

Beatrice Offshore Windfarm Limited (BOWL)

Scottish and Southern Electricity (SSE) Renewables & SeaEnergy Renewables

Commercial Fisheries Baseline

Brown & May Marine Ltd
Progress Way
Mid Suffolk Business Park
Eye
Suffolk
IP23 7HU
Tel: 01379 870181
Fax: 01379 870673
Email: sja@brownmay.com

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1.0 Executive Summary

The principal species targeted in the immediate area of the Beatrice offshore wind farm development is scallops. The ICES rectangle within which the Beatrice site is located (45E7) records the highest scallop landings in the Moray Firth, with a total value of medium importance on a national scale, at £957,355 (averaged 2000-2009), 57% of the total value of landings of that rectangle.

Scallops are principally targeted by boat dredges. Scallop vessels generally tow between one and two beams onto which a number of dredges are attached, depending upon vessel size, engine power and winch capacity. The number of dredges can vary from three or four on a small 10 metre boat and up to 18-20 on a 30 metre vessel with 1500hp. The principal type of dredge used is the English 'Springer' type, whereby the scallops are raked from the seabed by steel teeth that are attached along the leading edge of the dredges and which penetrate the seabed to a depth of approximately 20cm. Scallop dredging is not restricted by quota or effort and activity occurs year round, although it peaks in the summer months.

It is considered that the majority of vessels targeting scallops in the Moray Firth are over-15 metres in length. As a result it is possible to identify the activities of this fleet using satellite tracking (VMS) data. The VMS data indicates that the majority of the activity carried out by the over-15 metre scallop fleet during 2009 occurred to the east of the wind farm site, although annual fluctuations in activity should be noted. Previous data provided by Marine Scotland and consultation with scallop fishermen suggests that on occasion scallop grounds within the Beatrice wind farm site are targeted by the over-15 metre fleet and will be again. Scallop fishing is cyclical: large category (over-15 metres) vessels generally target grounds intensively for a period and they are then left to recover. Scallop fishing grounds are located on the Scottish east coast, the west coast, the Irish Sea and the English Channel, and vessels may potentially target grounds in these areas depending upon productivity.

In addition to the over-15 metre fleet, several small category vessels have been identified as operating in the area. Due to the limited operational range of these vessels, it is considered that their activity is restricted to grounds within the Moray Firth.

As has been previously stated, scallop landings fluctuate year on year. At the time of writing Marine Scotland considers stock levels in the Moray Firth to be stable. Other scallop grounds around the UK such as those located in Cardigan Bay and waters of the Isle of Man, have been subject to restrictions and closures as a result of concerns over scallop populations. Whilst this is currently not the case in the Moray Firth, it is nevertheless a possibility that future restrictions upon activity may apply.

Nephrops are the highest value shellfish species in the Moray Firth. The fishery, whilst of high importance to the Moray Firth, is one of the smaller Scottish nephrops fisheries, and is currently sustainably exploited. Vessels towing bottom otter trawls principally target the species, operating either one or two nets. Vessels of a range of lengths and power target the species. Activity is high in the summer months and is low to moderate for the remainder of the year. Nephrops inhabit muddy substrates and the Beatrice offshore wind farm site is not located on substrate type favoured by nephrops. Instead grounds are situated in the southern portion of the Moray Firth and areas of the inner Firth.

Within the Moray Firth area, whitefish, principally haddock, are mainly targeted by Scottish seine netters to the north east of the wind farm site. There is also a discrete haddock fishery down the south east coast, towards Fraserburgh. Haddock is targeted throughout the year, although there is a

decline in landings during the summer months. Marine Scotland data show some landings of cod in the same area, likely as a result of the mixed fishery. Whitefish are principally targeted by the over-15 metre fleet and landings are low within the Beatrice wind farm site. Historically, UK whitefish landings have declined significantly as a result of overfishing and the pattern is repeated in the Moray Firth. Fisheries management policies established to limit fishing pressure on dwindling whitefish stocks have had the effect of reducing both fleet numbers and time spent at sea by those remaining vessels. It is possible that stocks may recover to a sufficient extent to see increased effort in the fishery, although this is not considered likely.

Squid is an increasingly important fishery in the Moray Firth, it is currently unregulated and vessels which are constrained by restrictions on other pressure stocks may target the species. Annual landings values vary significantly; the fishery is dependent upon the arrival of the species in the area to spawn. Peak landings for squid occur between August and October. Bottom otter trawls targeting nephrops or whitefish may reconfigure gear to operate nets with a smaller mesh size and a higher headline. The species is often targeted on rough ground and vessels may employ protective gear, such as rockhoppers. Depending upon productivity of the fishery, vessels of all categories, from small, inshore boats to larger category, visiting vessels could potentially target squid in the Moray Firth. At present, squid is considered generally resistant to fishing pressure, it is however considered that squid spawning grounds need to be identified and effectively managed in order protect future stocks.

There is a small static gear fishery in the Moray Firth, principally located in inshore waters inside of 6nm. Crustaceans such as crab and lobster are the main species targeted and vessels are under-15 metres in length. Species such as crab and lobster predominantly inhabit rocky habitats and are found in and around protected areas such as wrecks. Fishing grounds in the Moray Firth are located along the Caithness coast and to a lesser extent in areas in the south. There are no identified static gear grounds within the Beatrice offshore wind farm site.

There are currently several small scale bivalve fisheries in the inner Firths (Cromarty Firth, Dornoch Firth, etc.), as well as small scale artisanal fishing for mackerel.

2.0 Introduction

This report provides a commercial fisheries baseline relevant to the Beatrice offshore wind farm in order that an Environmental Impact Assessment (EIA) of the development relative to commercial fishing activities in the area may be undertaken, and to inform mitigation strategies, if required.

The following legislation and guidance has been considered in the preparation of this baseline: Food and Environment Protection Act (1985) (FEPA), Coast Protection Act (1949) (CPA), Department for Environment Food and Rural Affairs (DEFRA) and Centre for Environment, Fisheries and Aquaculture Science (CEFAS) requirements as specified in the 2004 Guidelines (CEFAS 2004) and British Wind Energy Association 2004 Recommendations (BWEA 2004).

In the case of wild salmon and sea trout fisheries, a combination of the regional socio-economic importance of these activities and the significant difference between commercial fishing and salmon and sea trout fishing is such that they have been separately assessed, and the findings covered in an additional report (BMM Salmon and Sea Trout Ecology and Fisheries Technical Report, November 2011).

There is no single data source or recognised model for establishing commercial fisheries baselines within small, discrete sea areas such as offshore wind farm sites. As a result the following description of the baseline has been derived using data and information from a number of sources.

Establishing a fisheries baseline is complicated by the fact that fishing activities are rarely the same year on year. Fluctuations in landings, changes in legislation, economic constraints such as fuel costs and crew availability, as well as additional environmental restrictions such as weather all contribute to variations in a fisheries baseline.

3.0 Study Area

The study area for the assessment of commercial fishing intensity and values is shown in Figure 3.1. The approach has been to provide a brief national overview (national study area) in order to situate fishing grounds in the general area of the Beatrice site within a national context. The regional study area has subsequently been defined to ensure sufficient coverage of those areas surrounding the site, and the local study area is the smallest available spatial unit for the collation of fisheries statistics. Where possible, fishing activities in the specific area of the site have been described.

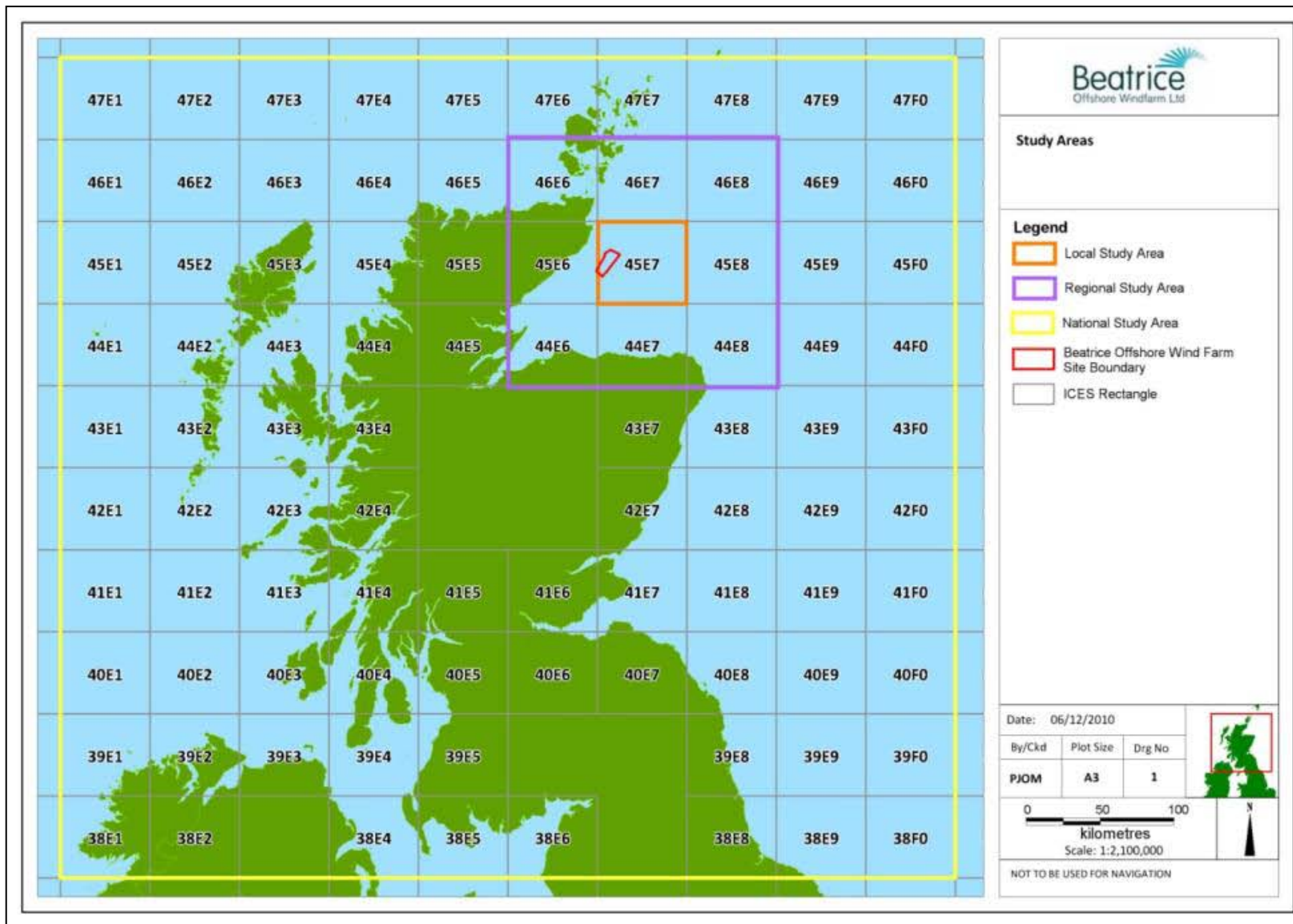


Figure 3.1 Beatrice Offshore Wind Farm Study Areas

4.0 Methodology

Establishing a commercial fisheries baseline requires an approach that incorporates a number of different data and information sources. Each data and information source is subject to varying sensitivities and limitations, described in Section 5.0, and as a result separate analysis is required in each instance. The aim is to describe in progressive detail commercial fishing activities by building upon the sources and analysis outlined below:

4.1 MMO Fisheries Statistics (Landings Values and Effort Data Sets)

Fisheries statistical data for the ten year period between 2000 and 2009 has been collected by the Marine Management Organisation (MMO). The data includes landings (weight and value) and effort (days fished) data. This data set has been analysed to identify:

- Species targeted
- Fishing methods used
- Vessel by length category (under-10 metres, 10-15 metres, over-15 metres)
- Annual variations
- Seasonal variations
- Landings values and effort by port

4.2 MMO Satellite Tracking (VMS) Data

The MMO has provided satellite tracking data (Vessel Monitoring System - VMS) for the years 2005 to 2008 and 2009 for all fishing vessels over-15 metres in length. The 2005 to 2008 data collates the activities of all over-15 metre vessels, however the categorisation of these vessels by fishing method was unreliable and therefore the data set has not be broken down in this way. The 2009 data was released in a different format and is thus separately analysed. The densities of recorded position plots of the 2009 data are shown in a larger grid format, however vessels have been accurately categorised and the data sets have been classified by fishing method.

4.3 MMO Fisheries Surveillance Sightings Data

Fisheries surveillance sightings have also been provided by the MMO which records sightings of fishing vessels in UK waters by fishing method and nationality. The limitations of this data set are discussed in Section 5.2.3; however the data set is useful for the purposes of assessing the spatial distribution of all fishing vessels in UK waters.

4.4 Marine Scotland Data Analysis

Marine Scotland provided additional charts to illustrate the spatial densities of the over-15 metre fleet relative to recorded landings. This information supplements the data analysis already undertaken.

4.5 Fishery Specific Information

Information provided by fishermen and their representatives also contributes to the establishment of a commercial fisheries baseline. Such information assists in the identification of the fisheries that occur in the regional and local areas relative to the BOWL Development, and the vessels that target those fisheries. The information has been collated through consultation and liaison with fishing organisations, fishermen and their representatives.

Consultation and liaison was undertaken and will continue with the following organisations and individuals whose valuable contribution in providing information and data for this assessment is recognised and appreciated:

Scottish Fishermen's Federation (SFF)

- John Watt

- Michael Sutherland
- John Ewen

Scallop Association

- John Hermse

Scrabster Fishery Office

- George Cunningham

Buckie Fishery Office

- Michael Barclay

Aberdeen Fishery Office

- Uilliam Fraser

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

Caithness Static Gear Fishermen's Association

- Alex Calder (Chairman)

Fishermen's Association Ltd

- Alexander Patience

Whitehills Harbourmaster

- Bertie Milne

Fishing Industry Representatives (FIRs)

- Ronald Milne
- Jay McKay
- George Jack

The vessels listed in Table 4.1 overleaf contributed to the commercial fishing baseline, and were contacted directly either by Brown and May Marine Ltd. (BMM) or the FIRs.

Table 4.1 Skippers who contributed to the Commercial Fishing Baseline

Vessel	Home Port	Vessel Type
Vessel A	Buckie	Creeler
Vessel B	Buckie	Demersal Trawler
Vessel C	Buckie	Demersal Trawler
Vessel D	Buckie	Scallop Dredges
Vessel E	Buckie	Scallop Dredge
Vessel F	Burntisland	Scallop Dredge
Vessel G	Burghead	Demersal Trawler
Vessel H	Burghead	Demersal Trawler
Vessel I	Dunbeath	Creeler
Vessel J	Girvan	Scallop Dredge
Vessel K	Helmsdale	Creeler
Vessel L	Helmsdale	Creeler
Vessel M	Helmsdale	Creeler
Vessel N	Inverness	Creeler
Vessel O	Lybster	Creeler
Vessel P	Lybster	Creeler
Vessel Q	Lybster	Creeler
Vessel R	Macduff	Demersal Trawler
Vessel S	Macduff	Demersal Trawler
Vessel T	Macduff	Demersal Trawler
Vessel U	Peterhead	Demersal Trawler
Vessel V	Peterhead	Scallop Dredge
Vessel W	Wick	Creeler
Vessel X	Wick	Creeler
Vessel Y	Wick	Creeler
Vessel Z	Wick	Seine Netter
Vessel AA	Wick	Scallop Dredge

4.6 Future Fisheries

In order to identify potential future changes to the existing baseline relevant to the timeframe of the BOWL Development, both desktop research and consultation were undertaken. It should be recognised that this data gathering is limited by the ongoing and proposed changes to the management of commercial fisheries.

5.0 Data and Information Sources, Sensitivities and Qualifications

The principal sources of data and information used were:

- International Council for the Exploration of the Sea (ICES)
- Marine Management Organisation (MMO)
- Marine Scotland
- Marine Scotland Science
- District Fishery Offices
- The Scottish Fishermen's Federation (SFF)
- Fishermen and their representatives
- Geotechnical, benthic and geophysical FLO logs

Consultation with local fishermen was principally undertaken by BMM, in association with the SFF and the FIRs appointed on behalf of the Moray Firth Offshore Wind Farm Developers Group (MFOWDG).

Analysis of the data and information sources used in the compiling of this baseline are subject to the following qualifications, limitations, sensitivities and gaps:

5.1 International Council for the Exploration of the Sea (ICES)

ICES statistical rectangles are the smallest spatial unit used for the collation of fisheries statistics used by the European Commission (EC) and Member States. The boundaries of ICES rectangles align to 1° of longitude and 30' of latitude. As is apparent from Figure 3.1 previously, however, the areas of ICES rectangles are large relative to the area of the Beatrice wind farm site, which is situated in ICES rectangle 45E7. Also, it is presumed that the spread of activity within a rectangle is not evenly distributed. Analysis of fisheries statistics by ICES rectangle should therefore take into account the small proportion of a statistical area that the site covers and the uneven distribution of activity throughout the rectangle.

5.2 MMO data sets

5.2.1 MMO Fisheries Statistics

The MMO collects and collates fisheries data by ICES rectangle for the whole of the UK. The principal source of data comes from the EC daily log sheets that over-10 metre vessels are required to complete and submit.

Vessels of under-10 metres in length are currently not obliged to submit daily log sheets although voluntary submissions can be made and, in addition, local fisheries officers undertake dockside checks on under-10 metre vessels. The Shellfish Entitlement Scheme, introduced in 2004 (discussed further in Section 6.5) and the "Registration of Buyers and Sellers of First Sale Fish and Designation Auction Site Scheme", introduced in 2005, further contribute to the collection of fisheries data for the under-10 metre fleet. It should be noted that the MMO fisheries statistics for this category in years prior to the introduction of these schemes, may, to some extent, underestimate the true levels of fishing in areas where a large percentage of the activity is by vessels within this category.

It should also be recognised that vessels referred to as "non-UK" in the MMO fisheries data includes only foreign vessels landing into UK ports. Foreign/non-UK vessels fishing in the area but landing into non-UK ports are not recorded by the MMO. The values given for non-UK vessels derived from the analysis of this data set should therefore not be taken as an indication of the total foreign activity in the area.

5.2.2 MMO UK Satellite Tracking (VMS) Data

Satellite tracking of European Union (EU) registered vessels currently applies to all vessels of more than 15 metres in overall length. The positions of the vessels are transmitted approximately every two hours via satellite link to the MMO and other national EU control centres. The MMO receives information on all UK vessels irrespective of location, and of foreign vessels within UK waters. The MMO however, cannot disclose data on foreign vessels without prior permission from the regulating body of the applicable Member State. Vessel position plots do not differentiate between vessels steaming and fishing and disclosure of UK vessels' identities is restricted under the Data Protection Act (1998).

It should be noted that there has been a recent change in UK and EU policy with regards to the release of satellite tracking data. The coordinates of the vessels can no longer be released; instead the number of plots by vessel type in a grid of rectangles of approximately 70nm² is given with a breakdown of density by gear type, which was not possible with the 2005-2008 data sets. The 2009 data has therefore been analysed independently from the 2005-2008 data sets given the differences in format.

5.2.3 MMO Surveillance Sightings

Surveillance sightings in UK waters are recorded by fishery protection aircraft and surface craft as a means of policing fisheries legislation. This type of data provides a good indication of the distribution of activity by method and nationality, it should not however be used for quantitative assessments of activity, given the low frequency of the flights over an area, which is generally once a week and only during daylight hours.

5.3 Marine Scotland Data Analysis

Charts have been provided to BMM by Marine Scotland Science to assist in the establishment of a commercial fisheries baseline in the Moray Firth area.

The charts provided show the distribution of commercial fishing landings from vessels exceeding 15 metres in length, by landing weight and value in Scottish waters for the years 2007-2009. The VMS records were applied to Fisheries Information Network (FIN), which is the Scottish Government's sea fisheries database. In addition to the VMS records, FIN also holds information on voyages (catches, gear, mesh size, etc.) and on landings (weight, price at sale, etc.). The VMS records are linked to landings data through one unique identifier common to both databases: the *Registry of Shipping and Seamen (RSS) number*, which identifies the vessel (this identifier is otherwise protected information). *Logtime*, the date and time of each VMS transmission, identifies the voyage by laying within the voyage start and end date times. This allows the linking of the location of the vessel at each trip to the weight of the landings and the value of the sale from said trips.

The speed of the vessel at the time of each VMS transmission has been used as a filter to eliminate those vessels steaming and not fishing, assuming that vessels travelling at 5 knots or over would be steaming. The information provided describes the landings of a fishing trip. Although a single trip will generally be comprised of a number of fishing events, information on catches per fishing event are not available and as a consequence multiple fishing events of a single trip are attributed with the overall landings weight and values for that entire trip. All information regarding the identity of individual trips or vessels is anonymous. As has been previously stated, the limitations of VMS monitoring only the over-15 metre fleet apply. It should also be noted that fishing grounds are not fixed year on year and exact locations of activity vary between years.

5.4 Fishermen and Fishermen's Representatives

Consultation has been undertaken with individual skippers and their representatives, with information collected and collated from these sources. It is possible that certain individuals and some unaffiliated stakeholders may not have been identified during the course of this assessment, although every attempt has been made, through open and advertised fisheries stakeholder meetings, extensive field work and through the forum of the Inshore Fisheries Group (IFG).

6.0 Fisheries Controls and Legislation

Whilst the international aspect of European fisheries negotiation, such as the settings of quotas, remains a reserved power, the implementation of fisheries regulations are devolved to the Scottish Parliament, and administered by Marine Scotland.

6.1 Fishing Vessel Licenses

All vessels engaged in commercial fishing must hold a valid fishing license. The system is designed to prevent increases in both fleet numbers and catching capacities through a system of vessel capacity units (VCUs). In addition to limiting any further increases in fishing vessel numbers, decommissioning schemes have, over the past 20 years, resulted in significant reductions in the numbers of UK and certain other Member States' fleets.

Since 1983 the structure and capacity of the UK and Scottish fishing fleets have been primarily dictated by the EU Common Fisheries Policy (CFP). Between 1997 and 2002 the Multi Annual Guidance Programme (MAGP) within the CFP was devised to manage fleet structures. In effect, fishing by method was restricted by capacity limits and effort reduction targets. When this programme ended it was replaced by Member State level controls which impose effort level ceilings through a system of exit/entry restrictions. In essence, fleet capacity (no. of vessels) cannot be increased, allowing vessels only to enter the fleet when an equivalent or larger capacity has exited the fleet.

One of the most significant impacts upon the Scottish fleet in recent years has been the two successive decommissioning schemes in 2001-2002 and 2003-2004, under which 165 vessels were removed from the national demersal fleet.

In 2010 the Scottish Government introduced Licence Parking as a measure to help the fleet adjust to current, restrictive conditions. The principle is to enable multiple existing fishing licenses to be combined and placed upon a single fishing vessel – thus sharing it – in order to reduce fixed and variable costs over both the short and long term. Alternatively, those wishing to leave the industry may be bought out and their effort concentrated on remaining vessels (under current licensing rules this is not possible). The process of 'parking' is however reversible; a parked license can be 'unparked'. Over 40 vessels applied for this scheme in 2010. In consultation with industry stakeholders and the Scottish Fisheries Council, Ministers have now also introduced a publicly funded (co-funded by the European Fisheries Fund) fleet resilience grant scheme aimed at disposing of those vessels made dormant through license parking.

6.2 Territorial Limits

Member States' territorial fishing limits extend out to 12nm. With some exceptions, access within 6nm of the coast is restricted to the vessels of that Member State. Only vessels from other Member States with historic rights are allowed access within the UK's 6-12nm limit. There are no historic rights for other Member State's vessels within Scotland's 6-12nm limit off the east coast, and hence within the area of the wind farm site.

It should be noted that a number of UK flagged fishing vessels are under foreign ownership, which could potentially fish within the UK 12 mile limit.

6.3 Quota Restrictions

Quotas are measured as the quantity of a species that can legally be landed within a specific period. The Scottish Executive manages the quota for fish stocks and controls the activities of fishing vessels and fishing effort (days at sea) in the Scottish waters of the North Sea, West of Scotland and Faroese waters, plus all inshore fisheries within the 12 mile territorial limit (The Scottish Government, 2010).

Such controls and regulations have had, and will continue to have, direct and indirect impacts on existing and future commercial fisheries baselines.

The principal remit of the CFP, ratified in the early 1980s, is the long-term conservation of fish stocks in EU waters. A central element of the CFP is a system of quotas by ICES area and sub-area. Species identified as requiring management are defined as pressure stocks. Annual Total Allowable Catches (TACs) are allocated for each pressure stock by area or sub-area.

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

Figure 6.1 shows the TACs for ICES area IV (North Sea) of the top 10 species for all countries, excluding blue whiting. Blue whiting has been excluded as a result of its proportionally high quota allocation. This species is targeted in deep, offshore waters and the TAC is not limited to Area IV.

Figure 6.2 shows the UK only total TAC (top 10 species) in area IV.

The system of quotas has however been criticised as a conservation measure despite being in place for more than 20 years as the primary stock conservation measure of the CFP. It is recognised that regulation by quotas encourages the discarding of either undersized or over-quota fish at sea. As of 2009, in recognition of failings such as this, the CFP is currently under reform, which could result in significant changes to future fisheries management policies and legislation. Changes to the reform were proposed in summer 2011 and are currently under discussion in the European Parliament and Council. The reformed CFP will enter into force in 2013.

6.3.1 Under-10 metre Fleet

The under-10 metre fishing fleet has not, as yet, been subject to the same levels of restrictions upon their activities as the over-10 metre sector. They are now, however, also subject to sea area and quota restrictions for certain species mainly as part of the 'Cod Recovery Programme'. Table 6.1 below shows the under-10 metre quota allocations for the past four years in the North Sea.

Table 6.1 Under-10 Metre Final Quota Allocations (Source: MMO)

Species	2007 Quota (Tonnes)	2008 Quota (Tonnes)	2009 Quota (Tonnes)	2010 Quota (Tonnes) (Provisional)
North Sea Nephrops	1587.3	1267.2	1078.8	882.0
North Sea Cod	281.0	403.1	561.3	588.0
North Sea Haddock	175.2	131.6	80.5	127.9
North Sea Sole	278.1	342.1	275.7	110.5
North Sea Plaice	43.3	54.2	40.7	40.4
North Sea Whiting	660.6	89.8	355.5	321.9
North Sea Skate and Rays	209.3	265.1	106.3	103.1
North Sea Lemon Sole/ Witches	62.6	72.6	23.2	22.2
North Sea Turbot/ Brill	22.7	17.9	15.0	10.6
North Sea Dab/ Flounder	17.6	18.7	18.9	19.4

Catch limits for nephrops were introduced in 1999 for the under-10 metre fleet in order to maintain the integrity of recorded landings and quota management of this stock. Vessel owners are required to complete the NEP1 form in respect of all landings over 12kg to be submitted to the Fishery Office on a weekly basis (Category A (10 metre and under) License: Conditions (91) Non Sector).

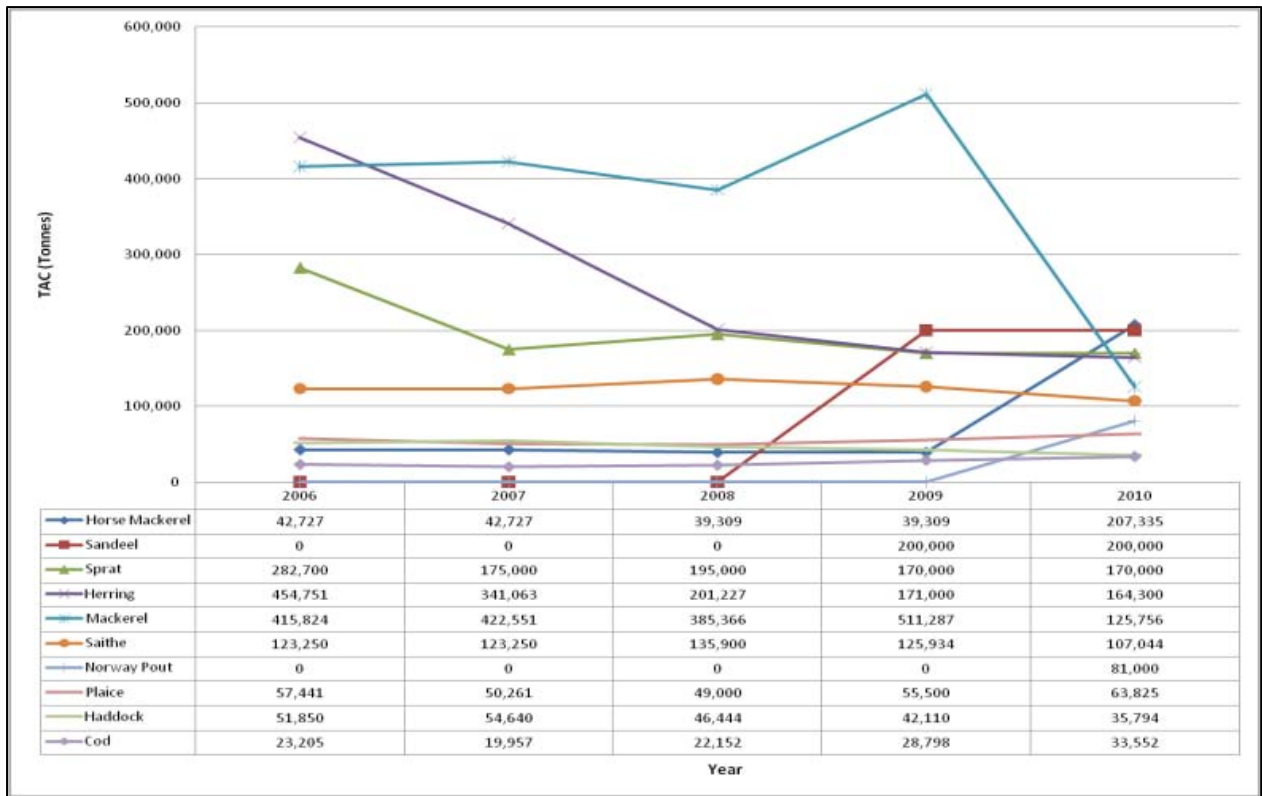


Figure 6.1 Combined National TACs (Top 10 Species) in ICES Area IV (North Sea), 2006-2010 (excluding Blue Whiting)
(Source: MMO)

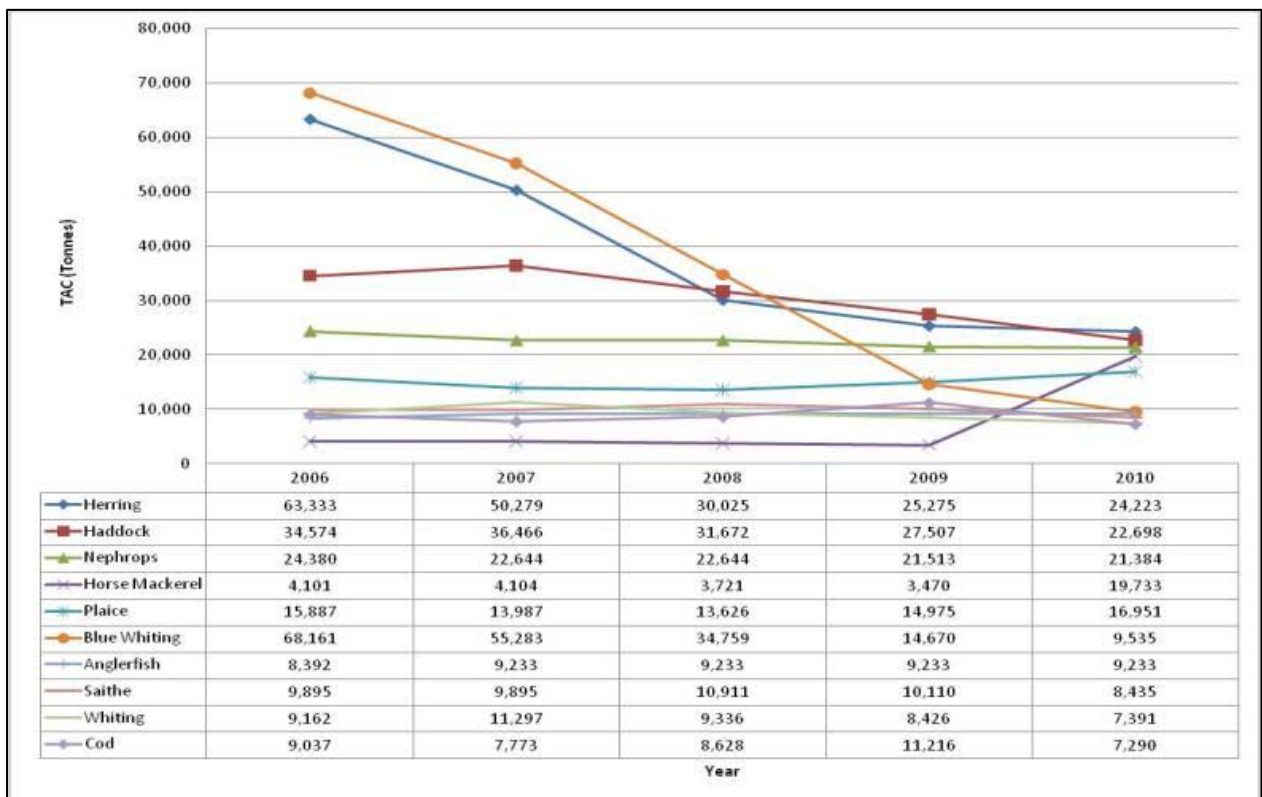


Figure 6.2 TACs (Top 10 Species) in ICES Area IV (North Sea), UK Only, 2006-2010 (Source: MMO)

6.4 Effort (Days at Sea) Restrictions

Over-10 metre vessels are currently also subject to days at sea limitations as part of the EC's policy of reducing fishing effort in EU waters. The regulation (Annex V, EU Regulation 2287/2003) is somewhat complex and relates to gear type, mesh size and elected management periods. In essence, vessels using demersal whitefish gears are restricted to the equivalent of 14-15 days a month at sea.

