values from ICES Rectangle 42E7 (Source: MMO)

Port	Average annual landings values (£) in the local study area	% of average annual values in the local study area	Total average annual port value	% of total average annual port value that the local study area represents
Arbroath	£608,479	32.5%	£888,830	68.5%
Aberdeen	£515,983	27.5%	£10,608,148	4.9%
Gourdon	£265,035	14.1%	£283,613	93.4%
Montrose	£155,006	8.3%	£283,802	54.6%
Stonehaven	£88,773	4.7%	£96,687	91.8%
Johnshaven	£88,470	4.7%	£94,007	94.1%
Peterhead	£53,848	2.9%	£92,541,652	0.1%
Fraserburgh	£30,834	1.6%	£42,443,828	0.1%
Pittenweem	£19,385	1.0%	£2,471,441	0.8%
Buckie	£16,439	0.9%	£3,101,428	0.5%
Burntisland	£9,869	0.5%	£47,200	20.9%
Macduff	£6,385	0.3%	£1,383,240	0.5%
Eyemouth	£5,289	0.3%	£3,525,875	0.2%
Cove	£4,196	0.2%	£4,612	91.0%
Catterline	£1,746	0.1%	£1,746	100.0%
Scarborough	£908	0.0%	£2,133,562	0.0%
Wick	£724	0.0%	£1,316,196	0.1%
Tarbert	£348	0.0%	£2,184,913	0.0%
Granton	£344	0.0%	£55,275	0.6%
North Shields	£274	0.0%	£3,619,128	0.0%

18A.5.2 Effort (Days at Sea)

18A.5.2.1 Regional Study Area

Figure 18A.30 shows the average annual effort in the regional study area by fishing method. It can be seen that the pattern is similar to that described for the landings values: boat dredging is the principal activity in the northeast of the study area. Activity by demersal otter trawlers (including nephrops trawlers) is high in the southeast of the regional area. In coastal areas, potting constitutes the majority of fishing activity.

Figure 18A.31 shows the average annual effort in the regional area by vessel category. Again, it can be seen that the pattern is similar to that described for the landings values. Significantly higher effort days are recorded in the coastal rectangles, principally by the under-10 metre and 10 to 15 metre vessels. The over-15 metre fleet records the large majority of effort in offshore rectangles. Effort by the non-UK fleet is negligible.

Figure 18A.30 Effort (Days Fished) by Method (Average 2001-2010) in the Regional Study Area (Source: MMO)

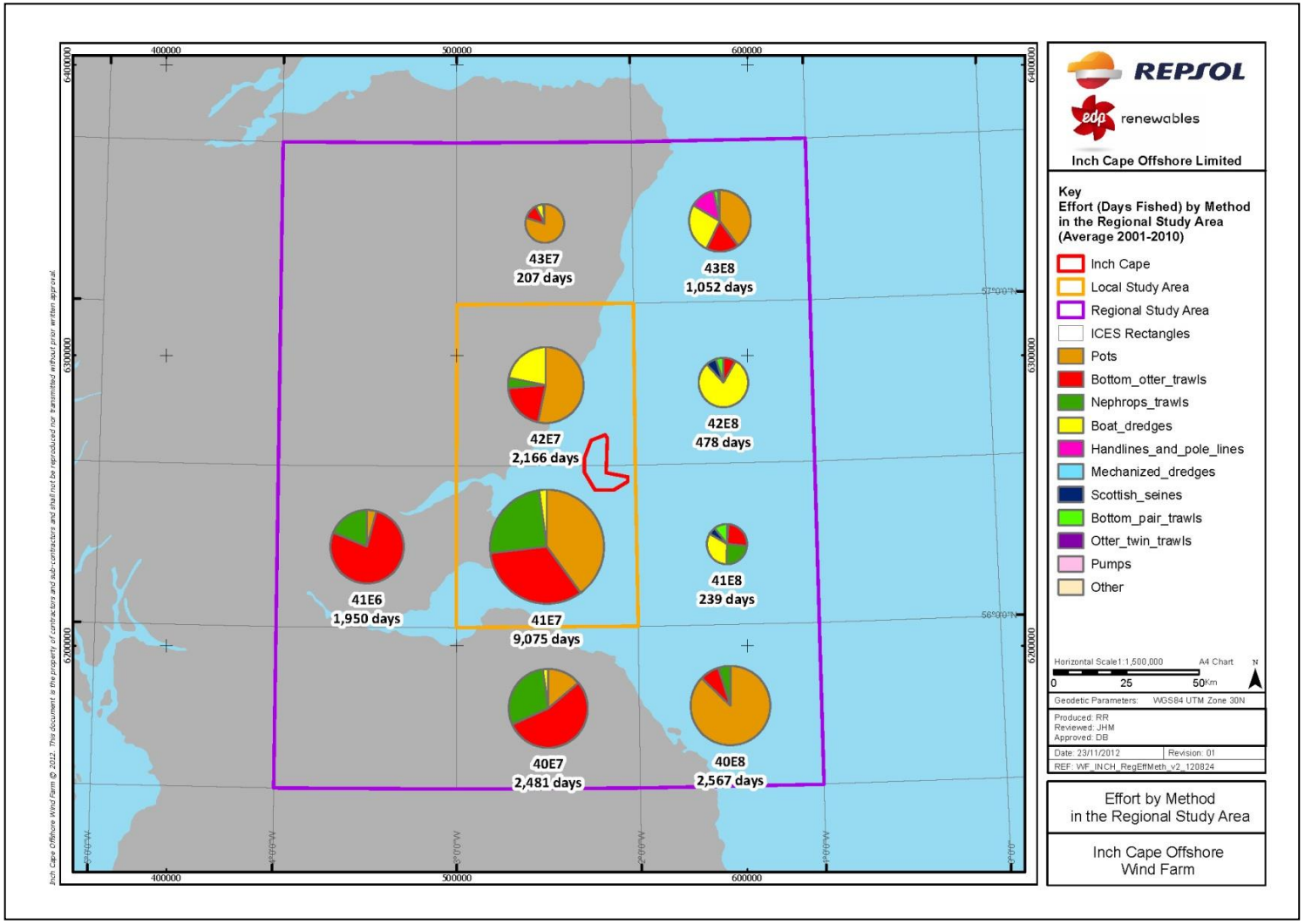
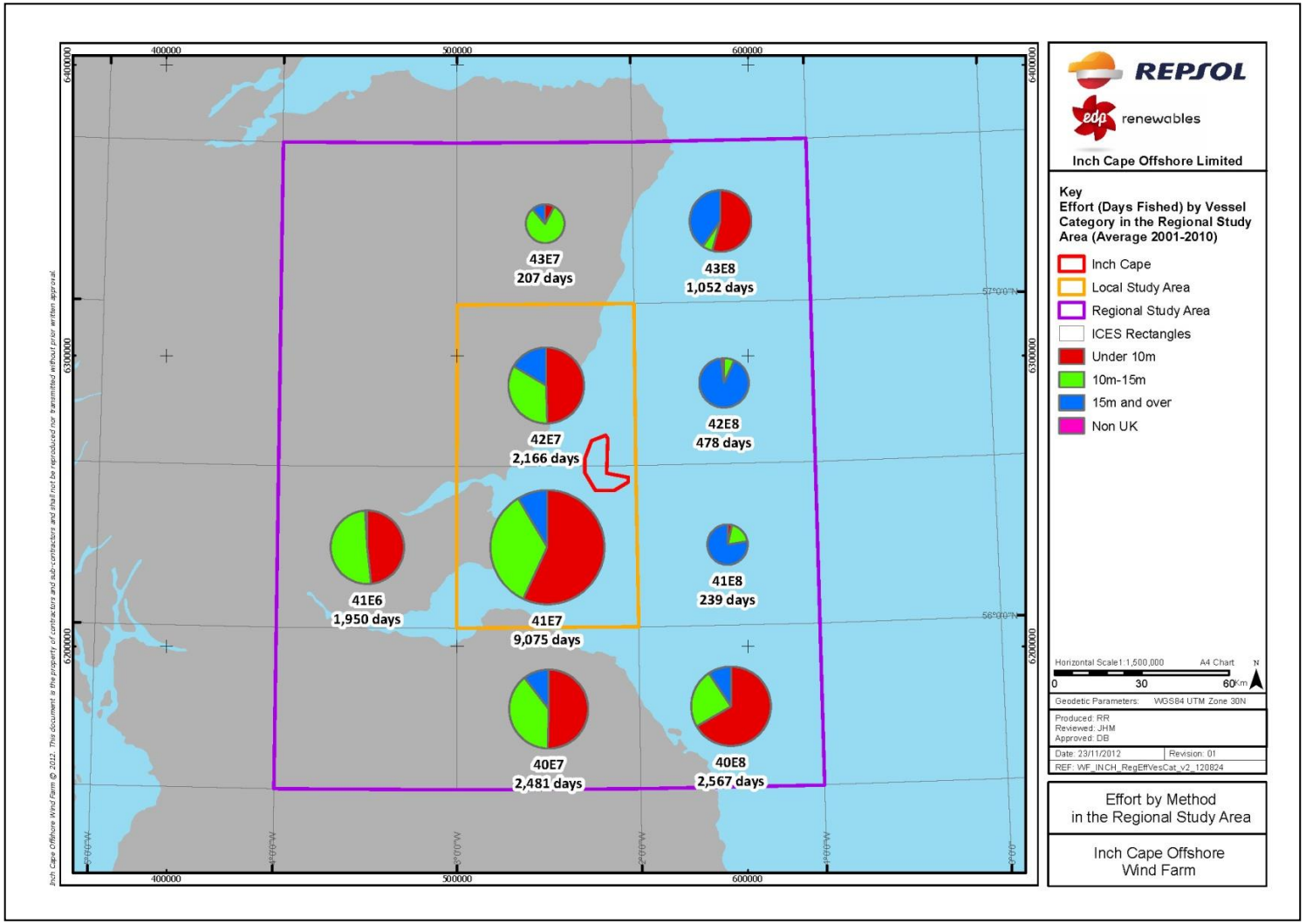


Figure 18A.31 Effort (Days Fished) by Vessel Category (Average 2001-2010) in the Regional Study Area (Source: MMO)



18A.5.2.2 Local Study Area (ICES Rectangles 41E7 and 42E7)

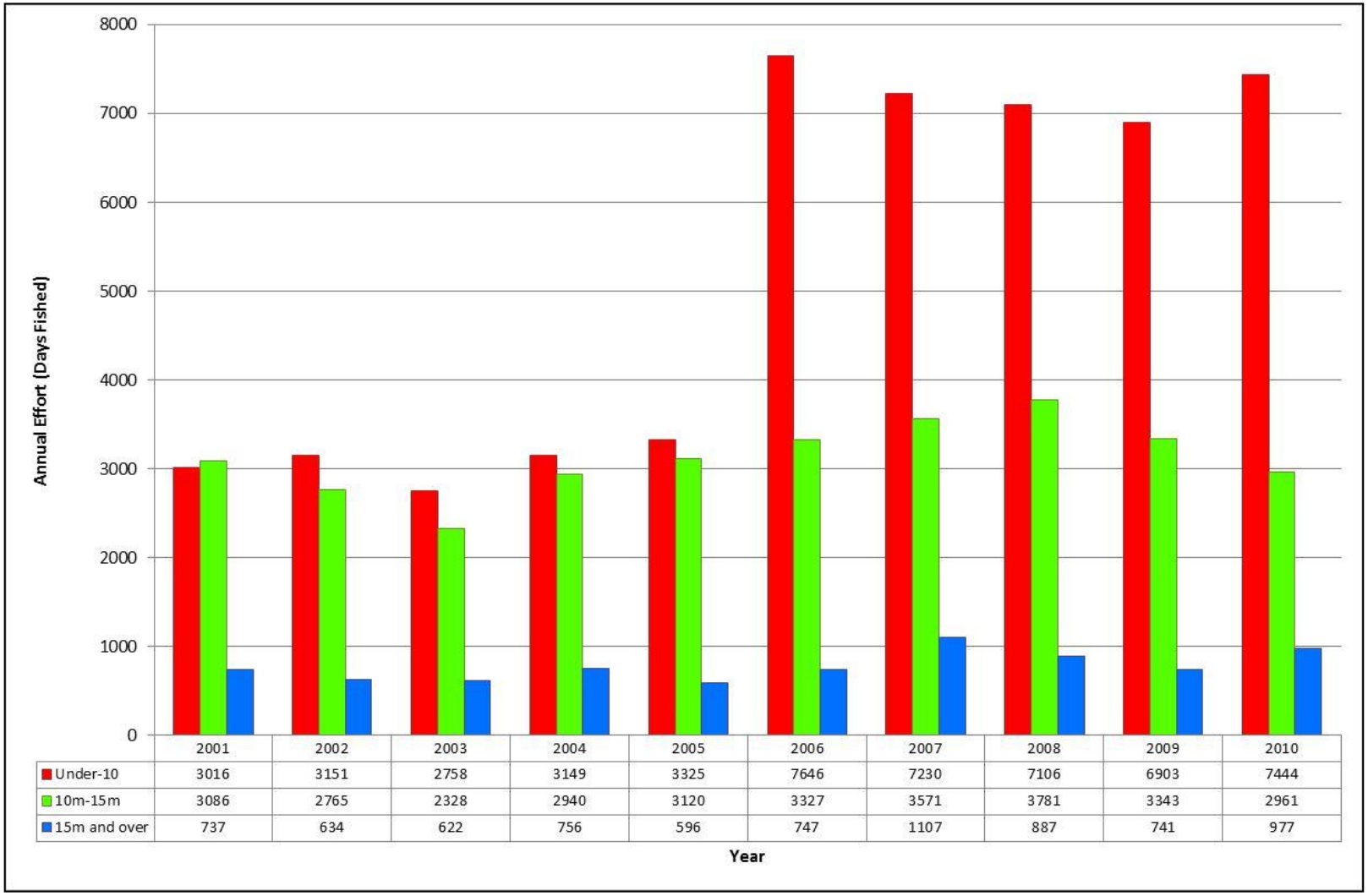
Figure 18A.32 and Figure 18A.33 show the annual variations in effort (days fished) in 41E7 and 42E7, respectively.

In rectangle 41E7 (Figure 18A.32), effort by the under-10 metre fleet has increased substantially in recent years, with an initial rise in effort in 2006 to 7646 days, likely as a result of regulations introduced to record landings for the under-10 metre fleet. Effort by the 10 to 15 metre fleet has remained relatively stable, and effort by the over-15 metre fleet has remained at lower levels than the other fleets.

In rectangle 42E7 (Figure 18A.33), effort by the under-10 metre fleet has increased substantially, with an initial rise in effort in 2006 to 1236 days, again likely as a result of introduced under-10 metre regulations; however this effort more than doubled in 2008 to 3512 days, declining again in 2009 to 1590 days. Effort by the 10 to 15 metre fleet has remained relatively stable, and effort by the over-15 metre fleet has remained at lower levels than the other sectors. Effort recorded by the non-UK fleet is negligible.

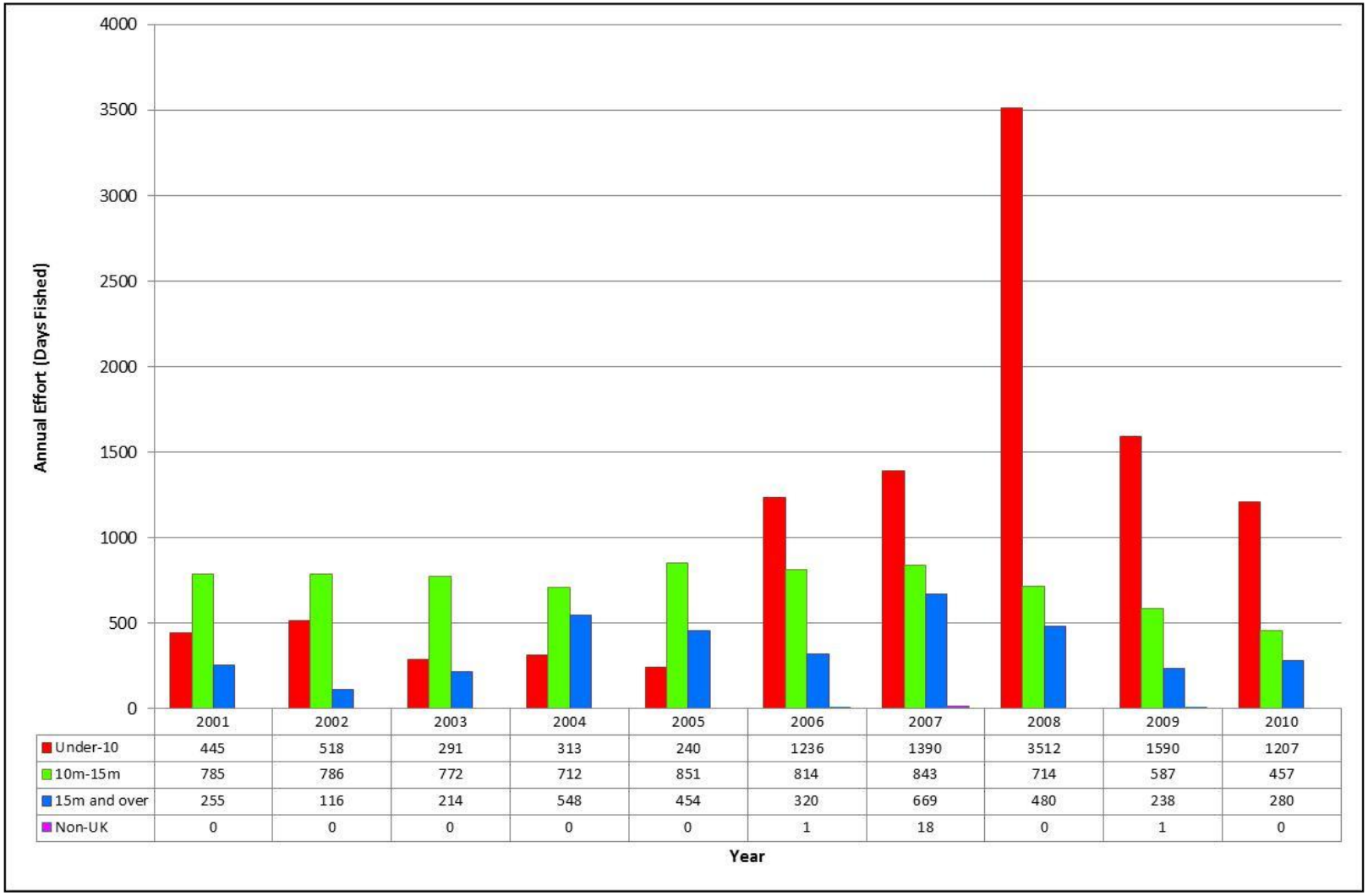
Figure 18A.34 and Figure 18A.35 illustrate the average annual seasonality of effort (days fished) in rectangles 41E7 and 42E7, respectively. The seasonality is similar to that demonstrated by the landings values data in Figure 18A.21 and Figure 18A.25. Rectangle 41E7 (Figure 18A.34) record effort peaks for all fleets between July and September, inclusive. Rectangle 42E7 (Figure 18A.35) recorded effort peaks between July and September, inclusive. Effort by the non-UK fleet is only recorded in the winter months (September to February, inclusive) although effort is comparatively lower.

Figure 18A.32 Annual Variations in Effort (Days Fished) by Vessel Category in ICES Rectangle 41E7 (Source: MMO)



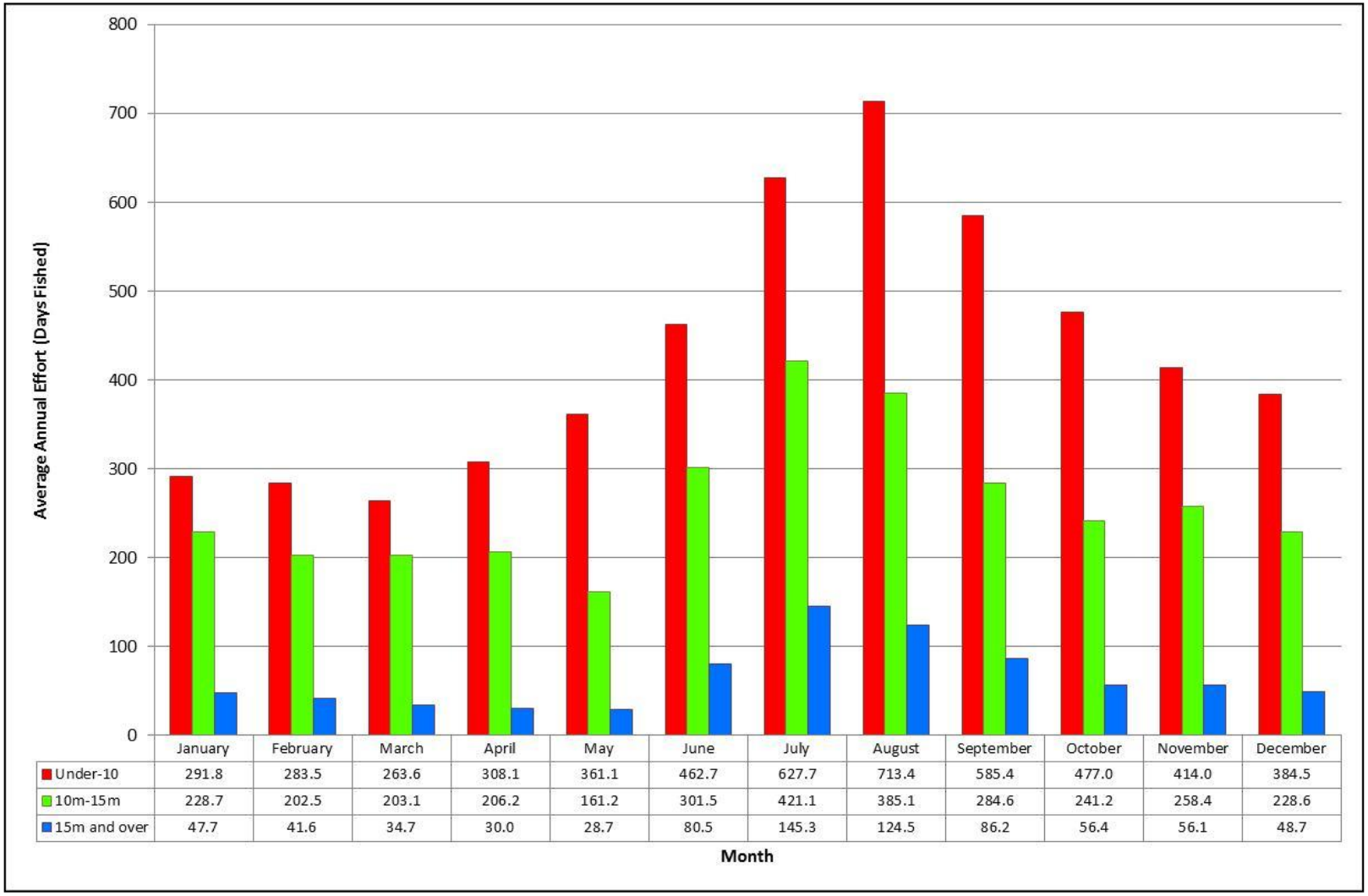
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Under-10	3016	3151	2758	3149	3325	7646	7230	7106	6903	7444
10m-15m	3086	2765	2328	2940	3120	3327	3571	3781	3343	2961
15m and over	737	634	622	756	596	747	1107	887	741	977