6.5 Shellfish Entitlements

Since 2004 vessels must also be specifically licensed to catch crabs and lobsters. Under these arrangements, shellfish entitlements allowing unrestricted amounts of crabs and lobsters to continue to be caught were issued to owners of licensed vessels that had a track record (between 1st January 1998 and 31st March 2004) of landing over a particular weight of these species per year (200kg lobster and 750kg crab). It is a condition of vessels of 10 metre and under with shellfish entitlements to submit weekly log sheets for crab and lobster landings to local Fishery Offices.

6.6 Scallop Dredging Restrictions

Scallop dredge vessels are restricted by the number of dredges they can use, depending upon the distance they are operating from the coast. Vessels fishing outside 12nm are allowed up to 14 dredges per side; within 6 and 12nm up to 10 dredges aside are permitted; and up to 8 dredges inside 6nm.

6.7 Regional and Local Fishing Restrictions

Restrictions upon fishing activities in addition to those transposed from EU and UK law are known as Scottish Statutory Instruments (SIs), a form of secondary legislation in Scotland, created by the Scotland Act 1998, and used to exercise devolved powers. There are several SIs in the regional study area, shown in Figure 6.3, and contained within the Inshore Fishing (Prohibition of Fishing and Fishing Methods) (Scotland) Order 2004, No.276 SI. It can be seen that SI restrictions in the Moray Firth apply to areas in the Inner Firth, well inshore of the wind farm boundary. In each instance, the use of mobile or active gear (except dredging, but not suction dredging, for mussels) is prohibited.

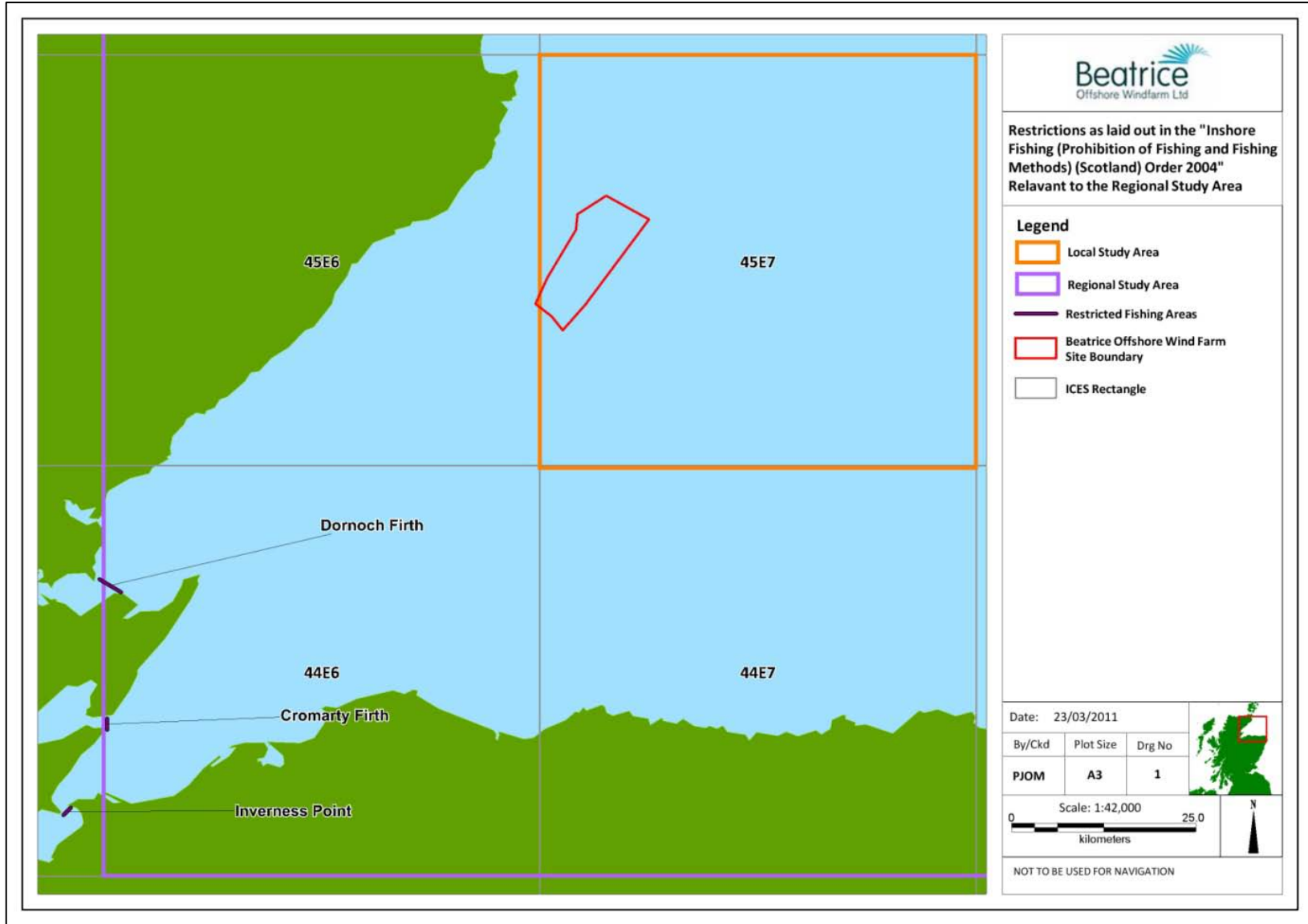


Figure 6.3 SI Restrictions upon Inshore Fishing Activities Relevant to the Regional Study Area (Source: Scottish Government)

7.0 MMO Fisheries Statistics

As has been previously stated, it should be recognised that the fisheries statistics analysed below are collated by ICES rectangle. An individual rectangle encompasses a comparatively large sea area relative to the Beatrice site, and although landings values are attributed to the whole rectangle, it is probable that fishing activities are not evenly distributed over the area of an ICES rectangle.

7.1 Landings Values

7.1.1 National Overview

Figure 7.1 and Figure 7.2 show the total landings values (average 2000-2009) by species and method in the national (Scottish) study area. It can be seen that the ICES rectangle within which the Beatrice site is located (45E7) records total values of medium importance on a national scale. Fishing for king scallops using boat dredges comprises the majority of landings in 45E7, and the rectangle records the highest value for the species relative to other rectangles in the immediate area. It is of note that squid landings, a species not recorded in high landings values elsewhere in Scotland, are of relative importance in the Moray Firth area. Squid is principally targeted by the demersal otter trawler fleet.

Figure 7.3 shows the level of scallop landings values on a national scale. It can be seen that ICES rectangle 45E7 records the highest landings for the species on the east coast, and is comparable to high value rectangles in the west of Scotland, signifying that scallop grounds in the Moray Firth are important on a national scale.

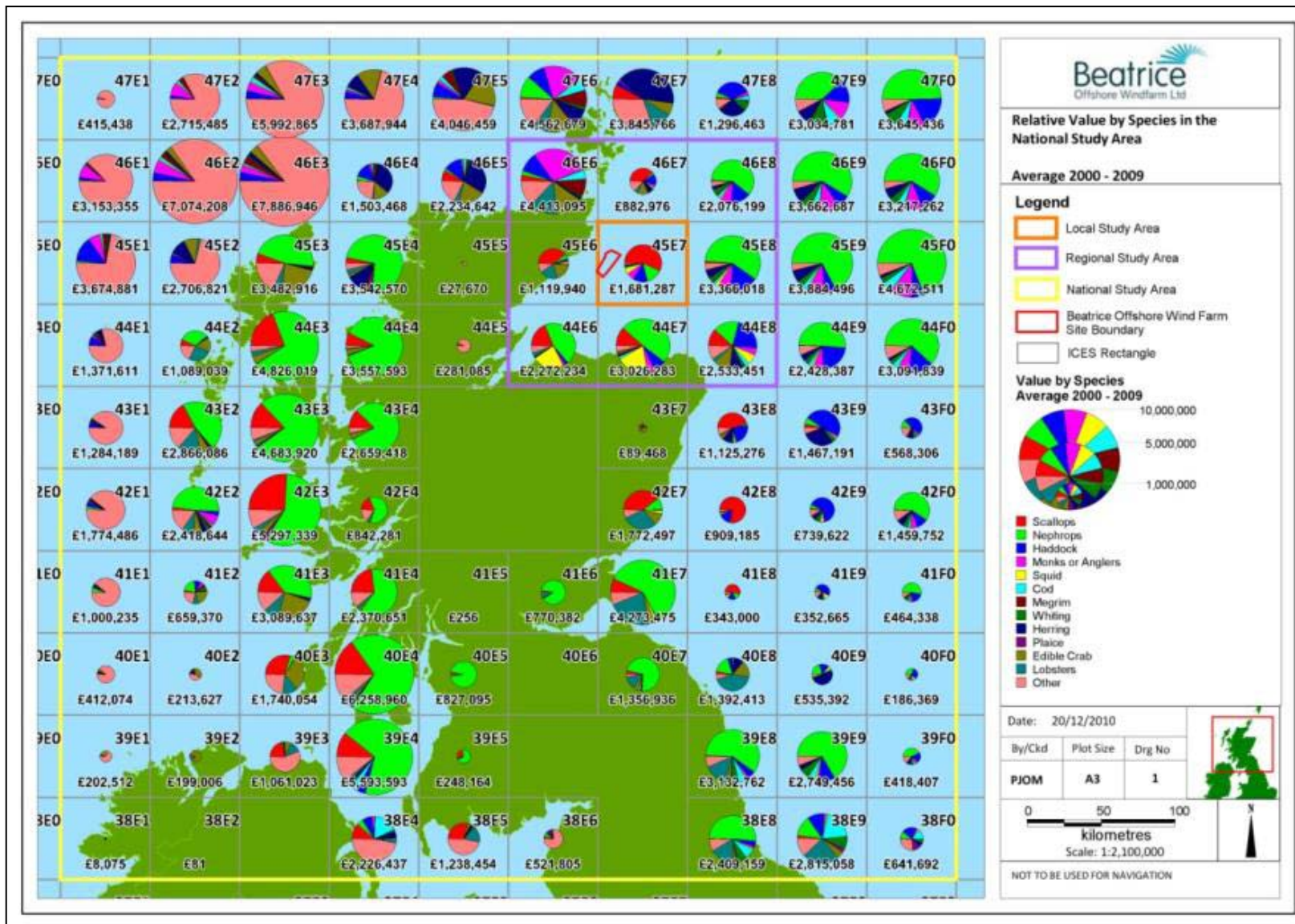


Figure 7.1 Landings Values by Species (Average 2000-2009) in the National Study Area (Source: MMO)

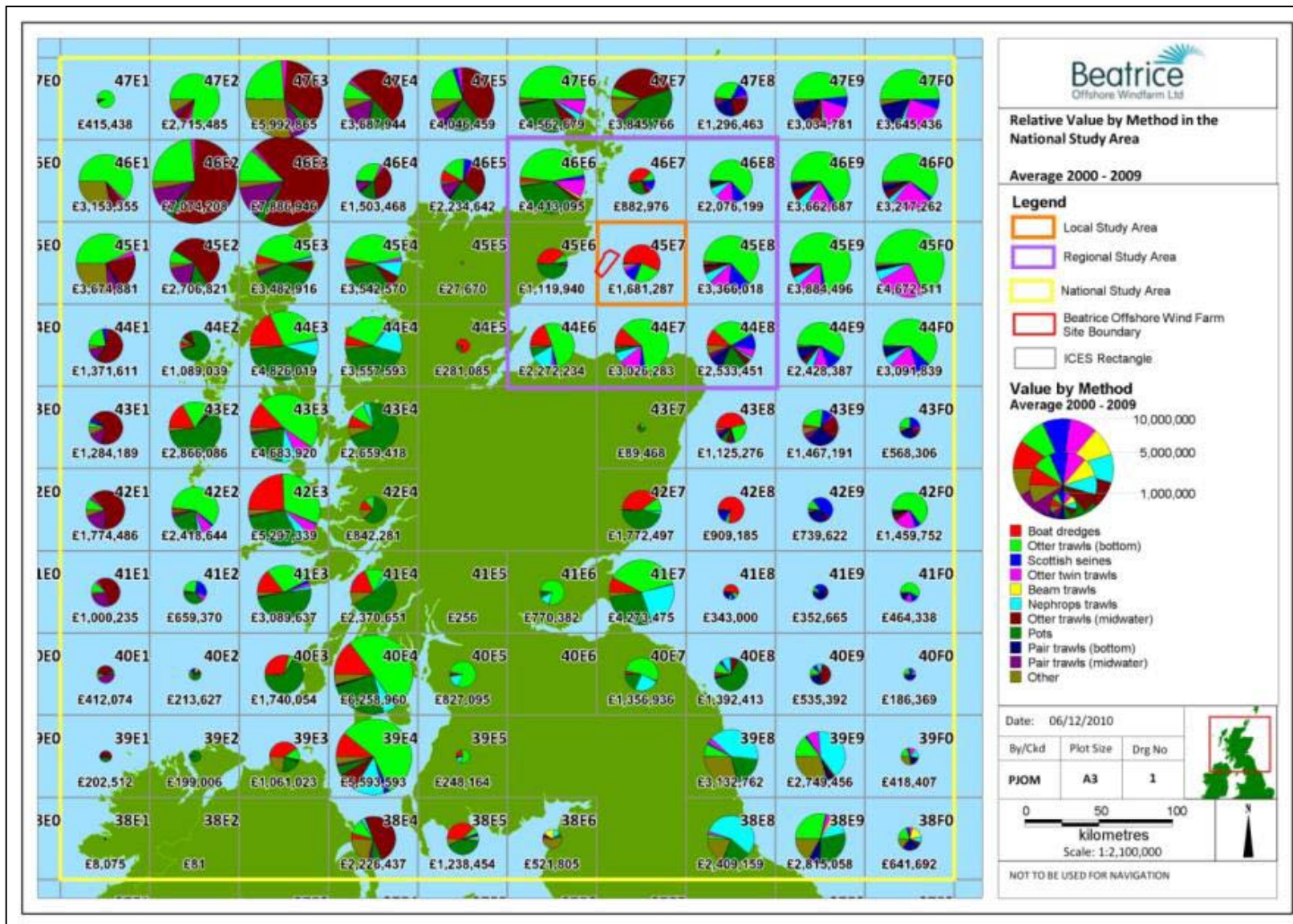


Figure 7.2 Landings Values by Method (Average 2000-2009) in the National Study Area (Source: MMO)

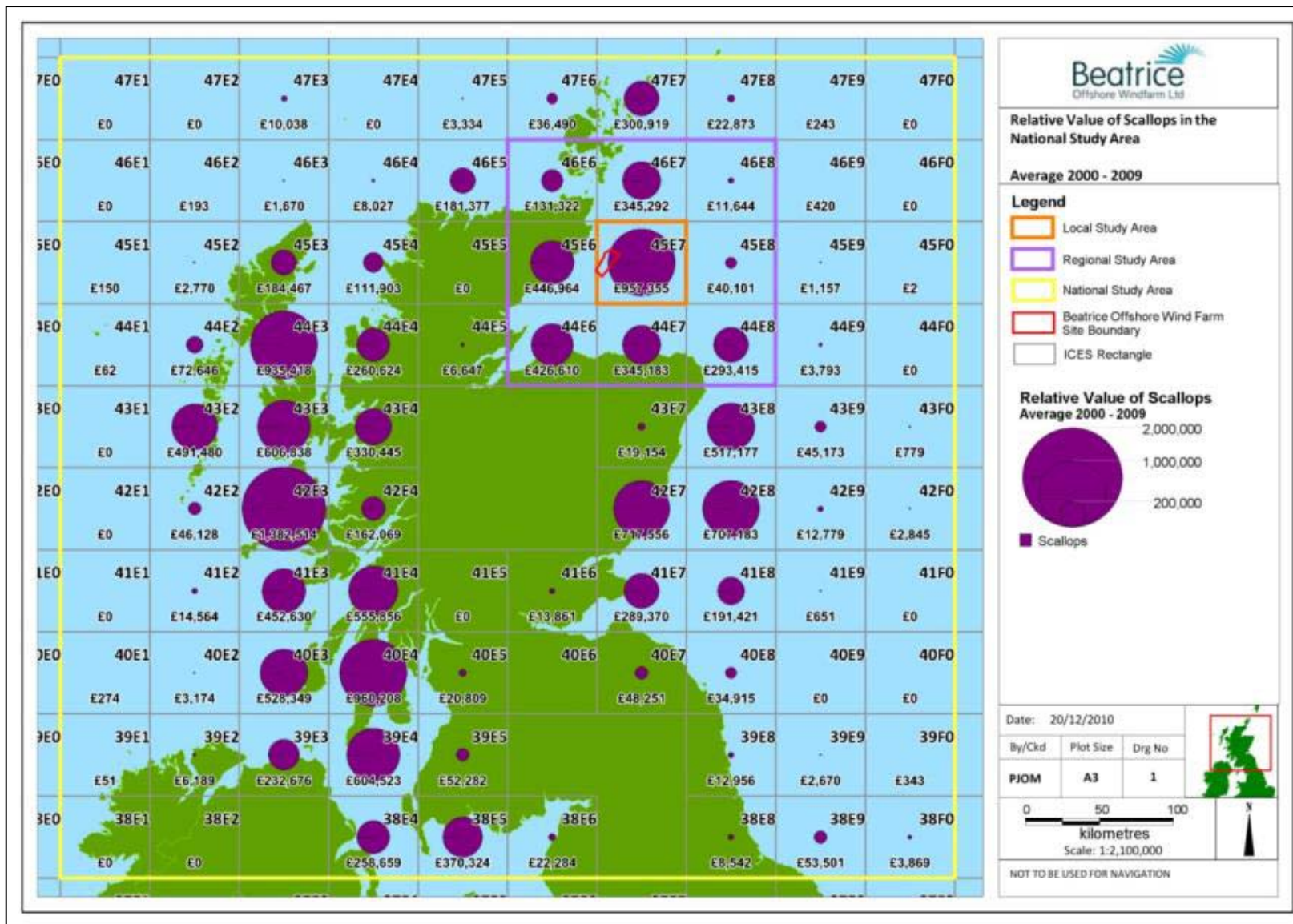


Figure 7.3 Landings Values of Scallops Only (Average 2000-2009) in the National Study Area (Source: MMO)

7.1.2 Regional Overview

Figure 7.4 and Figure 7.5 show the landings values recorded in the regional study area. It can be seen that 45E7 records a lower total value for the period than those rectangles in the east and south. Landings for nephrops are high in the south of the Moray Firth as well as in grounds further offshore in the east, targeted by both single and twin rig demersal otter trawlers. Whitefish such as haddock and monks (anglers) record relatively high landings values in rectangles in the eastern portion of the study area, and to a lesser degree in central rectangles. Demersal otter trawlers and Scottish seine netters target this fishery. Squid comprises a significant proportion of the landings values for ICES rectangles 44E6 and 44E7 which cover the south of the Moray Firth. Squid landings are recorded at lower levels in other rectangles in the area, including 45E7.

Figure 7.6 shows that the majority of activity in the regional study area is undertaken by vessels of over-15 metres in length. A lower level of activity is recorded by the 10-15 metre fleet, and activity by the under-10 metre fleet is, in the main, recorded in coastal rectangles.

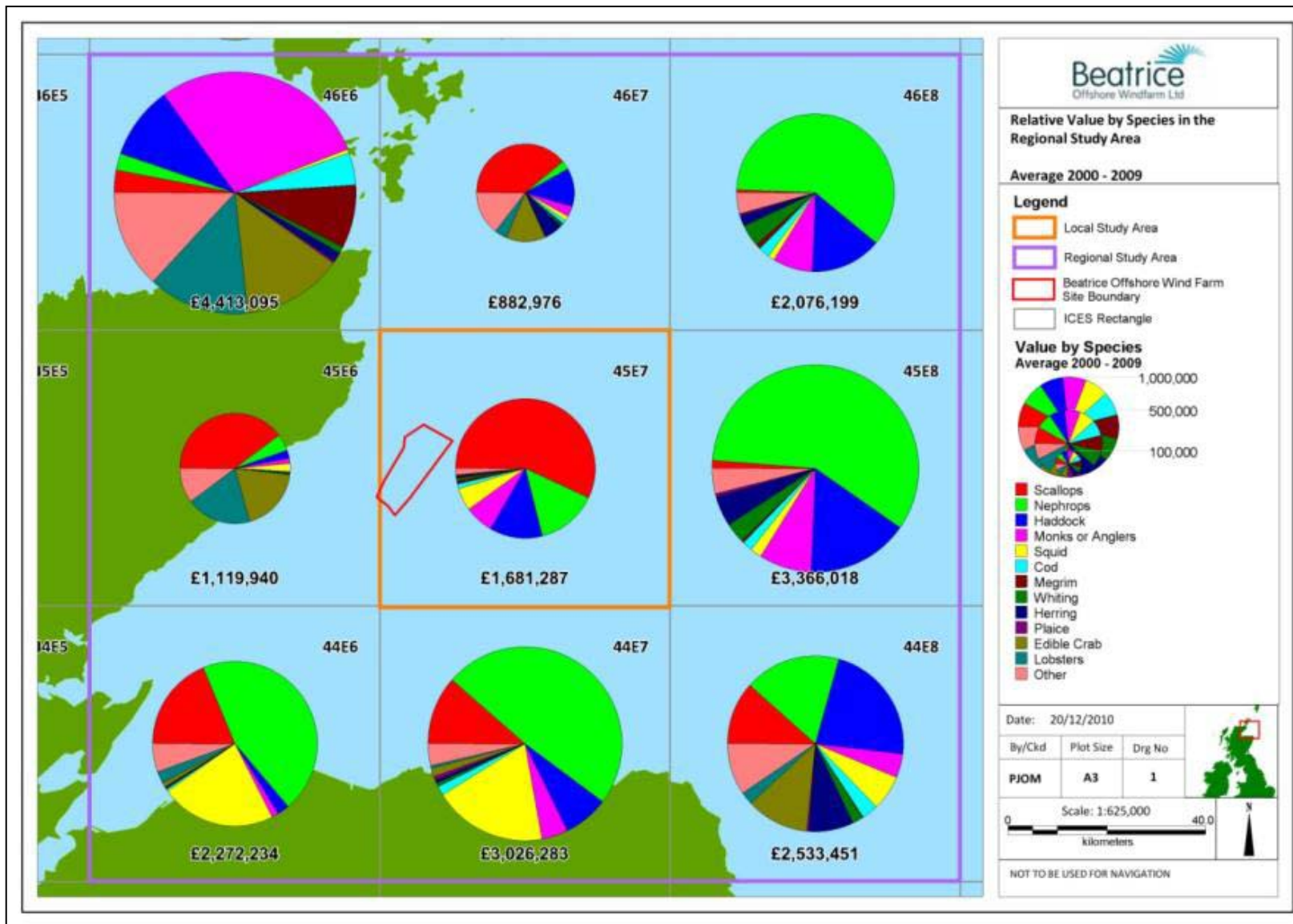


Figure 7.4 Landings Values by Species (Average 2000-2009) in the Regional Study Area (Source: MMO)

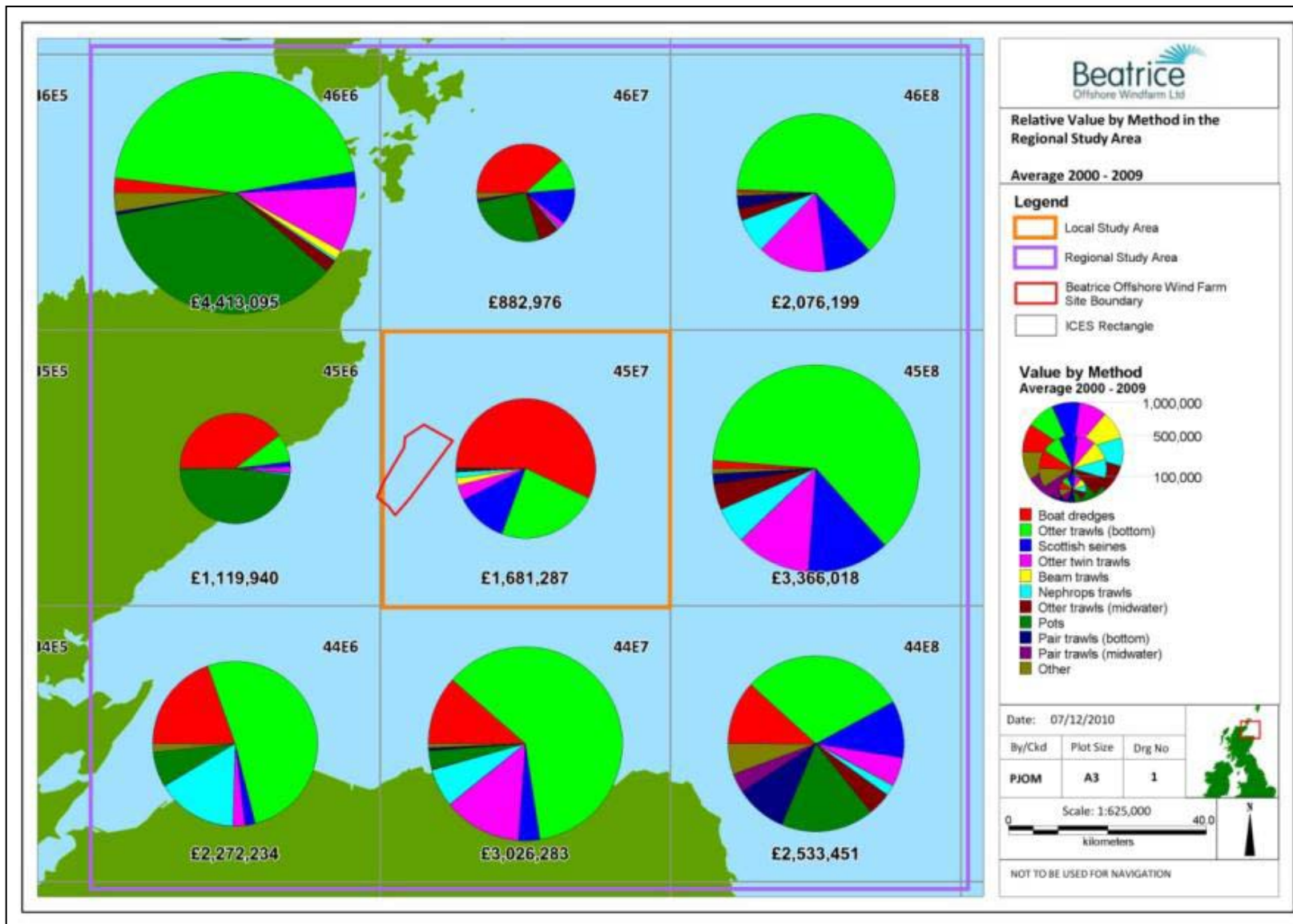


Figure 7.5 Landings Values by Method (Average 2000-2009) in the Regional Study Area (Source: MMO)

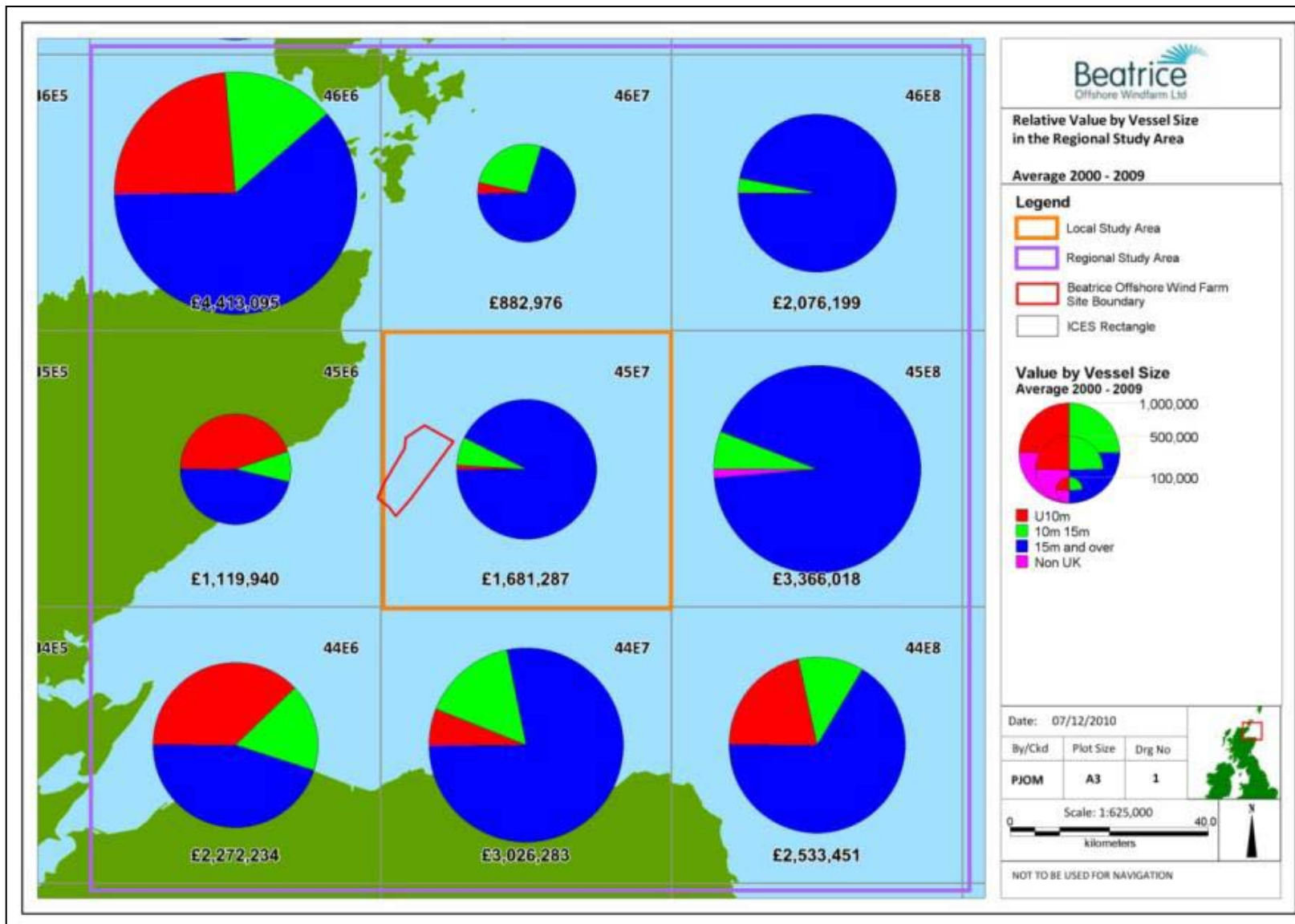


Figure 7.6 Landings Values by Vessel Category (Average 2000-2009) in the Regional Study Area (Source: MMO)

7.1.3 Local Study Area (ICES Rectangle 45E7)

Figure 7.7 below indicates that scallops constitute the highest landings values in the rectangle (57% of the total). Nephrops (14%), haddock (12%), monks (7%) and squid (5%) principally record the remainder.

Figure 7.8 demonstrates that boat dredges are the sole fishing method targeting king scallops. Bottom otter trawlers (including nephrops trawlers) principally target nephrops, with twin rig otter trawlers also accounting for a low level of the landings values. Monks and squid are also generally landed by demersal otter trawl vessels. Haddock is targeted primarily by Scottish seine netters, although a small proportion is caught using bottom otter trawls.

Figure 7.9 demonstrates that the large majority of scallop dredging vessels, demersal otter trawl vessels and Scottish seine netters are over-15 metres in length. A small percentage of dredgers and trawlers are 10-15 metres in length, with little recorded activity by the under-10 metre fleet. There is negligible activity recorded by the non-UK fleet.

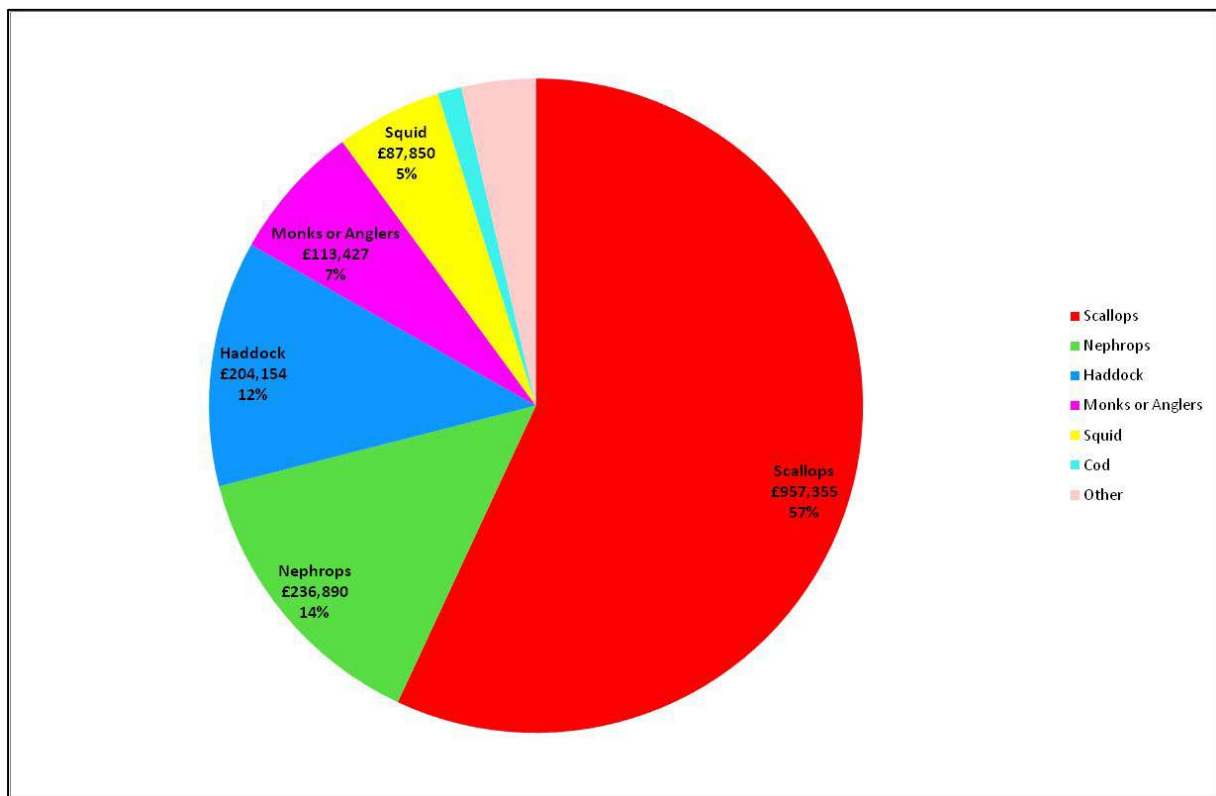


Figure 7.7 Percentage Distribution of Landings Values by Species in ICES Rectangle 45E7 (Source: MMO)

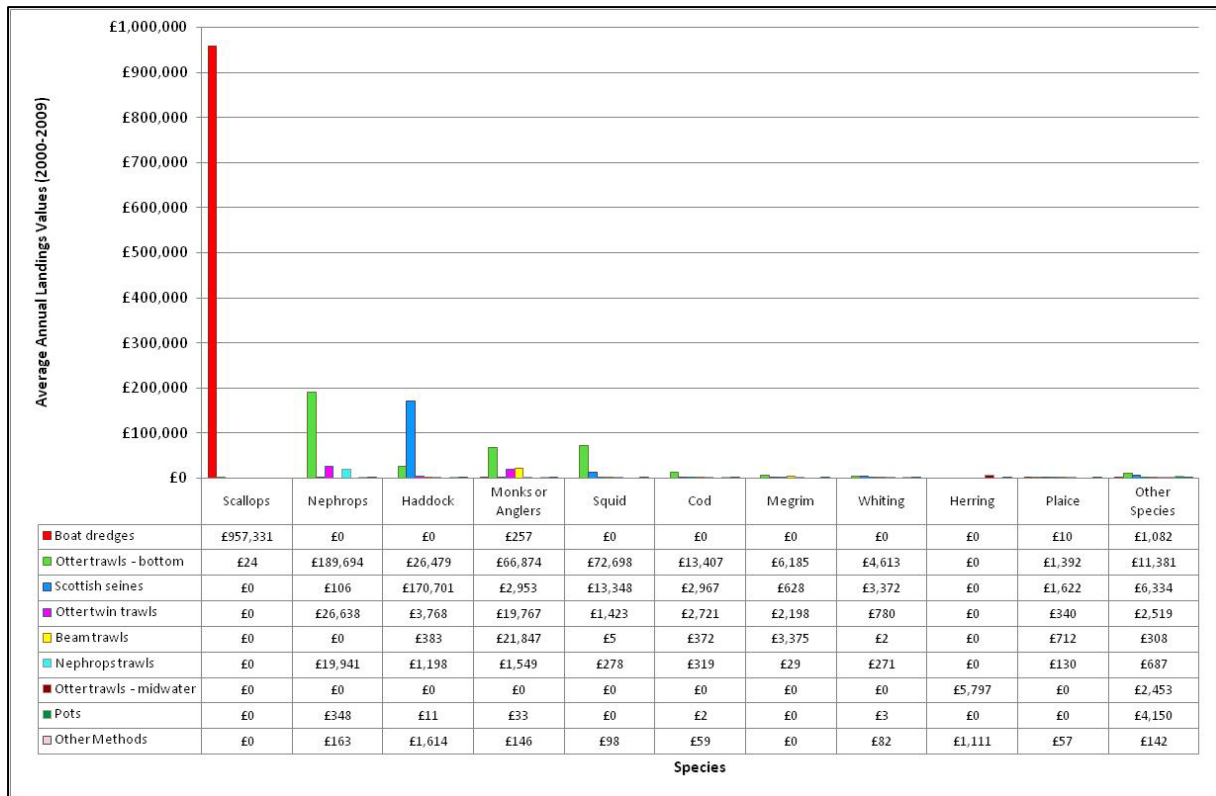


Figure 7.8 Annual Landings Values (Average 2000-2009) by Species and Method in ICES Rectangle 45E7 (Source: MMO)

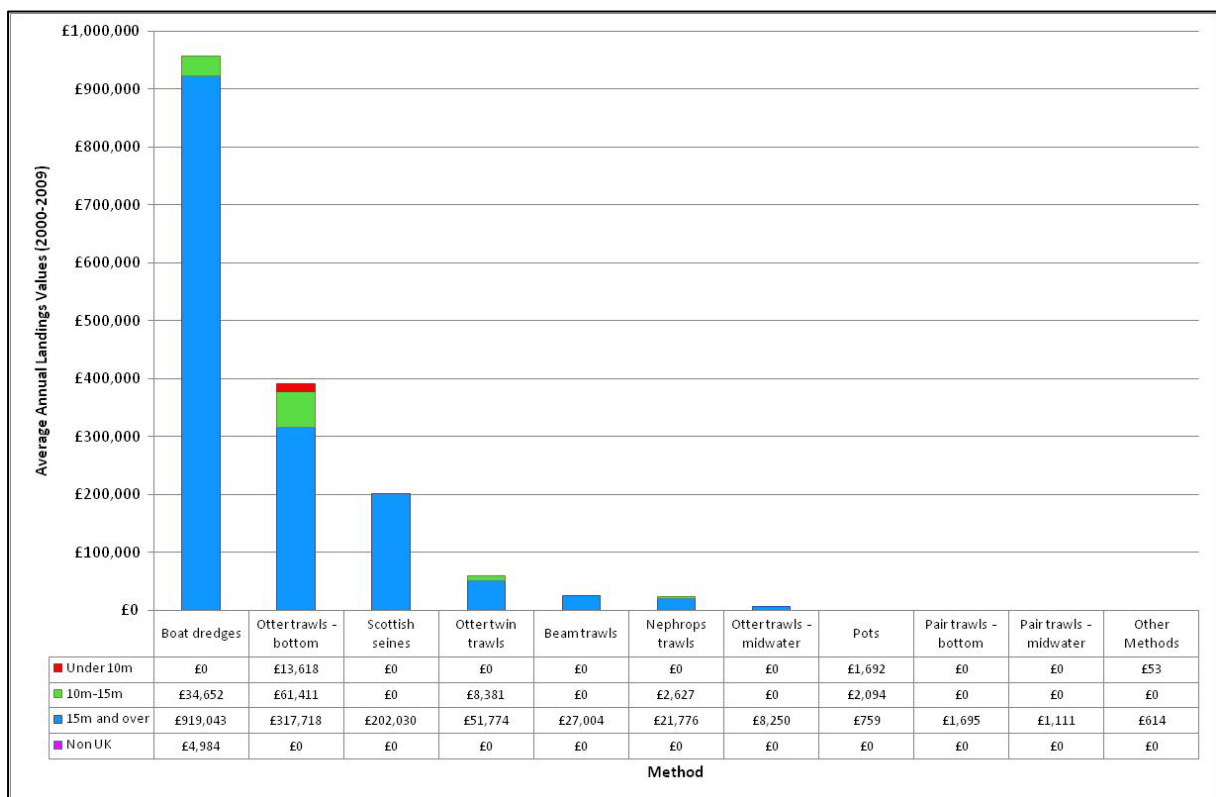


Figure 7.9 Average Annual Landings Values (Average 2000-2009) by Method and Vessel Category in ICES Rectangle 45E7 (Source: MMO)

7.1.4 Annual Landings

Figure 7.10 illustrates the annual variations in landings values by species. It can be seen that over the ten year period the total landings values for all species has been broadly consistent, although a decline was observed during 2002, as a result of a drop in scallop landings. The highest total value was recorded in 2009 due to the relatively high recorded landings of squid during this period (£566,765). Catches of squid do however vary significantly throughout the 10 years, recording a low of £8,380 in 2008.

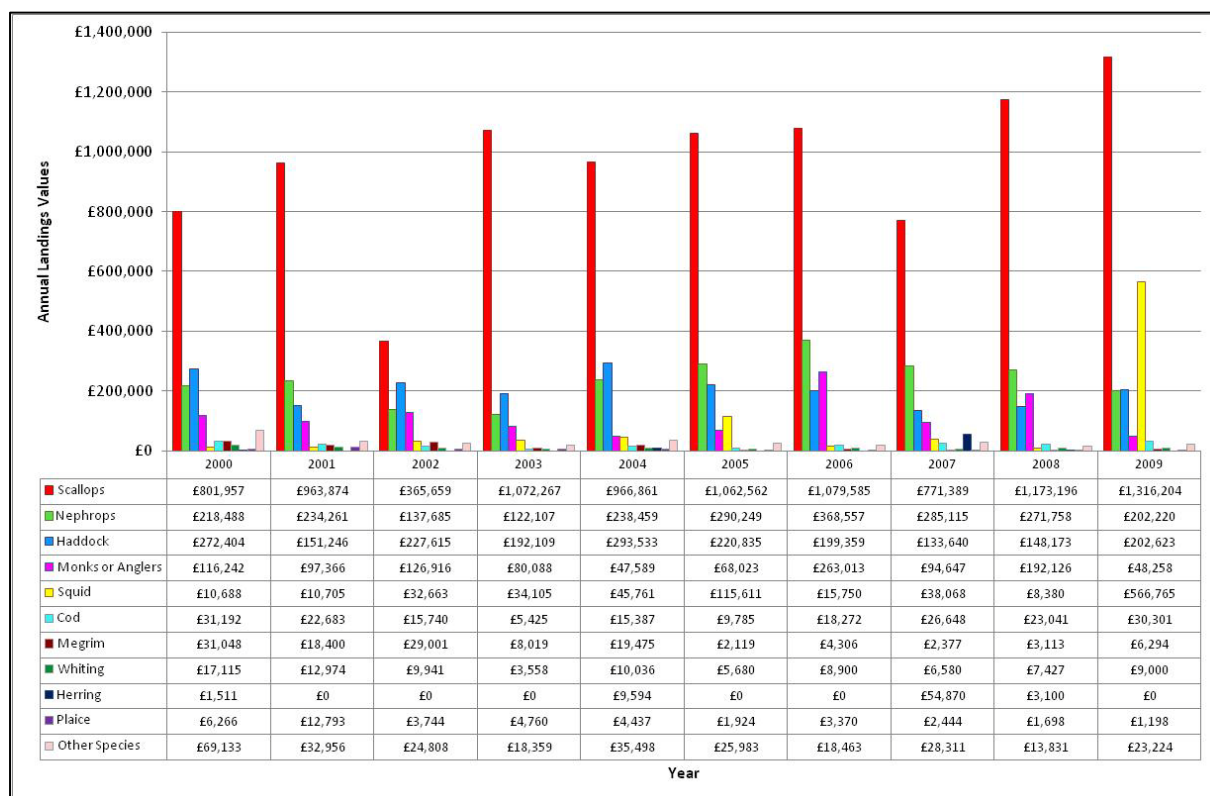


Figure 7.10 Annual Variations in Landings Values of Species in ICES Rectangle 45E7 (Source: MMO)

7.1.5 Seasonality

Figure 7.11 illustrates the seasonal trend of landings for all species in rectangle 45E7. It can be seen that landings are highest between May and September, inclusive. Moderate landings values are recorded in April and October, and the lowest values between November and January. Within this broad seasonality pattern, there are variations by individual species, for example, squid. As a result of the squid fishery recording high landings in 2009, the seasonality for this species is further described in Section 7.1.5.1 below.

Figure 7.12 - Figure 7.14 show the average monthly variations in landings for the top three species in rectangle 45E7, scallops, nephrops and haddock, respectively. Scallop and nephrops landings are broadly commensurate with the pattern of highest landings between May and September and low levels in the winter months (although nephrops landings record an increase in November and December). In contrast, the haddock fishery records more consistent levels throughout the year, with a peak in the winter months and August recording the lowest landings.

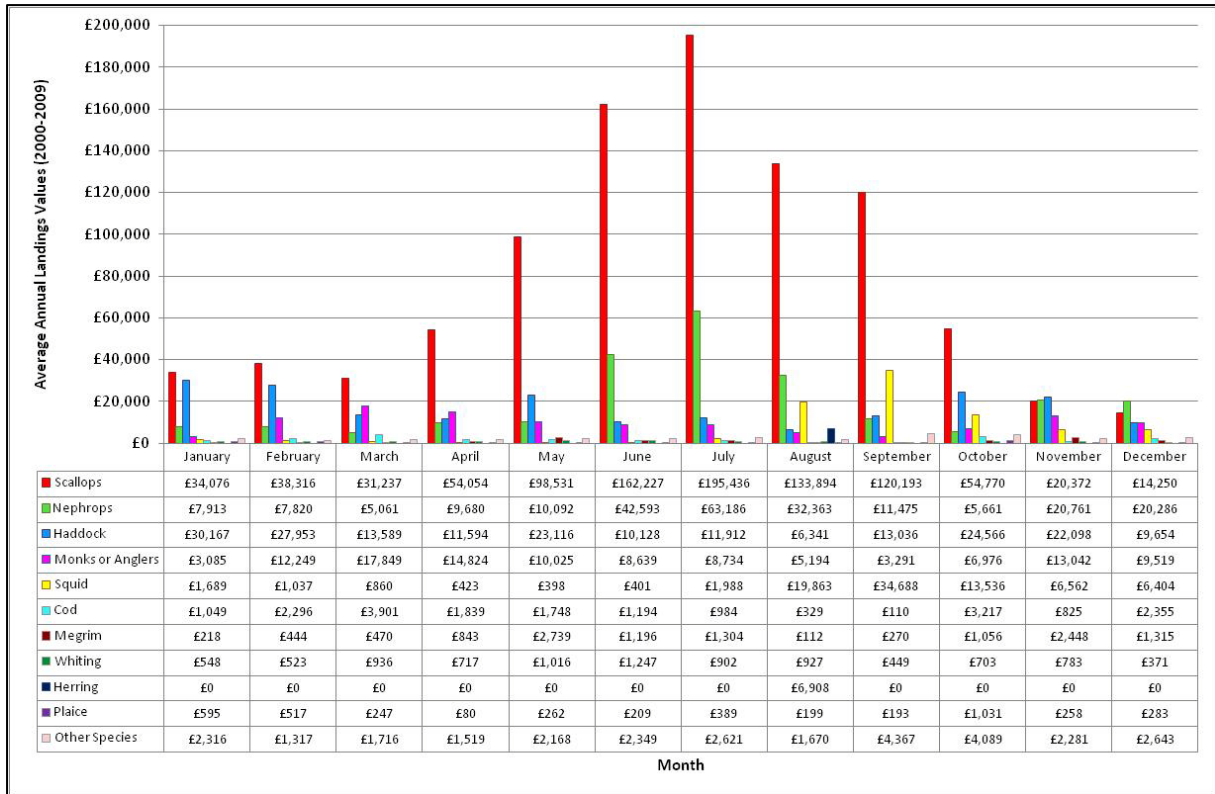


Figure 7.11 Annual (Average 2000-2009) Seasonality of Species in ICES Rectangle 45E7 (Source: MMO)

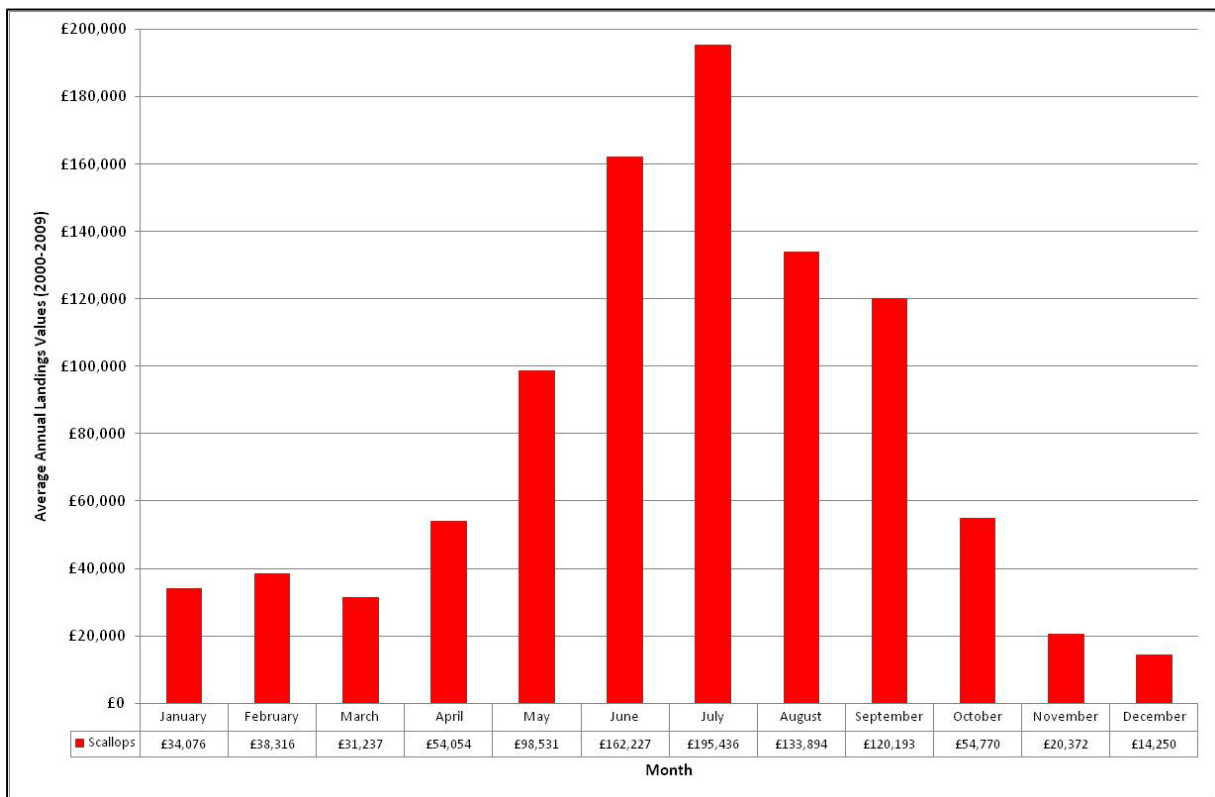


Figure 7.12 Annual (Average 2000-2009) Seasonality of Scallops in ICES Rectangle 45E7 (Source: MMO)

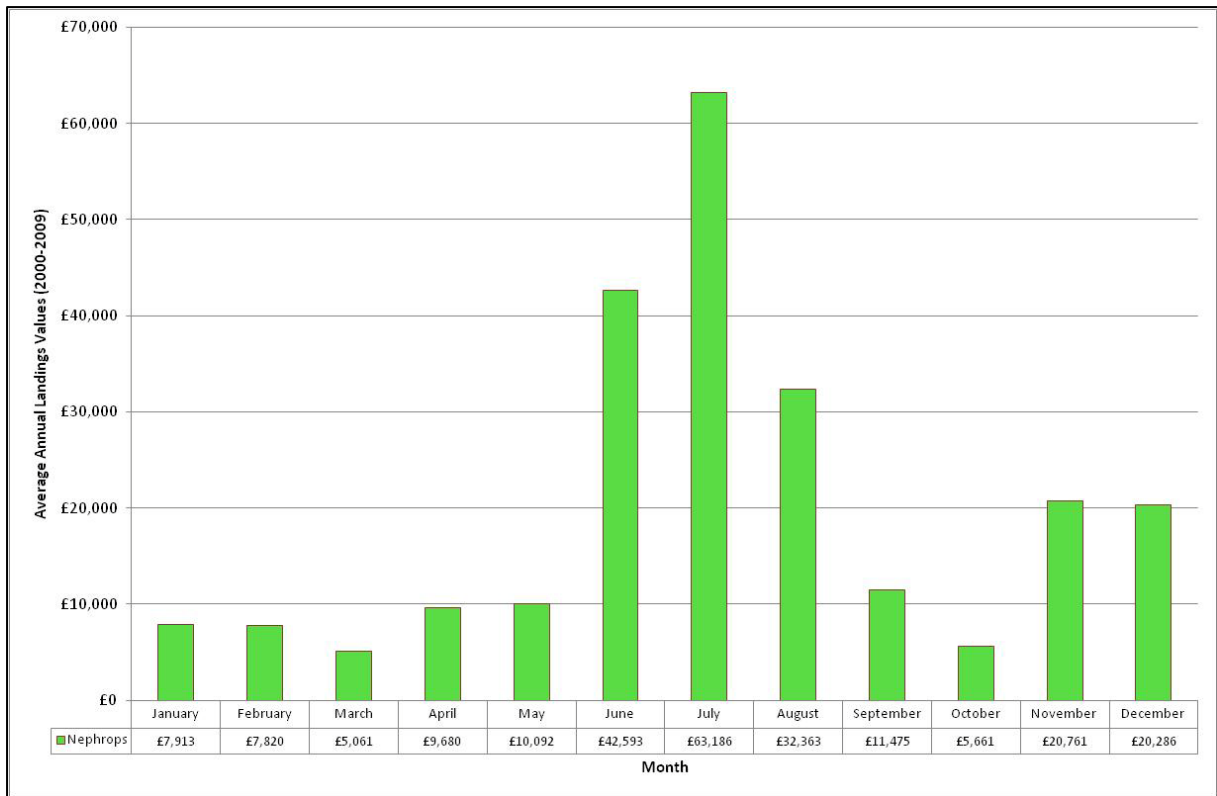


Figure 7.13 Annual (Average 2000-2009) Seasonality of Nephrops in ICES Rectangle 45E7 (Source: MMO)

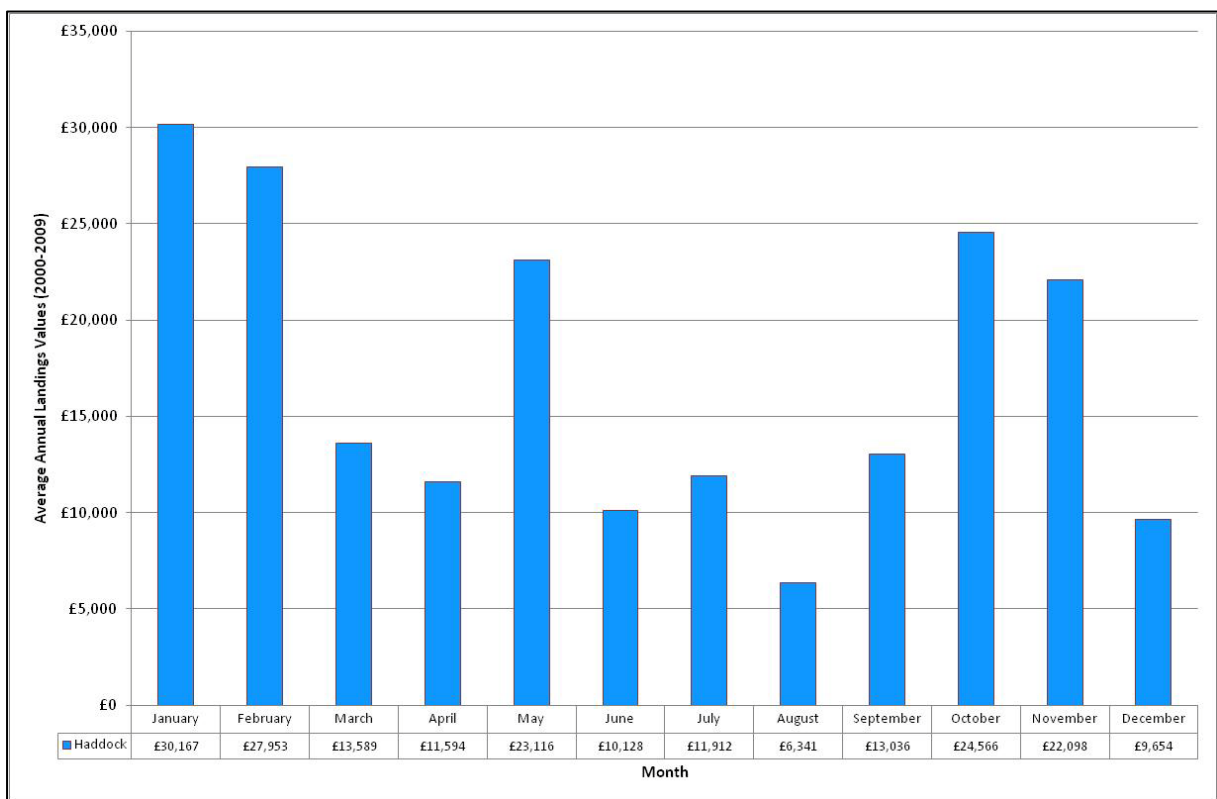


Figure 7.14 Annual (Average 2000-2009) Seasonality of Haddock in ICES Rectangle 45E7 (Source: MMO)

7.1.5.1 2009 Squid Fishery

As a result of the relatively high value of squid landed in 2009, the short duration of the fishery, and the potential of this fishery to generate similar levels in the future, Figure 7.15 below shows the monthly variation in landings during that period.

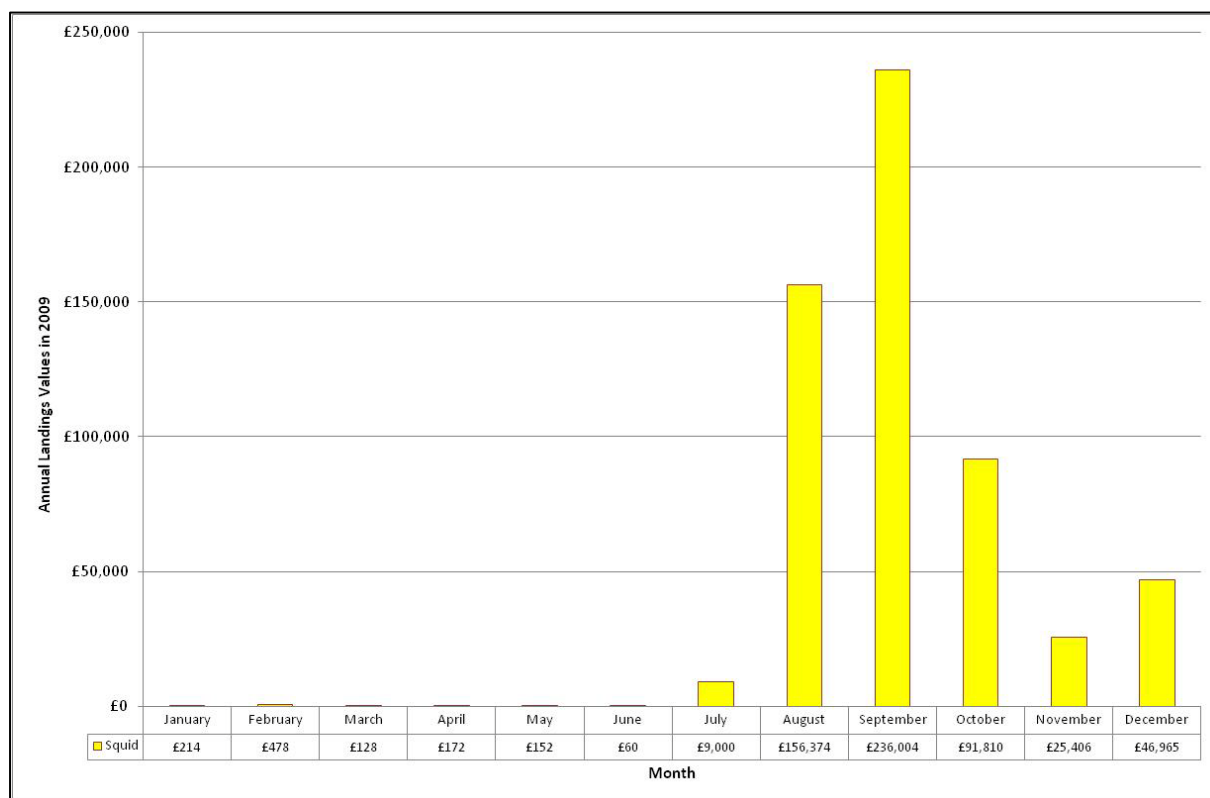


Figure 7.15 Seasonal Landings of Squid during 2009 in ICES Rectangle 45E7 (Source: MMO)

7.1.6 Landings Values by Port

Table 7.1 lists the top 20 ports by landings values from the local area (45E7), and the percentage of the ports' total income it represents. It should be noted that although the highest percentage of landings are into Fraserburgh (43%), this only contributes 1.8% of the ports total annual value. In contrast, the ports of Buckie, Wick and Whitehills have lower percentages of the total landings values from the local area, but landings from this rectangle contribute 12.6%, 16% and 14.7% of their total average annual values, respectively.

Table 7.1 Top 20 Ports by Value from ICES Rectangle 45E7 (Source: MMO)

Port	Average Annual Landings Values in 45E7 (2000-2009)	% of Annual Value in 45E7	Total Average Annual Port Value (2000-2009)	% of Total Annual Port Value 45E7 represents
Fraserburgh	£722,924	43.0%	£40,502,160	1.8%
Buckie	£403,617	24.0%	£3,200,018	12.6%
Wick	£213,519	12.7%	£1,338,177	16.0%
Peterhead	£128,460	7.6%	£85,703,602	0.1%
Macduff	£87,228	5.2%	£1,412,012	6.2%
Scrabster	£36,476	2.2%	£27,259,287	0.1%
Aberdeen	£17,612	1.0%	£12,482,442	0.1%
Lochinver	£14,799	0.9%	£34,115,956	0.0%
Kinlochbervie	£13,441	0.8%	£9,028,010	0.1%
Ullapool	£11,439	0.7%	£13,227,524	0.1%
Whitehills	£9,522	0.6%	£64,636	14.7%
Mallaig	£6,959	0.4%	£8,708,546	0.1%
Lossiemouth	£4,329	0.3%	£169,247	2.6%
Unspecified Faroese	£2,453	0.1%	£1,200,038	0.2%
Stromness	£1,692	0.1%	£903,950	0.2%
Helmsdale	£1,522	0.1%	£206,345	0.7%
Inverness	£811	0.0%	£82,352	1.0%
Snizort	£742	0.0%	£1,267,705	0.1%
Rosehearty	£633	0.0%	£15,222	4.2%
Lerwick	£535	0.0%	£43,180,318	0.0%

7.2 Effort (Days at Sea)

Figure 7.16 and Figure 7.17 show the average annual effort (2000-2009) in the regional study area by fishing method and vessel category, respectively. The patterns are commensurate with those described for the landings values: demersal otter trawlers (including nephrops trawlers) comprise the majority of activity in the south of the Moray Firth and offshore sections in the east; boat dredging is highest in the ICES rectangle of the Beatrice site, and potting constitutes the large majority of activity in coastal areas, particularly in rectangles 45E6 and 46E6.

7.2.1 Local Study Area (ICES Rectangle 45E7)

Figure 7.18 shows the average annual seasonality by effort (days fished) in the local area. The pattern illustrated is similar to that demonstrated by the landings values seasonality data, with catch rates peaking in summer (May to September). Figure 7.19 demonstrates the annual variation in effort in the local area. Effort for the over-15 metres fleet has generally been decreasing over the ten year period, whereas the effort made by the 10m-15m and under-10 metre fleets has been increasing.