Figure 18A.33 Annual Variations in Effort (Days Fished) by Vessel Category in ICES Rectangle 42E7 (Source: MMO)



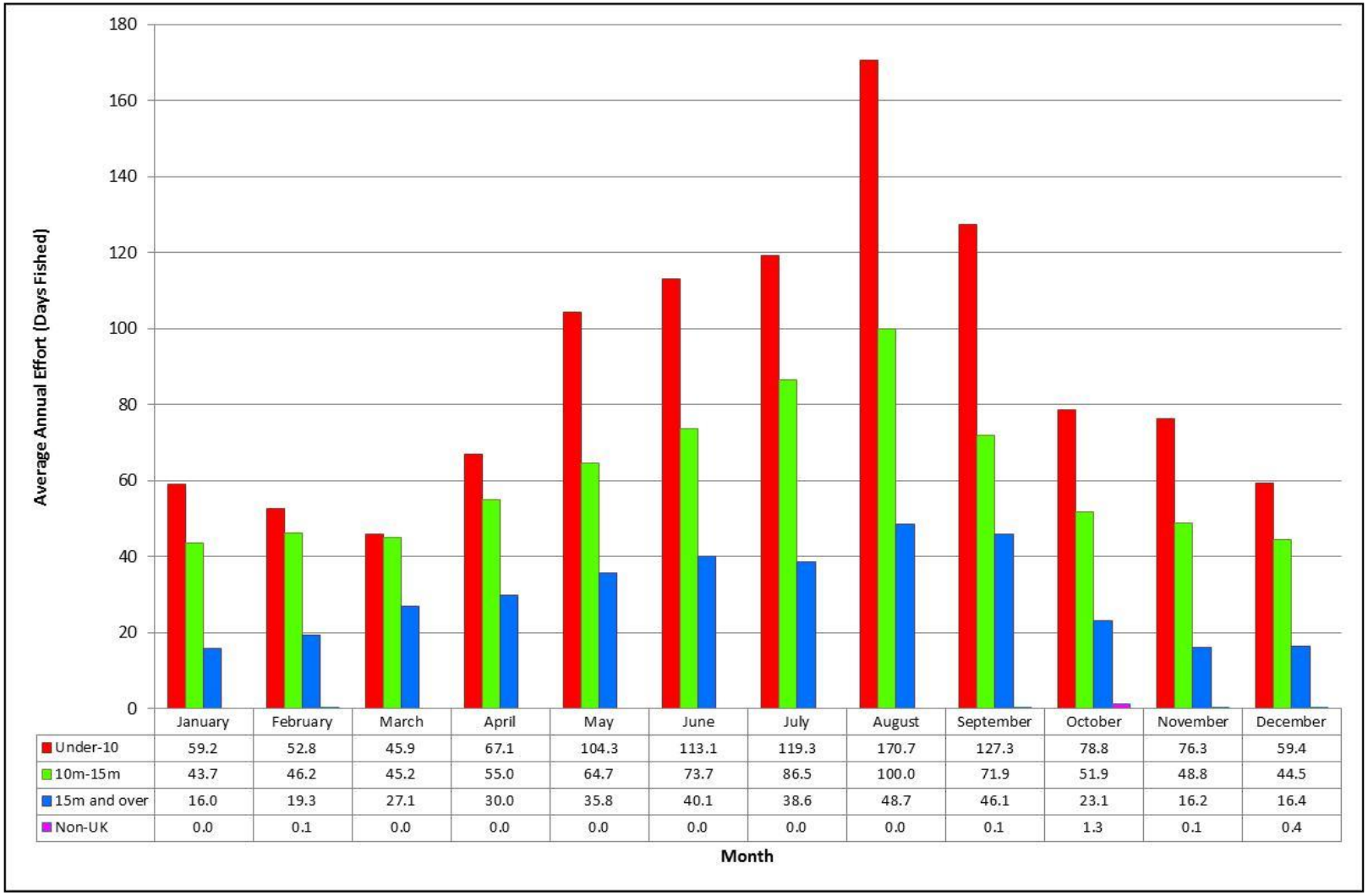
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Under-10	445	518	291	313	240	1236	1390	3512	1590	1207
10m-15m	785	786	772	712	851	814	843	714	587	457
15m and over	255	116	214	548	454	320	669	480	238	280
Non-UK	0	0	0	0	0	1	18	0	1	0

Figure 18A.34 Average Annual (2001 to 2010) Seasonality by Effort (Days Fished) and Vessel Category in ICES Rectangle 41E7 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Under-10	291.8	283.5	263.6	308.1	361.1	462.7	627.7	713.4	585.4	477.0	414.0	384.5
10m-15m	228.7	202.5	203.1	206.2	161.2	301.5	421.1	385.1	284.6	241.2	258.4	228.6
15m and over	47.7	41.6	34.7	30.0	28.7	80.5	145.3	124.5	86.2	56.4	56.1	48.7

Figure 18A.35 Average Annual (2001 to 2010) Seasonality by Effort (Days Fished) and Vessel Category in ICES Rectangle 42E7 (Source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Under-10	59.2	52.8	45.9	67.1	104.3	113.1	119.3	170.7	127.3	78.8	76.3	59.4
10m-15m	43.7	46.2	45.2	55.0	64.7	73.7	86.5	100.0	71.9	51.9	48.8	44.5
15m and over	16.0	19.3	27.1	30.0	35.8	40.1	38.6	48.7	46.1	23.1	16.2	16.4
Non-UK	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	0.1	0.4

Table 18A.5 and Table 18A.6 list the top 20 ports by the effort recorded in rectangle 41E7 and 42E7, respectively, and the percentage of the ports' total effort this represents. As you could expect, the data demonstrates similar patterns to the landings values data.

In rectangle 41E7 (Table 18A.5) the highest percentage of effort is recorded by vessels landing into Pittenweem (50.4%); representing 96.3% of the port's total average effort. Vessels landing into the ports of Dunbar, Crail, Methil and Leven, Anstruther, St. Andrews, St. Monance, Burntisland, North Berwick, Granton, Kirkcaldy, West Wemyss and Elie however, contribute lower percentages of the effort in 41E7 (10.9%, 9.5%, 6.9%, 4.8%, 3.5%, 2.1%, 1.3%, 1.0%, 0.2% and 0.2%, respectively), but the effort recorded by these vessels represents 81.4%, 99.7%, 98.0%, 99.7%, 99.5%, 96.8%, 79.7%, 90.6%, 88.6%, 100%, 100% and 100% of the ports' total average effort, respectively.

Table 18A.5 Top 20 Ports by Effort (Days Fished) in ICES Rectangle 41E7 (Source: MMO)

Port	Average annual effort (days fished) in the local study area	% of average annual effort in the local study area	Total average annual port effort (days fished)	% of total average annual port effort that the local study area represents
Pittenweem	4578.5	50.4%	4755.0	96.3%
Dunbar	989	10.9%	1215.7	81.4%
Crail	862.5	9.5%	865.5	99.7%
Methil and Leven	627.7	6.9%	640.8	98.0%
Anstruther	435.9	4.8%	437.4	99.7%
Eyemouth	415	4.6%	3689.1	11.2%
St Andrews	321.6	3.5%	323.1	99.5%
St Monance	187.1	2.1%	193.2	96.8%
Burntisland	119.9	1.3%	150.4	79.7%
Arbroath	92.2	1.0%	1009.1	9.1%
North Berwick	89.9	1.0%	99.2	90.6%
Port Seton	79.2	0.9%	1960.1	4.0%
Aberdeen	77.1	0.8%	4181.4	1.8%
Granton	46.6	0.5%	52.6	88.6%
Cove	23.9	0.3%	78.3	30.5%
Kirkcaldy	19.9	0.2%	19.9	100.0%
Montrose	17.6	0.2%	208.6	8.4%
Peterhead	15.4	0.2%	14764.9	0.1%
West Wemyss	15	0.2%	15.0	100.0%
Elie	13.7	0.2%	13.7	100.0%

In rectangle 42E7 (Table 18A.6) the highest percentage of effort is recorded by vessels landing into Arbroath (34.2%) and this represents 73.4% of the port's total average effort. Vessel landings into the ports of Gourdon, Stonehaven, Montrose, Johnshaven, Cove and Catterline however, contribute lower percentages of the effort in 42E7 (26.7%, 8.4%, 7.1%, 4.8%, 0.8% and 0.3%, respectively), but the effort recorded by these vessels represents 94.7%, 89.1%, 73.9%, 93.9%, 91.5% and 100.0% of the ports' total average effort, respectively.

Table 18A.6 Top 20 Ports by Effort (Days Fished) in ICES Rectangle 42E7 (Source: MMO)

Port	Average annual effort (days fished) in the local study area	% of average annual effort in the local study area	Total average annual port effort (days fished)	% of total average annual port effort that the local study area represents
Arbroath	740.6	34.2%	1009.1	73.4%
Gourdon	577.6	26.7%	610.2	94.7%
Aberdeen	270.1	12.5%	4181.4	6.5%
Stonehaven	181.0	8.4%	203.1	89.1%
Montrose	154.2	7.1%	208.6	73.9%
Johnshaven	104.7	4.8%	111.5	93.9%
Peterhead	27.3	1.3%	14764.9	0.2%
Pittenweem	24.9	1.1%	4755.0	0.5%
Burntisland	20.3	0.9%	150.4	13.5%
Fraserburgh	19.9	0.9%	17537.2	0.1%
Cove	17.3	0.8%	18.9	91.5%
Buckie	8.9	0.4%	2692.6	0.3%
Catterline	6.9	0.3%	6.9	100.0%
Eyemouth	4.8	0.2%	3689.1	0.1%
Macduff	3.1	0.1%	927.8	0.3%
Tarbert	1.1	0.1%	2857.5	0.0%
Scarborough	0.5	0.0%	3988.6	0.0%
North Shields	0.4	0.0%	4202.5	0.0%
Port Seton	0.4	0.0%	1960.1	0.0%
Tayvallich	0.3	0.0%	419.5	0.1%

Table 18A.7 and Table 18A.8 list the effort recorded in 41E7 and 42E7, respectively, by each vessel category form each port over a ten year period.

In rectangle 41E7 (Table 18A.7) on average, the under-10 metre fleet contributes the most effort, followed by the 10 to 15 metre fleet. The majority of this effort is recorded by vessels landing into Pittenweem. The over-15 metre fleet contributes moderate effort to the landings from 41E7, the majority of which is by vessels landing into Pittenweem and Eyemouth.

Table 18A.7 Annual Effort (Days Fished) by Port and Vessel Category in ICES Rectangle 41E7 (Source: MMO)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10 Yr Avg
Under 10 m											
Pittenweem	1569	1447	1070	1511	1670	2210	2786	2445	2615	2637	**1996.0**
Crail	397	587	730	442	417	1274	1277	1234	1036	1228	**862.2**
Methil and Leven	490	466	309	401	572	831	709	705	725	619	**582.7**
Dunbar	298	477	303	263	154	1451	556	463	397	420	**478.2**
St Andrews	3	18	87	164	174	444	565	612	601	545	**321.3**
Anstruther	227	122	73	144	109	325	379	560	591	560	**309.0**
St Monance	12	8	58	144	115	249	365	301	254	364	**187.0**
Burntisland	12	12	3	42	54	200	246	211	159	185	**112.4**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10 Yr Avg
North Berwick	0	0	0	0	0	427	121	149	85	117	**89.9**
Arbroath	0	7	114	19	14	11	3	143	1	276	**58.8**
Other Ports	8	7	11	19	46	224	223	283	439	493	**175.3**
Total	**3016**	**3151**	**2758**	**3149**	**3325**	**7646**	**7230**	**7106**	**6903**	**7444**	**5172.8**
10 m-15 m											
Pittenweem	2411	2121	1578	1962	1926	2067	2472	2430	2332	2065	**2136.4**
Dunbar	372	363	375	397	496	676	527	610	633	578	**502.7**
Eyemouth	53	72	113	311	397	361	286	369	119	158	**223.9**
Anstruther	138	148	153	176	140	163	166	124	59	0	**126.7**
Port Seton	42	7	74	86	107	29	53	99	40	45	**58.2**
Methil and Leven	18	23	15	0	19	10	0	57	139	54	**33.5**
Arbroath	12	9	8	0	3	3	35	21	1	6	**9.8**
Aberdeen	10	0	0	0	1	4	0	49	2	0	**6.6**
Burntisland	0	0	0	0	0	6	16	10	0	8	**4.0**
Montrose	9	4	0	0	4	0	2	0	0	19	**3.8**
Other Ports	21	18	12	8	27	8	14	12	18	28	**16.6**
Total	**3086**	**2765**	**2328**	**2940**	**3120**	**3327**	**3571**	**3781**	**3343**	**2961**	**3122.2**
15 m and over											
Pittenweem	485	402	403	526	496	567	506	405	385	286	**446.1**
Eyemouth	183	146	164	117	53	88	195	292	150	381	**176.9**
Aberdeen	7	19	4	27	21	62	239	96	121	81	**67.7**
Arbroath	22	38	11	16	15	8	27	40	33	26	**23.6**
Peterhead	1	3	1	17	5	7	41	8	13	51	**14.7**
Montrose	0	4	0	12	4	5	68	6	0	34	**13.3**
Methil and Leven	26	19	36	34	0	0	0	0	0	0	**11.5**
Dunbar	4	0	0	0	0	0	0	9	11	57	**8.1**
Fraserburgh	0	0	0	3	1	5	17	14	2	14	**5.6**
Port Seton	2	0	0	0	0	0	2	11	5	17	**3.7**
Other Ports	7	3	3	4	1	5	12	6	21	30	**9.2**
Total	**737**	**634**	**622**	**756**	**596**	**747**	**1107**	**887**	**741**	**977**	**780.4**
Grand Total	**6839**	**6550**	**5708**	**6845**	**7041**	**11720**	**11908**	**11774**	**10987**	**11382**	**9075.4**

In rectangle 42E7 (Table 18A.8) on average, the under-10 metre fleet contributes the most effort, followed by the 10 to 15 metre fleet. The majority of this effort is recorded by vessels landing into Arbroath and Gourdon. The over-15 metre fleet contributes moderate effort to the landings from 42E7, the majority of which is by vessels landing into Aberdeen. Non-UK vessels contribute negligible effort.

Table 18A.8 Annual Effort (Days Fished) by Port and Vessel Category in ICES Rectangle 42E7

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10 Yr Avg
Under 10 m											
Arbroath	299	414	208	206	105	426	398	1381	567	390	**439.4**
Gourdon	56	46	34	37	42	338	400	668	416	361	**239.8**
Stonehaven	36	31	37	39	37	162	176	499	195	103	**131.5**
Johnshaven	18	9	0	0	0	201	149	440	132	98	**104.7**
Montrose	26	6	1	0	7	51	106	224	183	127	**73.1**
Aberdeen	6	6	5	28	39	57	107	100	53	78	**47.9**
Cove	0	0	0	0	0	0	0	109	27	37	**17.3**
Catterline	4	5	6	3	4	0	24	22	0	0	**6.8**
Pittenweem	0	1	0	0	0	0	27	15	5	9	**5.7**
Burntisland	0	0	0	0	0	0	0	43	11	1	**5.5**
Other Ports	0	0	0	0	6	1	3	11	1	3	**2.5**
Total	**445**	**518**	**291**	**313**	**240**	**1236**	**1390**	**3512**	**1590**	**1207**	**1074.2**
10 m-15 m											
Gourdon	246	272	281	308	353	457	431	365	365	295	**337.3**
Arbroath	346	322	357	305	334	224	262	249	4	5	**240.8**
Montrose	76	50	71	54	28	70	75	19	59	40	**54.2**
Stonehaven	100	115	50	36	36	10	3	15	73	57	**49.5**
Pittenweem	7	27	6	0	22	4	18	21	44	22	**17.1**
Aberdeen	10	0	5	9	65	23	17	2	13	8	**15.2**
Burntisland	0	0	0	0	0	9	35	42	26	0	**11.2**
Fraserburgh	0	0	0	0	6	13	0	0	0	7	**2.6**
Eyemouth	0	0	0	0	1	0	0	0	0	17	**1.8**
Peterhead	0	0	0	0	4	3	0	0	3	0	**1.0**
Other Ports	0	0	2	0	2	1	2	1	0	6	**1.4**
Total	**785**	**786**	**772**	**712**	**851**	**814**	**843**	**714**	**587**	**457**	**732.1**
15 m and over											
Aberdeen	48	20	93	376	209	211	463	378	137	116	**205.1**
Arbroath	174	78	101	63	56	28	29	30	14	31	**60.4**
Montrose	1	0	0	35	62	31	77	21	11	31	**26.9**
Peterhead	22	9	9	46	57	19	33	25	20	23	**26.3**
Fraserburgh	3	9	6	11	24	12	31	6	8	53	**16.3**
Buckie	1	0	4	1	42	8	6	4	3	15	**8.4**
Burntisland	0	0	0	0	0	0	0	0	36	0	**3.6**
Macduff	6	0	0	16	3	3	2	0	0	0	**3.0**
Eyemouth	0	0	0	0	0	2	18	1	3	6	**3.0**
Pittenweem	0	0	0	0	0	0	0	13	5	3	**2.1**
Other Ports	0	0	1	0	1	6	10	2	1	2	**2.3**
Total	**255**	**116**	**214**	**548**	**454**	**320**	**669**	**480**	**238**	**280**	**357.4**
Non-UK											
Aberdeen	0	0	0	0	0	0	18	0	1	0	**1.9**
Buckie	0	0	0	0	0	1	0	0	0	0	**0.1**
Total	**0**	**0**	**0**	**0**	**0**	**1**	**18**	**0**	**1**	**0**	**2.0**
Grand Total	**1485**	**1420**	**1277**	**1573**	**1545**	**2371**	**2920**	**4706**	**2416**	**1944**	**2165.7**

18A.6 MMO Fisheries Surveillance Sightings Data

Figure 18A.36 and Figure 18A.37 below give the positions of vessels identified by fisheries surveillance officers in the regional study area, by method and nationality, respectively. Vessels of all lengths and nationalities are recorded.

Sightings broadly corroborate the analysis of the MMO data sets and satellite (VMS) densities: they are concentrated in inshore areas, with fewer vessels sighted further offshore. Scallop dredgers (yellow dots) are sighted in areas to the north, including within the site, and trawlers (blue and green dots) are concentrated in the southwest of the Forth and Tay area and fewer vessels are sighted along coastal areas to the northwest and southeast. In addition, the sightings show potting activity (red dots) in coastal areas.

The large majority of the vessels sighted within the regional study area are UK vessels; these vessels have been sighted throughout the regional study area, but are concentrated in inshore areas. Over the ten-year period approximately 70 vessels have been sighted inside the development, all of which have been UK registered. These vessels were recorded as being scallop dredgers (39), followed by potters/whelkers (23) and demersal trawlers (8).

There are a number of vessels from Denmark sighted in offshore areas to the southeast of the regional study area. Vessels from the Netherlands have been sighted to the northeast of the development area. As mentioned previously (*Section 18A.4.2*), there are no non-UK historic fishing rights within the 12 nm limit and therefore there will be no non-UK vessels fishing within the development.

Figure 18A.36 Surveillance Sightings (2001-2010) by Method in the Regional Study Area (Source: MMO)