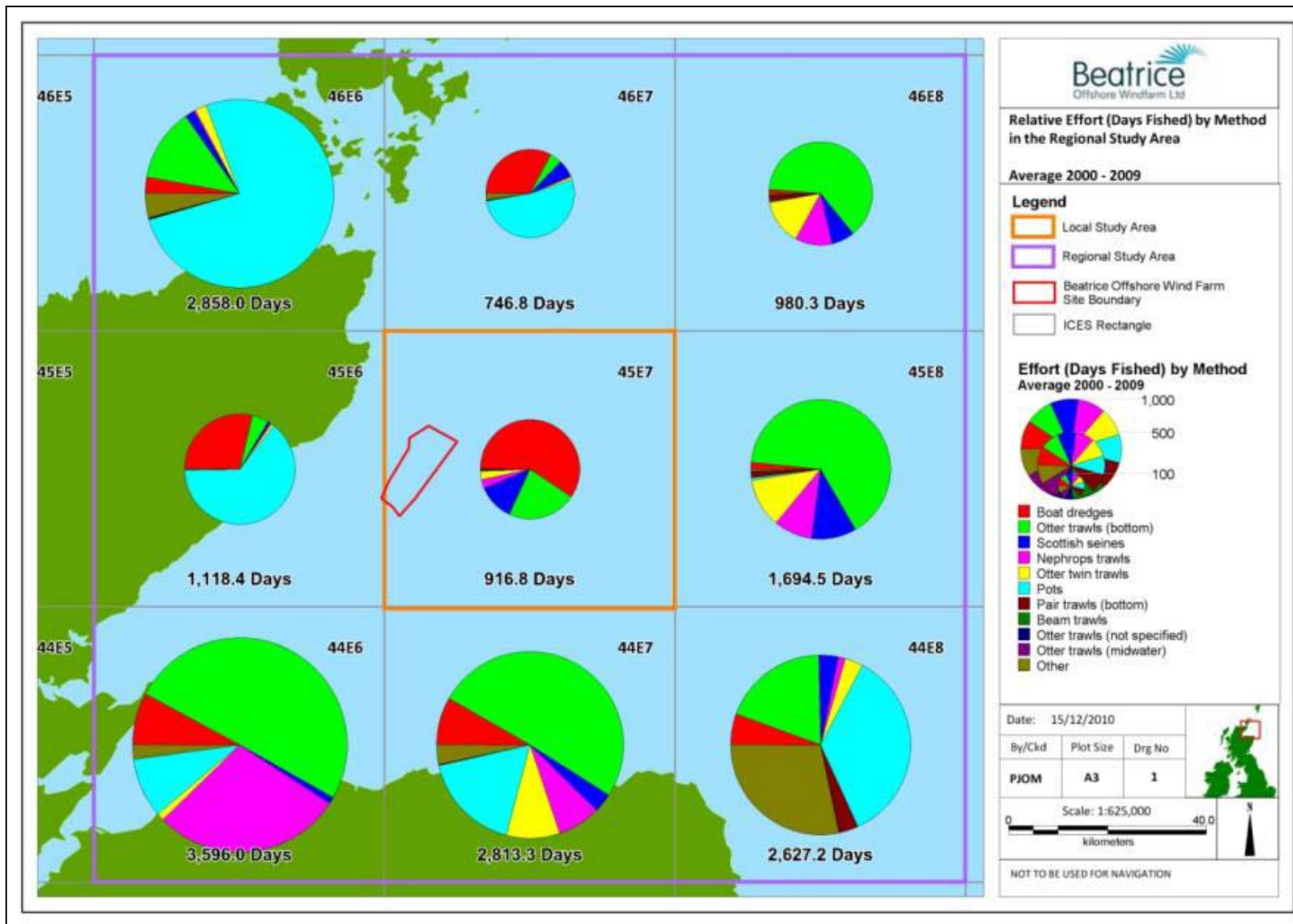


Figure 7.16 Effort (Days at Sea) by Fishing Method in the Regional Study Area (Average 2000-2009) (Source: MMO)

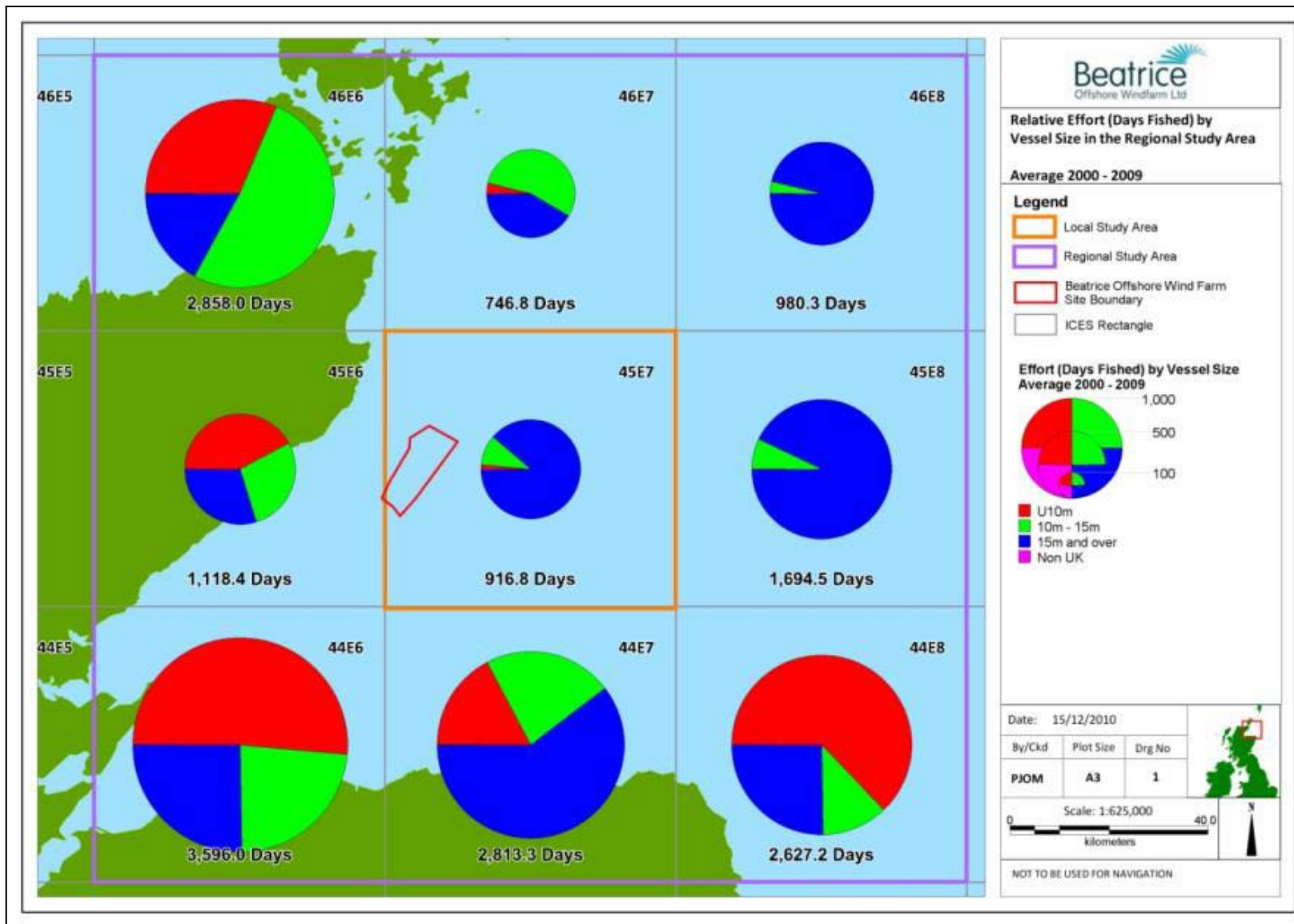


Figure 7.17 Effort (Days at Sea) by Vessel Category in the Regional Study Area (Average 2000-2009) (Source: MMO)

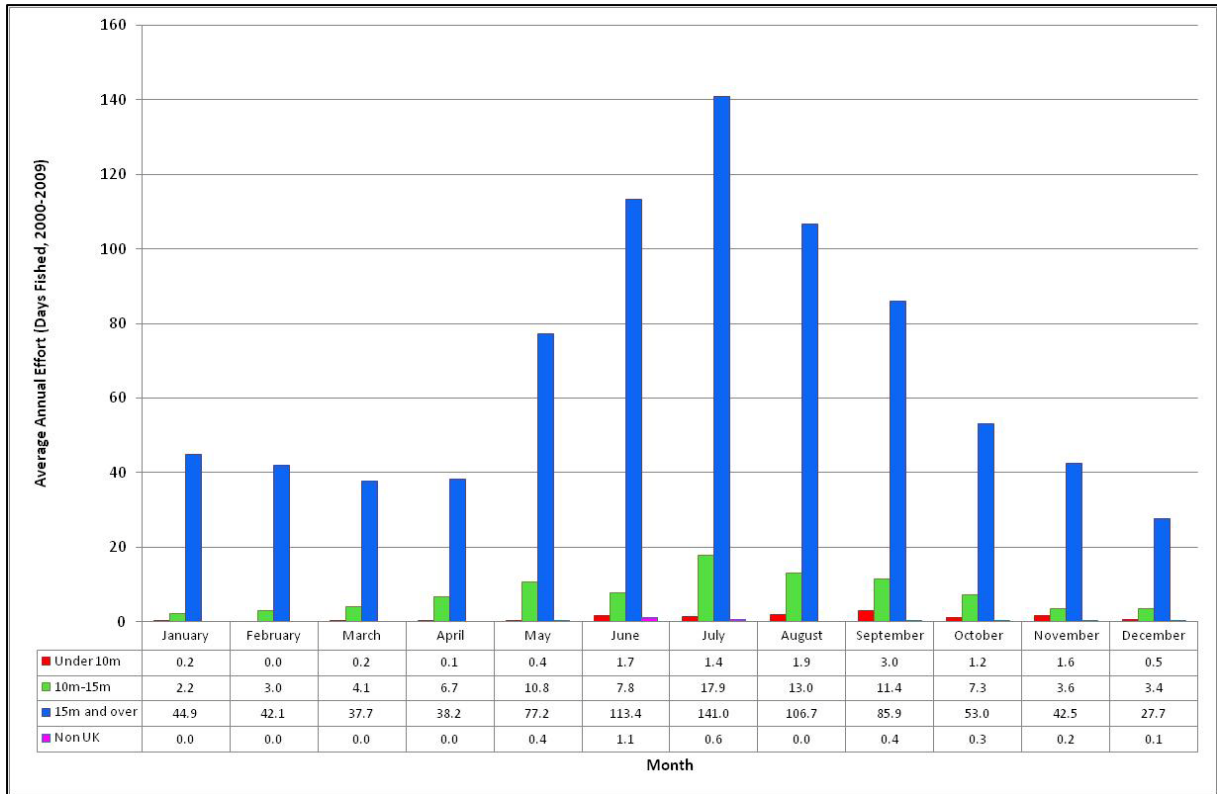


Figure 7.18 Annual (Average 2000-2009) Seasonality of Effort (Days Fished) by Vessel Category in ICES Rectangle 45E7 (Source: MMO)

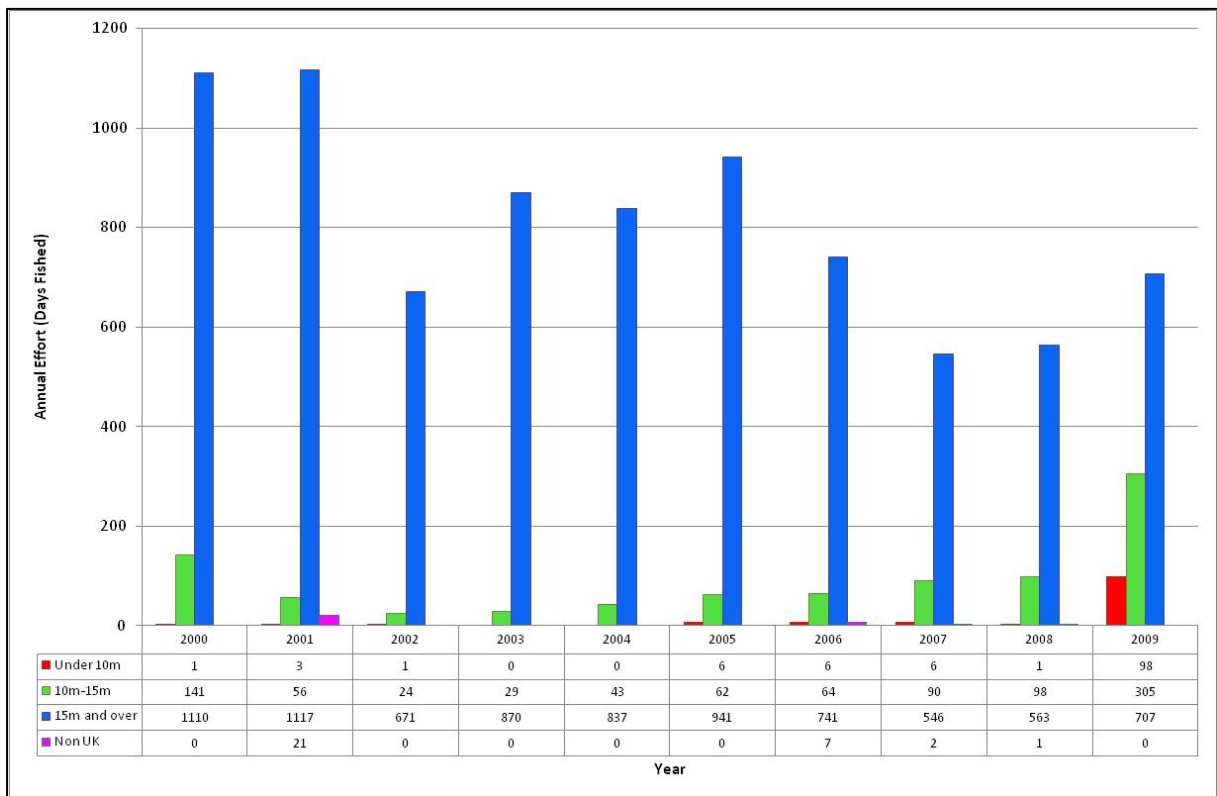


Figure 7.19 Annual Variations of Effort (Days Fished) by Vessel Category in ICES Rectangle 45E7 (Source: MMO)

Table 7.2 lists the top 20 ports by the effort made from each port from the local area and the percentage of the ports total effort it represents. As demonstrated with the landings values data, the highest percentage of effort from the local area is made from Fraserburgh (39.4%), although this only contributes 2.1% of the ports total average effort. The ports of Wick and Whitehills have relatively low percentages of the effort from the local area, but these percentages contribute 15.2% and 10.9% of their total average effort, respectively.

Table 7.3 shows the effort by each vessel category at each port over a ten year period. The over-15 metre fleet spend the greatest number of days at sea on average, followed by the 10m-15m fleet and then the under-10 metre fleet, with the non UK vessels contributing negligible effort. For the 15 metre and over and the 10m-15m fleets, the majority of the effort results in landings made into Fraserburgh. For the 10 metre and under fleet, the majority of the effort is by vessels landing into Buckie.

Table 7.2 Top 20 Ports by Effort (Days Fished) in ICES Rectangle 45E7 (Source: MMO)

Port	Average Annual Effort (Days Fished) in 45E7 (2000-2009)	% of Annual Effort in 45E7	Total Average Annual Port Effort (Days Fished) (2000-2009)	% of Total Annual Port Effort 45E7 represents
Fraserburgh	361.1	39.4%	17415.4	2.1%
Buckie	251.6	27.4%	2815.3	8.9%
Wick	153.1	16.7%	1010.2	15.2%
Macduff	49.3	5.4%	950.0	5.2%
Peterhead	39.5	4.3%	16129.0	0.2%
Scrabster	20.8	2.3%	6795.5	0.3%
Aberdeen	12.1	1.3%	4983.1	0.2%
Whitehills	9.2	1.0%	84.2	10.9%
Lossiemouth	5.0	0.5%	307.6	1.6%
Mallaig	2.4	0.3%	8237.7	0.0%
Kinlochbervie	2.0	0.2%	3333.2	0.1%
Helmsdale	1.6	0.2%	312.7	0.5%
Lochinver	1.2	0.1%	8215.3	0.0%
Ullapool	1.1	0.1%	4432.8	0.0%
Lerwick	1.0	0.1%	5648.2	0.0%
Kirkwall	0.8	0.1%	90.2	0.9%
Inverness	0.8	0.1%	2056.4	0.0%
Snizort	0.7	0.1%	4236.4	0.0%
North Shields	0.7	0.1%	1283.0	0.1%
Rosehearty	0.4	0.0%	41.4	1.0%

Table 7.3 Annual Effort (Days Fished) by Port and Vessel Category in ICES Rectangle 45E7 (Source: MMO)

Port and Vessel Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	10Yr Avg
15m and over											
Fraserburgh	305	444	175	349	325	469	336	276	247	348	327.4
Buckie	383	293	234	205	254	212	181	98	97	206	216.3
Wick	247	167	107	147	134	159	78	58	117	41	125.5
Macduff	39	86	17	61	35	18	59	53	62	17	44.7
Peterhead	39	31	36	33	52	32	56	20	29	64	39.2
Scrabster	25	45	29	17	15	25	19	14	3	8	20
Aberdeen	18	21	8	12	7	14	2	13	3	16	11.4
Whitehills	1	4	51	30	5	1	0	0	0	0	9.2
Lossiemouth	25	12	2	5	1	0	2	0	0	0	4.7
Mallaig	7	1	4	1	4	1	0	3	0	3	2.4
Other Ports	21	13	8	10	5	10	8	11	5	4	9.5
Total	1110	1117	671	870	837	941	741	546	563	707	810.3
10m-15m											
Fraserburgh	0	6	4	20	25	43	52	46	42	94	33.2
Buckie	104	0	0	0	0	5	1	2	4	149	26.5
Wick	34	45	15	9	11	8	7	39	47	33	24.8
Macduff	0	0	4	0	0	0	3	0	0	25	3.2
Scrabster	0	0	0	0	4	0	0	0	4	0	0.8
Aberdeen	0	0	0	0	0	4	0	0	0	0	0.4
Snizort	0	2	0	0	1	0	0	0	0	0	0.3
Helmsdale	0	3	0	0	0	0	0	0	0	0	0.3
Stromness	0	0	0	0	0	0	0	2	0	1	0.3
Lossiemouth	3	0	0	0	0	0	0	0	0	0	0.3
Other Ports	0	0	1	0	2	2	1	1	1	3	1.1
Total	141	56	24	29	43	62	64	90	98	305	91.2
Under-10m											
Buckie	0	0	0	0	0	1	3	0	1	79	8.4
Macduff	0	0	0	0	0	0	0	0	0	11	1.1
Inverness	0	0	0	0	0	0	0	4	0	4	0.8
Wick	1	2	0	0	0	1	1	2	0	0	0.7
Fraserburgh	0	0	0	0	0	0	2	0	0	3	0.5
Brora	0	0	0	0	0	3	0	0	0	0	0.3
Helmsdale	0	1	1	0	0	0	0	0	0	1	0.3
Peterhead	0	0	0	0	0	1	0	0	0	0	0.1
Total	1	3	1	0	0	6	6	6	1	98	12.2
Non UK											
Wick	0	21	0	0	0	0	0	0	0	0	2.1
Buckie	0	0	0	0	0	0	4	0	0	0	0.4
Aberdeen	0	0	0	0	0	0	0	2	1	0	0.3
Macduff	0	0	0	0	0	0	3	0	0	0	0.3
Total	0	21	0	0	0	0	7	2	1	0	3.1
Grand Total	1252	1197	696	899	880	1009	818	644	663	1110	916.8

8.0 Satellite Tracking

Since January 2005, all European Community vessels of over-15 metres in length have been fitted with satellite tracking equipment which transmits the vessels' position at a minimum of every two hours to the relevant Member States' fisheries authorities. Each Member States' Fisheries Monitoring Centre (FMC) monitors the activities of their fishing vessels to ensure compliance with fisheries legislation.

All UK satellite data are collected in one data set by the MMO. The data were obtained from the MMO in comma separated variable (CSV) format and, as mentioned previously, do not specify whether a vessel is fishing or steaming. Position plots of vessels that are stationary in port have not been included.

It is recognised that satellite data are only indicative of the activity of certain types of fishing vessels, i.e. those over-15 metres in length. Analysis of the landings values and effort levels data sets has demonstrated that the majority of activity in the local study area (ICES rectangle 45E7) is by the over-15 metre fleet and it can therefore be considered that the data presented below will be representative of the activity of these vessels.

As a result of the different data set provided for satellite tracked vessels in 2009 (previously discussed in Section 4.2), Section 8.2.2 below separately addresses activity for this period.

8.1 National Overview

Figure 8.1 shows the satellite (VMS) density of all UK vessels over-15 metres (average 2005-2008). Areas of high density are generally concentrated along the west coast and in offshore areas in north east. There is a moderate to high density of activity in the south of the Moray Firth.

8.2 Regional Study Area

8.2.1 2005-2008 Data

Figure 8.2 shows the relative density of all UK vessels over-15 metres (average 2005-2008). It can be seen that the highest density is located in the south of the study area, and, to a slightly lesser extent, in the east. Activity is moderate in the local study area, and low to moderate within the Beatrice site boundary.

8.2.2 2009 Data

Figure 8.3 shows the satellite density of all UK vessels over-15 metre in 2009, with patterns that are broadly commensurate with those shown in the 2005-2008 data sets. Figure 8.4 – Figure 8.7 provide a breakdown of density by gear type, which was not possible to apply to the data set in the preceding years, showing dredges, nephrops gear, whitefish gear and "other", respectively.

In the case of dredges (scallop vessels), it can be seen that the northern portion of the site records low activity and the southern portion moderate levels (Figure 8.4). Nephrops activity (Figure 8.5) is negligible within the Beatrice site. Density levels for whitefish are also low (Figure 8.6), although relatively higher in the northern section of the site. Figure 8.7 shows activity for all 'other' methods, which include unregulated trawl gear and hand-fishing. It is not likely that vessels of over-15 metres in length will be hand-fishing, and it is therefore probable that activity recorded will be trawling for squid, which is an unregulated fishery. Vessels trawling for squid are, therefore, recorded at higher levels in the southern portion of the site and in inshore areas in the south of the Moray Firth. The high level of sightings corresponds to the high recorded value for the fishery in 2009.

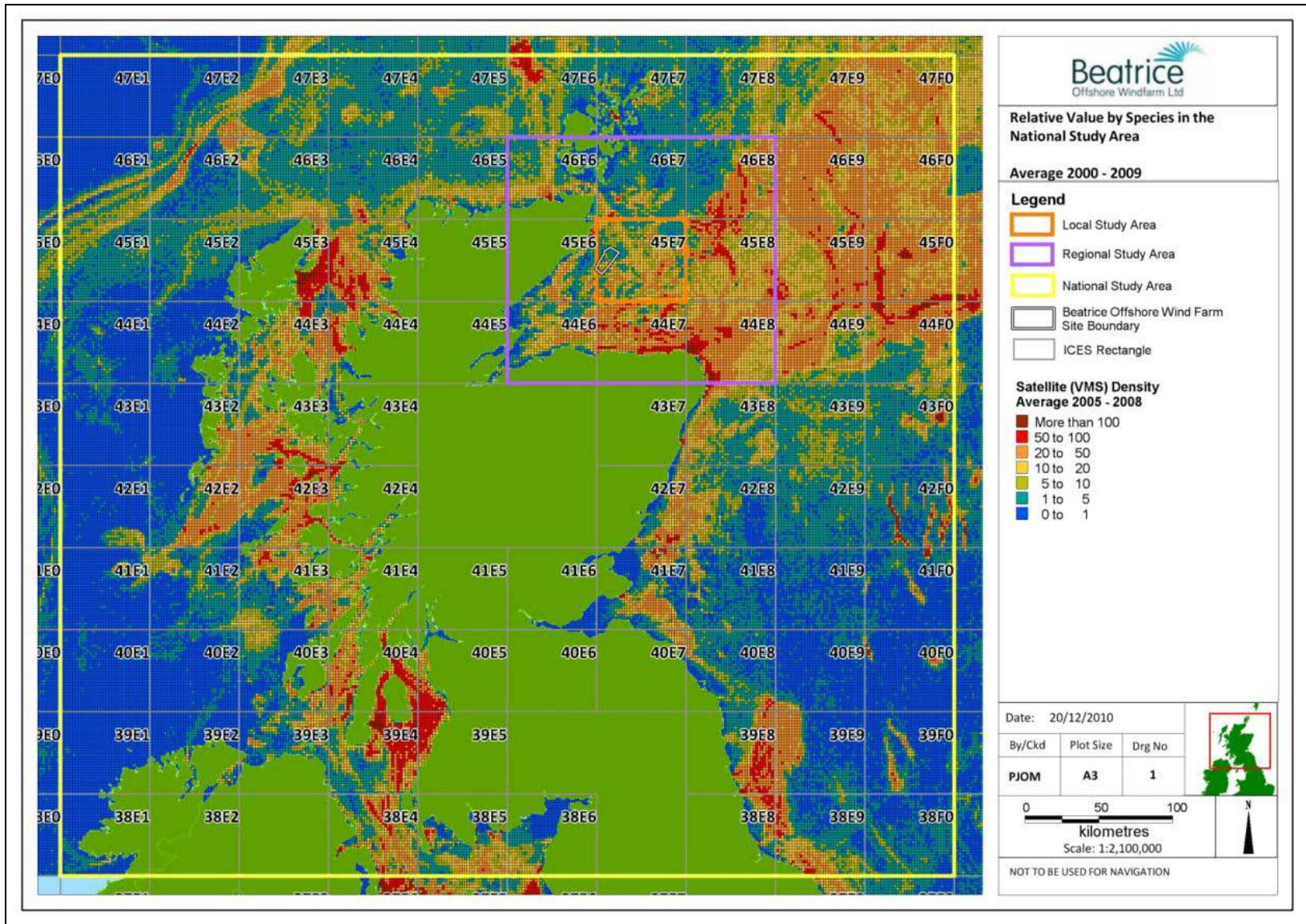


Figure 8.1 Satellite (VMS) Density of all UK Over-15 Metre Vessels (Average 2005-2008) (Source: MMO)

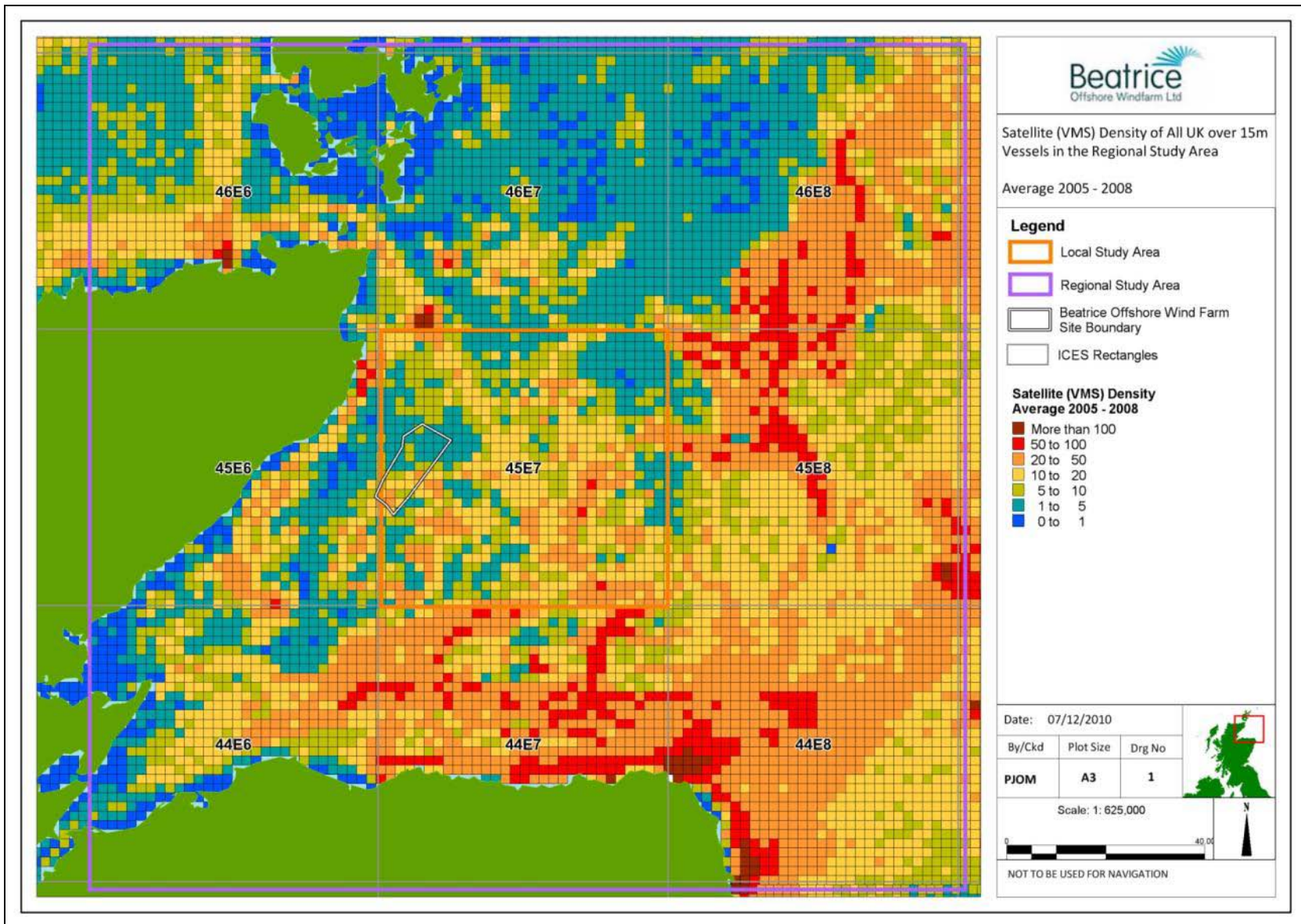


Figure 8.2 Satellite (VMS) Density of all UK Over-15 Metre Vessels (Average 2005-2008) (Source: MMO)

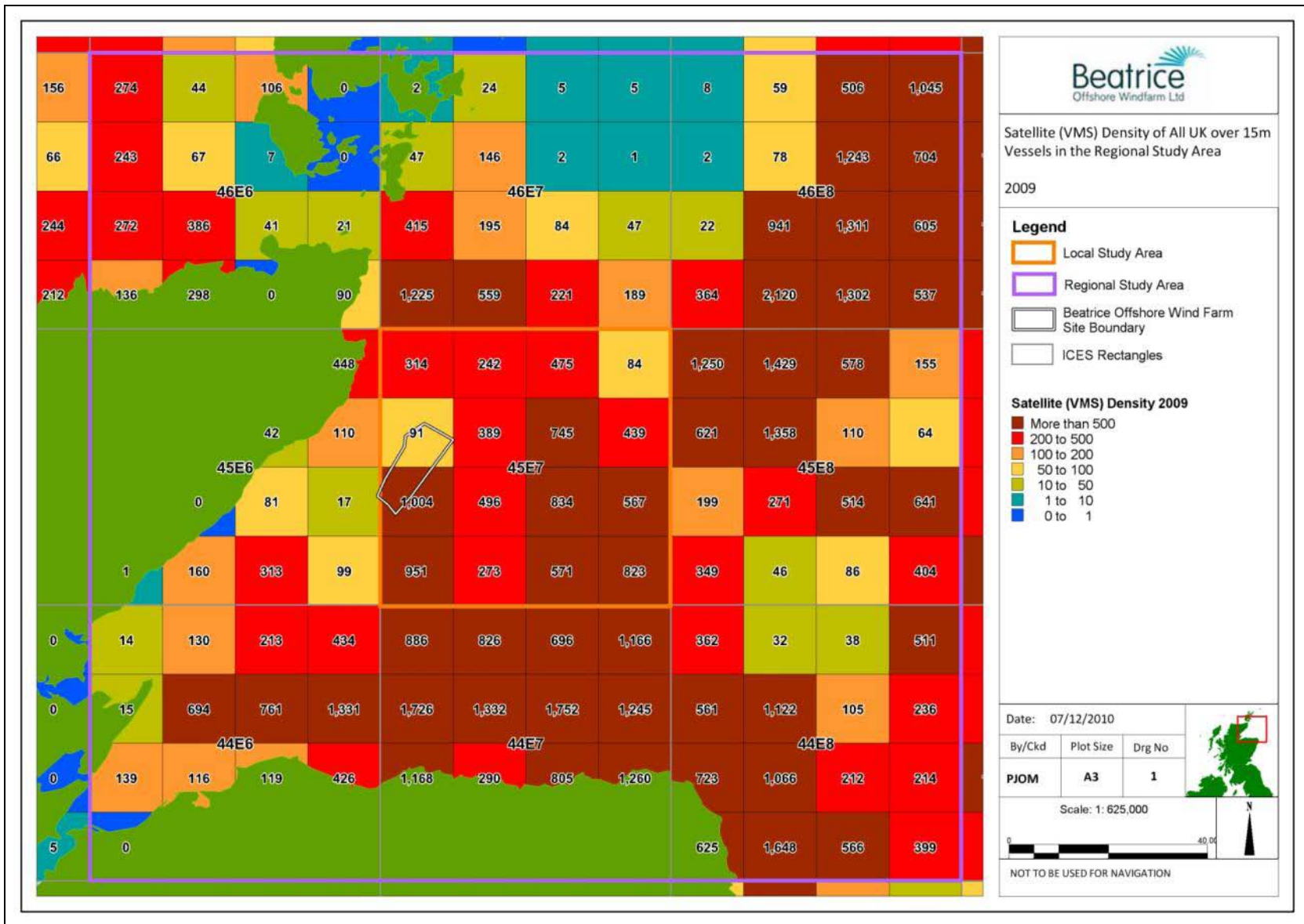


Figure 8.3 2009 Satellite (VMS) Density of all UK Over-15 Metre Vessels (2009) (Source: MMO)

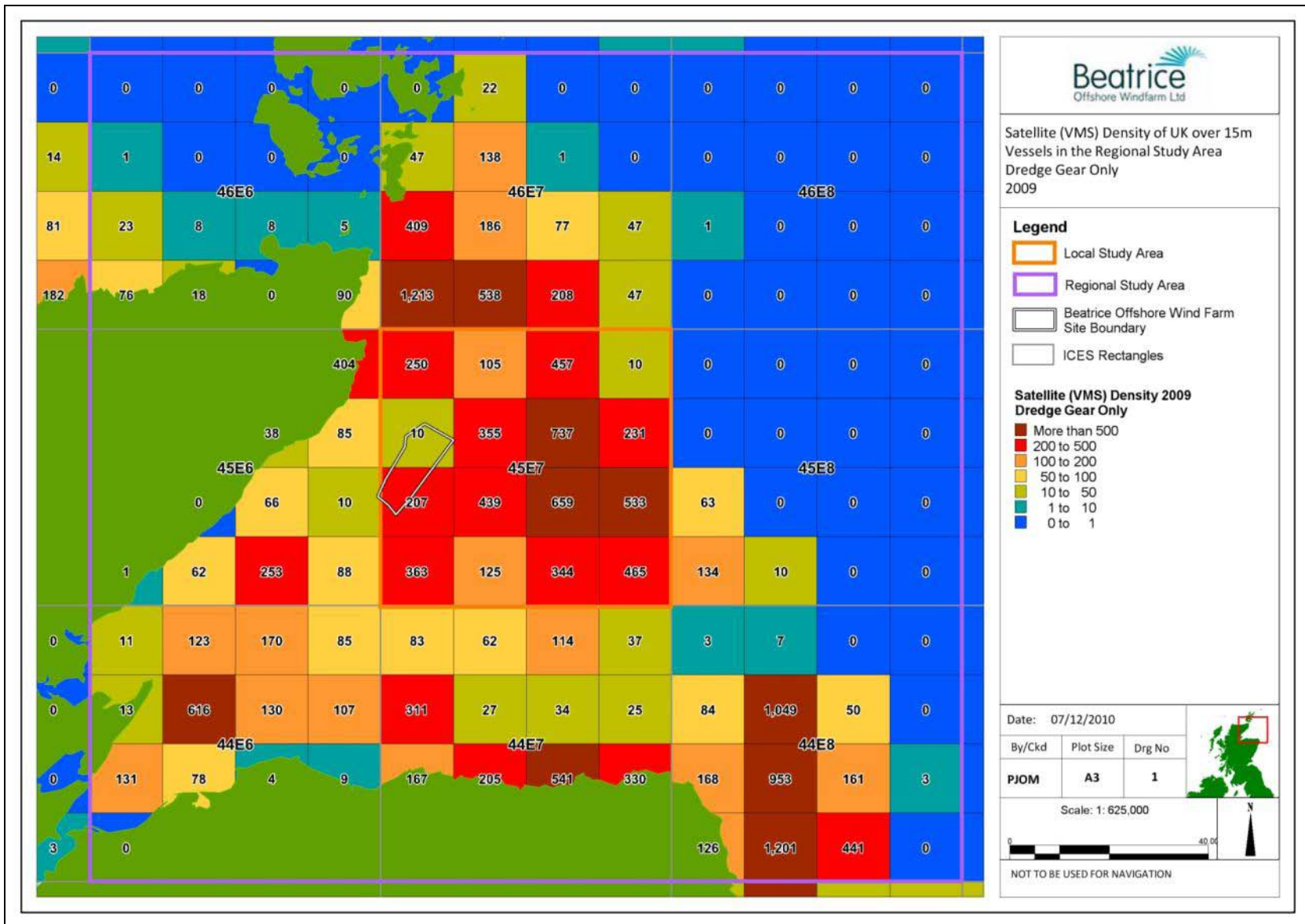


Figure 8.4 Satellite (VMS) Density of all UK Over-15 Metre Boat Dredge Vessels Only (2009) (Source: MMO)

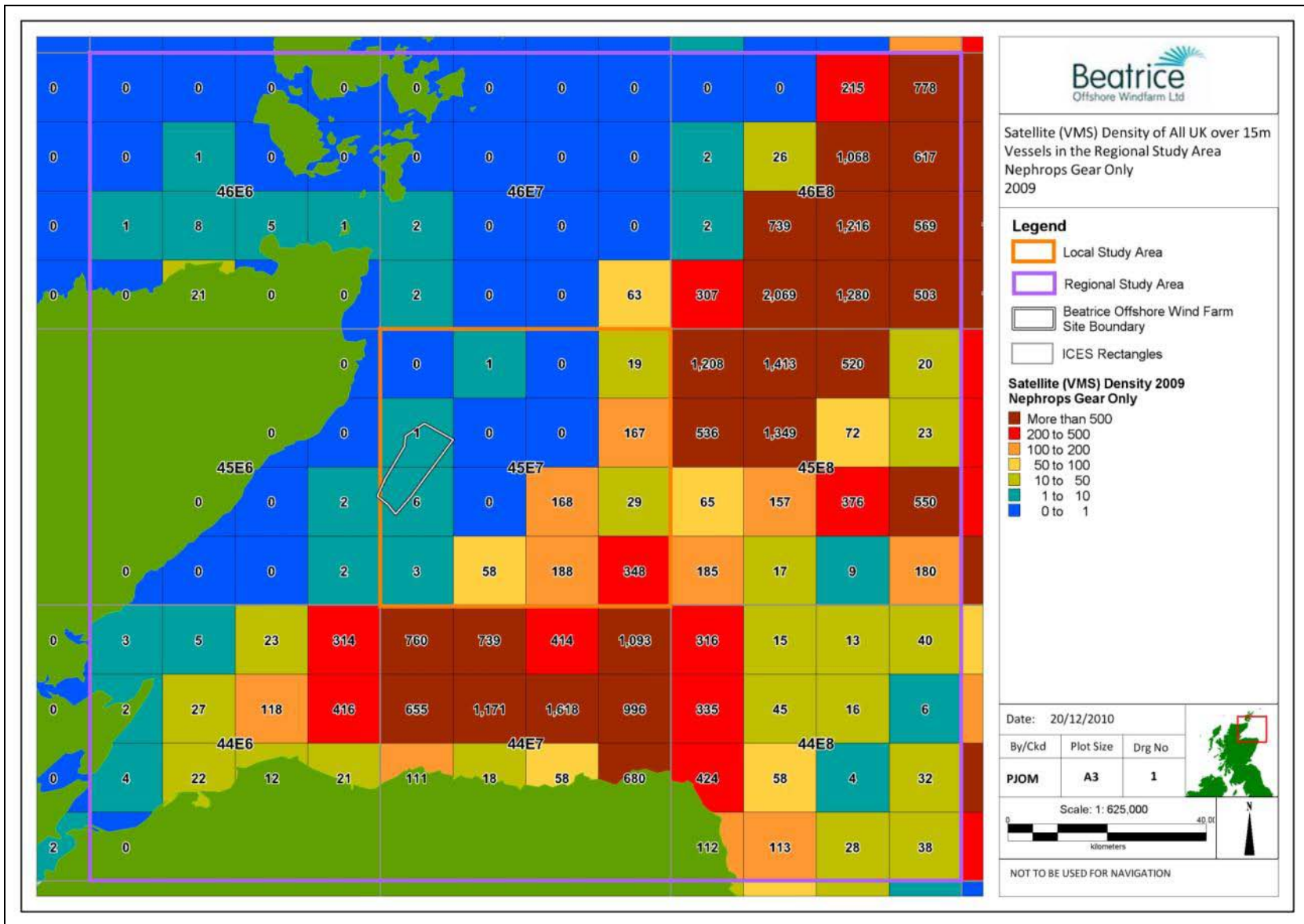


Figure 8.5 Satellite (VMS) Density of all UK Over-15 Metre Nephrops Trawl Vessels Only (2009) (Source: MMO)

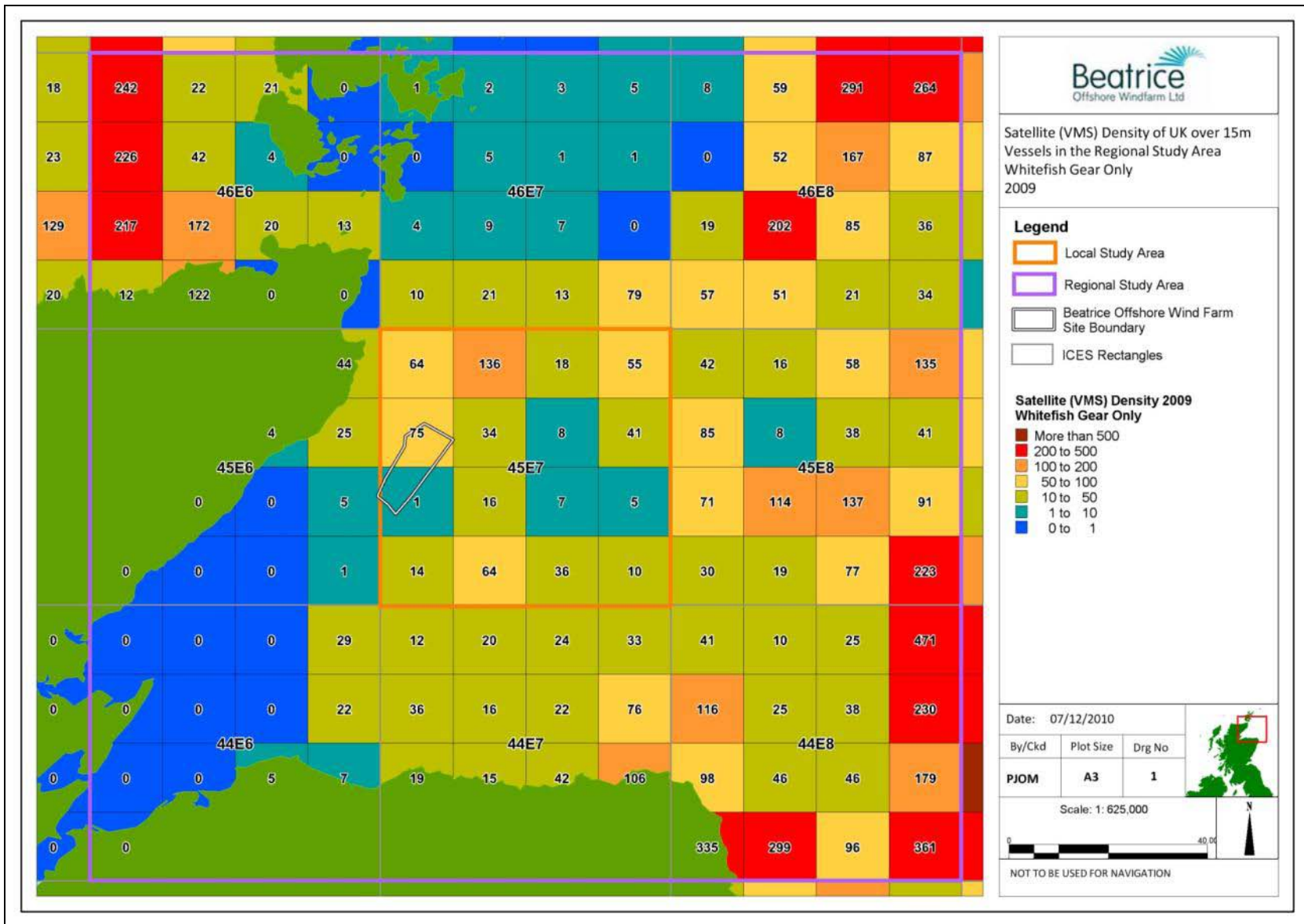


Figure 8.6 Satellite (VMS) Density of all UK Over-15 Metre Whitefish Gear Vessels Only (2009) (Source: MMO)

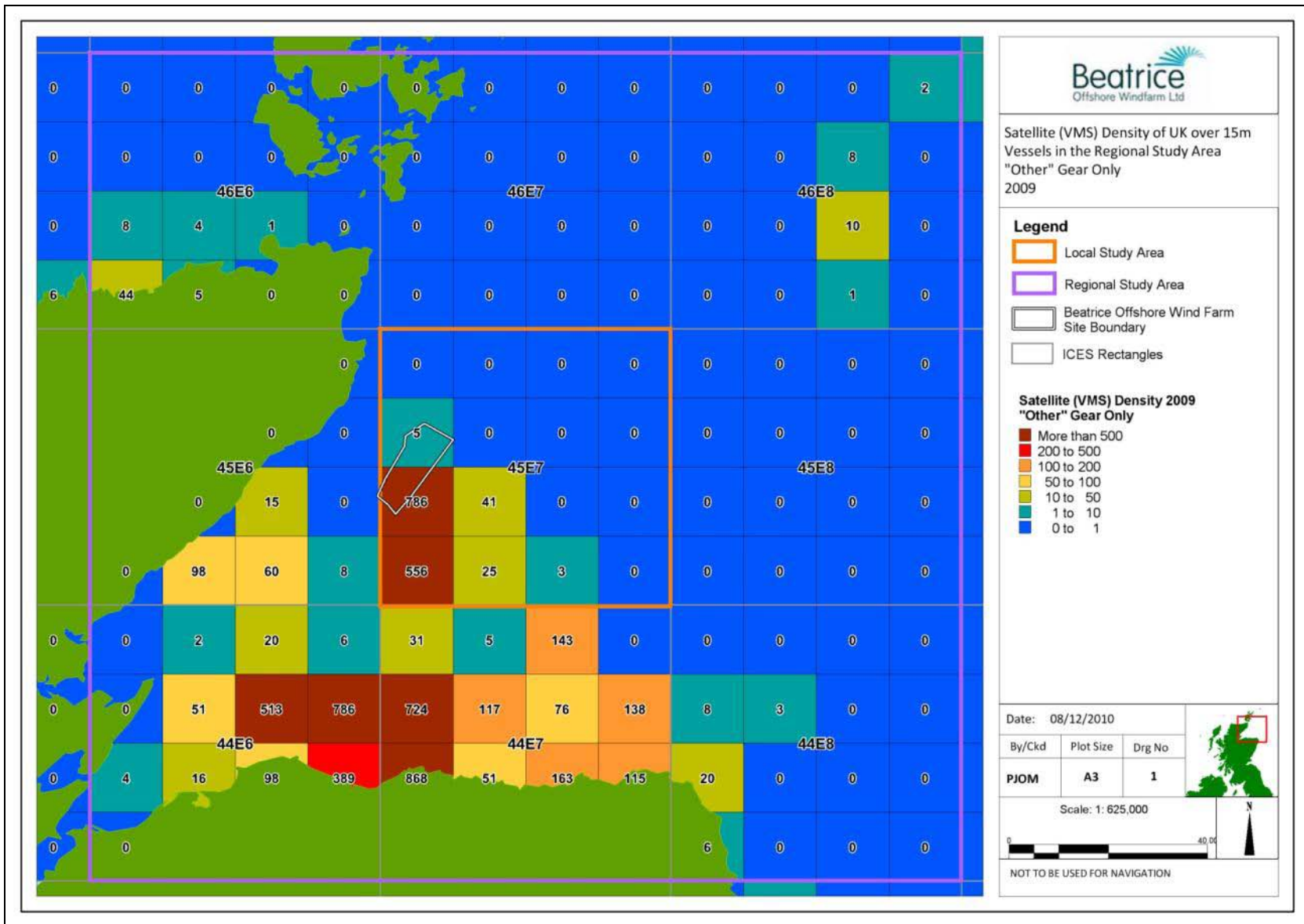


Figure 8.7 Satellite (VMS) Density of all UK Over-15 Metre "Other" Gear (2009) (Source: MMO)

9.0 Fisheries Surveillance Sightings

Figure 9.1 and Figure 9.2 give the positions of vessels identified by fisheries surveillance officers, part of Marine Scotland, in the regional study area, by method and nationality. Vessels of all lengths are recorded. It can be seen that the sightings broadly corroborate the analysis of the MMO fisheries statistics, and the satellite (VMS) density, with the highest densities located in the south and east of the study area. Activity is low to moderate in the local study area and negligible in the Beatrice site boundary with only two fishing vessels sighted by surveillance teams within the area over the ten year period. The majority of vessels sighted within the regional study area are demersal trawlers and a high percentage (98%) of sightings were of UK registered vessels.

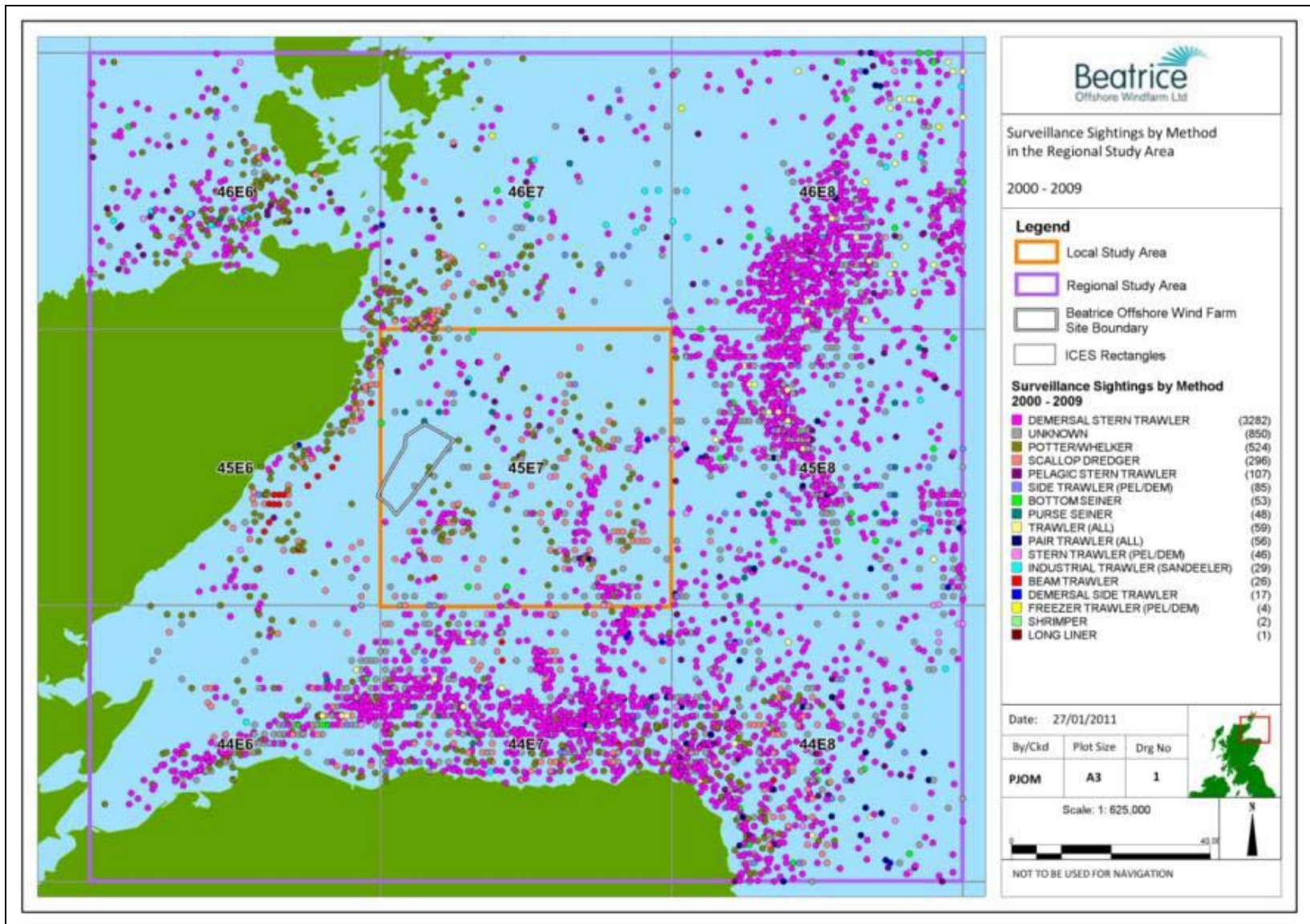


Figure 9.1 Surveillance Sightings by Method in the Regional Study Area (Source: MMO)

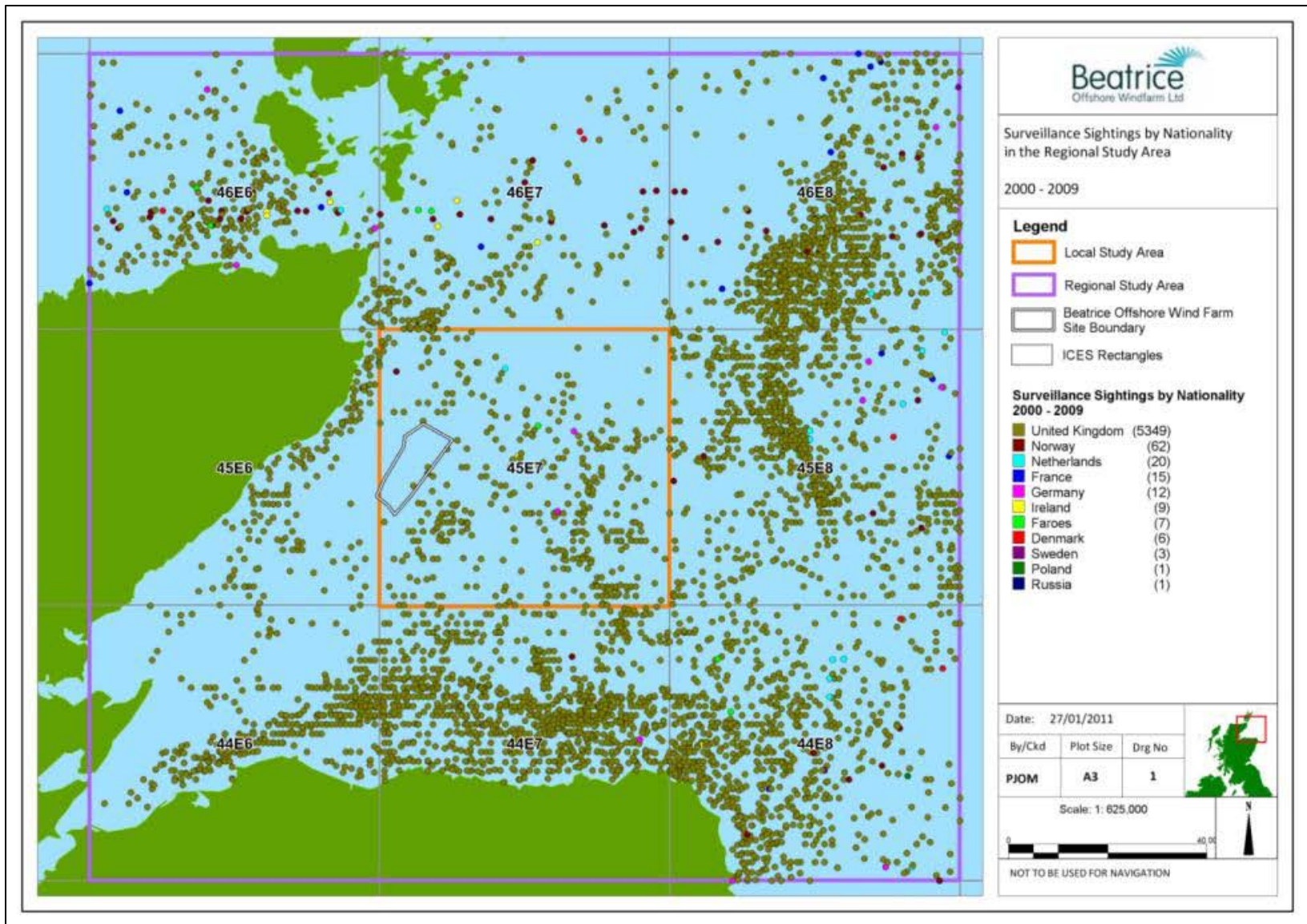


Figure 9.2 Surveillance Sightings by Nationality in the Regional Study Area (Source: MMO)

10.0 Marine Scotland Data Analysis

As previously mentioned (Section 5.3) 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 Moray Firth area.

Figure 10.1 – Figure 10.3 show the distribution of fishing gears in the Moray Firth for all over-15 metre UK vessels between 2007 and 2009, respectively. In the case of bottom trawls, the mesh sizes are indicative of the species targeted: <100mm is used by vessels targeting nephrops and squid, and >100mm by those targeting demersal finfish such as haddock. It can be seen that generally demersal trawlers targeting demersal finfish species are recorded to the immediate north of the Beatrice site, and in areas in the southern Moray Firth. Demersal trawlers using small mesh nets are predominantly recorded in the southern section of the Firth. Boat dredges are recorded to the east and south of the site, and over a proportion of the site (2007 and 2008 only), as well as in inshore areas. There is a low level of fishing gears recorded within the Beatrice site in 2009.

Figure 10.4 – Figure 10.6 show the commercial landings densities of finfish in the Moray Firth for all over-15 metre UK vessels between 2007 and 2009, respectively. It can be seen that demersal finfish are primarily caught, and that landings levels fluctuate throughout the three year period. The Beatrice site is for the most part outwith of areas recording landings, although there is a limited level in 2008. Figure 10.7 shows the commercial landings density of demersal finfish only in 2009. It can be seen that haddock landings record the highest density levels in a discrete area to the immediate north of the Beatrice site, and in the southern portion of the Moray Firth, where cod is also recorded, though at a lower level (corresponding to Figure 10.1 – Figure 10.3). There is a low level of landings recorded within the site in 2009.

Figure 10.8 – Figure 10.10 show the commercial landings densities of shellfish in the Moray Firth for all over-15 metre UK vessels between 2007 and 2009, respectively. It can be seen that there are low recorded landings for edible crab, although a cluster is recorded in the south-east of the Firth, which indicates that the majority of the creel fleet is under-15 metres and hence not recorded within this data set. Scallop landings reflect the pattern described for boat dredges (Figure 10.1 – Figure 10.3). Nephrops are landed from the southern portion of the Firth. It can be seen that scallop and nephrops grounds are clearly defined, as a result of the different substrates that the two species inhabit, which is discussed further in Section 10.0.

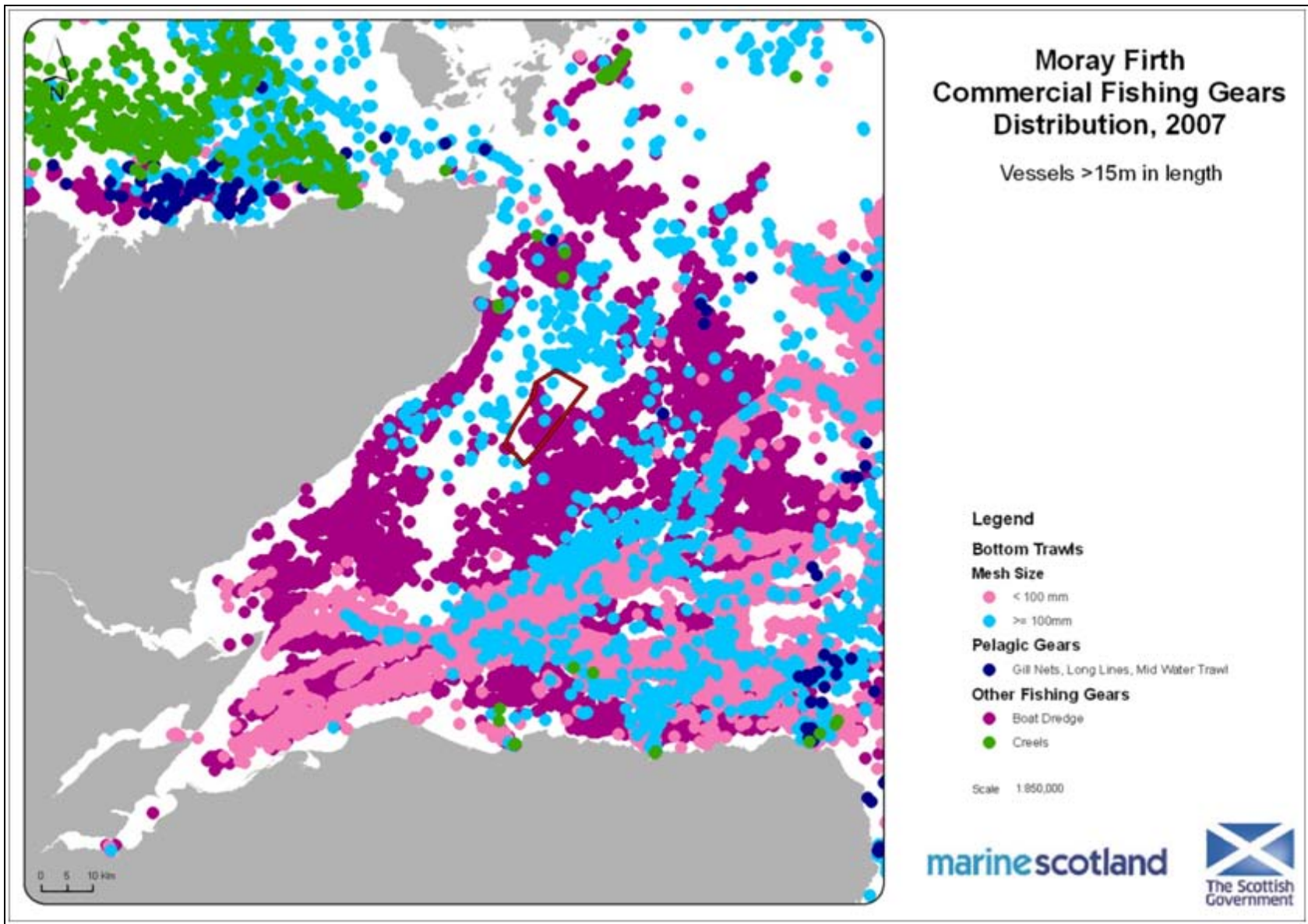


Figure 10.1 Fishing Gear Distribution for Over-15 Metre Vessels in the Moray Firth, 2007 (Source: Marine Scotland)

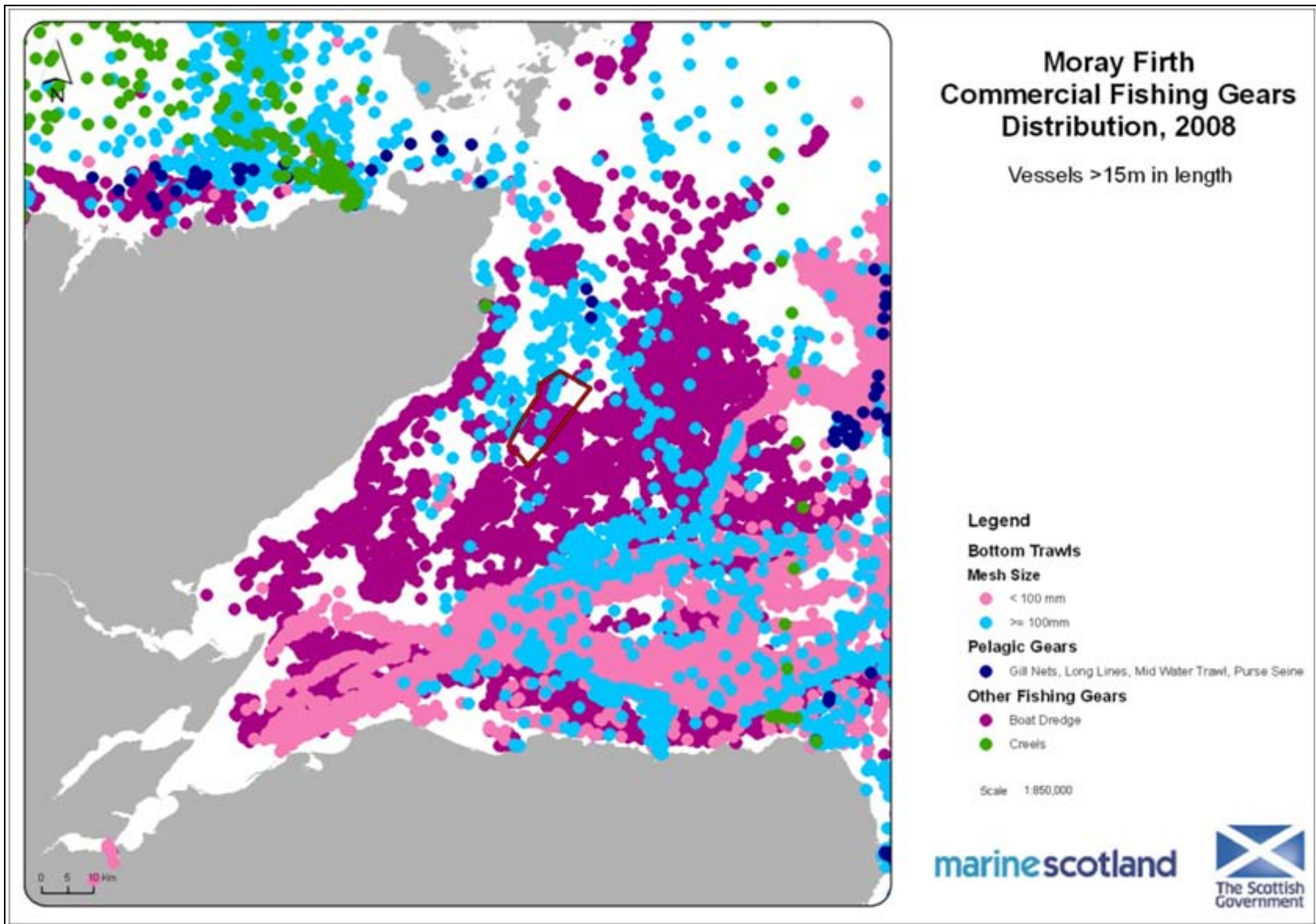


Figure 10.2 Fishing Gear Distribution for Over-15 Metre Vessels in the Moray Firth, 2008 (Source: Marine Scotland)

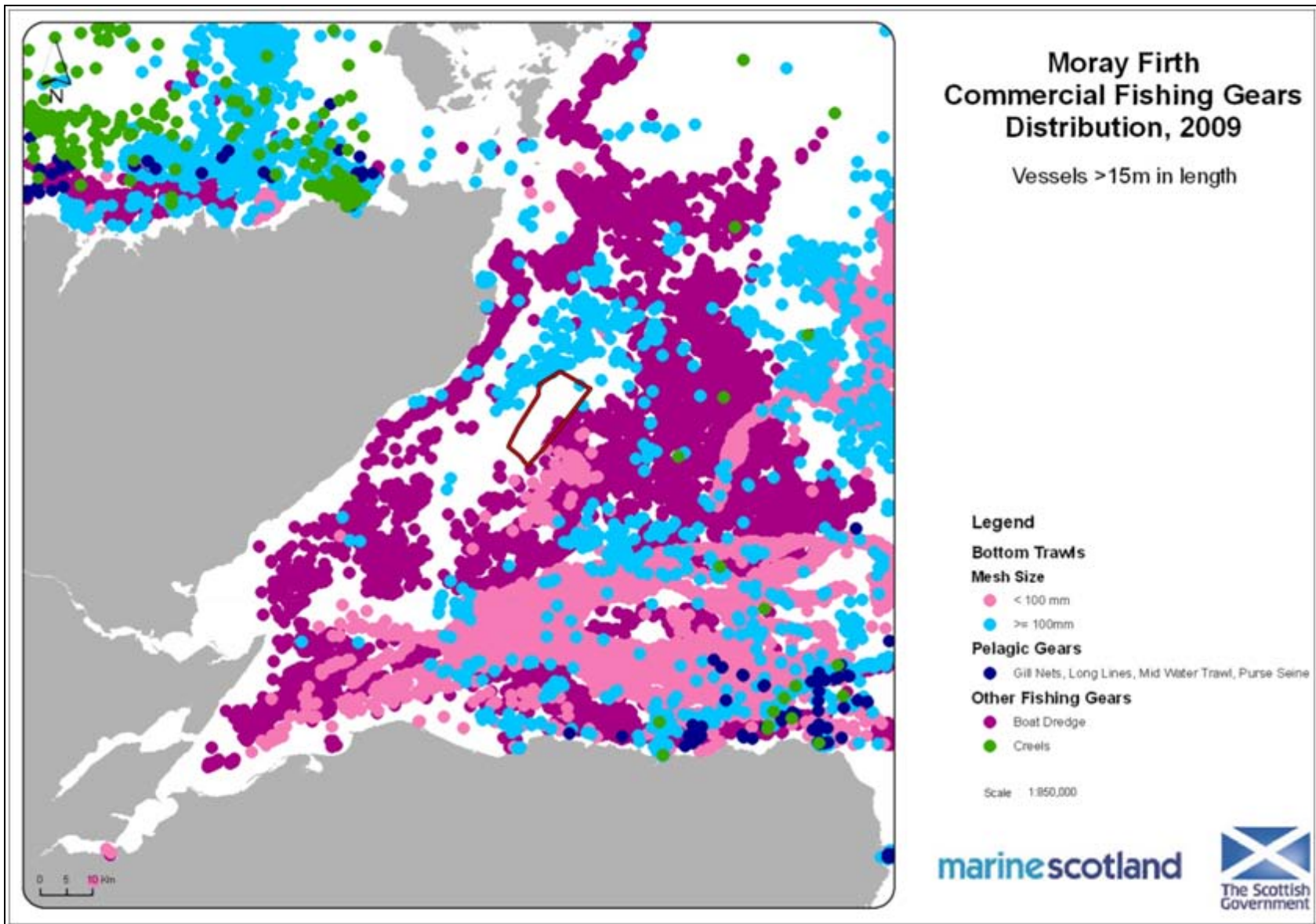


Figure 10.3 Fishing Gear Distribution for Over-15 Metre Vessels in the Moray Firth, 2009 (Source: Marine Scotland)