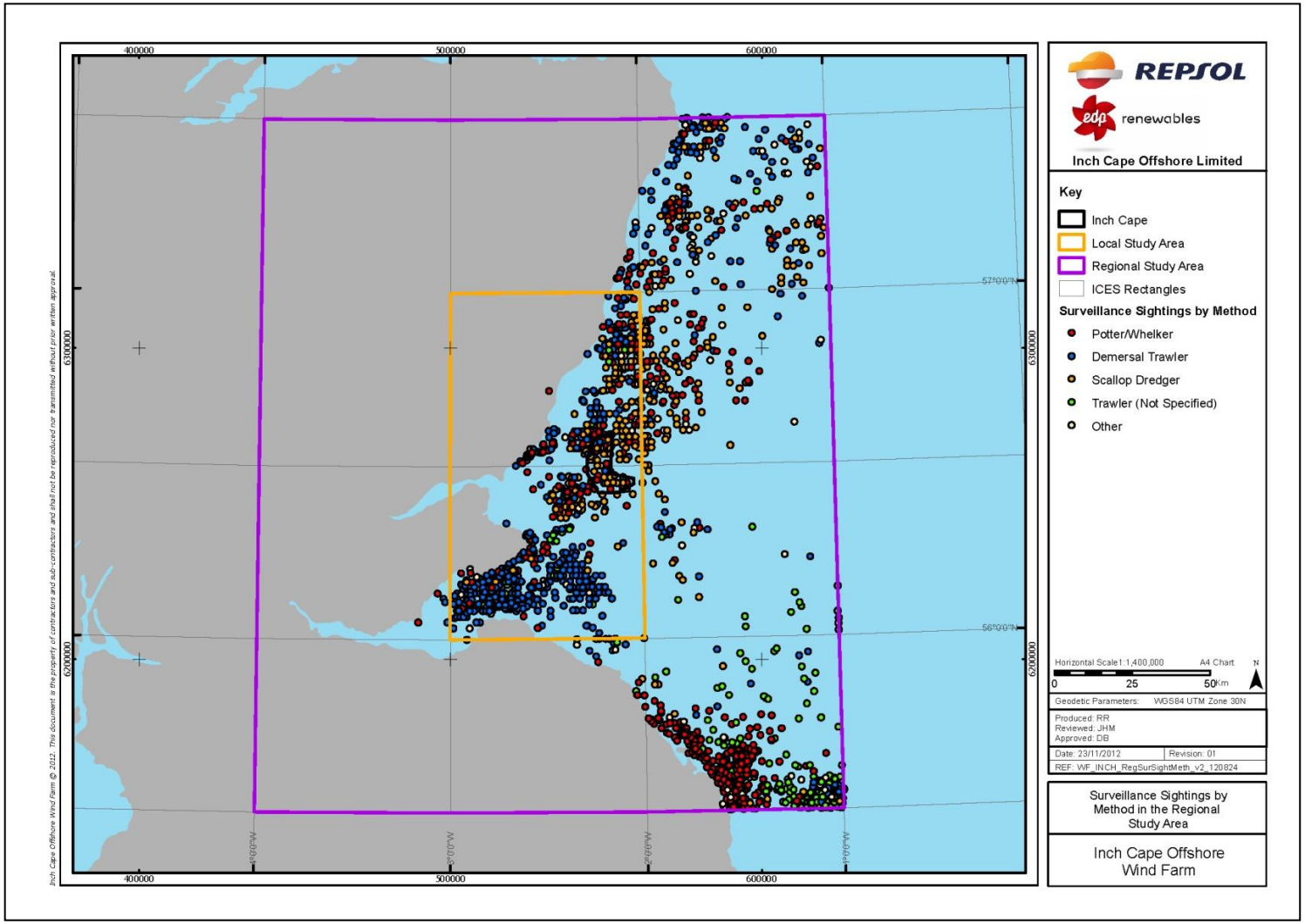
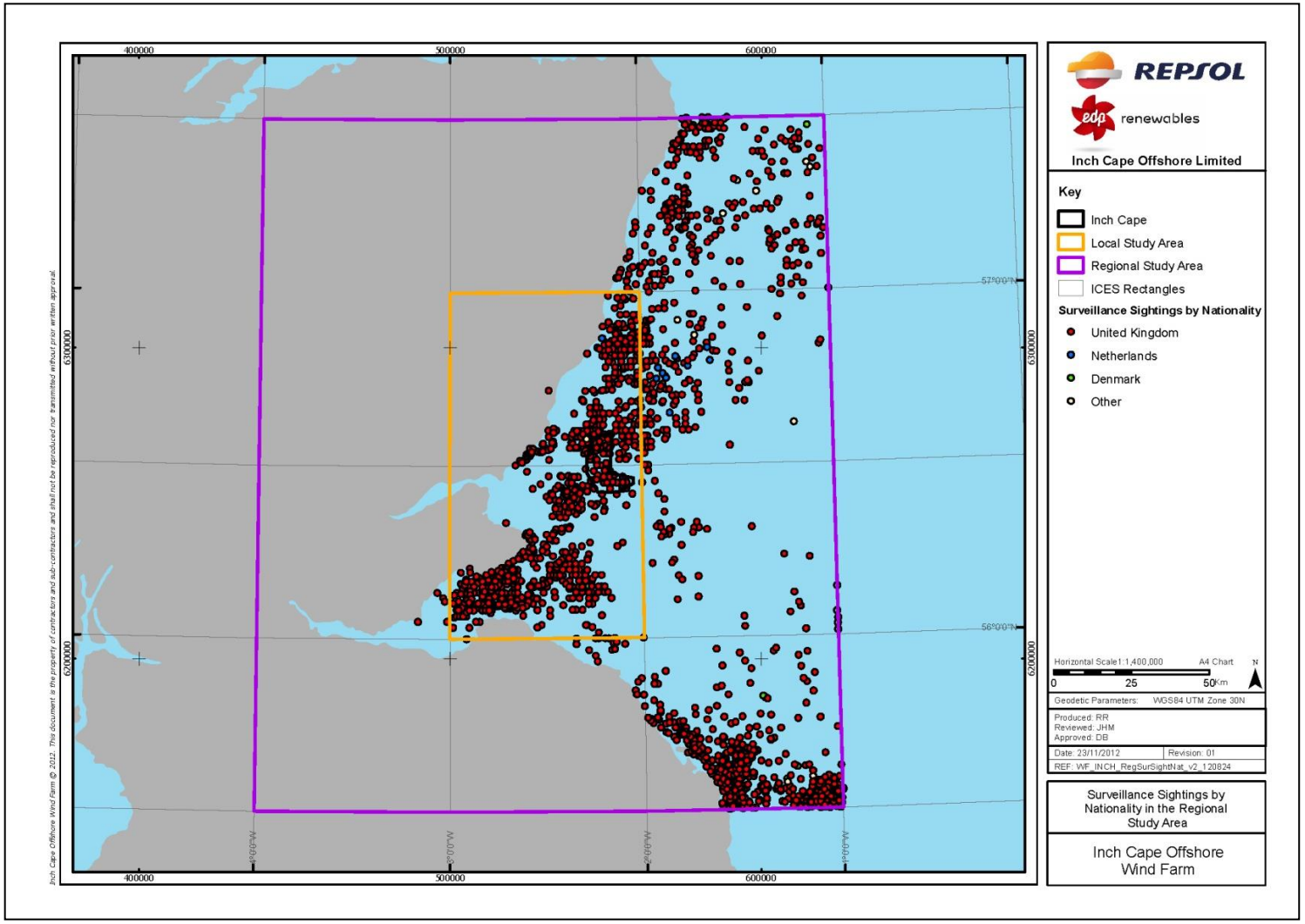


Figure 18A.37 Surveillance Sightings (2001-2010) by Nationality in the Regional Study Area (Source: MMO)



18A.7 MMO UK Satellite Tracking (VMS) Data

UK satellite data were obtained from the MMO and Marine Scotland in comma separated variable (CSV) format. The 2007 to 2010 data is not broken down by method due to concerns over data protection and has been cross-referenced with the landings and effort data to provide values in a 0.05° by 0.05° grid format. The 2009 data, as a result of restrictions on the release of data, have been provided as counts within one sixteenth of an ICES rectangle.

Due to the differences in data provided for satellite tracked vessels in 2009 (discussed in *Section 18A.3.1*); *Section 18A.7.2.2* separately discusses the activity for this period.

As mentioned previously, satellite data is only indicative of the activity of vessels over-15 metres in length. Analysis of landings and effort data has demonstrated that the majority of activity in rectangles 41E7 and 42E7 is by vessels under-15 metres which will not be represented in this data set. Despite this a significant proportion of vessels in rectangle 41E7 are over-15 metres in length and therefore the data presented below will be representative of the activity of these vessels.

18A.7.1 National Overview

Figure 18A.38 and Figure 18A.39 show the average satellite (VMS) density by value, respectively, of all UK vessels over-15 metres (2007 to 2010) within the national study area. The areas of the highest density are concentrated along the west coast and offshore in the northeast. The Forth and Tay area records a moderate level of patchy activity in terms of value. There are two patches of activity in the Forth and Tay which record high levels of effort (days fished).

Figure 18A.38 VMS Density by Value (Average 2007-2010) in the National Study Area (Source: MMO)

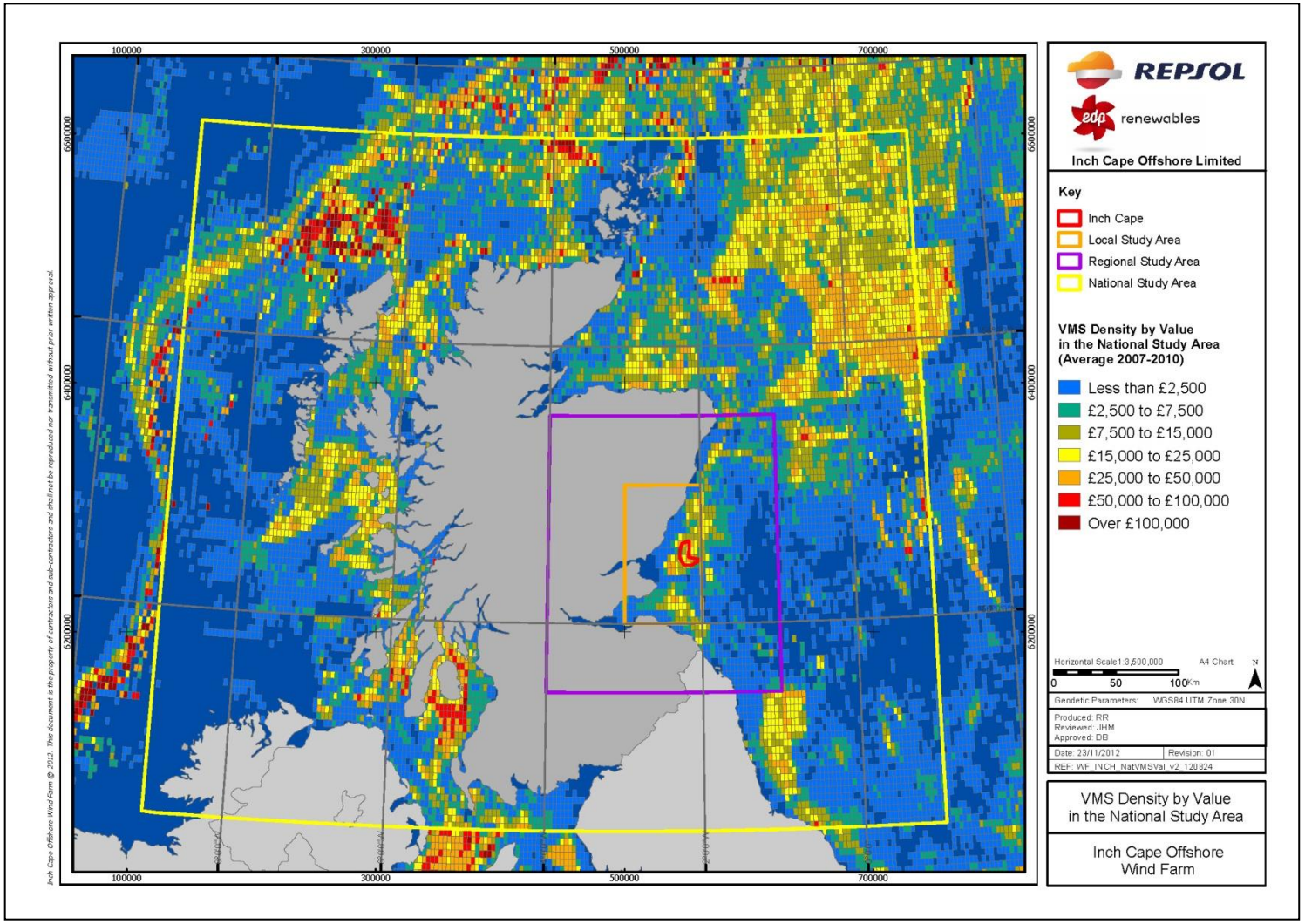
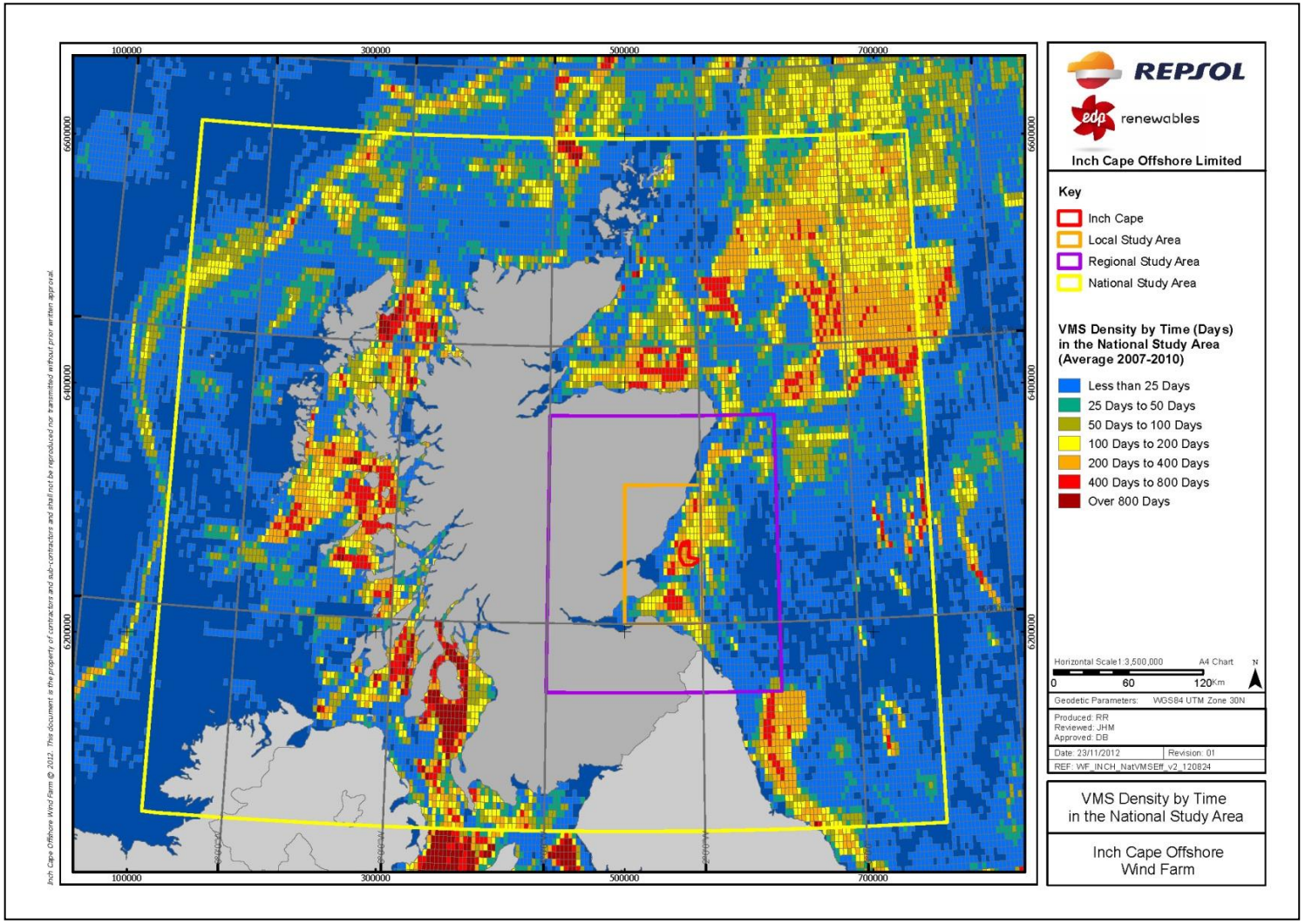


Figure 18A.39 VMS Density by Time (Days; Average 2007-2010) in the National Study Area (Source: MMO)



18A.7.2 Regional Overview

18A.7.2.1 2007 to 2010 Data

Figure 18A.40 and Figure 18A.41 show the average satellite (VMS) density by value and time (days), respectively, of all UK vessels over-15 metres (2007 to 2010) within the regional study area. It can be seen that there are two main concentrations in areas adjacent to the north and south coasts and in the far north of the regional area.

The Inch Cape Offshore Wind Farm Site is located over an area which records moderate average annual landings values of between £2,500 and £25,000 and records moderate to high average annual effort of between 200 and 800 days.

Figure 18A.40 VMS Density by Value (Average 2007-2010) in the Regional Study Area (Source: MMO)

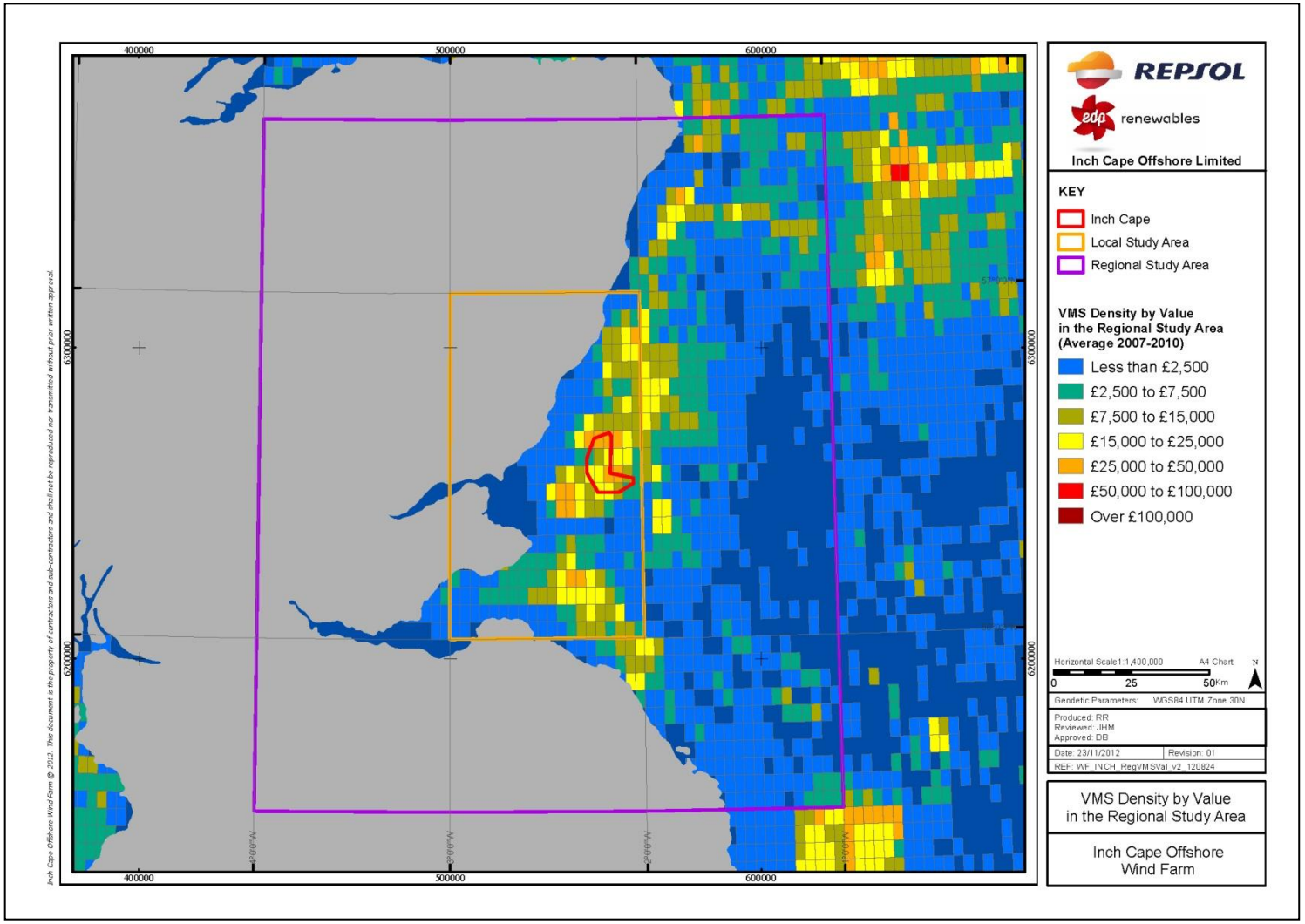
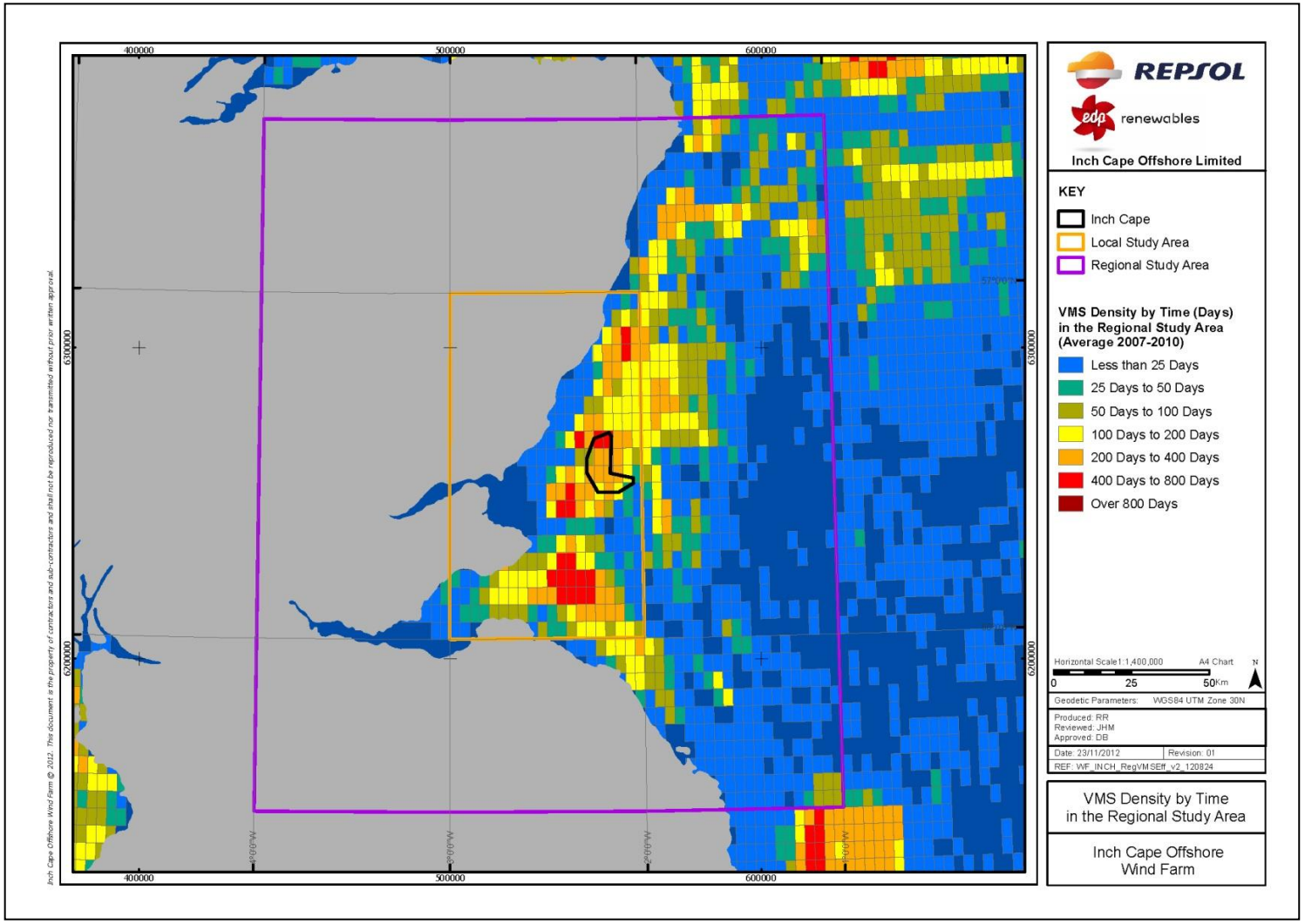


Figure 18A.41 VMS Density by Time (Days; Average 2007-2010) in the Regional Study Area (Source: MMO)



18A.7.2.2 2009 Data

Figure 18A.42 shows the satellite density of all UK over-15 metre vessels during 2009. The patterns are broadly consistent with the 2007 to 2010 data set, although the densities appear higher due to the differences in format.

Figure 18A.43 to Figure 18A.45 provide a breakdown of density by gear type, categorising density by vessels operating dredges, nephrops gear and whitefish gear, respectively.

The highest densities of scallop dredge vessels (Figure 18A.43) occur in grounds in coastal and central rectangles to the north of the regional study area, including the northern section of the development area.

Nephrops activity is concentrated to the southwest of the Forth and Tay area. There is no nephrops activity by the over-15 metre fleet within the Development Area (Figure 18A.44).