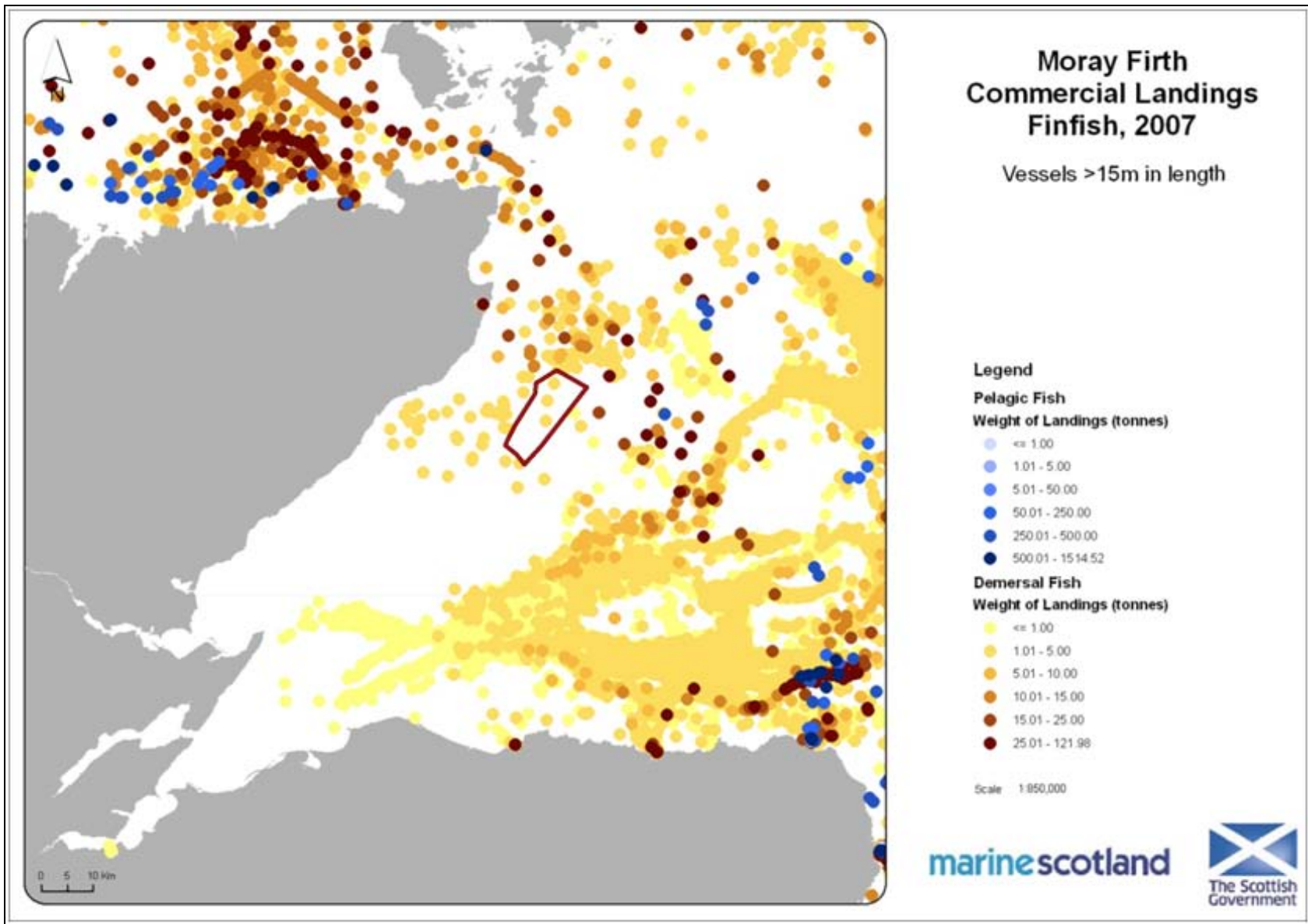


Figure 10.4 Commercial Landings of Finfish (Demersal and Pelagic) for Over-15 Metre Vessels in the Moray Firth, 2007 (Source: Marine Scotland)

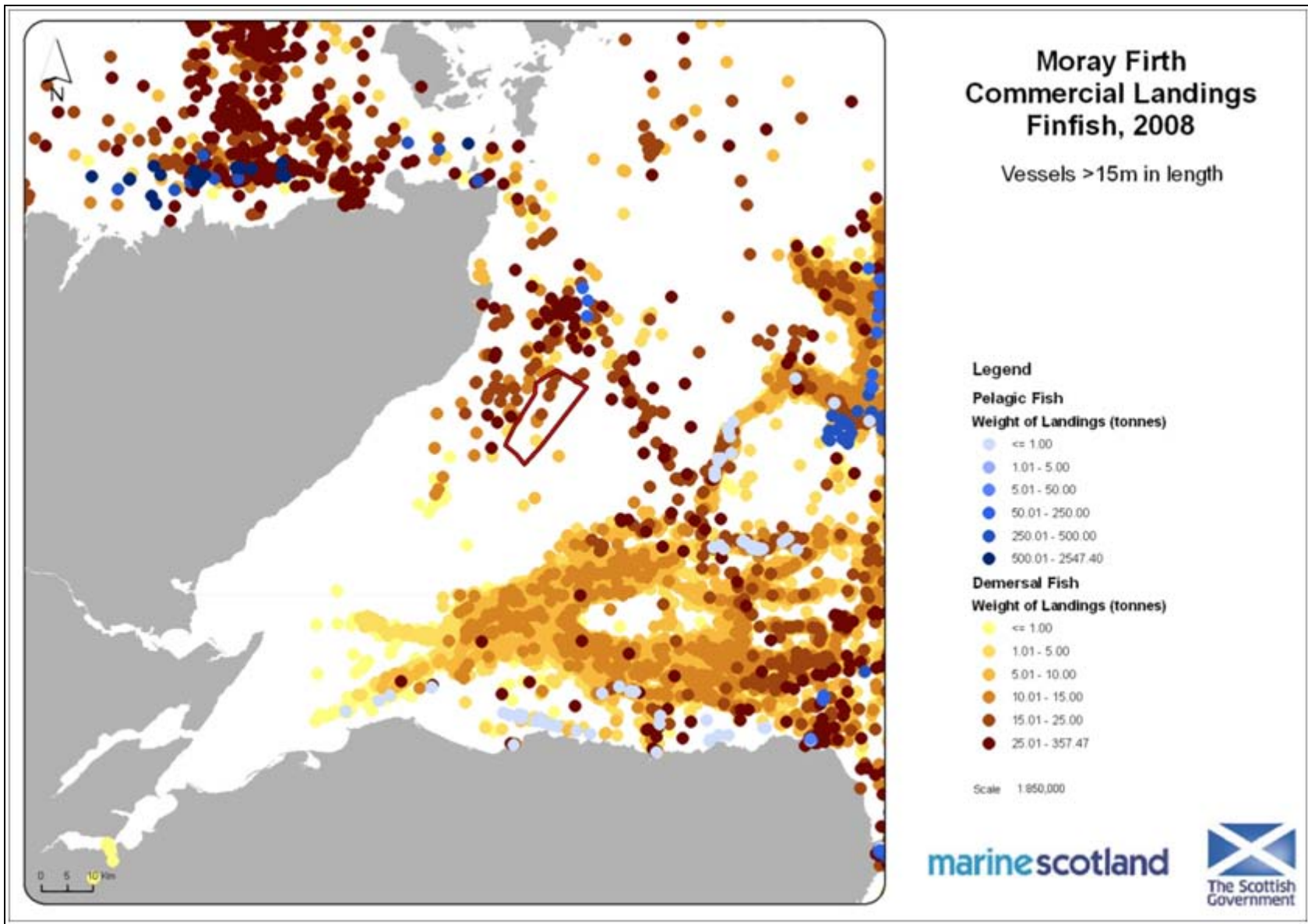


Figure 10.5 Commercial Landings of Finfish (Demersal and Pelagic) for Over-15 Metre Vessels in the Moray Firth, 2008 (Source: Marine Scotland)

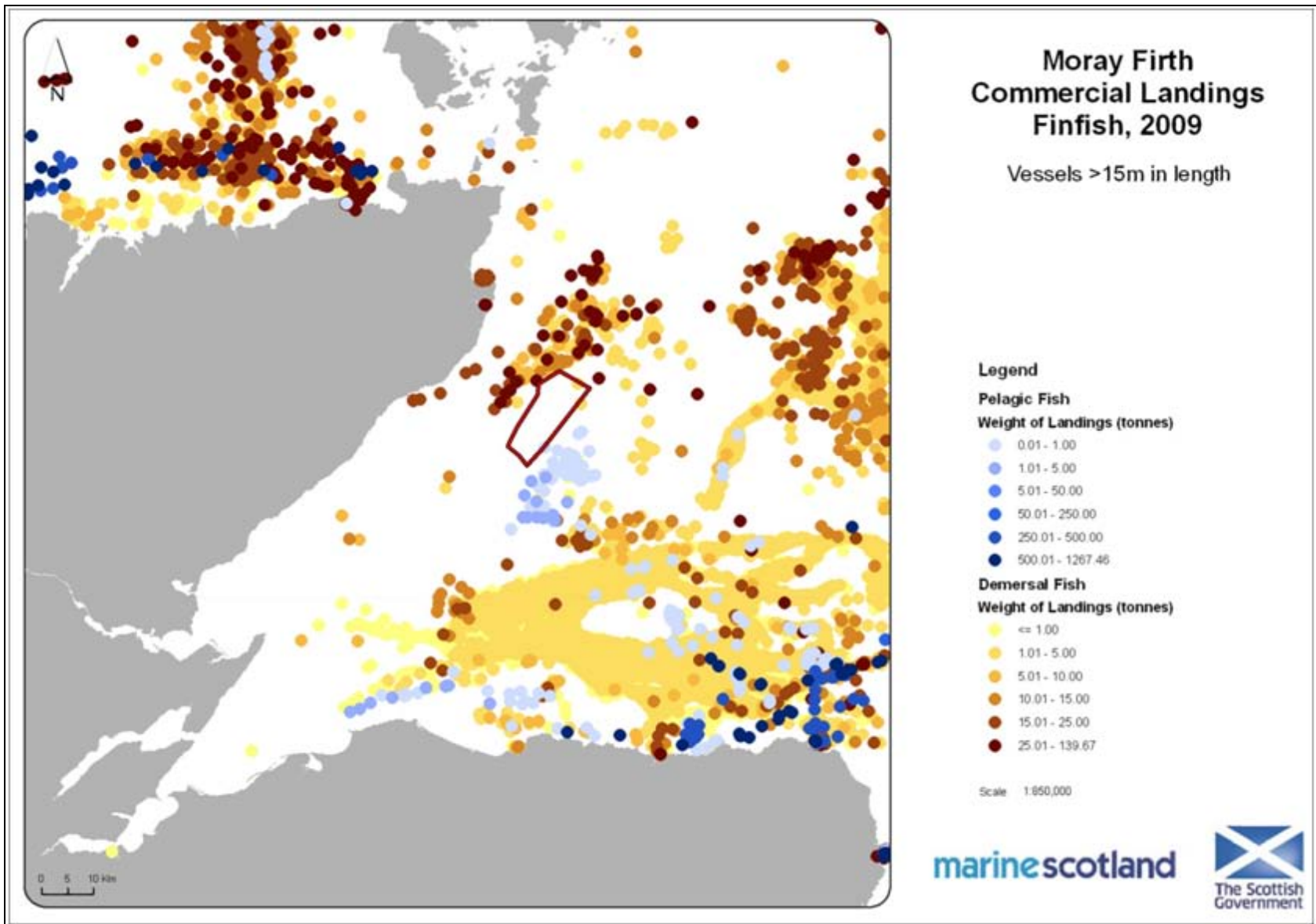


Figure 10.6 Commercial Landings of Finfish (Demersal and Pelagic) for Over-15 Metre Vessels in the Moray Firth, 2009 (Source: Marine Scotland)

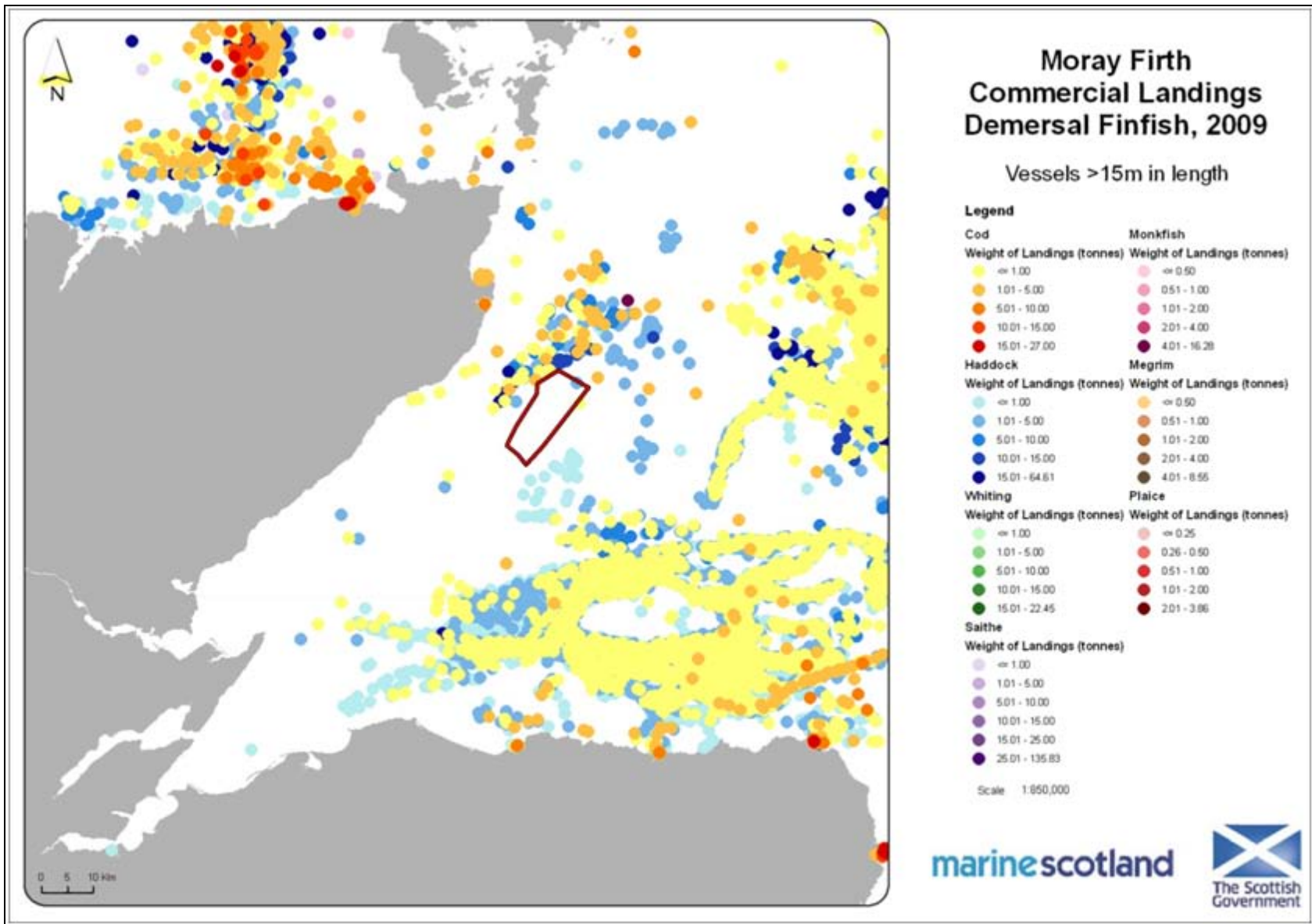


Figure 10.7 Commercial Landings of Demersal Finfish Only for Over-15 Metre Vessels in the Moray Firth, 2009 (Source: Marine Scotland)

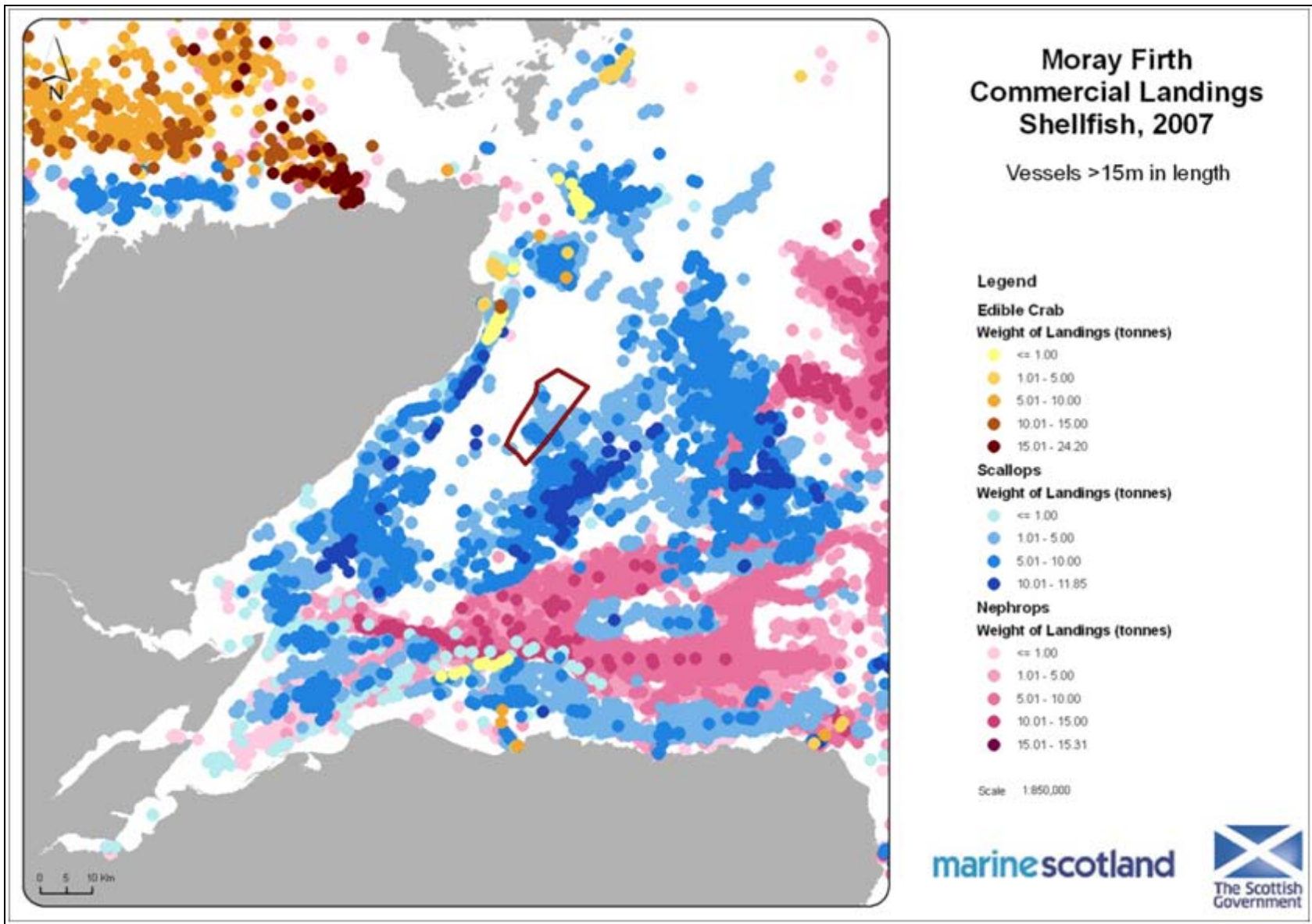


Figure 10.8 Commercial Landings of Shellfish (Edible Crab, Scallops and Nephrops) for Over-15 Metre Vessels in the Moray Firth, 2007 (Source: Marine Scotland)

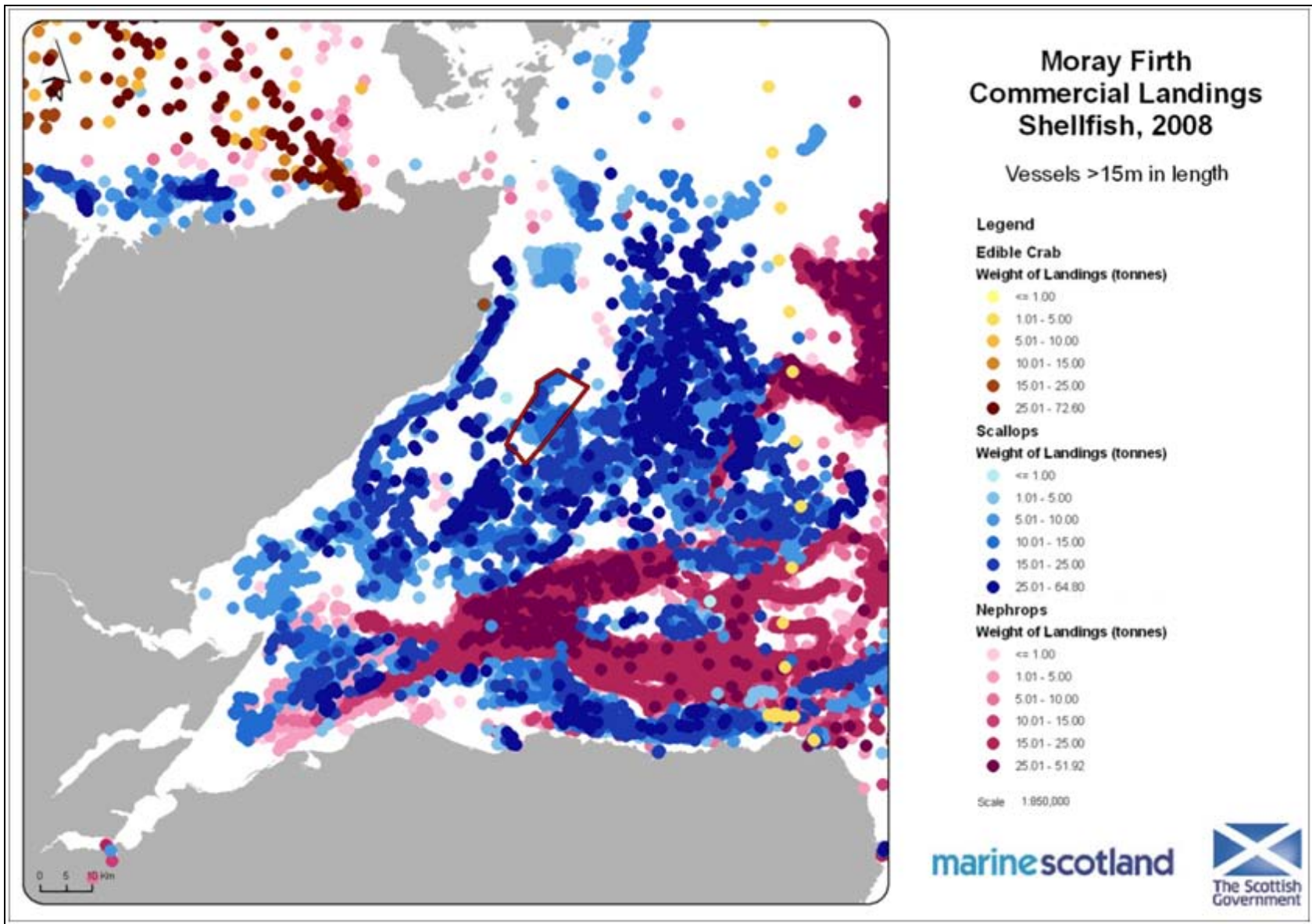


Figure 10.9 Commercial Landings of Shellfish (Edible Crab, Scallops and Nephrops) for Over-15 Metre Vessels in the Moray Firth, 2008 (Source: Marine Scotland)

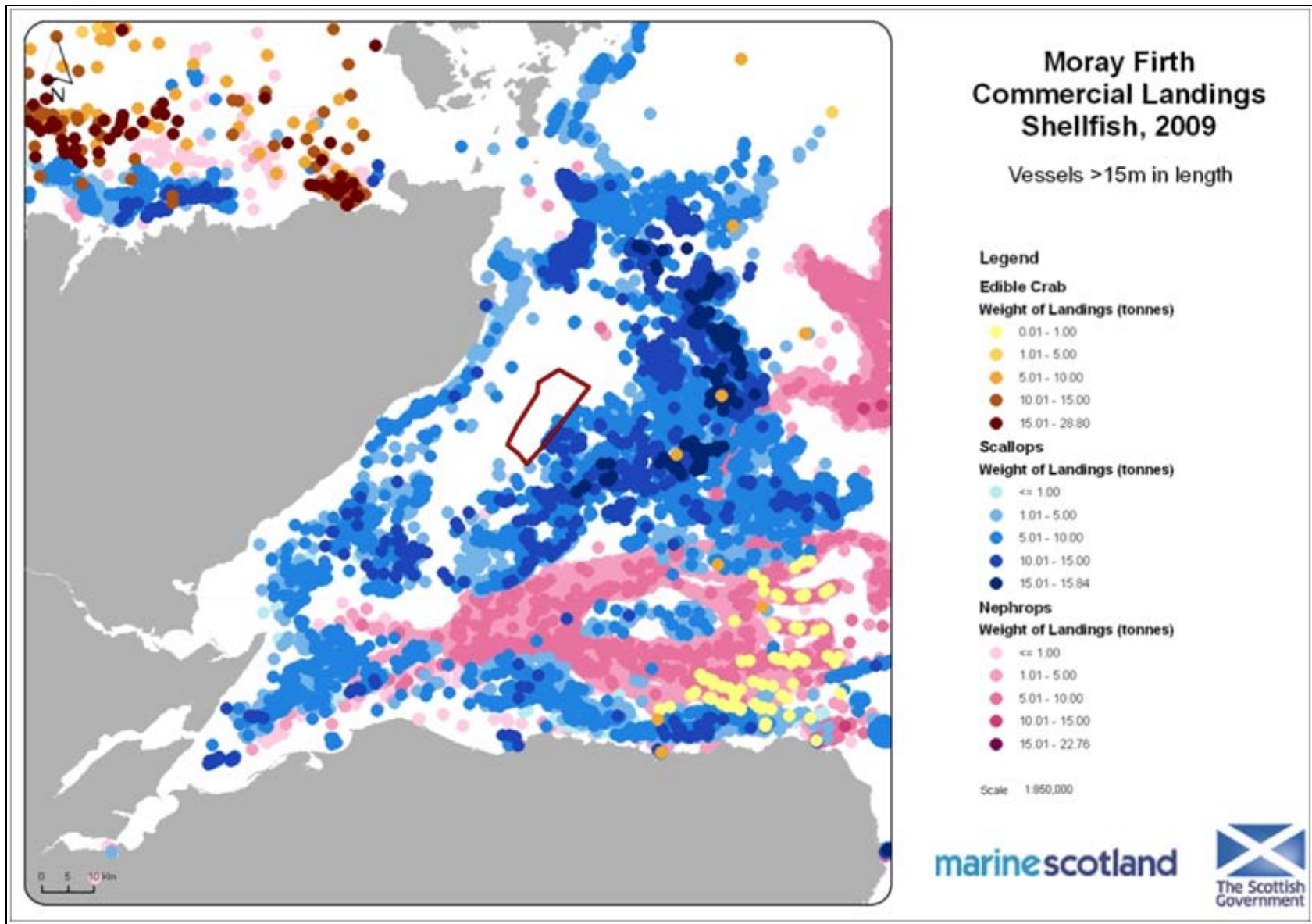


Figure 10.10 Commercial Landings of Shellfish (Edible Crab, Scallops and Nephrops) for Over-15 Metre Vessels in the Moray Firth, 2009 (Source: Marine Scotland)

11.0 Fishing Methods, Operating Patterns and Practices

The principal fishing activities undertaken in the area of the proposed Beatrice offshore wind farm are:

- Boat dredging for scallops
- Demersal otter trawling for demersal fish (whitefish), nephrops or squid
- Scottish seine netting for demersal fish (whitefish)
- Potting (creeling)

11.1 Scallop Dredging

11.1.1 Fishing Gear

Scallop vessels generally tow between one and two beams onto which a number of dredges are attached, depending upon vessel size, engine power and winch capacity. The number of dredges can vary from three or four on a small 10 metre boat and up to 18-20 on a 30 metre vessel with 1500hp. The principal type of dredge used is the English 'Springer' type, whereby the scallops are raked from the seabed by steel teeth that are attached along the leading edge of the dredges and which penetrate the seabed to a depth of approximately 20cm. The total gear width, which is indicative of the working area required for scallop dredging, can range from 9.2m for an 11m vessel to 16.5m for a 30m vessel. Figure 11.1 below shows the basic configuration of scallop fishing gear.

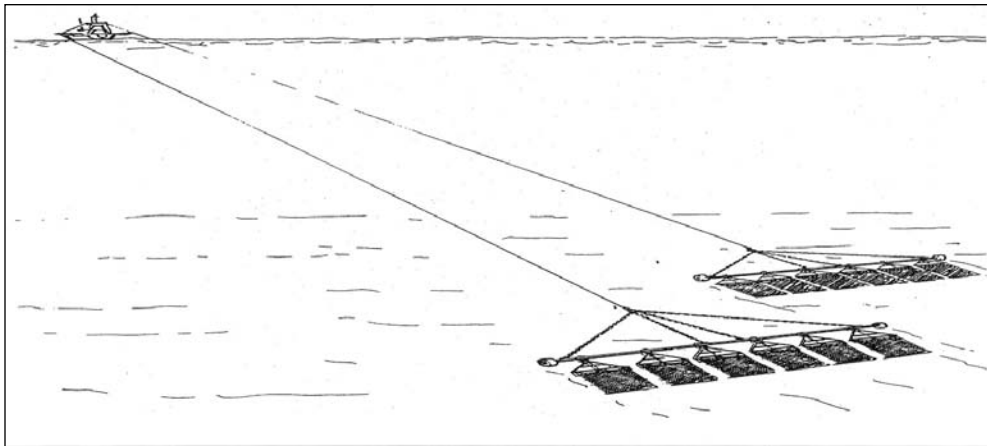


Figure 11.1 Scallop Dredging (created by BMM)

11.1.2 Fishing Patterns and Practices

The Moray Firth scallop fishery commenced in the mid 1970s, became the largest in Scotland in 1992 and continued to expand until 1996, when landings reached a peak of 300,490 tonnes. They then declined quite rapidly until 1998, where they levelled off. A dip in 2002 was immediately followed by a recovery in 2003 and anecdotal evidence suggested that it was as a result of a number of larger vessels spending time fishing in the English Channel (Howell *et al.* 2006).

The species is found below the low water mark to depths exceeding 100m in sediments generally comprised of sand, gravel and mud, sometimes with stones, rocks and boulders. The fishery is mostly managed through minimum landing sizes (100mm shell width), restrictions on dredge numbers and seasonal closures. There are no limits in the form of catch or effort quotas. Scallop fishing is year round, although the highest activity occurs in the middle two quarters of the year. The north east has a high proportion of its grounds beyond the 12nm limit, which attracts larger vessels with up to 14 dredges

attached to a beam on either side of the vessel. The scallop fishery could potentially increase as a result of improved knowledge of the extent and potential of scallop stocks offshore (Howell *et al.* 2006).

A large proportion of the scallop dredging fleet is nomadic, fishing around the UK coast in response to changing stock levels and regulations. Generally, scallop grounds are fished for two to three months each year and then left until stocks have sufficiently recovered before they are targeted once more. The length of time it takes for grounds to recover varies and is usually between eight and nine months (pers. comm. scallop fisherman, March 2011). Anecdotal evidence suggests that smaller vessels, with fewer dredges, will dominate the inshore sector and will generally land their catch locally on a daily basis. The offshore fleet of larger vessels, fishing a larger number of dredges, may operate trips of up to four or five days.

Visiting vessels from both the east and west coast of Scotland periodically fish scallop grounds in the Moray Firth, and in addition there are several locally based vessels who will concentrate their activities in the area.

The general location of scallop fishing grounds around the Scottish coast are indicated in Figure 7.3, which shows the landings values for the species on a national scale. It should additionally be noted that the larger category vessels will also concentrate their activities in grounds in the English Channel and the Irish Sea.

11.2 Demersal Otter Trawling for Nephrops, Whitefish or Squid

Demersal otter trawling is the most common fishing method in Scottish waters. Varieties of species are targeted, the common factor being that they are all located on or close to the seabed. Fishing gear is differently configured to target specific species, i.e. net mesh sizes vary and so different nets will be used to target different species. Figure 11.2 below gives the basic configuration of a single rig demersal otter trawler: the horizontal opening of the net is maintained by otter boards (doors), which are relatively heavy and often reinforced with a steel toe to ensure good contact with the bottom. The warp to depth payout ratio is generally around 3:1. Fish are herded between the boards and along the sweeps and into the mouth of the trawl. They then pass back through the net and are retained in the cod end.

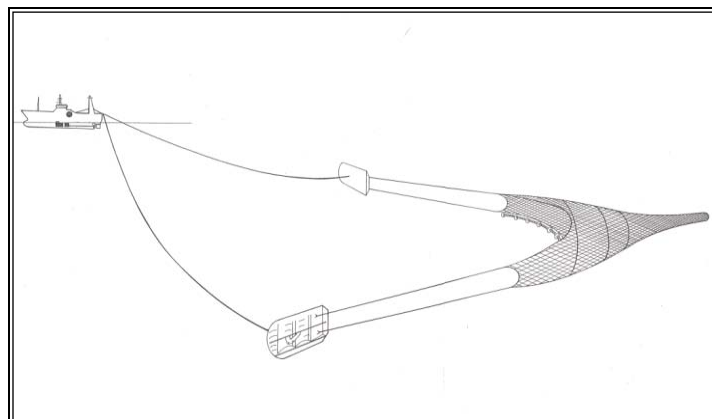


Figure 11.2 Single Net Demersal Otter Trawl (created by BMM)

Vessels may also operate 'twin-rig' gear, whereby two nets are towed. The lateral opening of the nets is maintained by a single pair of otter boards attached to the outer sweeps. In the majority of vessels, a third warp is attached to a central clump weight onto which the two inner net bridles are attached. Twin rig vessels are commonly used to target nephrops but are also employed in the whitefish fishery.

Demersal pair trawling is also undertaken whereby two vessels tow a single net, each vessel towing one warp.

The predominant fisheries targeted by demersal otter trawlers in the Moray Firth are for nephrops, whitefish and squid.

11.2.1 Nephrops Fishery

Vessels fishing for nephrops can employ either single or twin rig demersal trawl gear, as described above. A net with a smaller 70mm mesh cod end is used, but the gear is otherwise configured in the same way as shown in Figure 11.2 above.

The nephrops fishery commenced on a small scale in the 1960s, reaching a peak in landings in the 1980s, then declining until levelling out in the 1990s. Although one of the smaller Scottish nephrops fisheries, it is one of the most important shellfish fisheries in the Moray Firth (Moray Firth Partnership, 2006).

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. Underwater television (UWTV) surveys conducted by Marine Scotland in the Moray Firth indicated that the population is relatively stable but stock levels are at lower levels than recorded between 2003 and 2005. Size surveys also suggest that the mean size of nephrops has remained stable and therefore this suggests that stocks are currently being exploited sustainably (Keltz and Bailey, 2010).

11.2.2 Whitefish Fishery

The whitefish fishery is for the most part a mixed fishery with other species being caught in addition to the main target species. Whitefish landings have declined over past decades in the Moray Firth, in line with a similar trend in the North Sea. Dwindling cod stocks since the 1980s have resulted in a series of progressive quota reductions with a consequence that a number of vessels have diversified into targeting nephrops and scallops.

The majority of the Scottish whitefish fleet target grounds further offshore, but it has been reported that there is a discrete haddock fishery in the north of the Moray Firth (pers. comm. Buckie Fishery Office, November 2010).

11.2.3 Squid Fishery

Demersal otter trawlers are also able to target squid, which appears to spawn in the area. The squid fishery fluctuates from year to year. Squid have a short lifespan and stock levels depend on the survival success rates of individual breeding seasons, Section 7.1.4 (Annual Landings) shows that 2009, and to a lesser extent 2005, recorded relatively high landings levels for the species. In recent years the fishery has become an important alternative to whitefish for the demersal trawler fleet particularly as the fishery is, at present, unregulated and ability to target the species relieves pressure on other restricted stocks such as whitefish and nephrops.

The squid fishery is usually of short duration (Section 7.1.5: Seasonality), although it has been reported to be lengthening (Young *et al.* 2006). The timing of the fishery is dependent upon the arrival of the species in the area, but the peak is generally around August and September (Figure 7.15). In order to target squid, vessels will reconfigure their demersal gear, using nets with a 40mm mesh cod end. Nets have high headlines, as the species is caught off the seabed, where it returns during the day after feeding closer to the surface at night. Squid are often targeted on rocky or uneven ground (suitable for spawning), and

vessels targeting the species will deploy gear with rock hopper groundlines to minimise damage to the nets.

11.3 Scottish Seine Netting

Single boat seine netting involves encircling demersal fish species within a pattern of seine ropes laid on the seabed as shown in Figure 11.3. The progressive stages of seine netting are also shown in Figure 11.3. As the warps are hauled in the fish are herded into the path of the net.

Pair seining is effectively the same as pair trawling. In the past, seine net vessels were equipped with much lower power engines than their trawler counterparts however new vessels are generally built as dual purpose seine netters/trawlers. Seine netting is generally more fuel efficient than demersal otter trawling.

Seine net vessels in the Moray Firth area generally target whitefish, although vessels are potentially able to target squid when the species is present on sandier substrates.

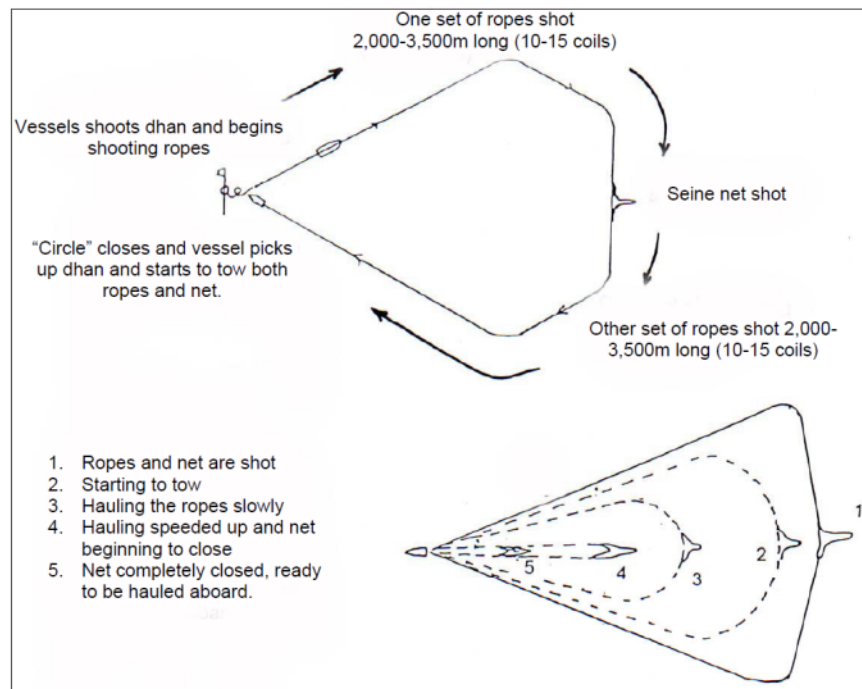


Figure 11.3 Scottish Seine Net Operation (Source: Seafish 2005)

11.4 Potting

Pots, or creels, are essentially traps baited to catch mobile shellfish such as lobster, crab or nephrops. A number of pots are set on a main line which is deployed on the seabed for an average soak time of three days, although this can be extended during periods of bad weather (Figure 11.4).

The priority of this fishery is the delivery of live catch. The scale of this activity can range from a 'hobbyist' fisherman setting 20 pots, to the long range vivier crabber which may set more than 3000 pots. Catch can be kept alive in cages located on the seabed, or in the case of larger vessels, purpose-built onboard vivier tanks.

In addition to potting vessels operating on a full time basis, a significant number of registered boats will be part-time. These vessels will generally operate in the summer months, and are hauled out in the winter.

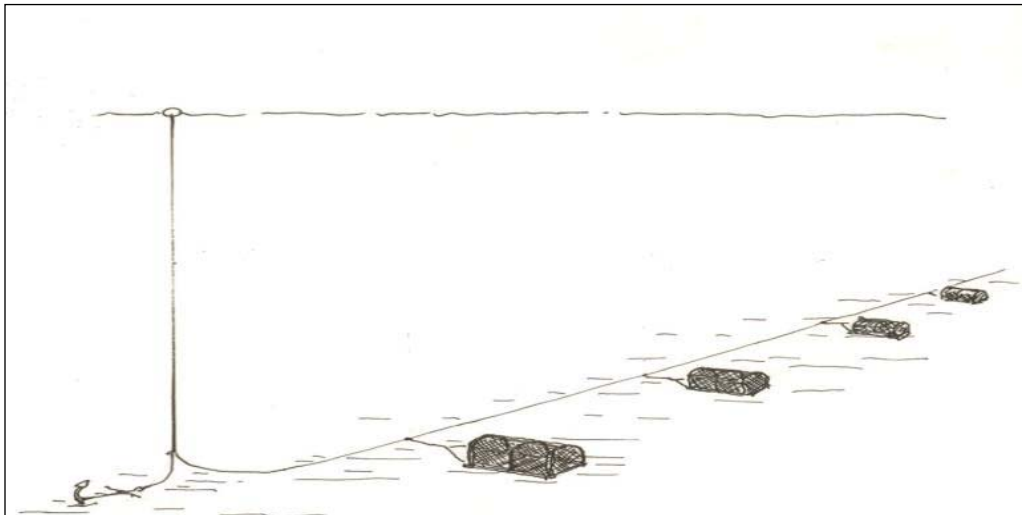


Figure 11.4 Fleet of Pots (created by BMM)

Analysis of landings data shows that the Moray Firth does not record high landings of crab or lobster species, although inshore areas along the Caithness coast sustain some activity, and to a lesser extent inshore areas of the southern Moray Firth.

12.0 Fisheries by Port and Vessel

The majority of vessels active in the vicinity of the Beatrice offshore wind farm site have home ports in the Moray Firth area. The principal fishery districts encompassing the Moray Firth are:

- Buckie (Cullen to the south end of Kessock Bridge, Inverness)
- Scrabster (Inverness to Strathy Point, and including a portion of the Orkneys)

In addition to vessels under the jurisdiction of these districts, boats from other locations in Scotland will also visit the Moray Firth, in the main, scallop dredgers and demersal trawlers/seine netters. Visiting vessels are discussed in Section 12.6. The fishing grounds of all vessels are discussed in Section 13.0.

12.1 Scallop Fishery

There are six scallop vessels with home ports in the locality of the Moray Firth which operate in the vicinity of the Beatrice site. Table 12.1 below lists individual vessels by home port and vessel length. With the exception of Vessel AA, all vessels are over-15 metres and hence satellite tracked.

Table 12.1 Scallop Vessels with Home Ports in the Moray Firth

Vessel	Home Port	Vessel Length (m)
Vessel AA	Wick	11.5
Vessel AB	Wick	16.4
Vessel E	Buckie	18.0
Vessel AC	Buckie	18.2
Vessel D	Buckie	30.2
Vessel AD	Fraserburgh	26.6

Vessel AA, having limited operational range as a result of its length, concentrates all of its activity on the Smith Bank, and in areas around the Beatrice site (pers. comm. scallop fisherman, January 2011). The basic vessel specifications of the vessel are listed in Table 12.2.

The remainder of scallop vessels spend varying amounts of time fishing in the Moray Firth, in addition to grounds along the east and west coasts of Scotland, the English Channel and the Irish Sea. The extent of time spent in scallop grounds in the Moray Firth is dependent upon the productivity of the fishing grounds. Of the vessels listed above, the largest is Vessel D whose home port is Buckie, and which dredges in the Moray Firth and down the east coast of Scotland. Due to the number of dredges the vessel operates, it targets fishing grounds outside of 12nm. The basic vessel specifications are listed in Table 12.3.

Table 12.2 Vessel AB, Scallop Dredge Vessel operating out of Wick

Fishing Vessel	Vessel AB
Home Port	Wick
Length	11.5m
Main Engine Power	250hp
Fishing Association	Scottish Fishermen's Federation
Typical Fishing Trip Duration	1 day
Typical Distance Steamed per Trip	Variable
Seasonality of Activity	12 months
Average no. of Days Fishing per Year	170 days per year
Average Towing Speed	Variable
Average Towing Duration	Variable
Average Tow Length	Variable

Table 12.3 Vessel D, Scallop Dredge Vessel operating out of Buckie

Fishing Vessel	Vessel D
Home Port	Buckie
Length	30.2m
Main Engine Power	999hp
Fishing Association	North East of Scotland Fishermen's Organisation/Scottish Fishermen's Federation
Typical Fishing Trip Duration	8 days
Typical Distance Steamed per Trip	12nm to 100nm
Seasonality of Activity	12 months
Average no. of Days Fishing per Year	260 days per year
Number of Beams per Side	2
Number of Dredges per Beam	14
Estimated Total Gear Width	16.5m
Average Towing Speed	3 knots
Average Towing Duration	2 hours
Average Tow Length	6nm

The main season for scallop dredging in the Moray Firth is between March and June, although a degree of activity occurs throughout the year. The fishery is cyclical (pers. comm. scallop fisherman, December 2011), and grounds are heavily targeted for a period and then left to recover. During the summer of 2008, for example, the Moray Firth area was heavily fished by the scallop fleet, however the 18 months since have seen low scallop landings.

12.2 Bottom Trawl Fisheries

Table 12.4 lists the trawl vessels registered at ports within the Moray Firth area as given by the MMO statistics data. Limitations of the figures provided by the MMO should also be noted as they do not always give a true representation of the number of vessels based at each home port and the registered home port of an individual vessel is not always accurate. Over 80% of the vessels are over-15 metres in length and their activities will therefore be included within the VMS data (Section 8.0)

Table 12.4 List of Demersal Trawlers Registered at Ports within the Moray Firth (Source: MMO)

Vessel Category	Number of Vessels	MMO Registered Home Ports
Under-10 metres	17	9 Buckie 5 Fraserburgh 1 Burghead 1 Rosehearty 1 Whitehills
10-15 metres	13	6 Fraserburgh 3 Macduff 1 Buckie 1 Inverness 1 Lossiemouth 1 Helmsdale
Over-15 metres	132	70 Fraserburgh 19 Buckie 14 Macduff 10 Gardenstown 7 Whitehills 5 Hopeman 2 Lossiemouth 2 Wick 1 Portknockie 1 Invergordon 1 Portsoy

12.2.1 Nephrops Fishery

There are two categories of vessel that target nephrops in the Moray Firth: under-15 metre vessels that are local to the area and concentrate activity on grounds in proximity to their home port, and larger vessels, which generally target grounds further offshore in the North Sea. The activities of vessels under-15 metres in length and with home ports in the Moray Firth area are not included within the VMS data set. Table 12.5 lists the under-15 metre demersal trawlers that have home ports in the Moray Firth and target nephrops. Vessel T and Vessel BT are the only vessels that operate twin rig gear for nephrops. The remaining vessels solely use single rig gear (i.e. one net) to target both nephrops and squid. Table 12.6 and Table 12.7 provide the basic specification of two nephrops trawl vessels, Vessel H and Vessel R.

Table 12.5 Moray Firth Demersal Trawlers Targeting Nephrops

Vessel	Home Port	Vessel Length (m)
Vessel BD	Buckie	8.1
Vessel BC	Buckie	9.8
Vessel BI	Burghead	6.8
Vessel BN	Burghead	8.5
Vessel BQ	Burghead	9.1
Vessel BU	Burghead	9.5
Vessel BM	Burghead	9.6
Vessel BR	Burghead	9.8
Vessel H	Burghead	9.9
Vessel AE	Burghead	9.9
Vessel BJ	Burghead	9.9

Vessel	Home Port	Vessel Length (m)
Vessel BL	Burghead	10.0
Vessel BO	Burghead	10.0
Vessel BP	Burghead	10.0
Vessel BS	Burghead	10.0
Vessel G	Burghead	11.4
Vessel BT	Burghead	11.5
Vessel BK	Burghead	12.0
Vessel T	Macduff	13.9
Vessel R	Macduff	14.1

Table 12.6 Vessel H, Demersal Trawl Vessel operating out of Burghead

Fishing Vessel	Vessel H
Home Port	Burghead
Length	9.9m
Main Engine Power	135hp
Fishing Association	None
Typical Fishing Trip Duration	1 day
Typical Distance Steamed per Trip	2 to 25nm
Seasonality of Activity	Nephrops – January to June; Squid – June to December
Average no. of Days Fishing per Year	150 days per year
Average Towing Speed	2.3 knots
Average Towing Duration	2 hours
Average Tow Length	4 to 4.5nm

Table 12.7 Vessel R, Demersal Trawl Vessel operating out of Macduff

Fishing Vessel	Vessel R
Home Port	Macduff
Length	14.1m
Main Engine Power	270hp
Fishing Association	Scottish Fishermen's Organisation
Typical Fishing Trip Duration	1 day
Typical Distance Steamed per Trip	2 to 30nm
Seasonality of Activity	Nephrops – February to May; Squid – June to February
Average no. of Days Fishing per Year	250 days per year
Average Towing Speed	2.5 knots
Average Towing Duration	5 hours
Average Tow Length	12nm

12.2.2 Whitefish Fishery

The whitefish species targeted in the Moray Firth include haddock, monkfish, cod, whiting and megrims. The majority of the demersal whitefish fleet are over-15 metres in length (Table 12.4) and therefore their activities are included within the VMS data (Figure 8.6).

Stocks of demersal whitefish species within the Moray Firth have fluctuated considerably over the years (pers. comm. retired whitefish fisherman, December 2010), generally showing a pattern of decline. As a result, the majority of whitefish vessels now target grounds further offshore. There is however limited activity in the Moray Firth. In particular, there is reported to be a recent improvement in haddock catches in the north of the Moray Firth (pers. comm. Buckie Fishery Office, November 2010).

12.2.2.1 Demersal Otter Trawls

Table 12.8 below gives the basic specifications of three demersal whitefish trawlers operating out of the Moray Firth. It should be noted that these vessels spend the majority of the year fishing for whitefish in areas outside of the Moray Firth. The basic specifications of Vessel B are listed in Table 12.9.

Table 12.8 Moray Firth Demersal Whitefish Vessels

Vessel	Home Port	Vessel Length (m)	Seasonality of Activity
Vessel C	Buckie	24.0	Whitefish – December to May; Squid – All year
Vessel B	Buckie	21.7	Monkfish and megrims – January to June Squid – June to November
Vessel S	Macduff	20.6	Monkfish, megrim and cod – winter months Squid and haddock – summer months

Table 12.9 Vessel B, Demersal Whitefish Vessel operating out of Buckie

Fishing Vessel	Vessel B
Home Port	Buckie
Length	21.7m
Main Engine Power	675hp
Fishing Association	Scottish White Fish Producers Organisation Ltd.
Typical Fishing Trip Duration	10 days
Typical Distance Steamed per Trip	200nm
Seasonality of Activity	Monkfish and megrims – January to June Squid – June to November
Average no. of Days Fishing per Year	210 days per year
Average Towing Speed	3 knots
Average Towing Duration	2 hours
Average Tow Length	6nm

12.2.2.2 Seine Nets

There are currently four vessels employing Scottish seines to target demersal whitefish species in the Moray Firth (Table 12.10) (pers. comm. retired whitefish fishermen, December 2010). As previously stated, vessel operating this gear requires clean grounds. The vessel specifications for Vessel Z are listed in Table 12.11.

Table 12.10 Moray Firth Vessels Employing Scottish Seine Nets to Target Whitefish

Vessel	Home Port	Vessel Length (m)
Vessel Z	Wick	26.0
Vessel AF	Wick	25.9
Vessel AG	Fraserburgh	19.4
Vessel AH	Lossiemouth	24.0

Table 12.11 Vessel Z, Scottish Seine Net Vessel operating out of Wick

Fishing Vessel	Vessel Z
Home Port	Wick
Length	26m
Main Engine Power	625hp
Fishing Association	Scottish White Fish Producers Organisation Ltd.
Typical Fishing Trip Duration	6 to 8 days
Typical Distance Steamed per Trip	Varies
Target Species	Haddock in the Moray Firth; Cod, whiting, megrim and monkfish elsewhere
Average no. of Days Fishing per Year	200 days per year
Average Towing Speed	1 to 1.5 knots
Average Towing Duration	2 hours
Average Tow Length	1nm to 2nm

12.2.3 Squid Fishery

Squid appears on a seasonal basis in the Moray Firth, and there has been a directed squid fishery since 2004. Demersal otter trawlers and seine netters principally target the species. As previously stated, the fishery is currently unregulated and provides an important alternative to vessels who are constrained by the quota and effort restrictions of their main target species. Fishermen stated the squid fishery is increasingly important to the demersal fleet as progressively more restrictive management measures are imposed upon them.

The fishery is the focus of both local and visiting vessels that would otherwise target nephrops and whitefish. Visiting vessels are further discussed in Section 12.6. The number of vessels targeting squid is dependent upon the abundance of the species, although numbers can reach up to 30 in peak fishing periods (pers. comm. squid fisherman, December 2010).

The seasonality of the squid fishery has altered since it became a directed fishery in the Moray Firth. Historically, squid were targeted during October and December, but the season has extended with fishermen beginning to fish squid in June and continuing into February. This seasonality however can vary each year as the squid stocks fluctuate (pers. comm. retired whitefish fisherman; squid fisherman, December 2010).

Both the bottom trawl vessels listed in Table 12.8 and the seine netters listed in Table 12.10 are able to target squid. Vessels reconfigure their fishing gear to exploit the fishery (i.e. use nets with smaller mesh sizes).

12.3 Crab and Lobster Fishery

The crab and lobster fisheries are predominantly targeted by creels. There are over 100 creel vessels registered at ports in the Moray Firth according to the MMO statistics (Table 12.2) however, as mentioned previously, account should be taken of the limitations of the MMO data. All creel vessels are under-15 metres in length and therefore their activities will not be covered by VMS data.

Table 12.12 List of Creelers Registered at Ports within the Moray Firth (Source: MMO)

Vessel Category	Number of Vessels	MMO Registered Home Ports
Under-10 metres	104	32 Fraserburgh 26 Buckie 11 Wick 6 Brora 6 Lybster 4 Macduff 4 Gardenstown 3 Helmsdale 3 Portmahomack 2 Dunbeath 2 Rosehearty 1 Sandhaven and Pitullie 1 Whitehills 1 Inverness 1 Lossiemouth
10-15 metres	8	2 Buckie 2 Wick 1 Invergordon 1 Lybster 1 Fraserburgh 1 Gardenstown

Due to the limited operational range of most creel vessels, fishermen generally set their creels close to the coast and in areas where the seabed is unsuitable for trawling. The Caithness Static Gear Fishermen’s Association (which represents the activities of approximately 26 creelers, although not all of these will be fishing in the Moray Firth) did not feel that the Beatrice development would impact on their activities (pers. comm. Caithness Static Gear Fishermen’s Association, December 2010).

There are currently up to 5000 creels (pers. comm. shellfish fisherman, December 2010) deployed in the Moray Firth at any one time. The details of a sample of 12 full time creel vessels located at ports in the Moray Firth are given in Table 12.13. The vessel specifications for Vessel N, an example of a typical creel vessel, are listed in Table 12.14.

Table 12.13 Creel Vessels Based at Home Ports in the Moray Firth

Vessel	Home Port	Vessel Length (m)	Target Species
Vessel A	Buckie	9.0	Edible Crabs, Lobster and Velvet Crabs
Vessel I	Dunbeath	6.5	Edible Crabs and Lobster
Vessel M	Helmsdale	6.9	Edible Crabs, Lobster and Velvet Crabs
Vessel K	Helmsdale	8.0	Edible Crabs, Lobster and Velvet Crabs
Vessel L	Helmsdale	8.3	Edible Crabs, Lobster and Velvet Crabs
Vessel N	Inverness	10.0	Edible Crabs, Lobster and Whelks
Vessel Q	Lybster	7.3	Edible Crabs, Lobster and Velvet Crabs
Vessel O	Lybster	10.8	Edible Crabs, Lobster and Velvet Crabs
Vessel P	Lybster	11.4	Edible Crabs, Lobster and Velvet Crabs
Vessel W	Wick	9.9	Edible Crabs and Lobster
Vessel Y	Wick	10.0	Edible Crabs, Lobster and Velvet Crabs
Vessel X	Wick	13.0	Edible Crabs, Lobster and Velvet Crabs

Table 12.14 Vessel N, Creeler operating out of Inverness

Fishing Vessel	Vessel N
Home Port	Inverness
Length	10m
Main Engine Power	150hp
Fishing Association	N/A
Typical Fishing Trip Duration	1 day
Typical Distance Steamed per Trip	25nm
Seasonality of Activity	Edible Crabs and Lobster – all year; Whelks – May to September
Average no. of Days Fishing per Year	140 days per year
Typical Depth Fished	20m in summer, 20m to 60m in winter
Deployment Method	No specific direction
Typical Soak Time	Crabs and Lobster – half hauled daily; Whelks – every three days

12.4 Visiting Vessels

The Moray Firth is seasonally visited by vessels targeting the scallop and squid fisheries with home ports outside of the Buckie and Scrabster districts.

12.4.1 Scallop Vessels

Scallop vessels are amongst the most nomadic vessels in the Scottish fleet, variously targeting fishing grounds around the UK coast and at varying times of the year will operate from a variety of ports depending on the locations of the fishing grounds they are working. Figure 12.1 shows the relative value of scallop landings around the UK.

The number of visiting scallop vessels depends upon the availability of productive fishing grounds elsewhere. Furthermore, the time each vessel spends in the area also varies, for example, an individual vessel may focus 80% of its total fishing time in the Moray Firth, whereas another boat may spend 10% of its fishing time in the area. Generally, however, the largest vessels in the fleet, those between 25 and 30 metres in length and towing between 16 and 20 dredges per side, for the most part will work grounds in the English Channel (pers. comm. scallop fisherman, December 2010).

Although the scallop fishery is not at present restricted by quota or effort limits, additional constraints are having an increasing impact on the fleet. Closure of fishing grounds in Cardigan Bay due to conservation grounds, previously an important scallop fishing ground, has displaced activity and increased pressure on other areas. In addition, restrictions imposed upon the Scottish fleet in the Isle of Man, another important fishing ground, have further increased pressure upon the remaining grounds. As a result of this restriction, the Scottish Government deemed it necessary to extend the seasonal closure of scallop grounds in Luce Bay to the north of the Isle of Man, over fears of the environmental impact of the displaced vessels (Ross, 2010).

There are between 10 and 20 scallopers based at Scottish west coast ports which will occasionally fish in the Moray Firth area between February and August. The number of non-local scallopers present in the Moray Firth and the amount of time they spend in the area targeting scallops will depend on the productivity of the grounds, which varies each year. For example, during 2009 a high number of scallopers fished the Moray Firth scallop grounds and remained in the area for several months. Last year (2010) however, the amount of time spent in the area by non-local vessels decreased to one to two weeks (pers. comm. scallop fisherman, December 2010).

Table 12.15 below lists the scallop dredges that have home ports outside the Moray Firth but are known to be targeting scallops in the area. A chart to show the position of the home ports around the UK can be seen in Figure 12.2. The basic specifications for four of these vessels are listed in Table 12.16.

Table 12.15 Visiting Scallop Dredges to the Moray Firth

Vessel	Home Port
Vessel AI	Annan
Vessel AJ	Annan
Vessel AK	Brixham
Vessel F	Burntisland
Vessel AL	Fleetwood
Vessel AM	Fleetwood
Vessel J	Girvan
Vessel AN	Kirkcudbright
Vessel AO	Kirkcudbright
Vessel AP	Kirkcudbright
Vessel AQ	Kirkcudbright
Vessel AR	Kirkcudbright
Vessel AS	Kirkcudbright
Vessel AT	Kirkcudbright
Vessel AU	Kirkcudbright
Vessel AV	Kirkcudbright
Vessel AW	Oban
Vessel AX	Oban
Vessel AY	Oban
Vessel AZ	Oban
Vessel V	Peterhead

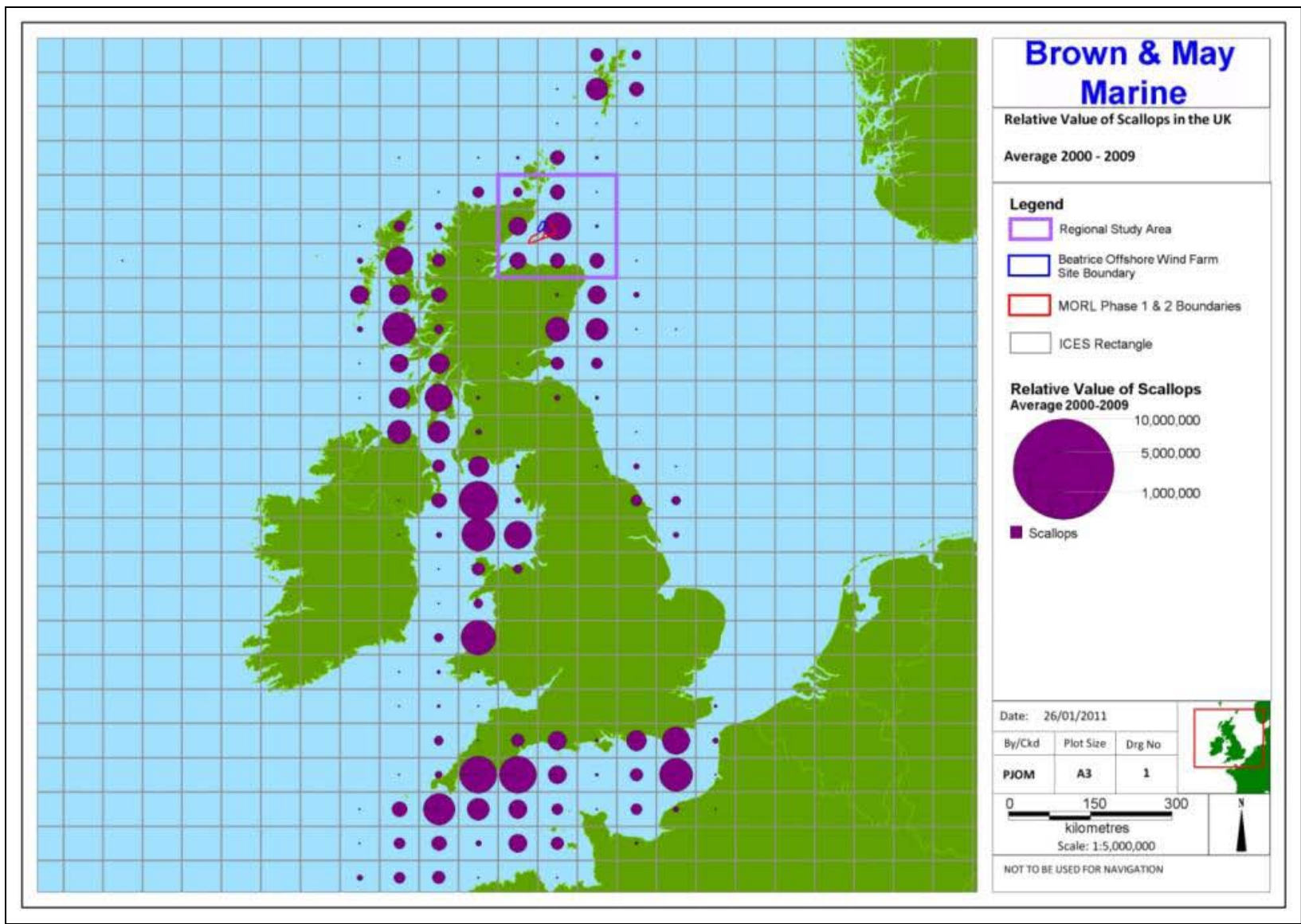


Figure 12.1 Scallop Landings by Value (£) in the UK (Source: MMO)

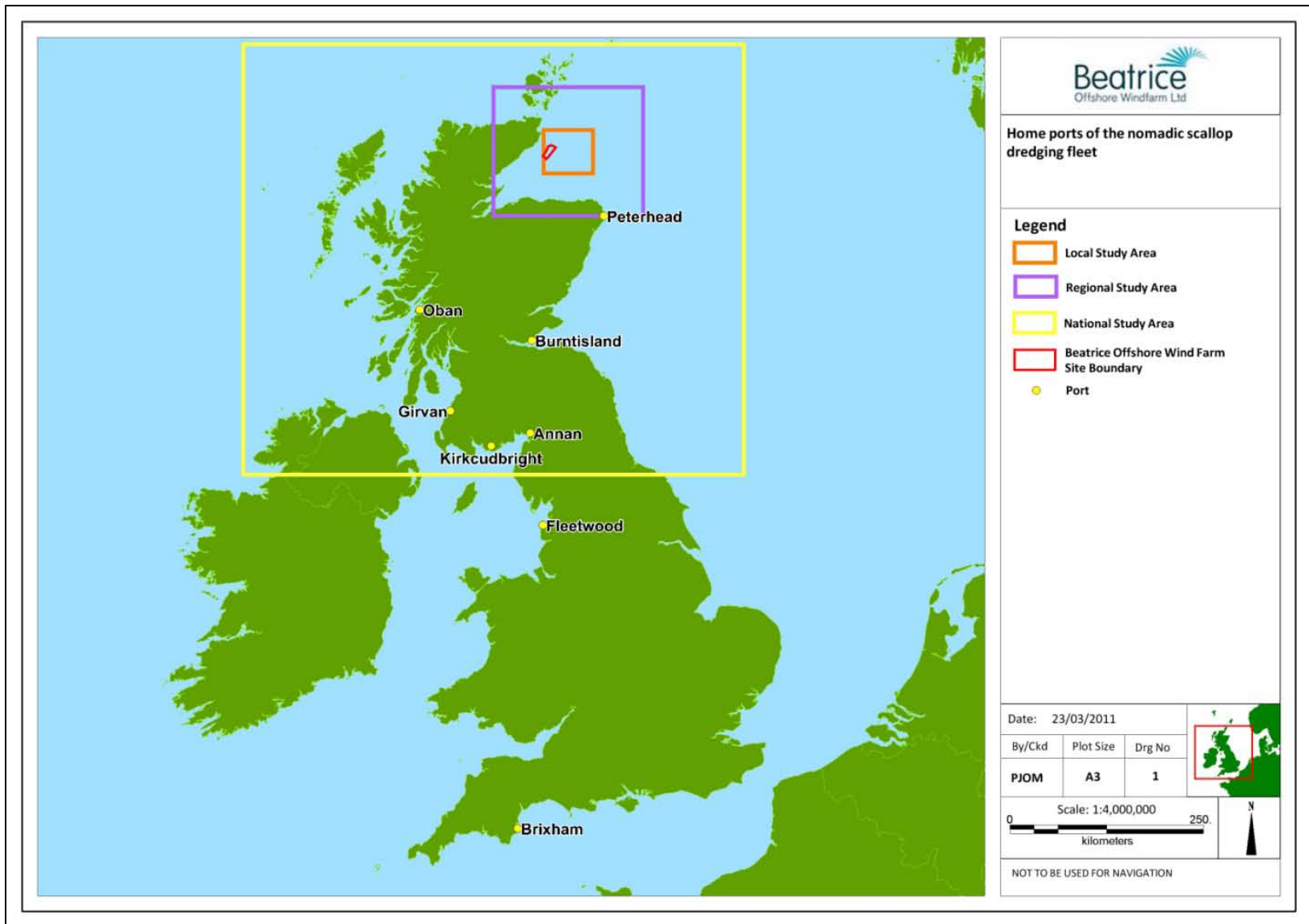


Figure 12.2 Home Ports of the Nomadic Scallop Fleet who target Grounds in the Moray Firth

Table 12.16 Specifications of Vessel V, Vessel F, Vessel AJ and Vessel J

Fishing Vessel	Vessel V	Vessel F	Vessel AJ	Vessel J
Home Port	Peterhead	Burntisland	Annan	Girvan
Length	21.0m	20.3m	15.9m	18.0m
Main Engine Power	625hp	500hp	269hp	440hp
Fishing Association	N/A	Scallop Association	N/A	SFF
Typical Fishing Trip Duration	N/A	10 days	1 day	9 days
Typical Distance Steamed per Trip	N/A	50nm	N/A	N/A
Seasonality of Activity	King scallops all year	King scallops all year	King scallops all year	King scallops all year
Average no. of Days Fishing per Year	N/A	200 days per year	N/A	200 days per year
Number of Beams per Side	2	2	2	2
Number of Dredges per Beam	10	8	5	8
Estimated Total Gear Width	N/A	9m each side	9.2m each side	12.2m
Average Towing Speed	N/A	2 knots	2.2 to 2.3 knots	2.4 knots
Average Towing Duration	N/A	1.5 hours	20 to 60 minutes	1 to 1.5 hours
Average Tow Length	N/A	3nm	N/A	N/A

12.4.2 Demersal Trawl Vessels

The number of vessels targeting squid is dependent upon the productivity of the fishery, and fluctuates significantly year on year. In peak periods, up to 30 vessels may be targeting squid in the Moray Firth, as was seen in 2009, which reported high landings. Vessels targeting squid start arriving during June and stay in the area until November (pers. comm. squid fisherman, December 2010). Table 12.17 below provides the basic vessel specifications of four vessels which seasonally target squid, in addition to whitefish or nephrops, in the area.