The highest densities of whitefish activity occur in offshore areas to the northeast of the regional study area. There is no whitefish activity recorded within the Development Area (Figure 18A.45)

Figure 18A.42 VMS Density of all Vessels in the Regional Study Area (2009 only; Source: Marine Scotland)

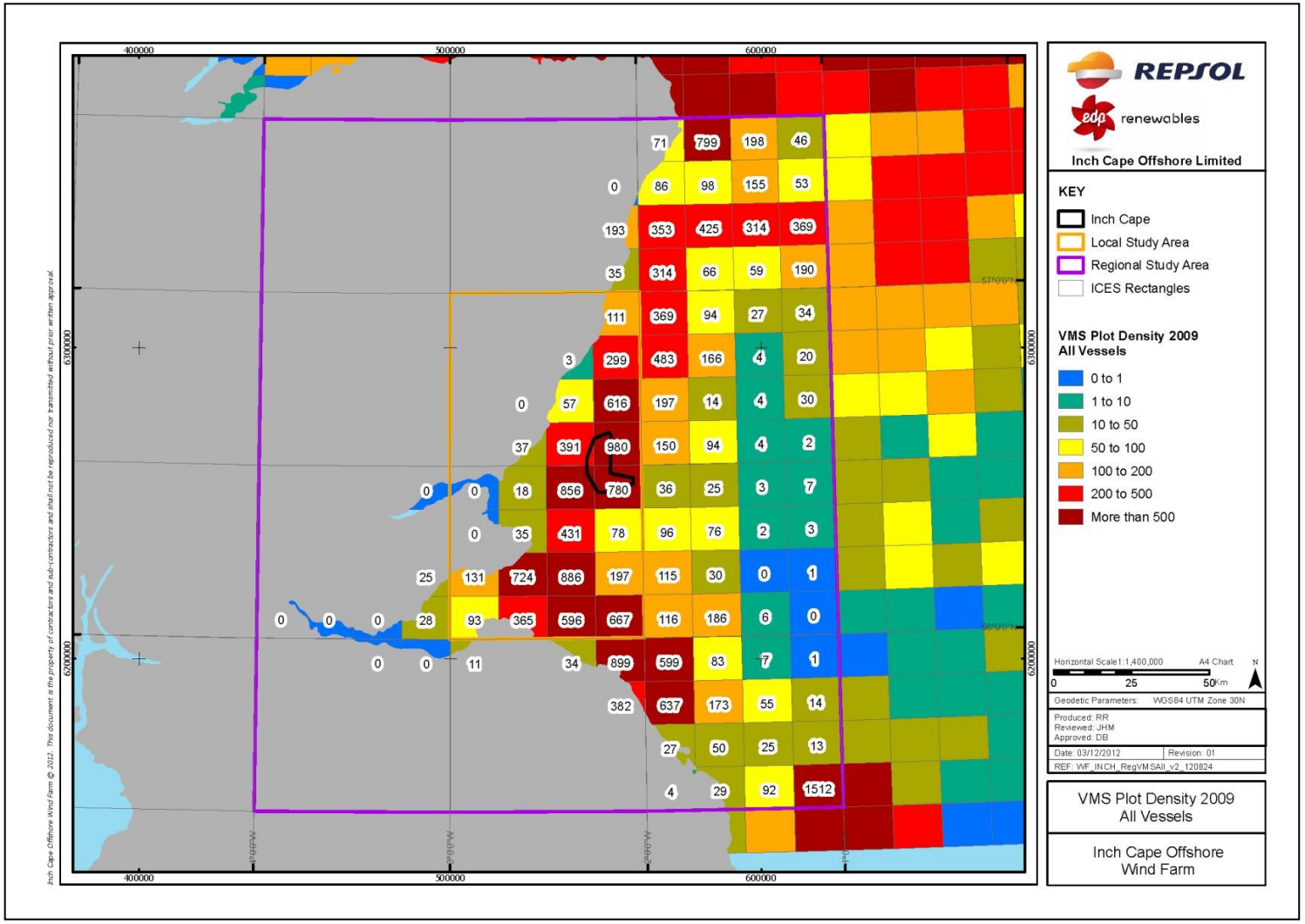


Figure 18A.43 VMS Density of Vessels Operating Scallop Dredge Gear in the Regional Study Area (2009 only; Source: Marine Scotland)

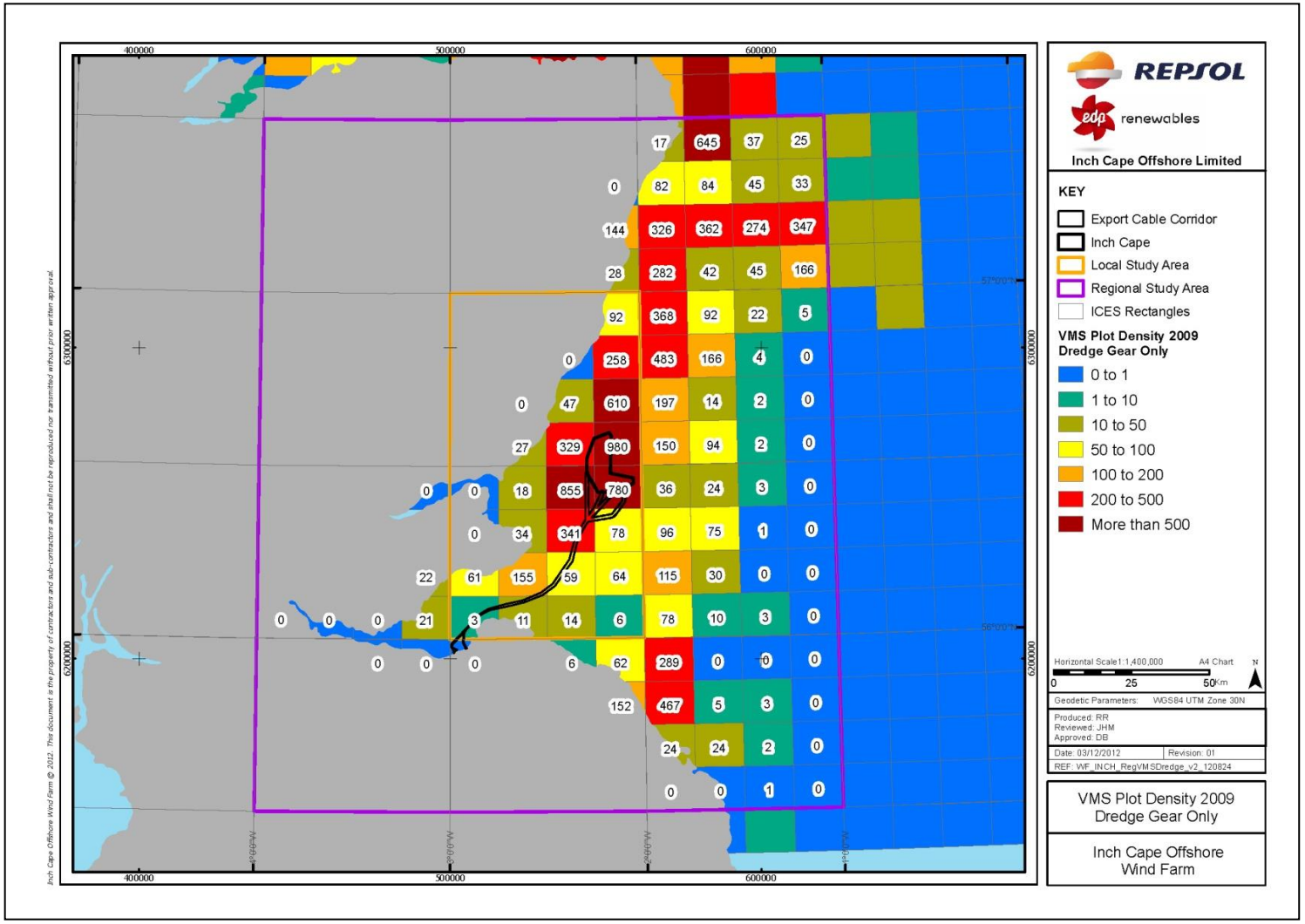


Figure 18A.44 VMS Density of Vessels Operating Nephrops Gear in the Regional Study Area (2009 only; Source: Marine Scotland)

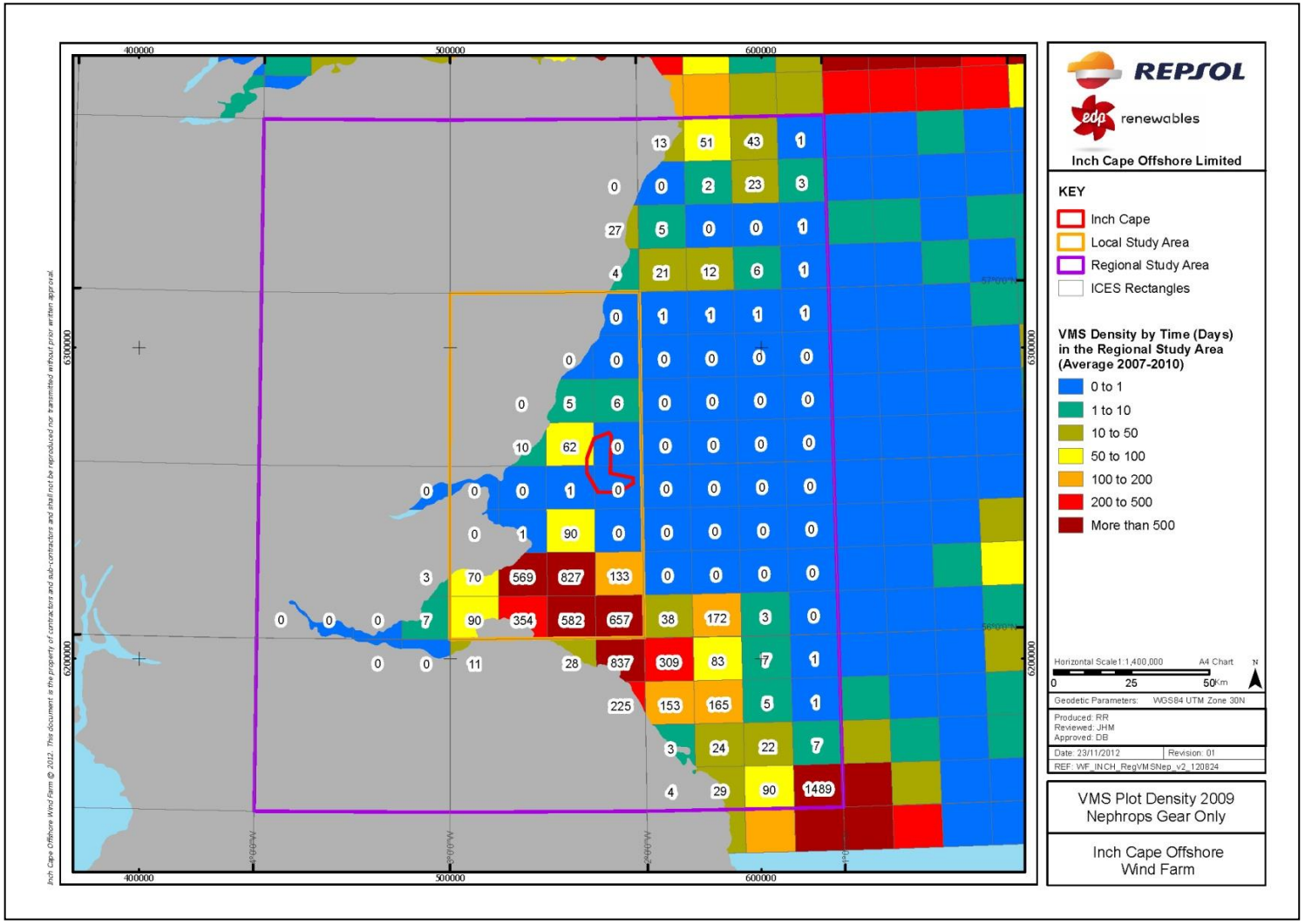
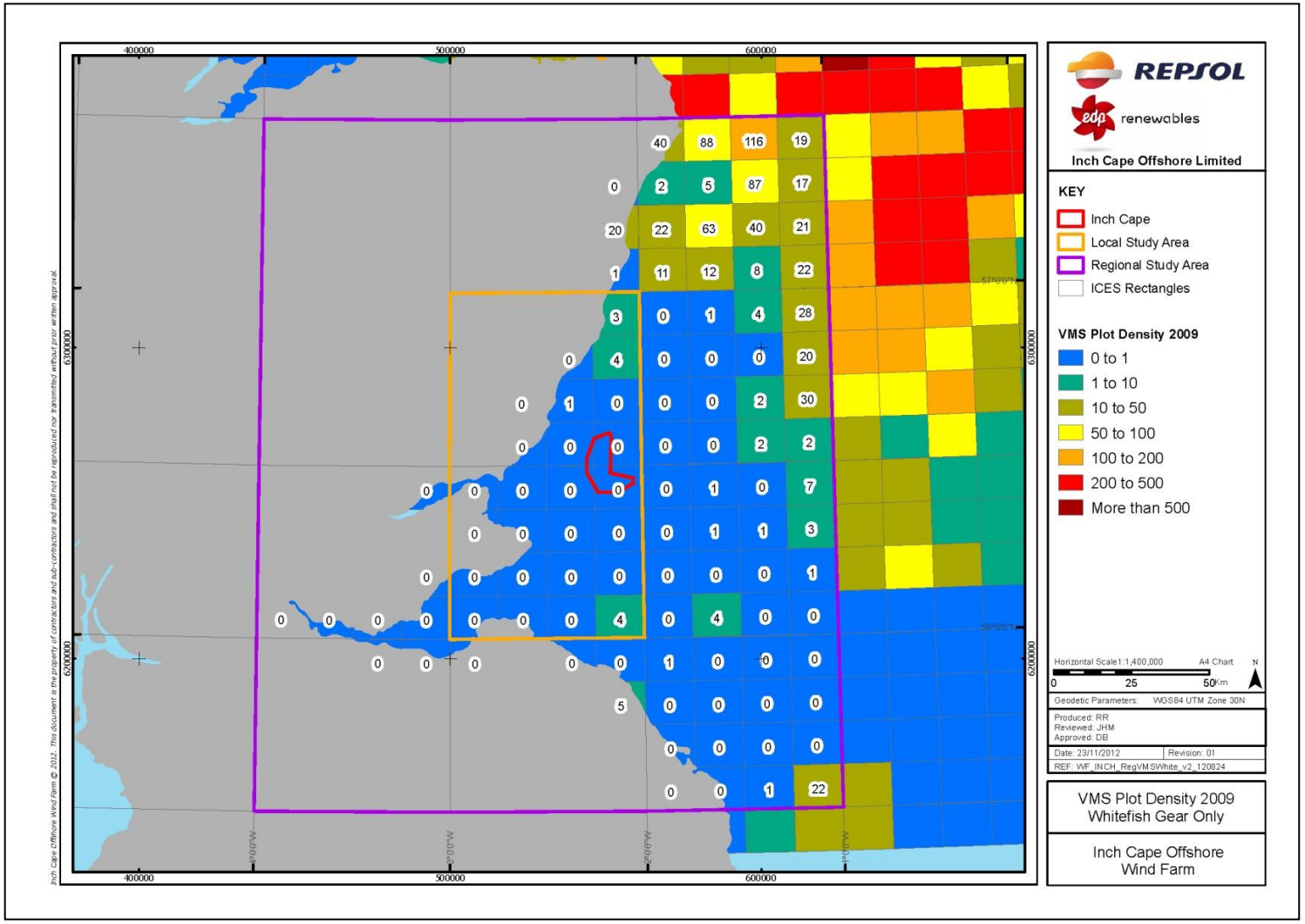


Figure 18A.45 VMS Density of Vessels Operating Whitefish Gear in the Regional Study Area (2009 only; Source: Marine Scotland)



18A.8 Marine Scotland Data Analysis

As mentioned in *Section 18A.3.3* previously, the following charts have been derived by Marine Scotland Science and provided to BMM to assist in the establishment of a commercial fisheries baseline in the Forth and Tay area. The limitations of this data set, as explained previously *in Section 18A.3*, are recognised.

Figure 18A.46 to Figure 18A.49 show the distribution of commercial fishing activities in the Forth and Tay area for over-15 metre UK vessels between 2007 and 2011 by scallop, nephrops, squid and demersal fisheries, respectively.

The Inch Cape Offshore Wind Farm site is located on grounds which are predominantly fished by vessels targeting scallops, with grounds extending to the north, with high relative values recorded in the vicinity of the Inch Cape site. Nephrops activity is predominantly recorded in inshore areas in the Firth of Forth and the distribution of this activity extends to the south. Squid and demersal activity is relatively low and is principally recorded throughout the Forth and Tay area, including in the vicinity of the Inch Cape site.

Figure 18A.46 Distribution of Scallops by Value (Average 2007 to 2011) in the Regional Study Areas (Source: Marine Scotland, 2012)

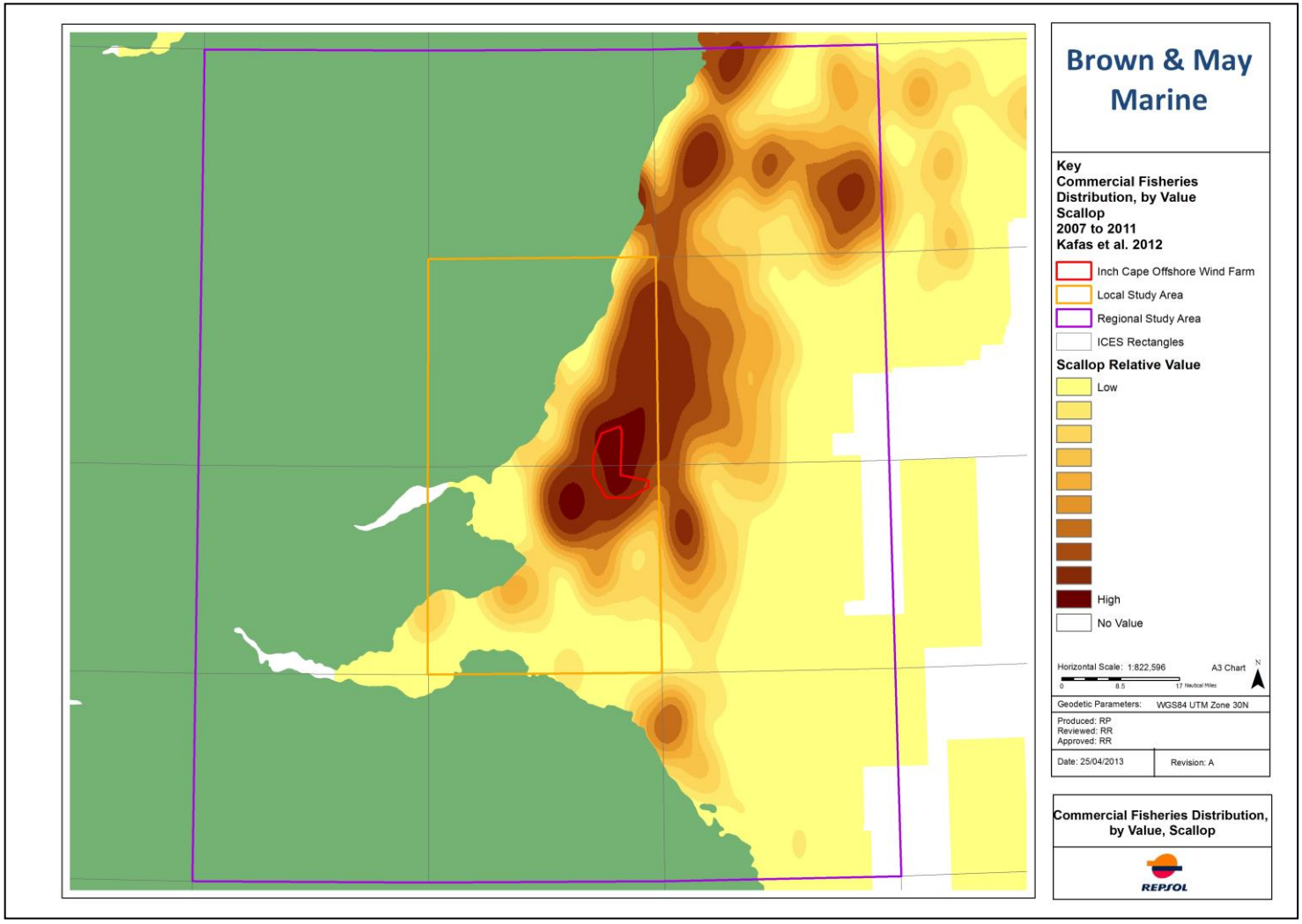


Figure 18A.47 Distribution of Nephrops by Value (Average 2007 to 2011) in the Regional Study Areas (Source: Marine Scotland, 2012)

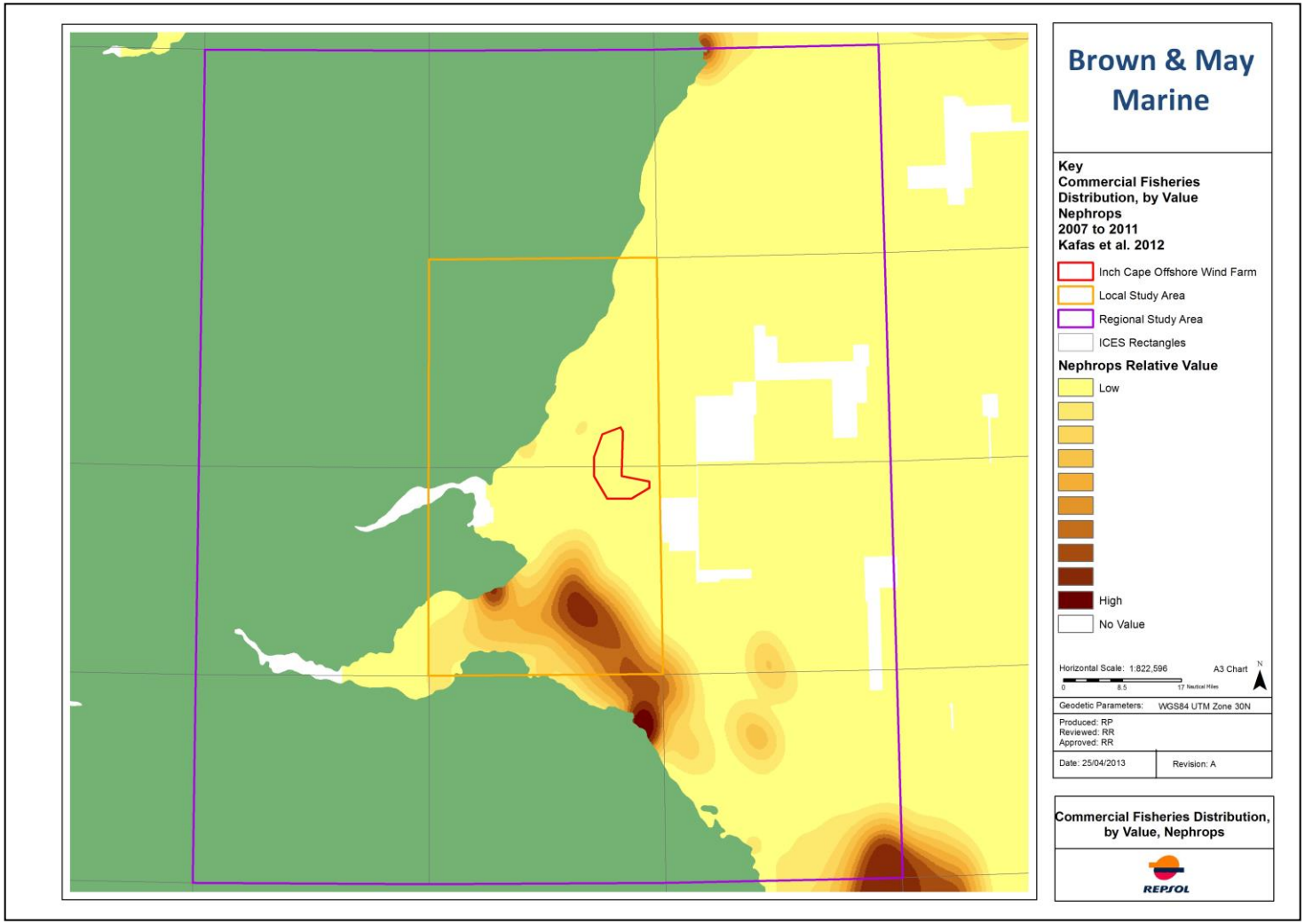


Figure 18A.48 Distribution of Squid by Value (Average 2007 to 2011) in the Regional Study Areas (Source: Marine Scotland, 2012)

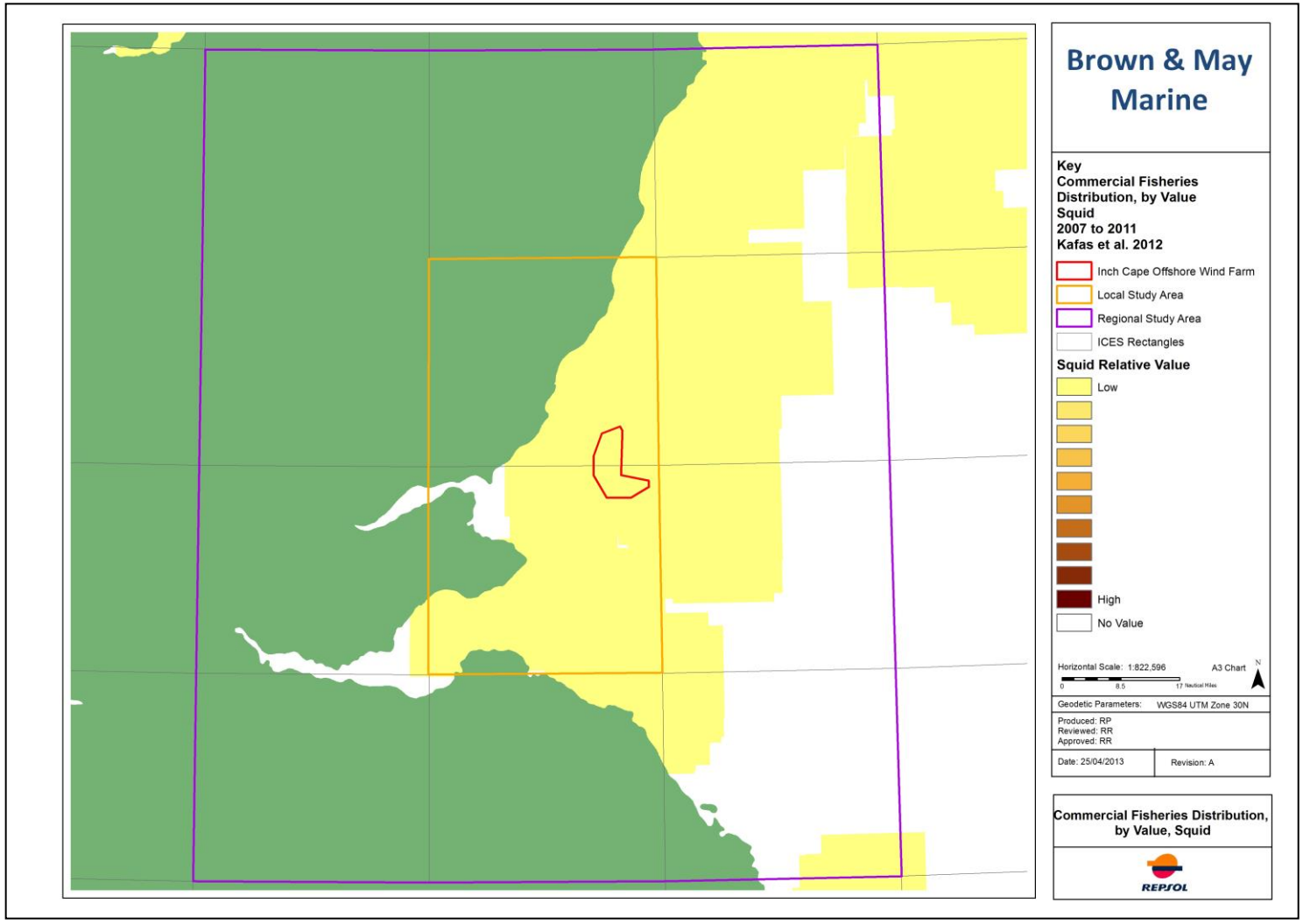
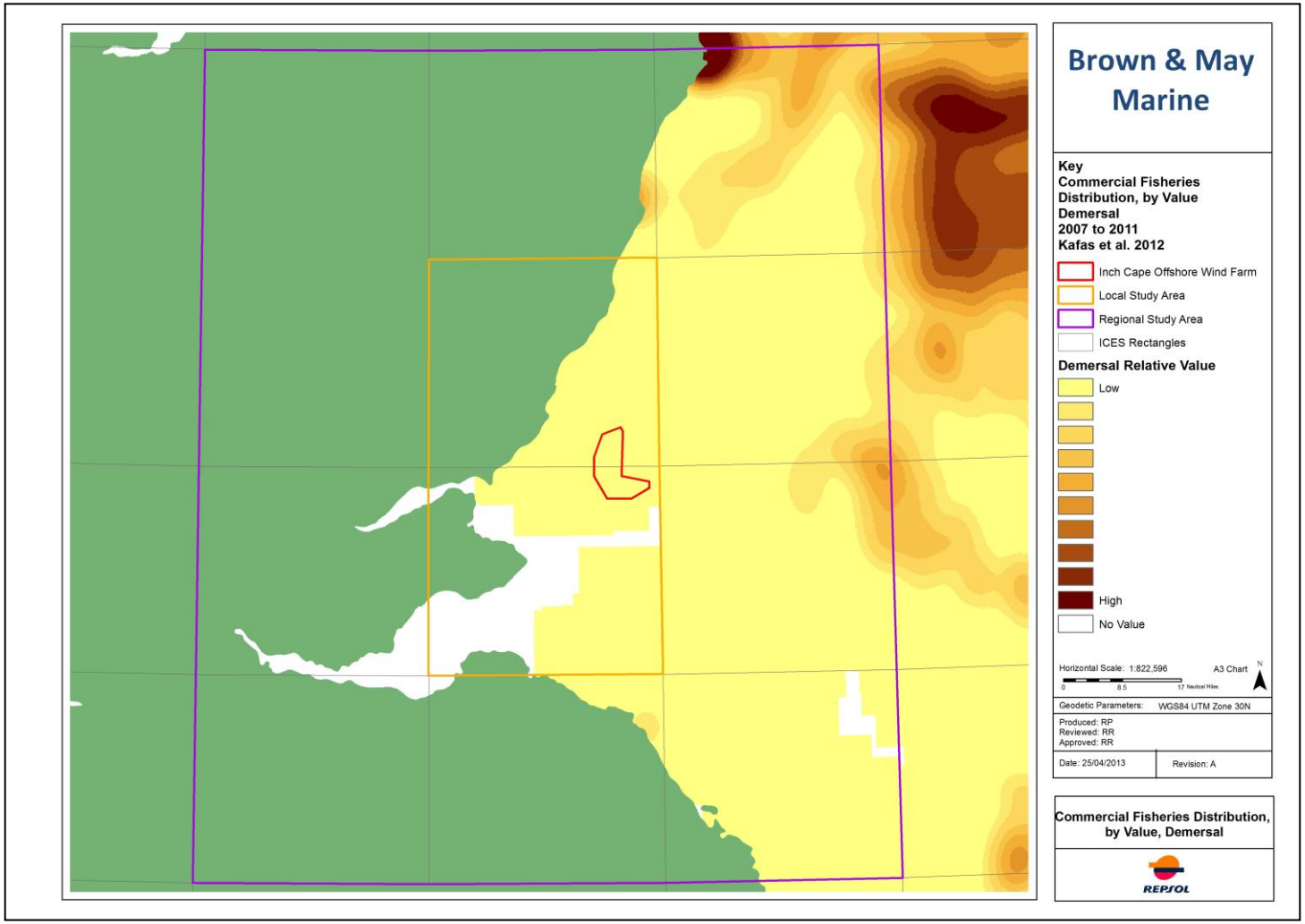


Figure 18A.49 Distribution of Demersal Landings by Value (Average 2007 to 2011) in the Regional Study Areas (Source: Marine Scotland, 2012)



18A.9 Fishing Methods, Operating Patterns and Practices

The principal fishing activities undertaken in the area of the development are:

- Scallop dredging;
- Demersal trawling;
- Potting.

Fishing patterns and practices relevant to these activities are also described. Information gathered through consultation with fisheries stakeholders has informed the assessment.

18A.9.1 Scallop Dredging

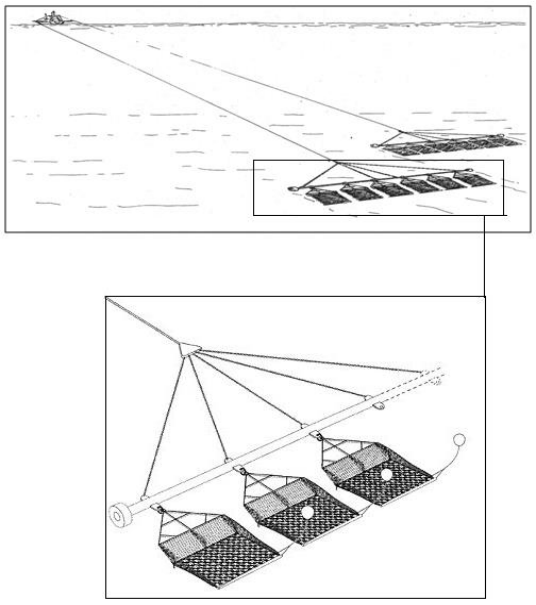
18A.9.1.1 Fishing Gear

Scallop vessels operate by towing one (astern) or two (either side) beams onto which a number of dredges are attached. The number of dredges used depends on vessel size, engine power, winch capacity and distance travelled to fishing grounds. In Scottish waters, the total number of dredges can vary from three to four on a small, ten metre boat and up to 14 nm outside of 12 nm (in English waters this can increase up to 18/20).

The most common dredge type used in UK waters is the Newhaven scallop dredge. Scallops are 'raked' from their recessed position in the seabed by eight or nine steel teeth that penetrate the seabed. Teeth are up to 11 cm long and are attached along the leading edge of the dredges. Mesh bags are situated behind the teeth to retain the catch[6]. The penetration depth of this gear is up to 200mm, although this will vary depending on substrate composition. Furthermore, repeated dredging of grounds may result in deeper excavations of the seabed[7].

Figure 18A.50 shows the basic configuration of scallop fishing gear. The gear dimensions of a smaller, locally based boat and a larger category, nomadic vessel reported to target grounds in the Forth and Tay area (Vessel A and Vessel J) are provided in Table 18A.9.

Figure 18A.50 Scallop Dredging Gear



[6] Beukers-Stewart, B.D. and Beukers-Stewart, J.S. (2008) Principles for the Management of Inshore Scallop Fisheries around the United Kingdom. *Environmental Department, University of York report to CCW/SNH/NE*.

[7] Linnane, A., Ball, B., Munday, B., van Marlen, B., Bergman, M. and Fonteyne, R. (2000) A review of potential techniques to reduce the environmental impact of demersal trawls. *Irish Fisheries Investigations (New Series) No. 7.*

Table 18A.9 Gear Dimensions of Two Scallop Dredge Vessels

Fishing vessel	Vessel A	Vessel J
Home port	Montrose	Buckie
Length	14.33 m	30.2 m
Drive type	Hydraulic	Hydraulic
Number of winch drums	2	4
Length of warp on each drum	220 m	500 m
Braking type	Band	Band
Wire type	6x19+1	6x26+1
Warp diameter	20 mm	32 mm
Length of warp paid out relative to depth	2.5-3.5:1	2.5:1
Number of beams	2	2
Beam length	5.3 m	16 m
Beam weight	N/A	2.5 tonne
Wheel diameter	65 mm	480 mm
Number of dredges per side	6	14
Dredger length	1 m	0.81 m
Dredger weight	N/A	0.25 tonnes
Estimated total gear width	10.7 m	16.5 m (per beam)

18A.9.1.2 Fishing Patterns and Practices

Scallops prefer sediments comprised of sand, gravel and mud, sometimes with stones, rocks or boulders[8] and are found below the low water mark to depths exceeding 100m. The scallop fleet is most active during the second quarter of the year, although scallop fishing occurs all year round. A large proportion of scallop grounds to the east of Scotland (including the Forth and Tay area) are beyond the 12 nm limit and therefore attract larger vessels which are able to use up to 14 dredges attached to a beam. Little is known about potential scallop grounds further offshore and it is possible that improved knowledge of the extent and potential of offshore stock could lead to an increase in the size of the scallop dredge fleet, activity and grounds covered[9].

A high proportion of the scallop fleet is nomadic and will variously target grounds around the UK. The areas fished depend on the productivity of each scallop ground and the changes in stock levels and regulations. It is understood that the majority of scallop grounds are fished periodically and then left (which can be for periods of approximately 18 months) until stocks have sufficiently recovered.

Within the Forth and Tay area, there are several locally based vessels that concentrate the majority of their activities within the local area. In addition, there are visiting vessels from the east and west coasts of Scotland that periodically fish the Forth and Tay scallop grounds as well as other grounds around the UK. These vessels are further discussed in *Section 18A.10.1.1*.

As has been previously stated, the scallop fishery is managed through minimum landing sizes (100mm shell width), restrictions on dredge numbers (Scotland only) and seasonal closures. There are currently no limits in the form of catch or effort quotas. It should be noted however that alternative management schemes have restricted scallop dredging activity. For example, the closure of important scallop grounds in Cardigan Bay for conservation measures has displaced activity and increased pressure in other areas. In addition, restrictions have also been imposed upon the scallop fleet in the waters around the Isle of Man. These restrictions were deemed necessary to prevent a repeat of the intensive levels of fishing activity as seen during the 2008 and 2009 seasons, which

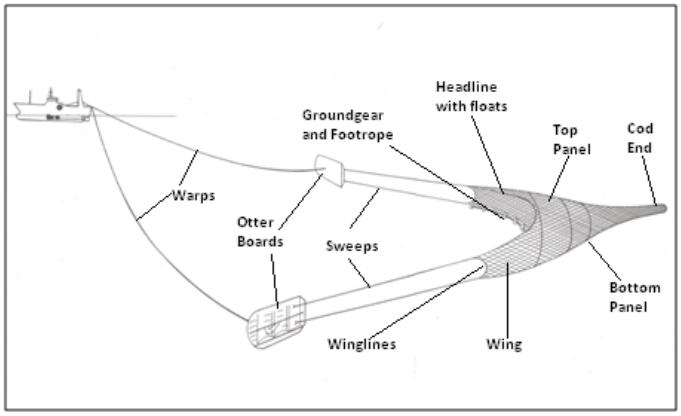
[8] Keltz, S. and Bailey, N. (2010) Fish and Shellfish Stocks 2010. *Marine Scotland Report.*
[9] Howell, T.R.W., Davis, S.E.B., Donald, J., Dobby, H., Tuck, I. and Bailey, N. (2006) Report of Marine Laboratory Scallop Stock Assessments, *Fisheries Research Internal Report No. 08/06.*

resulted in significant damage to the Isle of Man scallop stocks and fishing grounds. The Isle of Man closure excludes all vessels over 300hp that have not fished in the area for at least 50 days over the past 18 months and impacts upon many Scottish vessels who seasonally dredge the area. Directly related to the Isle of Man closure, environmental concerns over displaced vessels targeting grounds in nearby Luce Bay to the north resulted in the Scottish Government extending the seasonal closure of Luce Bay[10].

18A.9.2 Demersal Otter Trawling for Nephrops, Whitefish or Squid

In terms of full time vessel numbers, demersal otter trawling is currently the most common commercial fishing method in Scottish waters. Figure 18A.51 gives the basic configuration of a single rig demersal otter trawler. The otter boards maintain the horizontal opening of the net, they are relatively heavy and a steel toe can be added to ensure good contact with the seabed. Fish are herded between the otter boards, along the sweeps and into the mouth of the trawl where they drift through the net to be retained in the cod end. Studies have shown that otter board penetration depths can vary between 50 mm on sandy bottoms to 300 mm on soft mud[11] when used to fish the three species described in more detail below. The warp to depth payout ratio is generally around 3:1. Predominantly, demersal otter trawlers in the Forth and Tay area target nephrops and squid, with whitefish targeted further offshore.

Figure 18A.51 Single Net Demersal Otter Trawl



Demersal otter trawl vessels can also operate two nets at the same time, known as twin-rigging. The two otter boards are used to maintain the lateral opening of the nets on the outer sweeps and a third warp is attached to a central clump weight, separating the two nets in the middle. Twin rig vessels are often used to target nephrops, but are also used in whitefish fisheries.

Demersal pair trawling can be undertaken whereby two vessels tow a single net between them, with each vessel towing one warp. The nets used for pair trawling are a similar design to those used for single net trawling, but tend to be larger and heavier. This allows vessels of moderate horsepower to tow relatively large gear between them.

The gear dimensions of an average demersal trawler are given in Table 18A.10. Vessel C is a nephrops trawl vessel which is able to reconfigure its gear to target squid.

[10] Ross, D. (2010) Scallop-dredging row leaves Scots boats nowhere to fish. *The Herald Scotland, 18/11/10.*

[11] Linnane, A., Ball, B., Munday, B., van Marlen, B., Bergman, M. and Fonteyne, R. (2000) A review of potential techniques to reduce the environmental impact of demersal trawls. *Irish Fisheries Investigations (New Series)*. No. 7.

Table 18A.10 Gear Dimensions of Vessel C, a Demersal Otter Trawler

Fishing vessel	Vessel C	
Home port	Pittenweem	
Length	12.94 m	
Drive type	Hydraulic	
Number of trawl winch drums	2	
Length of warp on each drum	366 m	
Braking type	Band	
Wire type	6/19 FC	
Warp diameter	14 mm	
Warp minimum breaking strain	9.5 tonnes	
Length of warp paid out relative to depth	3:1	
Trawl door length	1.67 m	
Trawl door height	1 m	
Trawl door weight	0.303 tonnes	
Trawl door angle of attack	11° to 13°	
Distance between doors	36 m	
	Nephrops	**Squid**
Number of bridles per side	1	2
Bridle length	73.84 m	36.92 m
Ground line type	Small rubber soft ground	Rockhopper
Grounds line length	36.92 m	30.76 m
Disc diameter of rockhoppers	0.3 mm	0.3 mm
Net type	Nephrops net	Squid net
Mesh size	80 mm	40 mm
Estimated headline height	2 m	2.5 m
Estimated distance between net wing ends	10 m	8 m

18A.9.2.1 Nephrops Fishery

Nephrops gear is configured similarly to that above (Figure 18A.51). A smaller mesh is used, which is a minimum of 70 mm in diameter. Nephrops vessels can employ either single or twin rig demersal gear, as described above. Nephrops inhabit burrows in the seabed and favour muddy and soft substrates. Fishing is year round, although there is a peak in activity in the summer months[12].

Nephrops are targeted by both the under and over-15 metre fleets. The under-15 metre fleet is generally comprised of local vessels which concentrate activity on grounds in proximity to their home ports. The over-15 metre fleet usually target grounds further offshore in the North Sea.

As has been previously stated, the nephrops fishery has become an important resource to demersal trawl fishermen. In Scottish waters, it is currently considered that there are too many vessels targeting the fishery and increasing pressure on the current stocks, which have seen a decline in landings in recent years[13]. In the Firth of Forth however, underwater television (UWTV) surveys conducted by Marine Scotland revealed that the nephrops population has been at a relatively high level since 2003 and, taken with information showing stable mean sizes, indicates that the stock is being exploited sustainably[14].

[12] Keltz, S. and Bailey, N. (2010) Fish and Shellfish Stocks 2010. *Marine Scotland, The Scottish Government.*
[13] The Scottish Government (2010) The Future of Fisheries Management in Scotland; *Edinburgh 2010.*
[14] Keltz, S. and Bailey, N. (2010) Fish and Shellfish Stocks 2010. *Marine Scotland, The Scottish Government.*

18A.9.2.2 Squid Fishery

Demersal otter trawl vessels are capable of targeting squid and will reconfigure gear to target the species when it is present. Due to the relatively short lifespan of squid and variable breeding success and survival rates, the squid fishery fluctuates from year to year.

In recent years the squid fishery has become a valuable alternative fishery for nephrops trawlers, chiefly supplying the European market. The fishery is unregulated, so there are currently no restrictions upon the activity (either in quota or effort). Ability to target the species can relieve pressure on regulated stocks such as nephrops.

The squid fishery is usually of short duration but is reported to have been extending in recent years. The timing of the squid fishery is dependent upon the arrival of the species in the area, but the peak season is generally around August and September. The fishery has become increasingly important to both local inshore trawl fishermen and larger category vessels from further afield, particularly during periods where other fisheries are experiencing low catch rates. 2010 was reported to be a very good year for squid landings and fishermen stated that there was an extended squid season 2010, with activity continuing into November (pers. comm. Fishermen's Mutual Association Ltd. (Pittenweem) (FMA), Oct 2010). In addition, vessels from Fraserburgh and Peterhead were reported to be targeting the species, additionally landing quantities of by-catch including mackerel and lobster (pers. comm. Arbroath and Montrose Fishermen's Association, April 2012). There was a decline in squid stocks in 2011 however, with poor landings reported throughout the year (pers. comm. squid fisherman, April 2012).

Squid grounds are not fixed, and fishermen stated they were targeting the species in grounds further offshore than previously recorded (pers. comm. FMA, Oct 2010). Furthermore, it was considered that there is the potential for squid grounds to change in future years. A number of fishermen consulted considered that squid grounds are not moving, instead new squid grounds are still being discovered, as a result of the relatively recent introduction of the fishery. Current squid grounds, as identified by trawl fishermen, are discussed in *Section 18A.11.3.*

In order to target the species, vessels will reconfigure their demersal gear (Figure 18A.51). Nets are changed to those with a smaller mesh size of 40mm. Nets will have high headlines (i.e. the top of the net is higher in the water column), as the species is caught off the seabed. Squid are often targeted on rocky or uneven ground, and vessels targeting the species will employ additional protective gear such as rockhoppers (rubber disks attached immediately ahead of the ground-line to allow net to pass over rough ground) or 'flipper' gear (rubber mats fixed between the net and seabed to protect nets from rough ground) to minimise damage to nets.