Table 12.17 Visiting Vessels to the Moray Firth Targeting Squid

Vessel	Home Port	Vessel Length (m)
Vessel BW	Orkney	9.8
Vessel BV	Orkney	10.0
Vessel BA	Orkney	27.9
Vessel BB	Peterhead	30.5

Vessel will travel from south of the Moray Firth, the west coast of Scotland and the Shetland Islands to target squid in the Moray Firth (pers. comm. retired whitefish fisherman; squid fisherman, December 2010). The vessel specifications of the two vessels are listed in Table 12.18 and Table 12.19.

Table 12.18 Vessel BA, Demersal Trawl Vessel

Fishing Vessel	Vessel BA
Home Port	Kirkwall
Length	27.8m
Main Engine Power	744hp
Fishing Association	N/A
Typical Fishing Trip Duration	10 days
Typical Distance Steamed per Trip	30 to 360nm
Seasonality of Activity	Squid and whitefish all year
Average no. of Days Fishing per Year	320 days
Average Towing Speed	3 knots
Average Towing Duration	5 hours
Average Tow Length	N/A

Table 12.19 Vessel BB, Demersal Trawl Vessel

Fishing Vessel	Vessel BB
Home Port	Peterhead
Length	30.5m
Main Engine Power	1480hp
Fishing Association	Scottish White Fish Producers Organisation Ltd
Typical Fishing Trip Duration	8 to 10 days
Typical Distance Steamed per Trip	200nm
Seasonality of Activity	Squid – August and September; whitefish – October to July
Average no. of Days Fishing per Year	284 days
Average Towing Speed	3.5 knots
Average Towing Duration	1.5 to 2 hours
Average Tow Length	N/A

13.0 Fishing Grounds

The charts below have been produced using information provided by individual fishermen on paper charts and therefore may be subject to a degree of inaccuracy.

13.1.1 Scallop Fishing Grounds

Figure 13.1 shows the location of scallop grounds relative to the Beatrice development area. It is understood that larger category vessels do not generally operate within the Beatrice wind farm site due to the rough ground within the site, and because of the restrictions within the 12nm limit as to the number of dredges that can be operated (Section 6.6).

Due to sediment preference, scallop grounds are located in areas throughout the Moray Firth; on the Smith Bank, along the southern and western coastlines and offshore to the east of the Firth. Vessel 1 has identified grounds on the Smith Bank (in red but overlapping grounds in green). General scallop fishing grounds in the Moray Firth have been identified by the skipper of Vessel 2. Vessel 3, a small category, local vessel, has identified discrete towing locations at points in the Moray Firth (blue dots).

13.1.2 Nephrops Fishing Grounds

Figure 13.2 shows the location of nephrops grounds targeted by the under-15 metre fleet, relative to the Beatrice development area. It can be seen that grounds are for the most part located in the southern Moray Firth particularly in areas in the inner Firth. There are approximately 15 vessels which are based at Burghead and concentrate the majority of their activities in areas in the inner Firths, including the Cromarty and Dornoch Firths.

Although an important fishery to the local area, in terms of landings values the Moray Firth nephrops fishery is on a much smaller scale compared to nephrops fisheries elsewhere in Scottish waters (Southall and Hambrey, 2005). Nephrops fishing activity is concentrated in two main areas of Scotland: The Minches off the west coast and the Fladen Grounds in the north east (The Scottish Government, 2010).

13.1.3 Whitefish Fishery Grounds

The two Wick vessels employing Scottish seine nets for the most part operate on grounds at depths greater than 45 metres to the north of the Beatrice site where the main target species is haddock. As has been previously stated, these vessels require a clean seabed to operate this gear. There are also haddock grounds fished by demersal otter trawlers to the south east of the Moray Firth, down the coast towards Fraserburgh. Figure 13.3 illustrates these fishing. Whitefish vessels will also target grounds in the North Sea and off the west coast of Scotland (pers. comm. trawler fisherman, November 2010).

13.1.4 Squid Fishery Grounds

The main squid fishing grounds are located between Troup Head and Spey Bay in the south of the Moray Firth, on the Smith Bank and between the Craig and McCowie. Grounds can vary each year, and as the season progresses vessels will move further offshore into deeper waters (pers. comm. squid fisherman, December 2010), with the larger vessels fishing depths in excess of 100 metres (Smith *et al.* 2006). Figure 13.4 illustrates the squid fishing grounds in the Moray Firth. A number of vessels seasonally target grounds in locations across the Moray Firth including the Beatrice wind farm site.

13.1.5 Crab and Lobster Fishery Grounds

Creels are deployed within the Moray Firth close to the shore, over rough grounds and along the contours of banks (pers. comm. shellfish fisherman, December 2010). There are also crab and lobster grounds to

the south and west of the Beatrice wind farm site. Figure 13.5 shows the creel fishing grounds in the Moray Firth. There are no identified static gear grounds in the Beatrice wind farm site.

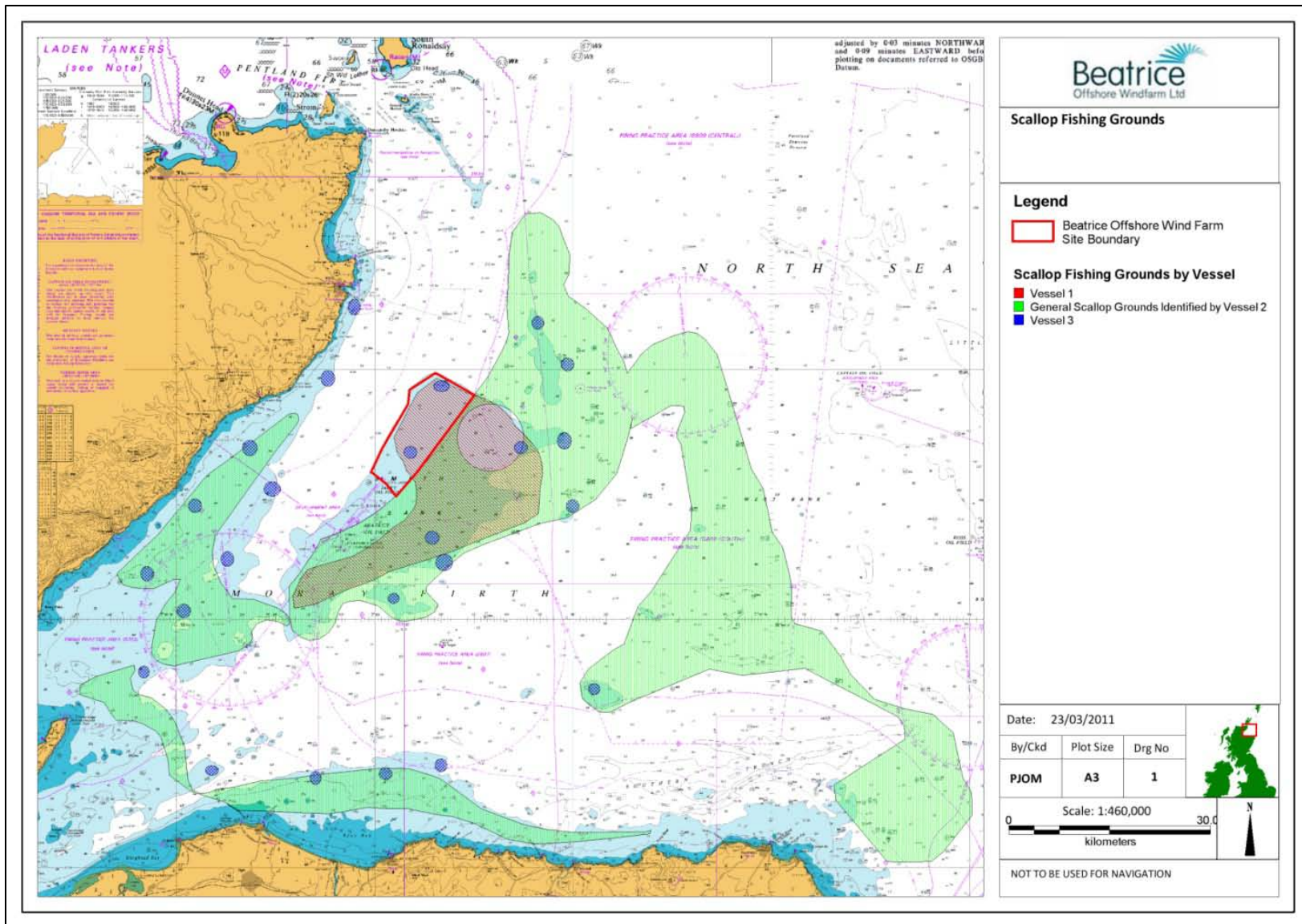


Figure 13.1 Moray Firth Scallop Fishing Grounds

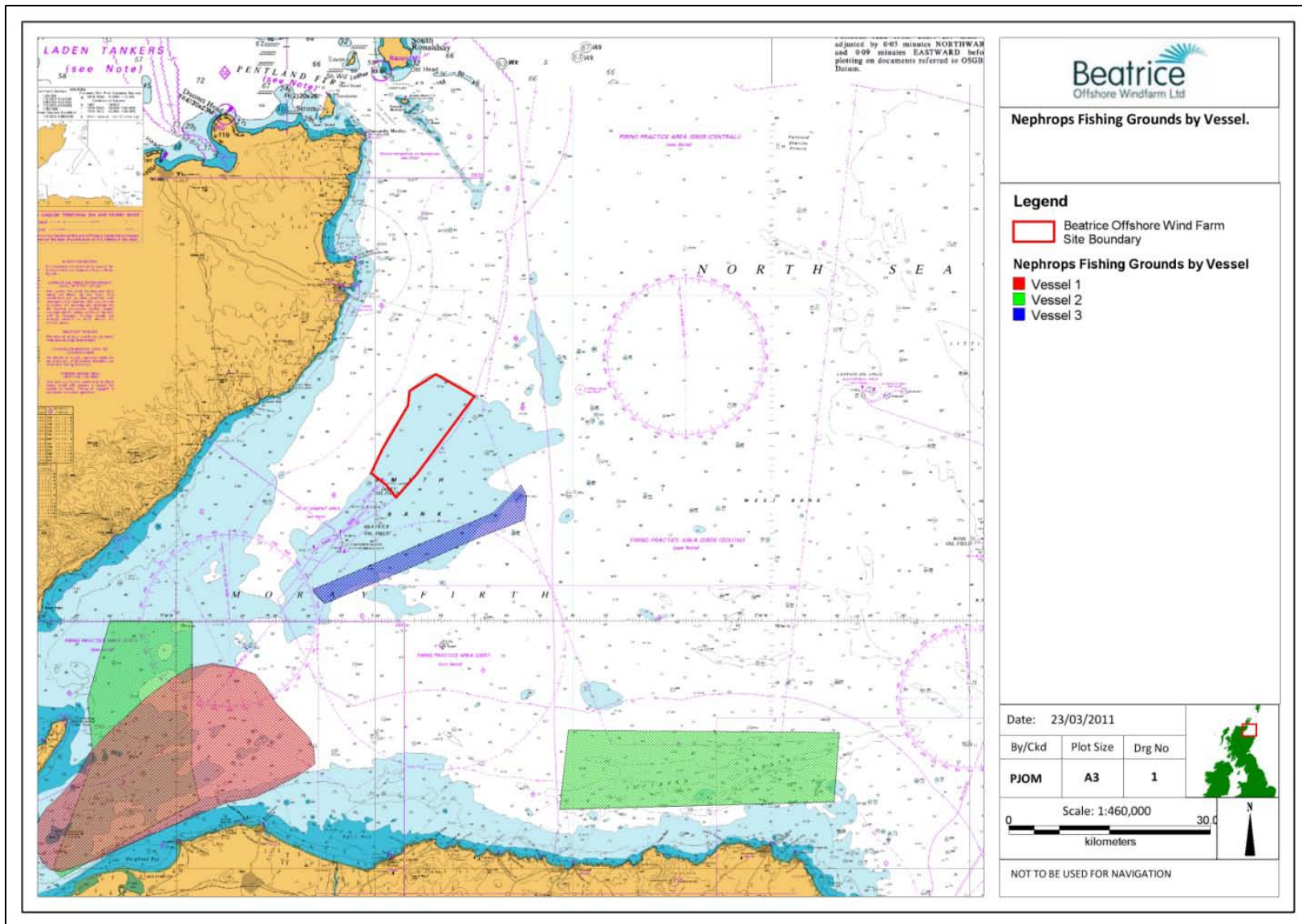


Figure 13.2 Moray Firth Nephrops Fishing Grounds

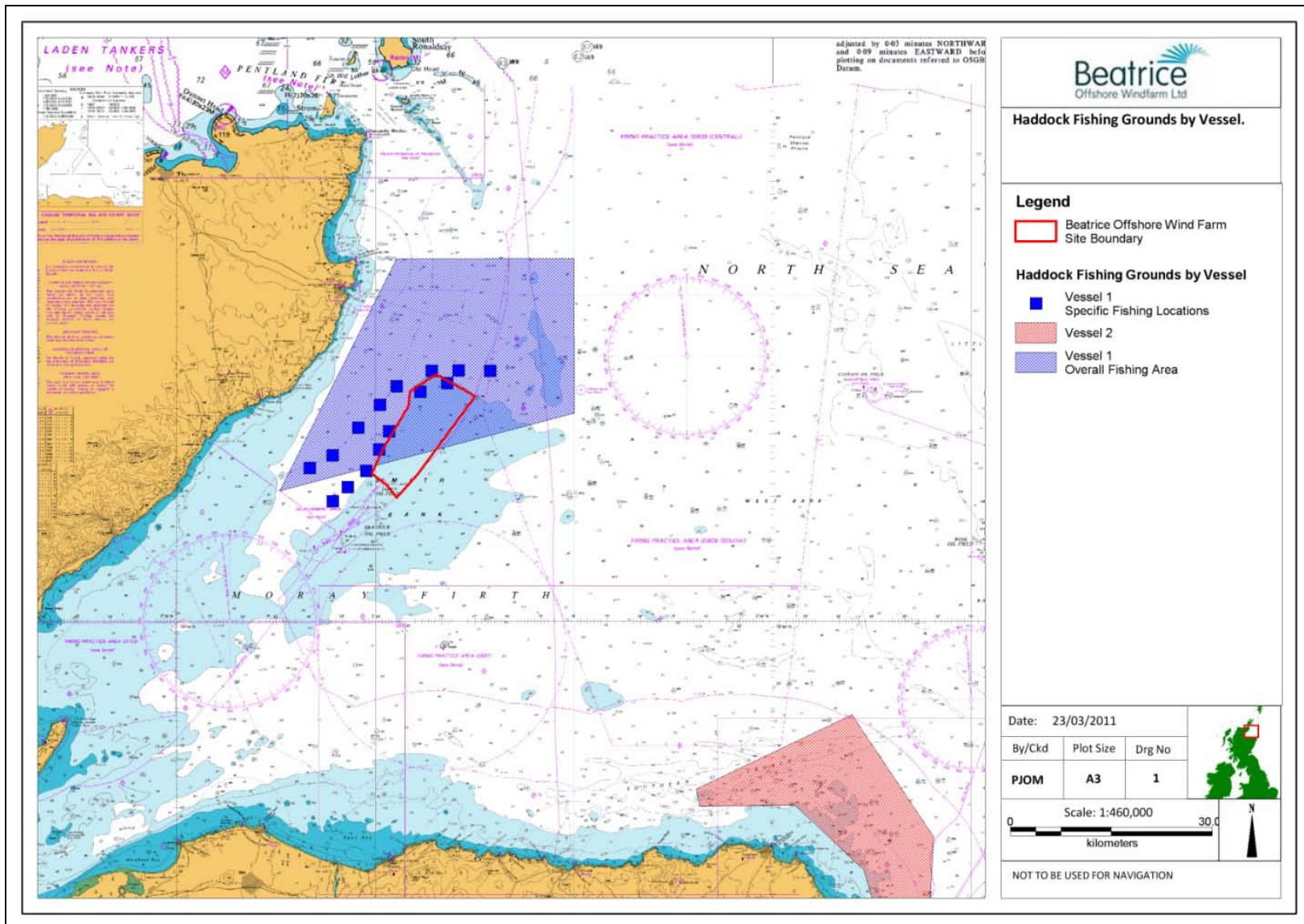


Figure 13.3 Moray Firth Haddock Fishing Grounds

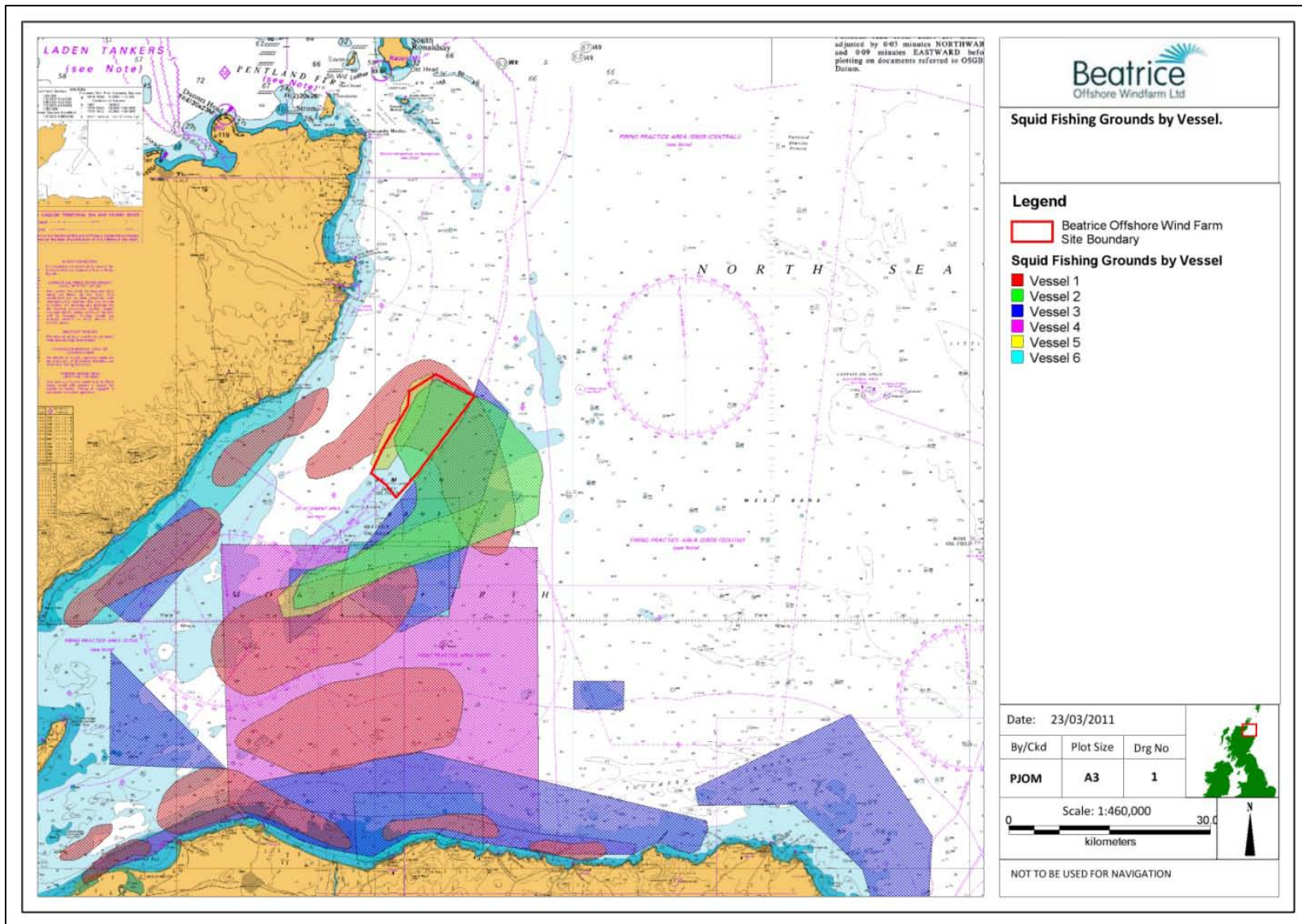


Figure 13.4 Moray Firth Squid Fishing Grounds

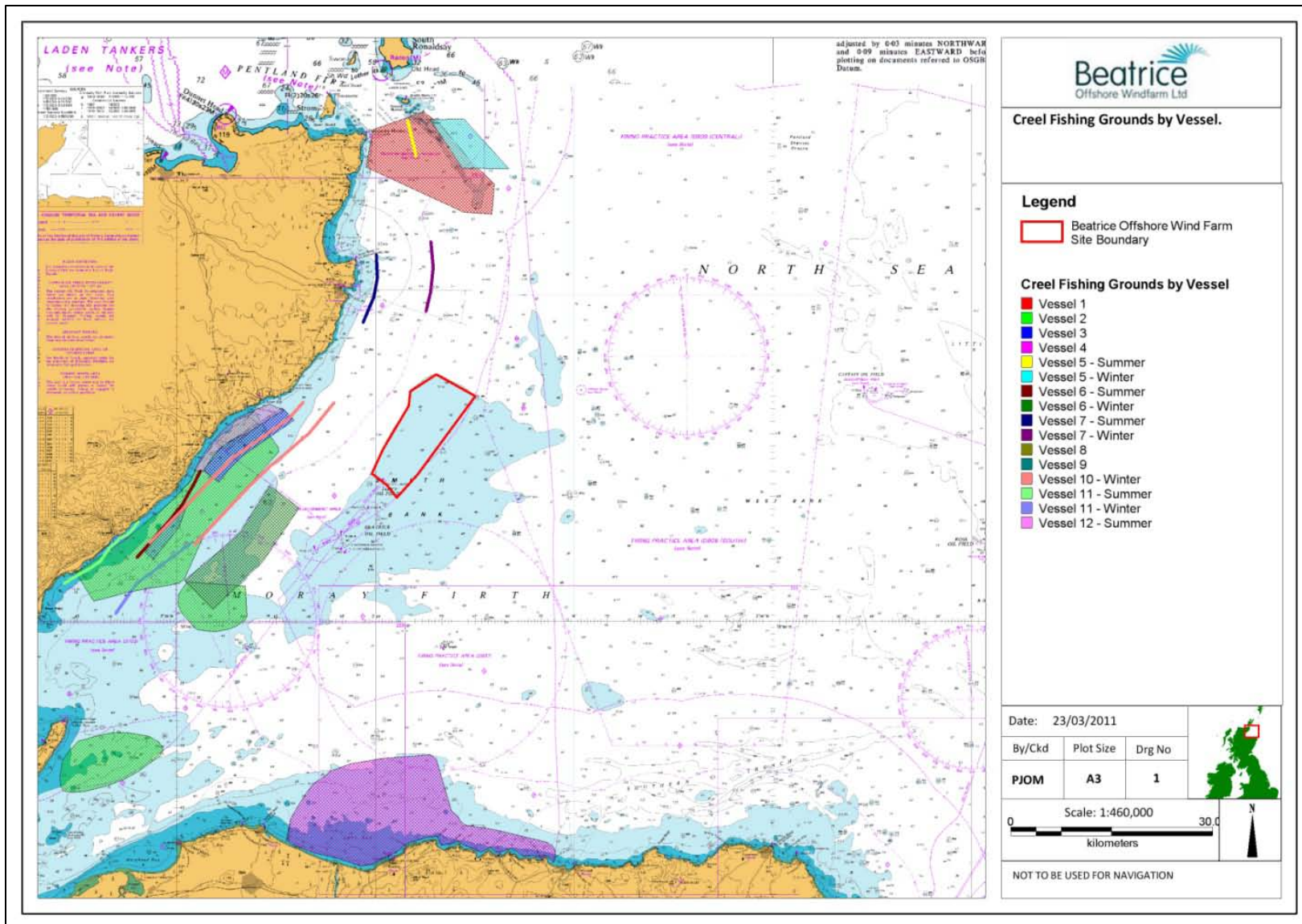


Figure 13.5 Moray Firth Creel Fishing Grounds

14.0 Future Fisheries

Commercial fishing activities are not constant; with fluctuations in patterns of activity both on an annual and longer term basis. As such, it is difficult to accurately predict with confidence future patterns of fishing activity, particularly over the longer term. A short summary of potential changes to the current fishing baseline identified above that may occur in the future is provided below.

14.1 Scallop Fishery

A number of nomadic scallop vessels are currently spending a large proportion of time targeting scallops in the English Channel. As mentioned previously however, it is considered that the fishery is cyclical and grounds in the Moray Firth will be increasingly targeted in the future (pers. comm. scallop fisherman, December 2010). The number of vessels targeting scallops has increased over the last decade, attributed to: favourable stock levels; the decline of whitefish stocks, and the relative lack of restrictions on the scallop fishery. It should also be noted, that the stable UK landings of scallops are not an indication of durable regional stock levels. It may in fact represent a progressive depletion of overall stock levels whereby fishermen are continuously moving to new grounds. The introduction of restrictions on the number of vessels entering the scallop fleet and increases in the minimum landings size were advised by Marine Scotland Science (2010) to be introduced in the future to effectively manage the fishery (Keltz and Bailey, 2010). Ocean acidification has also had a negative effect on the physiology of scallops, although ocean warming has been attributed to the recent increase in catches of European scallops (Shephard *et al.* 2010).

14.2 Nephrops Fishery

On a Scottish national level, there are considered to be too many vessels currently targeting nephrops and increasing the pressure on current stocks, which has seen a decline in landings (The Scottish Government, 2010), however the squid fishery has had the effect of relieving some of this pressure. Underwater television (UWTV) surveys conducted by Marine Scotland in the Moray Firth revealed that the nephrops population is relatively stable but that stock levels are at lower levels than recorded during 2003-2005. Stock levels are the number of nephrops that are fishable, while the population is the total number of nephrops in an area, including undersized individuals. Nephrops size surveys also suggest that at present the mean size of individuals has remained relatively stable which may indicate that stocks are currently being exploited sustainably (Keltz and Bailey, 2010).

14.3 Whitefish and Flatfish Fisheries

There have been several whitefish and flatfish species in the Moray Firth that have been commercially targeted in the past, but are not presently viable. These included fisheries for plaice, sole, codlings, herring, haddock, mackerel and bass. Recent years have seen a return of the haddock and mackerel fisheries to the area (pers. comm. retired whitefish fisherman, December 2010) and therefore it is possible that other whitefish or flatfish species could once again become commercially targeted species if stocks were to return to sustainable levels.

14.4 Squid Fishery

As has been previously discussed, the squid fishery has become increasingly important to specific local fishermen. It is considered that the short life span of squid results in it being generally resistant to fishing pressure. As the Moray Firth is a potential spawning area (squid eggs have been found on creels in the area), it is considered that these grounds need to be identified and effectively managed in order protect future stocks (Young *et al.* 2006).

Due to the erratic fluctuations in squid stocks and their high sensitivity to environmental factors, it is not currently possible to predict future stocks. It is considered that factors such as climate change and rising sea temperatures could alter the distribution of squid stocks whereby they continue to move further north (Hastie *et al.* 2009). It is also difficult to predict the seasonality of squid stocks and the fishing season for squid is beginning earlier and finishing later each year which is considered by many as unsustainable. A major concern of local inshore fishermen, who have fewer alternative fishing options due to the restrictions on their target species, is the early depletion of squid stocks (pers. comm. squid fisherman, December 2010).

As the squid fishery is a relatively new fishery in the Moray Firth, there is potential for more efficient methods to be developed. For example, at the beginning of the squid fishery, seine nets were predominantly used to target squid on sandy substrates, but the reconfiguration of demersal trawl gear enabled fishing to occur over rocky substrates with the use of rockhopper groundlines. There is also the potential for 'jigging' as developed in Japan to be used in the Moray Firth. Frequently used in Europe, jigging is the mechanical use of a multi-hooked line, principally operated to target pelagic fish and squid. During the 1970s and 80s, jigging was trialled in the Moray Firth, but to mixed reviews, however there is the possibility that it could be used again in the future (Young *et al.* 2006). A study conducted by Seafish also considered that there were more productive marketing opportunities for squid than are currently exploited (e.g. for the bait market) (Hastie *et al.* 2009).

14.5 Bivalve Fishery

Within the Moray Firth, there are potential fisheries for razor clams, mussels and cockles:

Razor clams are found on the Navity Bank in the Moray Firth (The Moray Firth Partnership, 2007) and although only modest numbers are landed, the fishery is still an important local resource, with scope for expansion in the future (The Moray Firth Partnership, 2006).

There is a wild mussel fishery in the Dornoch Firth, which is run by the Highland Fresh Mussels Ltd. on behalf of the Highland Council. The common mussel is found in many locations in the Moray Firth and therefore potential exists for further development of this fishery (The Moray Firth Partnership, 2003).

There are currently two cockle fisheries in the Moray Firth: the Inver Bay in the Dornoch Firth and Culbin Sands in the Inner Moray Firth. Potential cockle fisheries are also proposed for other areas. Cockle landings from the Moray Firth are modest compared to other areas, but the fishery is an important local resource (The Moray Firth Partnership, 2006b). The Moray Firth IFG Committee considers that, historically, the cockle fishery has represented a 'boom or bust' industry whereby at certain times large cockle dredges are attracted to the area which effectively depletes stocks for a number of years (Moray Firth IFG Committee, 2009). It is also considered that future management of the cockle fishery could lead to an increase in effort and landings due to a strong European market, which could benefit local vessels (Moray Firth IFG Committee, 2010).

14.6 Sandeel Fishery

Sandeels are considered to be an important component of the marine ecosystem being the principal prey for a number of fish, bird and marine mammal species. Sandeels have been industrially exploited for rendering to fish meal and oil for incorporation into animal feeds. The year 2000, however, saw the closure of the Scottish east coast sandeel fishery due to low stock levels and concerns over the impacts on commercially fished species (Daunt *et al.* 2008). As mentioned previously, the last couple of years have seen an increase in sandeel populations in harbours and bays and subsequently an increase in the

numbers of species that prey on sandeels (in particular herring and mackerel; pers. comm. retired whitefish fisherman, December 2010). The North Sea fishery was reopened in 2009 with a quota of 200,000 tonnes (MMO statistics), although there still remains a moratorium on the fishery along the Scottish east coast.

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