18A.9.2.3 Whitefish Fishery

Historically, the demersal otter trawl fleet (in addition to Scottish seine vessels) targeted whitefish such as cod and haddock in the Forth and Tay area. The fishery started to decline in the mid 1950s. Dwindling cod stocks throughout the North Sea resulted in a series of reductions in quota in the 1980s. The whitefish trawl fishery is, for the most part, a mixed fishery (i.e. multiple demersal species are simultaneously caught) and the restrictions placed upon the landing of cod have had a detrimental impact on the fleet's ability to fish alternative species. In addition, cuts to cod quota have encouraged the discarding of fish at sea, considered by all within the industry to be one of the biggest failures of the management policy. As a result of a lack of available quota, demersal trawlers have diversified into the nephrops fishery, where quota levels are not so restrictive.

There are currently no whitefish trawlers operating from home ports within the Forth and Tay area, and furthermore, it is not considered that vessels will return to the fishery in the near future, as a

result of both a perceived lack in target species as well as a lack of available quota based upon track record (since the 1980s). It is considered that the level of whitefish landings recorded in inshore areas in the MMO statistics are by-catches from other demersal fisheries. The whitefish landings recorded further offshore to the northeast of the regional study area are considered to be larger demersal trawl vessels which will land their catch at ports outside of the Forth and Tay area.

18A.9.2.4 Potting

Pots, or creels, are essentially traps baited to catch mobile shellfish such as lobster, crab species or nephrops (Figure 18A.52). Pots are attached to a main line which is deployed from the vessel onto the seabed (Figure 18A.53). Pots normally have an average soak time of around three days, although this can be extended during periods of bad weather. The priority of this fishery is to land live catch.

The scale of the activity can range from a 'hobbyist' fisherman setting around 20 pots, to a vivier crabber which may set more than 3000 pots at one time. Smaller vessels will keep their catch alive in cages on the seabed, while larger vessels will use purpose-built onboard vivier tanks.

Figure 18A.52 Example of a 'Parlour' Lobster Pot

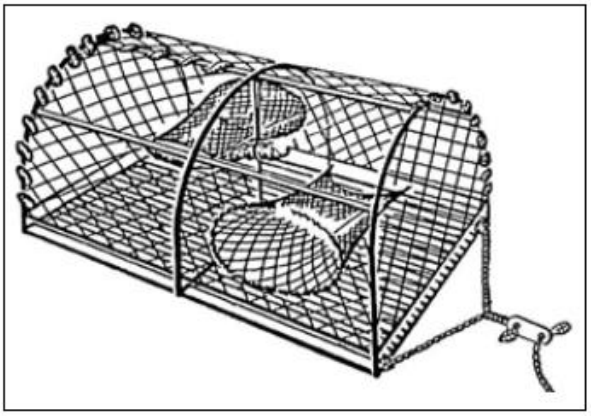
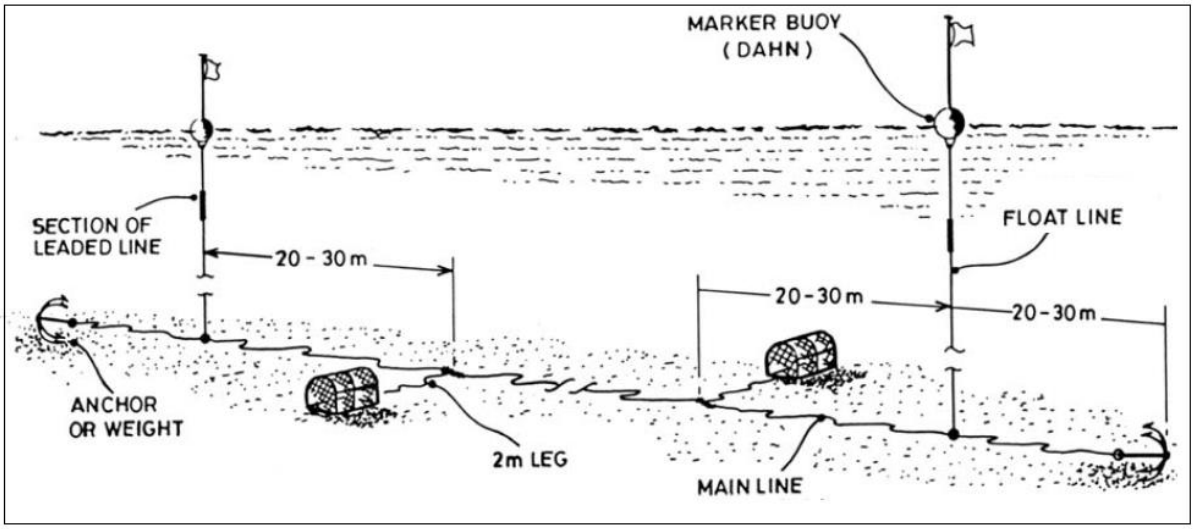


Figure 18A.53 Fleet of Pots



Due to the limited operational range of small, inshore vessels, fishermen generally deploy their pots closer to the coast and in areas not frequented by towed gear. The Arbroath and Montrose Static Gear Fishermen's Association stated however that a number of vessels are working further offshore than in previous years and identified creel grounds targeted by three vessels which would be

impacted by the development (*Section 18A.11: Fishing Grounds*) (pers. comm. Arbroath and Montrose Static Gear Fishermen's Association, April 2012).

There are a number of potting vessels operating on a part-time basis. Generally, these vessels will operate during the summer months and are hauled out over the winter.

The gear dimensions of a potting vessel which is known to target grounds within the development is given in Table 18A.11.

Table 18A.11 Gear Dimensions of Vessel D, a Potter

Fishing vessel	Vessel D
Home port	Arbroath
Length	9.9 m
Pot type	Parlour
Pot length	0.8 m
Pot height	0.5 m
Number of fleets	50
Fleet length	322 m
Number of pots per fleet	20
Distance between each pot	18 m
Type of gear marker	Dhan pole with flags
Number of gear markers per fleet	2
Deployment method	Directional (mainly southeast)
Typical depth fished	2 to 50 m
Bait used	Scad
Typical soak time	1 to 2 days (dependent on weather)
Method of hauling	Hydraulic

18A.10 Vessels

With the exception of the nomadic scallop fleet and offshore whitefish fleet, the majority of vessels active in the Forth and Tay area have home ports within the jurisdiction of the following Fishery Districts:

- Aberdeen Fishery District (Aberdeen down to the north side of the Tay Bridge);
- Anstruther Fishery District (south side of the Tay Bridge to the north side of the Kincardine Bridge); and
- Eyemouth Fishery District (south side of the Kincardine Bridge down to the Scottish border).

The primary remit of DFOs is to ensure compliance with fisheries regulations from vessels within their jurisdiction. In addition, DFOs ensure vessels are kept informed of all change and amendments to fisheries management policies and of any relevant marine activity that may affect normal fishing practices. In addition to vessels under the jurisdiction of these districts, there are vessels from other locations in Scotland and England that will periodically visit the Forth and Tay area. The majority of these are scallop dredgers and demersal trawlers. Visiting vessels are discussed separately in *Sections 18A.10.1.1* and *18A.10.2.3*. The fishing grounds of all vessels are discussed in *Section 18A.11*.

18A.10.1 Scallop Fishery

Table 18A.12 below lists the three scallop vessels which are based in the locality of the Forth and Tay area and which operate within the vicinity of the development. Both Vessel T and Vessel E are over-15 metres in length and therefore satellite tracked.

Table 18A.12 Scallop Vessels with Home Ports in the Forth and Tay Area

Vessel number	Home port	Vessel length (m)
Vessel A	Montrose	14.33
Vessel T	Kirkcudbright (currently operating out of Arbroath)	17.83
Vessel E	Pittenweem	16.67

Of the vessels listed in Table 18A.12, the largest is Vessel T. Vessel T is from Kirkcudbright but is currently based in Arbroath and fishes grounds in the Forth and Tay area. The vessel was reported to have arrived from the west coast around the spring of 2012 (pers. comm. pers. comm. Arbroath and Montrose Static Gear Fishermen's Association, October 2012). As mentioned previously, scallop grounds around the UK are fished periodically and therefore the proportion of time spent fishing in the Forth and Tay area is dependent upon the productivity of the fishing grounds. Due to the number of dredges the vessel operates, it is able to operate within any distance of the coast. The basic specifications for the vessel are listed in Table 18A.13.

Table 18A.13 Specifications of Vessel T, a Scallop Dredger Currently Operating Out of Arbroath

Fishing vessel	Vessel T
Home port	Kirkcudbright (currently operating out of Arbroath)
Length	17.83 m
Main engine power	394 hp
Fishing association	Scallop Association (SA)
Typical fishing trip duration	1-2 days
Typical distance steamed per trip	Up to 60 nm
Seasonality of activity	Scallops – all year
Average number of days fishing per year	220 days per year
Number of beams per side	2
Number of dredges per beam	8

The two remaining vessels, Vessel A and Vessel E, have home ports in the locality and spend all of their time fishing in the Forth and Tay area. These vessels are multi-purpose and are able to target other species in addition to scallops using the appropriate trawl gear. The vessel specifications of these two vessels are listed in Table 18A.14.

Table 18A.14 Specifications of Vessel A and Vessel E, Scallop Dredgers

Fishing vessel	Vessel A	Vessel E
Home port	Montrose	Pittenweem
Length	14.33 m	16.67 m
Main engine power	310 hp	280 hp
Fishing association	Northern Fisheries Producers Organisation (NFPO)	FMA
Typical fishing trip duration	36 to 40 hours	10 days
Typical distance steamed per trip	90 to 100 nm (depends on weather)	25 nm
Seasonality of activity	Scallops – all year Nephrops – 3 months during the summer Squid – 4 months during the summer	Scallops – 70% Nephrops – 30%
Average number of days fishing per year	150 to 200 days per year	280 days per year
Average towing speed	2 to 2.5 knots	2.7 knots
Average towing duration	2 to 4 hours	1 hour 20 minutes
Average tow length	2 to 8 nm	1 nm

Due to increasing restrictions on other fisheries, some demersal trawl vessels are currently using additional gear to target scallops in the Forth and Tay area. One demersal trawl vessel known to be targeting scallops is Vessel F, the specifications for which are given in Table 18A.15.

Table 18A.15 Specifications of Vessel F, a Pittenweem Registered Trawler

Fishing vessel	Vessel F
Home port	Pittenweem
Length	13.65 m
Main engine power	279 hp
Fishing association	FMA
Seasonality of activity	Nephrops – June to February Scallops – February to June
Typical fishing trip duration	1 day
Typical distance steamed per trip	16 nm
Average number of days fishing per year	220 days

18A.10.1.1 Visiting Scallop Vessels

Scallop dredge vessels from home ports outside of the Aberdeen, Anstruther and Eyemouth districts seasonally visit the regional study area of the development. Figure 18A.54 shows the relative value of scallop landings around the UK. Grounds with values less than £5000 have been removed to prevent the data represented in the pie charts being disproportionate in scale. It can be seen that scallop landings in the Forth and Tay area are comparable to landings in the Moray Firth and are slightly lower than scallop landings on the Scottish west coast, in the Irish Sea and in the English Channel.

Figure 18A.54 Scallop Landings Values (Average 2001-2010) in the UK (Source: MMO)

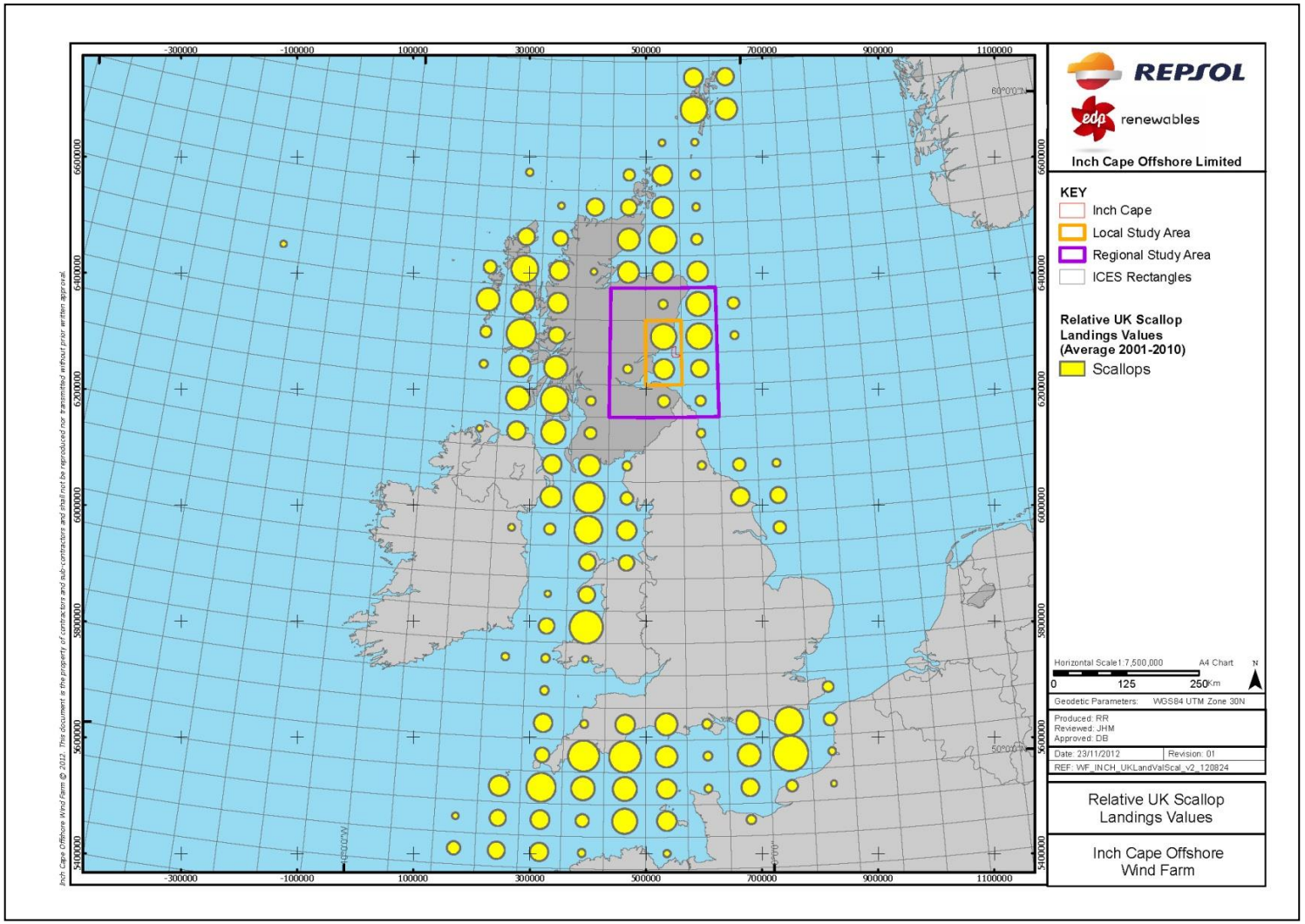
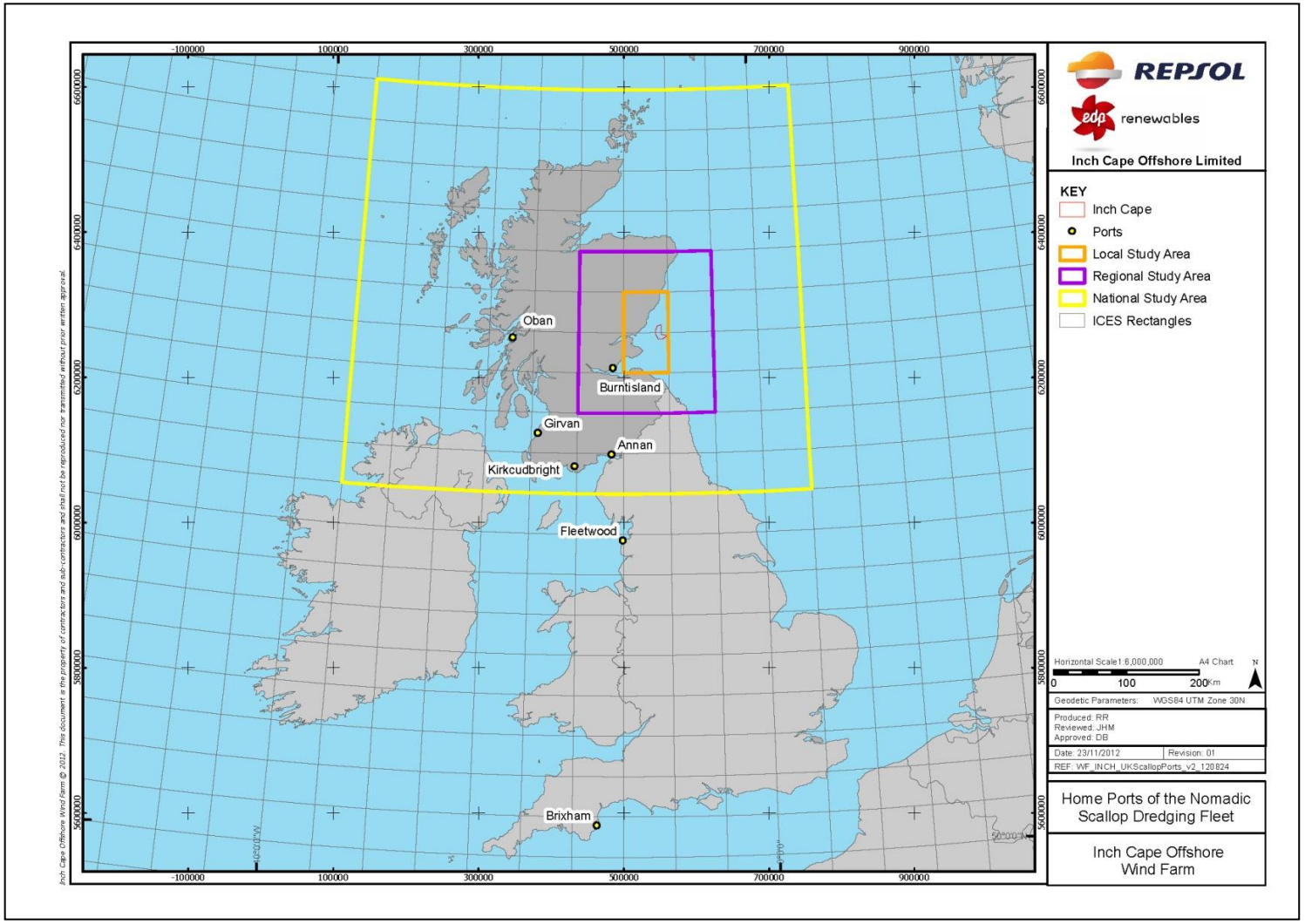


Table 18A.16 lists the scallop dredgers that have home ports outside the Forth and Tay area and are known to target grounds down the east coast of Scotland (pers. comm. scallop fishermen, March 2011), potentially including grounds in the Forth and Tay area. The home ports of each vessel can be seen in Figure 18A.55. It should be noted that the number of visiting scallop vessels targeting grounds in the Forth and Tay area and the amount of time they will spend in the area depends on the productivity of grounds elsewhere, which varies each year. Furthermore, it is considered that the largest vessels of the nomadic scallop fleet (those between 25 and 30 metres) are presently more likely to target scallop grounds in the English Channel (pers. comm. scallop fisherman, December 2010).

Table 18A.16 Nomadic Scallop Dredgers

Fishing vessel	Home port
Vessel G	Annan
Vessel H	Brixham
Vessel I	Buckie
Vessel J	Buckie
Vessel K	Fleetwood
Vessel L	Fleetwood
Vessel M	Girvan
Vessel N	Kirkcudbright
Vessel O	Kirkcudbright
Vessel P	Kirkcudbright
Vessel Q	Kirkcudbright
Vessel R	Kirkcudbright
Vessel S	Kirkcudbright
Vessel T	Kirkcudbright
Vessel U	Kirkcudbright
Vessel V	Kirkcudbright
Vessel W	Oban
Vessel X	Oban
Vessel Y	Oban
Vessel Z	Oban
Vessel AA	Peterhead

Figure 18A.55 Home Ports of the Nomadic Scallop Dredge Vessels Operating in the Forth and Tay Area



The specifications of four nomadic vessels known to regularly target grounds in the Forth and Tay area are listed in Table 18A.17 .

Table 18A.17 Specifications of Vessel I, Vessel J and Vessel M, Nomadic Scallop Dredgers

Fishing Vessel	Vessel I	Vessel J	Vessel M
Home port	Buckie	Buckie	Girvan
Length	18.17 m	30.2 m	18 m
Main engine power	540 hp	999 hp	440 hp
Fishing association	N/A	North East of Scotland Fishermen's Organisation (NESFO)/SFF	Scottish Fishermen's Organisation (SFO)
Typical fishing trip duration	3 days	8 days	9 days
Typical distance steamed per trip	1 to 30 nm	12 to 100 nm	N/A
Seasonality of activity	Scallops – all year	Scallops – all year	Scallops – all year
Average number of days fishing per year	240 days per year	260 days per years	200 days per year
Average towing speed	2.3 knots	3 knots	2.4 knots
Average towing duration	1 hour	2 hours	1 to 1.5 hours
Average tow length	2.5 nm	6 nm	N/A

18A.10.2 Demersal Trawl Fisheries

Table 18A.18 lists the number of trawl vessels registered at ports within the Forth and Tay area. This list was created through cross-referencing the MMO vessel register with databases that contain information on individual vessel's gear categorisation. The list should not however be considered an accurate record of the vessels based in the area as individual vessels may have changed their home port and decommissioned or inactive vessels may still be included. In addition, the list does not distinguish between trawlers targeting different fisheries (nephrops or whitefish). It should also be noted that the majority of the vessels listed in Table 18A.18 are under-15 metres in length and as a result are limited in their operation (i.e. geographical range).

Table 18A.18 List of Demersal Trawlers Registered at Ports within the Forth and Tay Area (Source: MMO)

Vessel length category	Number of vessels	MMO registered home ports
Under-10 metres	21	6 Pittenweem 5 Eyemouth 2 Methil and Leven 2 Port Seton 2 Aberdeen 1 Anstruther 1 Arbroath 1 Granton 1 St. Abbs
10-15 metres	20	4 Eyemouth 4 Port Seton 4 Pittenweem 3 Anstruther 2 Dunbar 2 Gourdon 1 St. Abbs
Over-15 metres	9	4 Eyemouth 2 Granton 1 Arbroath 1 Pittenweem 1 Port Seton

18A.10.2.1 Nephrops Fishery

Table 18A.19 lists local demersal nephrops trawlers that are known to be fishing in the Forth and Tay area. It should be noted that the majority of the vessels listed are under-15 metres in length and therefore will not be included in the VMS data set. The vessels listed below will employ a mixture of twin and single rig gear to target nephrops. It is of note that the majority of vessels are registered to home ports in the south of the study area and as a result will likely concentrate activities in nephrops grounds closer to their respective home ports.

Table 18A.19 Forth and Tay Demersal Trawlers who are known to be Actively Targeting Nephrops

Vessel number	Length (m)	Home port
Vessel AC	8.00	Dunbar
Vessel AD	8.65	Eyemouth
Vessel AE	9.26	Dunbar
Vessel AF	9.30	Montrose
Vessel AG	9.49	Port Seton
Vessel AH	9.70	Pittenweem
Vessel AI	9.75	Port Seton
Vessel AJ	9.85	Port Seton
Vessel AK	9.95	St. Abbs
Vessel AL	10.21	Eyemouth
Vessel AM	10.97	Anstruther
Vessel AN	11.18	Dunbar
Vessel AO	11.27	Dunbar
Vessel AP	11.48	Port Seton
Vessel AQ	11.58	Pittenweem
Vessel AR	11.80	Dunbar
Vessel AS	11.83	Stonehaven
Vessel AT	11.90	Port Seton
Vessel AB	11.98	Arbroath
Vessel AU	12.17	Eyemouth
Vessel AV	12.23	Port Seton
Vessel AW	12.47	Eyemouth
Vessel C	12.94	Pittenweem
Vessel AX	13.10	Dunbar
Vessel AY	13.60	Port Seton
Vessel F	13.65	Pittenweem
Vessel A	14.33	Montrose
Vessel AZ	14.70	Montrose
Vessel BA	15.58	Newhaven
Vessel E	16.67	Pittenweem
Vessel BB	16.82	Eyemouth
Vessel BC	17.20	Pittenweem
Vessel BD	17.78	Port Seton
Vessel BE	18.22	Eyemouth
Vessel BF	19.81	Eyemouth
Vessel BG	20.43	Fisherrow
Vessel BH	20.82	Eyemouth
Vessel BI	21.10	Fisherrow
Vessel BJ	21.53	Eyemouth
Vessel BK	21.78	Eyemouth

The basic specifications for one of the demersal trawl vessels targeting nephrops in the vicinity of the Inch Cape Offshore Wind Farm site, Vessel AB, are given in Table 18A.20.

Table 18A.20 Specifications of Vessel AB, an Arbroath Registered Demersal Trawler

Fishing vessel	Vessel AB
Home port	Arbroath
Length	11.98 m
Main engine power	300 hp
Fishing association	FMA
Typical fishing trip duration	5 days
Average steaming speed	6 knots
Seasonality of activity	Nephrops – 6 months Squid – 6 months
Average number of days fishing per year	200 days per year
Days at sea allocation	200 days per year

18A.10.2.2 Squid Fishery

The majority of the vessels listed in Table 18A.19 are able to reconfigure their gear to target squid on a seasonal basis.

The vessel specifications of two nephrops trawlers, Vessel AR and Vessel AX, which are known to be seasonally targeting squid in the vicinity of the development, are given in Table 18A.21 and Table 18A.22, respectively.

Table 18A.21 Specifications of Vessel AR, a Pittenweem Registered Demersal Trawler

Fishing vessel	Vessel AR
Home port	Pittenweem
Length	11.58 m
Main engine power	173 hp
Fishing association	FMA
Typical fishing trip duration	16 hours
Average steaming speed	7.7 to 8 knots
Typical distance steamed per trip	20 to 30 nm
Seasonality of activity	Nephrops – 9 to 10 months Squid – 2 to 3 months
Average number of days fishing per year	160 days per year
Days at sea allocation	200 days per year

Table 18A.22 Specifications of Vessel AX, a Dunbar Registered Demersal Trawler

Fishing vessel	Vessel AX
Home port	Dunbar
Length	13.10 m
Main engine power	210 hp
Fishing association	Eyemouth and District Association
Typical fishing trip duration	14 hours
Average steaming speed	8 knots
Typical distance steamed per trip	20 nm
Seasonality of activity	Nephrops and whitefish – 8 months Squid – 4 months
Average number of days fishing per year	185 days per year
Days at sea allocation	200 days per year

18A.10.2.3 Visiting Demersal Trawl Vessels

The majority of demersal trawl vessels visiting the Forth and Tay area are part of the transient northeast English fleet (Seahouses, Amble or Blyth). These vessels will target both nephrops and squid in the Forth and Tay during the summer months, landing their catches at the ports in the district, including Port Seton, Pittenweem and Eyemouth.

There are a number of vessels which will seasonally visit the Forth and Tay from elsewhere in Scotland. Vessels from the Moray Firth, Orkney Islands and the west coast will berth at local ports and sell their catch to local buyers during the nephrops season. These visiting vessels appear in mid-June and may stay until the end of December. The vessels are also able to transfer to fishing for squid when they are available, generally between August and September, and may be joined by several larger category vessels seeking to capitalise on the unregulated fishery. There are also a number of larger, offshore demersal trawl vessels which will target whitefish species within the regional area of the development, but will land their catch at ports outside of the Forth and Tay area. Table 18A.23 lists the visiting demersal trawl vessels that are known to be targeting grounds in the Forth and Tay area. The operational limitations of the smaller vessels should be noted and it is unlikely that a number of the boats listed below will target offshore grounds such as those within which the development is located.

Table 18A.23 Visiting Demersal Trawl Vessels Fishing Grounds in the Forth and Tay

Fishing vessel	Length (m)	Home port
Vessel BM	9.45	Blyth
Vessel BN	9.75	Seahouses
Vessel BO	9.90	Seahouses
Vessel BP	9.92	Amble
Vessel BQ	11.88	Amble
Vessel BR	12.08	Amble
Vessel BS	12.20	Amble
Vessel BT	13.17	Amble
Vessel BU	13.40	Buckie
Vessel BL	13.90	Macduff
Vessel BV	14.90	Seahouses
Vessel BW	14.95	Kirkwall
Vessel BX	14.99	Oban
Vessel BY	16.28	Seahouses
Vessel BZ	16.61	Kirkwall
Vessel CA	16.73	Amble
Vessel CB	18.59	Ardglass
Vessel CC	18.60	Buckie

The basic specifications of Vessel BL are listed in Table 18A.24 . Vessel BL is based in Macduff in the Moray Firth but will seasonally target nephrops in the Forth and Tay area once the Moray Firth directed squid fishery has finished.

Table 18A.24 Specifications of Vessel BL, a Visiting Nephrops Demersal Trawler

Fishing vessel	Vessel BL
Home port	Macduff
Length	13.9 m
Main engine power	325 hp
Fishing association	SFF
Typical fishing trip duration	1 day
Seasonality of activity	Nephrops (in Forth and Tay) – December to May Squid (in Moray Firth) – June to December
Average number of days fishing per year	250 days per year
Average towing speed	2.5 knots
Average towing duration	3.5 hours
Average tow length	Up to 10 nm

As previously stated, vessels from Fraserburgh and Peterhead were reported to be targeting the species in the area, depending upon the productivity of the fishery (pers. comm. Arbroath and Montrose Fishermen's Association, 2012). These vessels are larger category over-15 metre vessels capable of operating in distant offshore grounds.

18A.10.3 Crab and Lobster Fishery

Table 18A.25 lists the creel vessels registered at ports within the Forth and Tay. As previously stated, the limitations of this information apply. It should be noted that all of the creel vessels listed in Table 18A.25 are under-15 metres in length and therefore their activities will not be included within the VMS data set.

Table 18A.25 List of Creelers Registered at Ports within the Forth and Tay Area (Source: MMO)

Vessel length category	Number of vessels	MMO registered home ports
Under-10 metres	201	44 Pittenweem 35 Eyemouth 34 Aberdeen 10 Montrose 8 Arbroath 8 Johnshaven 7 Anstruther 7 St. Andrews 6 Crail 6 Gourdon 6 Methil and Leven 5 Dunbar 5 Granton 5 St. Abbs 3 North Berwick 3 Port Seton 3 St. Monance 2 Burntisland 2 Stonehaven 1 Burnmouth 1 Cove
10-15 metres	9	3 Aberdeen 2 Eyemouth 2 Pittenweem 1 Dunbar 1 Gourdon

There are currently 39 local vessels that are known to be operating static gear to target crab and lobster within the Forth and Tay area, listed in Table 18A.26. The limited length of the vessels restricts their range of operation, largely by reducing their capacity to operate in deeper waters at greater distances from their home port (i.e. economic viability and safety issues) and in inclement weather conditions. The vessel specification of two vessels (Vessel D and Vessel CD) which are based at Arbroath and target crab and lobster species in the vicinity of the development are given in Table 18A.27 and Table 18A.28, respectively.

There are a number of visiting creel vessels in the southern area of the regional study area which are part of the transient English fleet (from Berwick, Seahouses and the Holy Island). However, due to their size restraints it is considered that these vessels will not operate within the vicinity of the development.

Table 18A.26 Forth and Tay Creelers who are known to be Actively Targeting Crab and Lobster

Fishing vessel	Length (m)	Home port
Vessel D	9.90	Arbroath
Vessel AE	9.26	Dunbar
Vessel CE	9.60	Arbroath
Vessel CF	4.87	North Berwick
Vessel CG	5.62	Burnmouth
Vessel CH	6.15	Burnmouth
Vessel CI	6.30	Burnmouth
Vessel CJ	6.40	Burnmouth
Vessel CK	6.40	St. Abbs
Vessel CL	6.50	Eyemouth
Vessel CM	6.90	Arbroath
Vessel CN	7.20	St Monance
Vessel CO	7.33	Arbroath
Vessel CP	7.39	Arbroath
Vessel CQ	7.52	Montrose
Vessel CR	7.70	Pittenweem
Vessel CS	7.77	Pittenweem
Vessel CT	7.87	Eyemouth
Vessel CU	7.93	Johnshaven
Vessel CV	7.95	Anstruther
Vessel CW	8.20	Arbroath
Vessel CX	8.25	Arbroath
Vessel CY	8.40	Eyemouth
Vessel CZ	8.60	St. Abbs
Vessel DA	8.75	Arbroath
Vessel DB	8.89	Eyemouth
Vessel DC	9.00	Arbroath
Vessel DD	9.15	Pittenweem
Vessel DE	9.15	St. Abbs
Vessel DF	9.20	Arbroath
Vessel DG	9.55	Burnmouth
Vessel DH	9.78	Dunbar
Vessel DI	9.78	Dunbar
Vessel CD	9.80	Arbroath
Vessel DJ	9.90	Montrose
Vessel DK	9.90	Montrose
Vessel DL	9.92	Burnmouth
Vessel DM	9.94	Pittenweem
Vessel DN	10.40	Pittenweem

Table 18A.27 Specifications of Vessel D, an Arbroath Creeler

Fishing vessel	Vessel D
Home port	Arbroath
Length	9.9 m
Main engine power	300 hp
Fishing association	Arbroath and District Static Gear Association
Typical fishing trip duration	7 to 14 hours
Seasonality of activity	Creels for edible crabs, lobster and velvet crabs – all year Netting – 2 months
Average number of days fishing per year	310 days per year
Average steaming speed	11 knots
Typical distance steamed per trip	20 nm to 50 nm

Table 18A.28 Specifications of Vessel CD, an Arbroath Creeler

Fishing vessel	Vessel CD
Home port	Arbroath
Length	9.8 m
Main engine power	300 hp
Fishing association	Arbroath and District Static Gear Association
Typical fishing trip duration	12 to 14 hours
Seasonality of activity	Creels for edible crabs, lobster and velvet crabs – all year
Average number of days fishing per year	320 days per year
Average steaming speed	9 knots
Typical distance steamed per trip	14 nm

18A.11 Fishing Grounds

The charts below have been produced using information provided by individual fishermen on paper charts. As whitefish are targeted further offshore by vessels not landing into ports within the Forth and Tay area, they have not been included in this format.

18A.11.1 Scallop Fishing Grounds

Figure 18A.56 shows the location of scallop grounds relative to the development as identified by two individual vessels. Scallop grounds are located on in areas encompassing and adjacent to the development.

18A.11.2 Nephrops Fishing Grounds

Figure 18A.57 shows the principal nephrops grounds in the Forth and Tay area. It can be seen that the majority of grounds are inshore and to the south of the Forth and Tay area, with three vessels (vessels 6, 7 and 8) and vessels from Fishing Association 1 identified as targeting nephrops off the coast at Arbroath. One vessel (vessel 8) also targets nephrops grounds in the north of the development. It should be noted however that this has not been corroborated by additional information collected throughout this assessment. There are no other nephrops grounds within the site.

18A.11.3 Squid Fishing Grounds

Fishermen targeting squid in the Forth and Tay area stated that the species were caught in a variety of locations and in addition, fishermen are catching squid in new grounds. The grounds identified in Figure 18A.58 are therefore considered to be general squid fishing areas, not discrete grounds, and verification through analysis of VMS data sets is not possible as a result of the vessels' length (under-15 metres). The areas identified by vessels are in inshore areas to the south of the Forth and Tay area, and in areas further offshore, including within the development.

18A.11.4 Crab and Lobster Fishing Grounds

Figure 18A.59 shows the principal creel fishing grounds in the Forth and Tay area. It can be seen that, for the most part, grounds are inshore, largely as a result of the limited operational range of the vessels involved and the avoidance of towed gear grounds in areas further offshore. The Bell Rock is however considered to be an important creel area.

There are four vessels (vessels 1, 9, 10 and 11) which set creels within the northern section of the development.

Figure 18A.56 Scallop Fishing Grounds by Vessel in the Regional Study Area

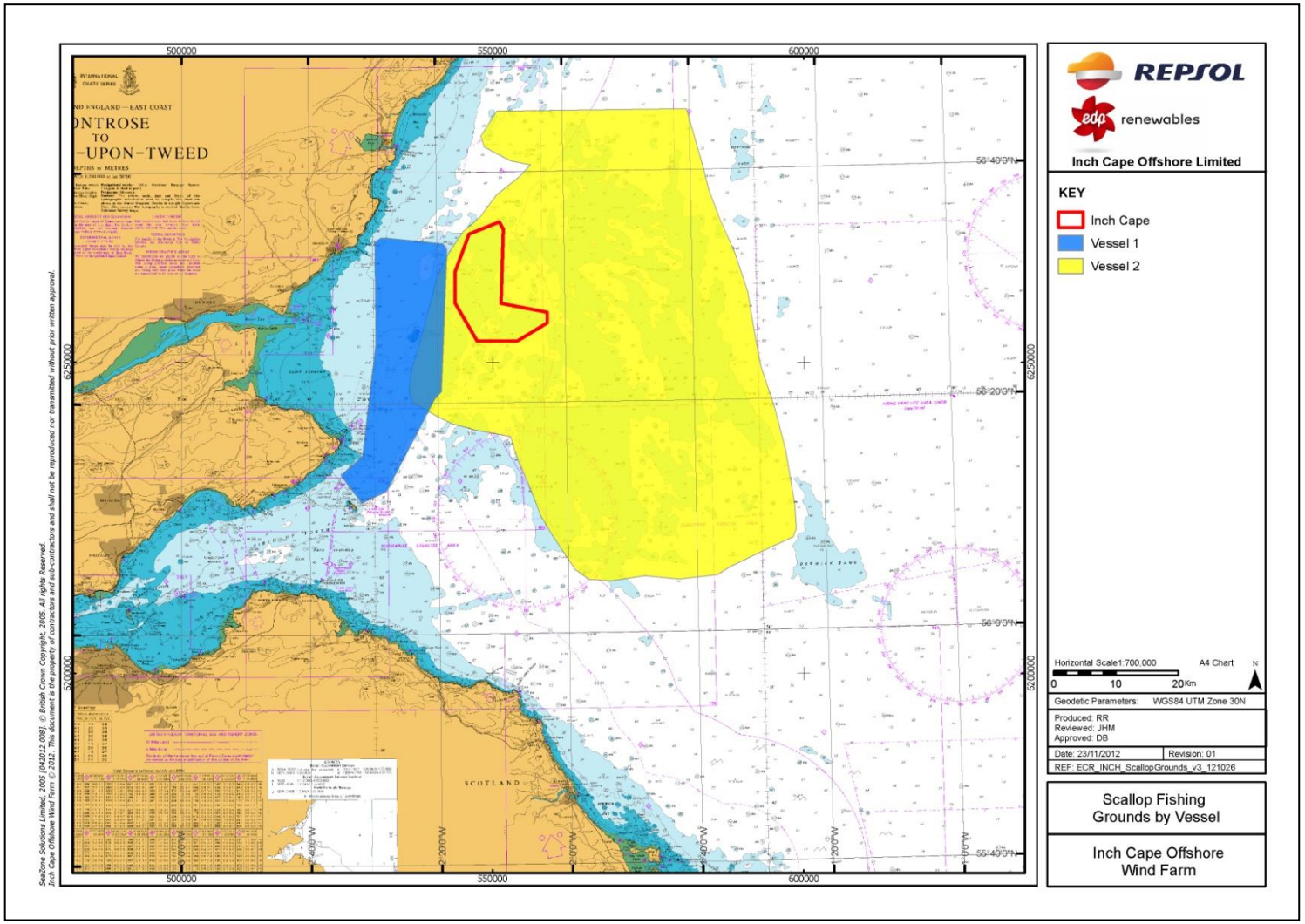


Figure 18A.57 Nephrops Fishing Grounds by Vessel in the Regional Study Area

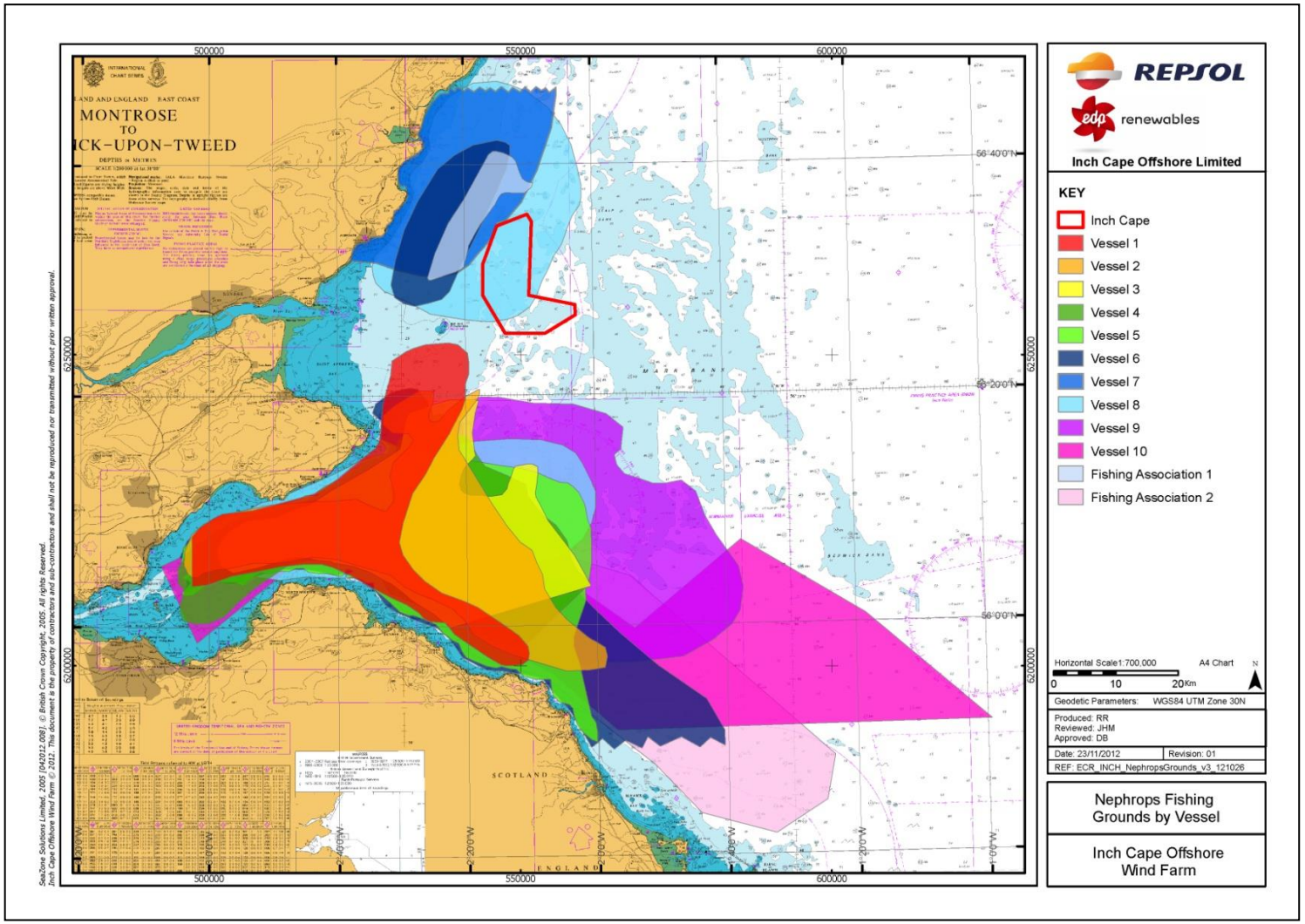


Figure 18A.58 Squid Fishing Areas by Vessel in the Regional Study Area

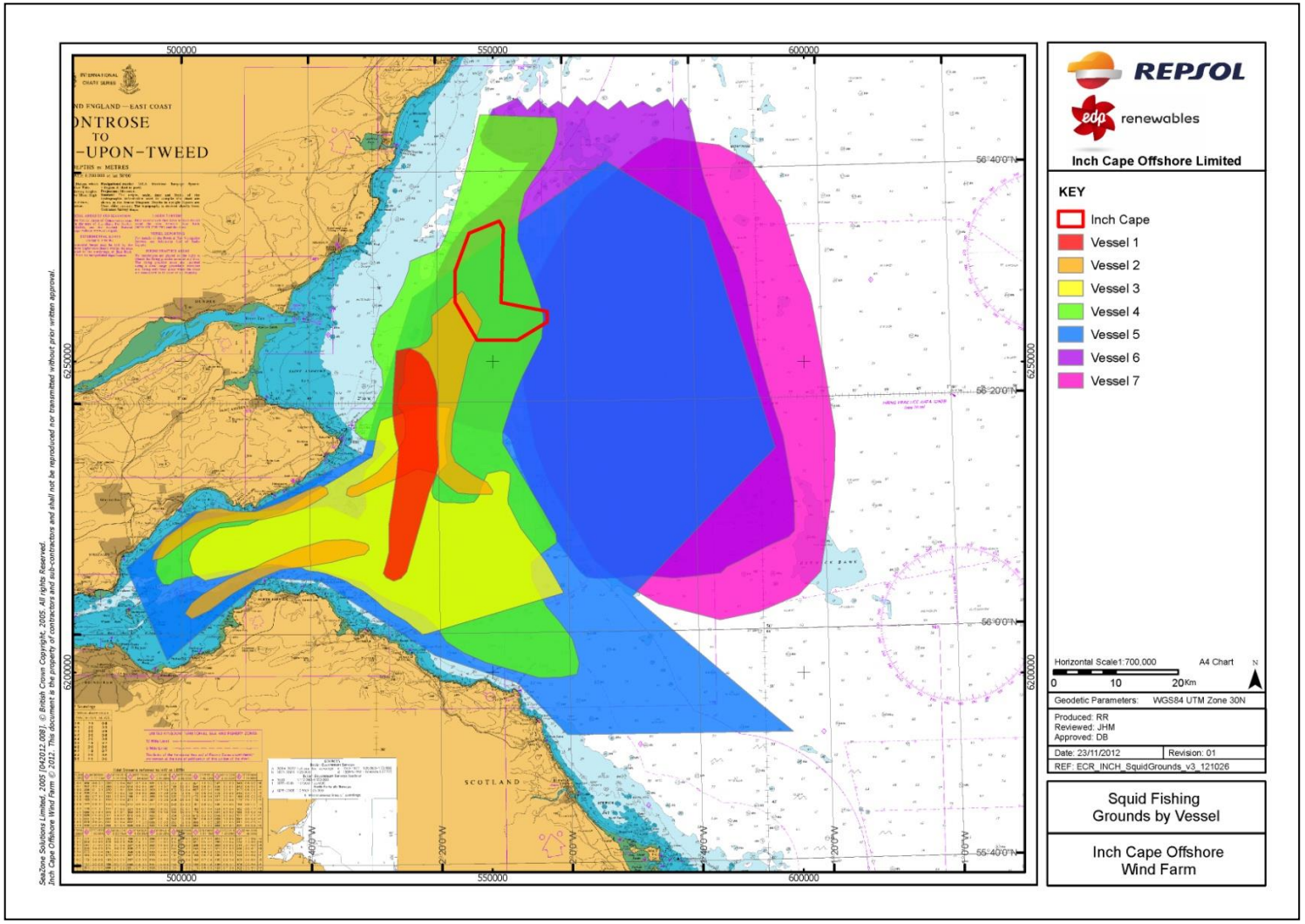
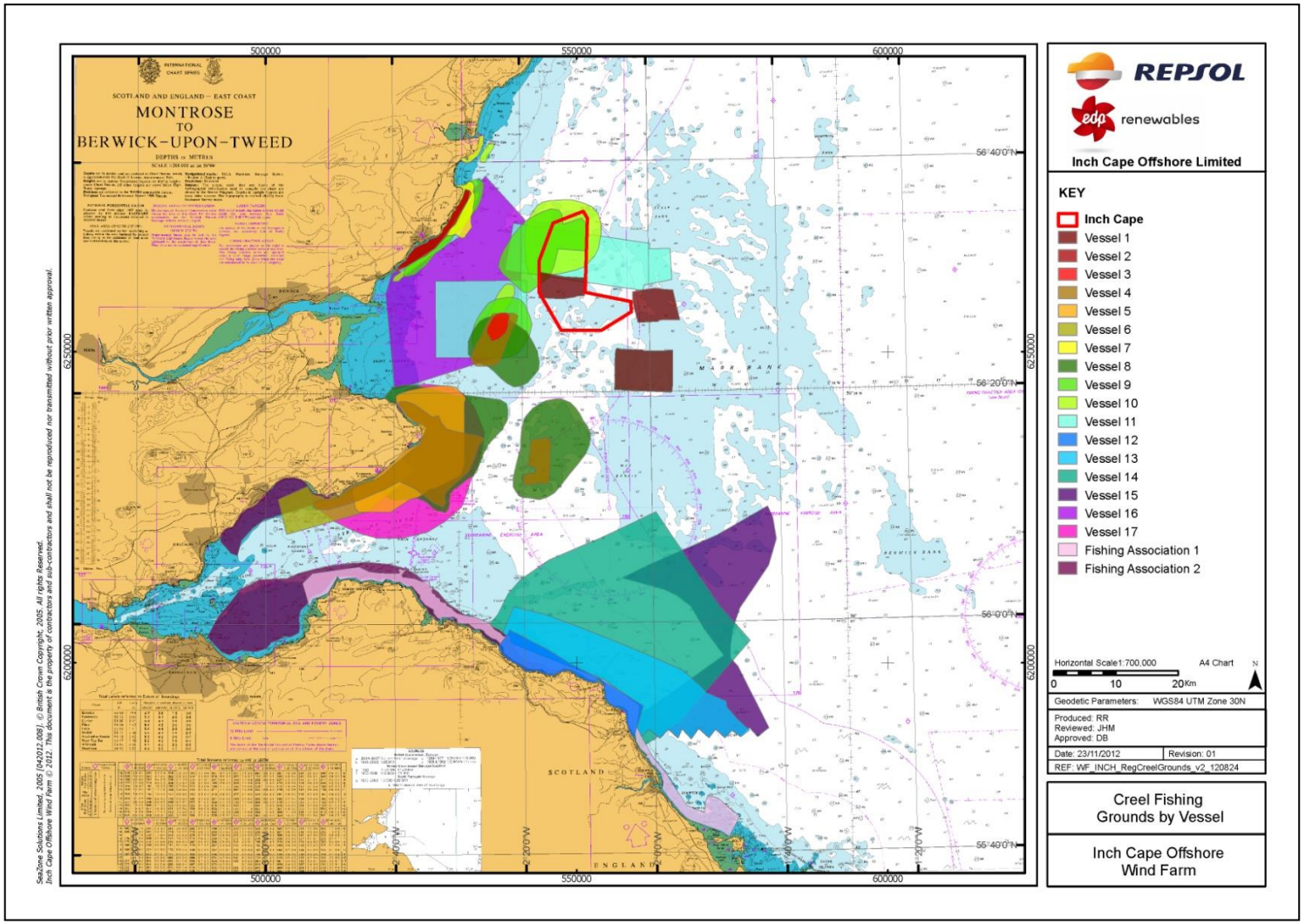


Figure 18A.59 Creel Fishing Grounds by Vessel in the Regional Study Area



18A.12 Future Fisheries

Commercial fishing activities are not constant and patterns of fishing activity fluctuate both annually and on a longer term basis. As a result, predictions of future fishing activity are complicated. Furthermore, impending changes to fisheries management as a result of revisions to the CFP and other related legislation will likely significantly alter future fishing practices.

A summary of the potential changes in current fishing activities that may occur in the future is provided below. This summary is based upon current knowledge of fishing patterns and practices in the Forth and Tay area.

18A.12.1 Scallop Fishery

Marine Scotland Science recommends that to protect scallop stocks and effectively manage the fishery, restrictions on the number of vessels entering the scallop fleet and increases in the minimum landing size are introduced in the near future[15]. As has been previously stated, the Isle of Man has already introduced fishing restrictions to protect stocks. In addition, concerns over the impact of scallop dredging upon the environment have resulted in restricted or no access to sea areas, such as has occurred in Cardigan Bay. It is possible and indeed likely, in light of the commitments to increased protection of marine habitats through the establishment of Marine Protected Areas (MPAs), that further restrictions will apply to the fishery as it exists in its current form.

18A.12.2 Nephrops Fishery

The nephrops fishery in the Forth and Tay area is currently considered to be sustainably exploited and significant changes to the activity of the fleet are not expected in the future. It is possible however, that other pressures on the fleet, such as rising fuel and crew costs and national quota cuts, may result in a number of vessels being decommissioned.

As previously stated, all demersal trawl vessels operating in the Forth and Tay area target nephrops year round, as well as squid on a seasonal basis depending upon the productivity of the fishery. These vessels are however able to also target whitefish although a current lack of available quota, coupled with a collapse in the fishery in the area, has curtailed this activity. It is possible that stocks of whitefish may recover and, subject to having access to the species, vessels may target this fishery in the future.

18A.12.3 Squid Fishery

The squid fishery is a relatively new fishery to the Forth and Tay area, and future fishing practices are uncertain. It has however become an important alternative fishery for the nephrops fleet and it is likely, in the light of restrictions on pressure stock species such as whitefish and nephrops, that it will be increasingly important in the future.

Squid populations are currently perceived to be resistant to fishing pressure, however as squid have a relatively short life span, there are growing concerns that overfishing will result in limited numbers of spawning stock and a population depletion. Predicting the future of squid stocks is complicated and potentially misrepresentative due to the erratic fluctuations in stocks and squids high sensitivity to environmental factors. Current day factors, such as climate change and rising sea temperatures pose a risk to discrete squid populations as they continue to move to higher latitudes[16].

[15] Keltz, S. and Bailey, N. (2010) Fish and Shellfish Stocks 2010. *Marine Scotland Science. The Scottish Government*

[16] Hastie, L., Pierce, G., Pita, C., Viana, M., Smith, J. and Wangvoralak, S. (2009) Squid Fishing in UK Waters. *Report to SEAFISH Industry Authority*

Predicting the seasonality of squid stocks can also be difficult as it can vary annually. Vessels targeting squid are currently beginning earlier and finishing later each year. A major concern of the inshore fishermen is the early depletion of squid stocks as it leaves them with few alternative options for the remainder of the year (pers. comm. squid fisherman, December 2010).

As a result of the relatively recent focus on the squid fishery, there is the potential for fishing practices to be further adapted to better target the species. 'Jigging' for example, could be used in the Forth and Tay area. Jigging is fishing using a multi-hooked line and a mechanical, and nowadays computerised, jigger. The hooks are disguised with feathers or fish-like lures to attract the target species, and jigged up and down a few inches to seem lifelike. Fishing by this method is done mainly inshore, but larger craft would be able to target grounds further offshore. There is the possibility that jigging could be increasingly used in the future[17] as an alternative to traditional towed gear fishing methods. Furthermore, a Seafish study also considers that there are more productive marketing opportunities for squid in the UK than are currently exploited[18].

18A.12.4 Bivalve Fishery

There is currently a small bivalve fishery in the Anstruther district, targeted by one vessel which operates a small hydraulic dredge to target razor and surf clams in shallow waters off Pettycur Bay (between Kinghorn and Burntisland). There are however productive bivalve grounds in several inshore areas, such as Kinshaldy beach, Kirkcaldy Bay and St Andrews Bay, although commercial fishing activities are currently prohibited. At the time of writing a bivalve survey was being undertaken in St Andrews Bay, aimed at assessing population densities of bivalve species (pers. comm. IFG co-ordinator, February 2011). It is possible that in the future restrictions upon the prosecution of this fishery may be lifted, subject to an assessment upon the sustainability of stocks being undertaken.

18A.12.5 Sprat Fishery

Sprats were traditionally targeted in the Inner Forth, where the species over-wintered. There was a productive fishery about 20 years ago, targeted by an estimated 100 vessels. Concerns about the level of juvenile herring bi-catch led to the closure of the fishery. It is believed, however, that it is only when the sprat move into the outer Firth (generally around February) that the species mixes with herring stocks. The South East IFG has proposed to survey the inner Forth over winter to identify clean sprat (i.e. no juvenile herring bi-catch) that are of a size suitable for human consumption, which if successful may lead to the identification of a small scale fishery in the future (pers. comm. IFG coordinator, February 2011).

18A.12.6 Sandeel Fishery

There is currently no industrial trawling for sandeels in the vicinity of the development. There has however been a historic sandeel fishery, with fishing grounds on the east coast of Scotland including the Wee Bankie. Sandeel fishing grounds on the Wee Bankie were closed to industrial trawling in 2000 as a result of concerns about stock populations and the associated effect upon predators of conservation concern[19] (sandeels are a key component of the marine food web, providing food for seabirds, fish species and marine mammals).

The sandeel fishery is generally a Danish one, with the Danish fleet (operating in the main out of Esberg) allocated over 90% of the TAC for sandeels in the North Sea.

[17] Young, I.A.G., Pierce, G.J., Stowasser, G., Santos, M.B., Wang, J., Boyle, P.R., Shaw, P.W., Bailey, N., Tuck, I. and Collins, M.A. (2006) The Moray Firth directed squid fishery. *Fisheries Research*, 78, 39-43

[18] Hastie, L., Pierce, G., Pita, C., Viana, M., Smith, J. and Wangvoralak, S. (2009) Squid Fishing in UK Waters. *Report to SEAFISH Industry Authority*

[19] FIN (2008) Annual Review of the Feed grade fish stocks used to produce fishmeal and fish oil for the UK market. *FIN Dossier 2008*

Whilst some scientific surveying has been undertaken by the Danes, recorded levels of catch have not met requirements for the reopening of the fishery and there is still a moratorium on trawling for sandeels on the Wee Bankie. Vessels currently target sandeels elsewhere in the North Sea, such as on the Dogger Bank. It is possible that the species may recover to sufficient levels for the fishery to reopen in the future and the Danish fleet regains access to the Wee Bankie to target the species.

It should be noted that there is no historic access for the Danish fleet to waters between the 6 nm and 12 nm limit and activity was therefore restricted to outside of 12 nm, and thus outside the Inch Cape site boundary.

18A.12.7 Future Activity and Regulations

Changes to quota and effort allocation, fishing areas and gear restrictions make predicting future fishing activity difficult and subjective. Additionally, the CFP is undergoing reformation due to concerns in the fishing industry over the ineffectiveness of the policy in its current form. The reformation of the CFP will have an impact on the management of commercial fishing activities.

18A.12.7.1 Reform of the Common Fisheries Policy

Since 1983, the EU CFP has primarily dictated the structure and capacity of the UK fishing fleet. The CFP was reviewed in 2002 to ensure the sustainable exploitation of fisheries. In 2007 however, the EU Court of Auditors judged that the CFP has failed to achieve this objective and a new review was launched in 2008. Changes to the CFP were proposed in summer 2011. These include:

- Taking action against over-fishing and introduce more sustainable management of fisheries;
- Ensuring productivity of fish stocks to maximise long-term yields;
- Introducing a multi-annual plans governed by an ecosystem approach;
- Simplify rules and decentralise management;
- Introducing a system of transferable fishing concessions;
- Introducing measures that are beneficial to small-scale fisheries;
- Introducing a ban on discards;
- Introducing new marketing standards and clearer labelling;
- Introducing a better framework for aquaculture;
- Introducing EU financial assistance to support sustainability objectives;
- Maintaining up-to-date information on state of marine resources; and
- Promoting international responsibility.

The proposals are currently being discussed in the European Parliament and Council, with policy negotiations with Member States continuing in 2012. A reform agreement is expected to be reached in autumn 2012, with the reformed CFP entering into force in 2013.

It is likely that there will be considerable restructuring of current fisheries management policies as a result of the reformation, which will affect commercial fishing activities in the future.

18A.12.7.2 Changes in Fleet Size

The current national fleet is considered to be proportionate with sustainable stock levels by those in the fishing industry and it is therefore considered that fishing practices will not alter considerably in the future. It is possible however, that reduction in quota allowance and cuts in effort could lead to a reduction in fleet size.

If future pressure stock levels are deemed to be unsustainable, it is possible that further rounds of decommissioning may be introduced, which could be voluntary or compulsory.

18A.12.7.3 Changes in Vessel Use and Fishing Gear Configuration

Vessels have generally increased in size and power over the past twenty years, however this is considered to be incremental and in line with normal advancement. There are several factors which could have the potential to affect the fishing method or gear a vessel employs:

18A.12.7.3.1 Increased Fuel Costs

Increases in fuel costs have led to fishermen altering the configuration of their vessels, fishing gears and operating patterns to minimise costs. A number of fishing gear trials to assess the feasibility of modified and alternative gears are currently being undertaken.

18A.12.7.3.2 Increased Restrictions upon certain Fishing Methods

Restrictions on specific fishing methods have led to vessels utilising different gear types or becoming multi-purpose in order to target other, less restrictive fisheries. This is most likely to be the case for demersal towed gear, which is considered to be one of the more environmentally sensitive fishing methods. Static gear methods, such as gill netting and long lining, are not considered to have such an environmental impact but can still target demersal species. It is therefore possible that use of static gear to target demersal species may increase in the future as a result of increasing restrictions on demersal towed gear.

18A.13 Consultation List

Consultation and liaison has been ongoing, and will continue, with the following organisations and individuals:

SFF

- Michael Sutherland;
- John Watt;
- Malcolm Morrisson.

FMA

- Billy Hughes (Fishing Industry Representative - FIR).

Anglo Scottish Fishermen's Association

- Sandy Ritchie (FIR).

SA

- John Hermse.

Anstruther Fishery Office

- Philip Gibson;
- Ellie Burt.

Eyemouth Fishery Office

- Stuart Bell.

Aberdeen Fishery Office

- Uilleam Fraser.

The following individuals and associations were additionally met with during the course of the baseline information gathering process:

Anglo-Scottish Fishermen's Association – October 2010

- William Aitcheson (vice chairman);
- Sandy Ritchie (secretary).

FMA – October 2010

- Billy Hughes (secretary);
- Graham Riley;
- Stuart Allen;
- John Davidson;
- Tom Gordon.

Arbroath Fishermen's Association – December 2010

- Bryan Beckett (chairman) and 14 members.

Cockenzie and Port Seton Fishermen's Association – December 2010

- Archie Johnson.

Arbroath and Montrose Fishermen's Association – April 2012

- Bryan Beckett (chairman) and 2 members.

In addition to the above-listed consultation, three fisheries stakeholder events were held in February 2011 and April 2012 on behalf of the FTOWDG, to which all fishermen operating in the area were invited to attend.

The skippers of the following vessels (Table 18A.29) contributed to the commercial fishing baseline:

Table 18A.29 List of Vessels who Contributed to the Commercial Fishing Baseline

Vessel	Home port	Vessel type
Vessel CV	Anstruther	Creels
Vessel CD	Arbroath	Creels
Vessel CE	Arbroath	Creels
Vessel CM	Arbroath	Creels
Vessel CO	Arbroath	Creels
Vessel CP	Arbroath	Creels
Vessel CW	Arbroath	Creels
Vessel CX	Arbroath	Creels
Vessel D	Arbroath	Creels
Vessel DA	Arbroath	Creels
Vessel DC	Arbroath	Creels
Vessel DF	Arbroath	Creels
Vessel CJ	Burnmouth	Creels
Vessel DL	Burnmouth	Creels
Vessel CL	Eyemouth	Creels
Vessel CT	Eyemouth	Creels
Vessel CY	Eyemouth	Creels
Vessel CU	Johnshaven	Creels
Vessel CQ	Montrose	Creels
Vessel DJ	Montrose	Creels
Vessel DK	Montrose	Creels
Vessel CR	Pittenweem	Creels
Vessel CS	Pittenweem	Creels
Vessel DD	Pittenweem	Creels
Vessel DM	Pittenweem	Creels
Vessel CK	St. Abbs	Creels
Vessel CZ	St. Abbs	Creels
Vessel DE	St. Abbs	Creels
Vessel CN	St. Monance	Creels
Vessel AX	Dunbar	Demersal trawl
Vessel AL	Eyemouth	Demersal trawl
Vessel AU	Eyemouth	Demersal trawl
Vessel AW	Eyemouth	Demersal trawl
Vessel BB	Eyemouth	Demersal trawl

Vessel	Home port	Vessel type
Vessel BL	Macduff	Demersal trawl
Vessel AZ	Montrose	Demersal trawl
Vessel AH	Pittenweem	Demersal trawl
Vessel AQ	Pittenweem	Demersal trawl
Vessel BC	Pittenweem	Demersal trawl
Vessel C	Pittenweem	Demersal trawl
Vessel F	Pittenweem	Demersal trawl
Vessel BV	Seahouses	Demersal trawl
Vessel DO	Stonehaven	Demersal trawl
Vessel AC	Dunbar	Demersal trawl and creels
Vessel AB	Arbroath	Demersal trawl and scallop dredge
Vessel A	Montrose	Demersal trawl and scallop dredge
Vessel E	Pittenweem	Demersal trawl and scallop dredge
Vessel I	Buckie	Scallop dredge
Vessel J	Buckie	Scallop dredge
Vessel B	Burntisland	Scallop dredge
Vessel M	Girvan	Scallop dredge
Vessel AA	Peterhead	Scallop dredge

18A.14 References

Beukers-Stewart, B.D. and Beukers-Stewart, J.S. (2009) Principles for the Management of Inshore Scallop Fisheries around the United Kingdom, *Environmental Department, University of York report to CCW/SNH/N*.

British Wind Energy Association(BWEA).(2004). *Recommendations for Fisheries Liaison.*

Cefas(2004). Offshore wind farms. *Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements.* – Version 2. Cefas, Prepared by Cefas on behalf of the Defra Marine Consents and Environment Unit, (MCEU) 2004. Available online from: http://www.cefas.co.uk/publications/files/windfarm-guidance.pdf [accessed April 2013].

European Parliament, Council(2003). *Council Regulation (EC) No 2287/2003 of 19 December 2003 fixing for 2004 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required.*

FIN (2008) Annual Review of the Feed grade fish stocks used to produce fishmeal and fish oil for the UK market. *FIN Dossier 2008*

Great Britain Parliament (1998). *Data Protection Act 1998*

Hastie, L., Pierce, G., Pita, C., Viana, M., Smith, J. and Wangvoralak, S. (2009).Squid Fishing in UK Waters. *Report to SEAFISH Industry Authority*

Holmes, S.J., Bailey, N., Campbell, N., Catarino, R., Barrett, K., Gibb, A., and Fernandes, P.G. (2011) Using fishery-dependant data to inform the development and operation of a co-management initiative to reduce cod mortality and cut discards. *ICES Journal of Marine Sciences* 68 (8): 1679-1688.

Howell, T.R.W., Davis, S.E.B., Donald, J., Dobby, H., Tuck, I. and Bailey, N. (2006) Report of Marine Laboratory Scallop Stock Assessments, *Fisheries Research* Services *Internal Report No. 08/06.*

Kafas, A., Jones, G., Watret, R., Davies, I. and Scott, B. (2012) Representation of the use of marine space by commercial fisheries in Marine Spatial Planning. *ICES Annual Science Conference 2012* Joint ICES/PICES Session I, ICES CM code: I:23

Keltz, S. and Bailey, N. (2010), *Fish and Shellfish Stocks 2010*, Marine Scotland Report.The Scottish Government.

Lee, J., South, A.B. and Jennings, S. (2010) Developing reliable, repeatable, and accessible methods to provide high-resolution estimates

Linnane, A., Ball, B., Munday, B., van Marlen, B., Bergman, M. and Fonteyne, R. (2000), A review of potential techniques to reduce the environmental impact of demersal trawls, *Irish Fisheries Investigations (New Series) No. 7*.

Marine (Scotland) Act 2010. *Marine Licensing Requirements* (replacing Section 5 Part II of the Food and Environmental Protection Act 1985 and Section 34 of the Coast Protection Act, 1949).

Natural Scotland (2010) Scottish Sea Fisheries Statistics 2009, *Scottish Government*

Ross, D. (2010) Scallop-dredging row leaves Scots boats nowhere to fish. *The Herald Scotland, 18/11/10*.

Scottish Parliament(1998) *Scotland Act (1998*). Available at: http://www.legislation.gov.uk/ukpga/1998/46/contents

Scottish Parliament (2004) *Inshore Fishing (Prohibition of Fishing and Fishing Methods) (Scotland) Order 2004.*

Synthesis of the Consultation on the Reform of the Common Fisheries Policy (2010) *European Commission*

The Scottish Government (2010), The Future of Fisheries Management in Scotland; *Edinburgh 2010*.

The Scottish Government, Fisheries Section: http://www.scotland.gov.uk/Topics/Fisheries/Sea-Fisheries (2011)

Young, I.A.G., Pierce, G.J., Stowasser, G., Santos, M.B., Wang, J., Boyle, P.R., Shaw, P.W., Bailey, N., Tuck, I. and Collins, M.A. (2006) The Moray Firth directed squid fishery. *Fisheries Research*, 78, 39-43