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1 Contents

2 Executive summary

Seagreen Wind Energy Limited, hereafter referred to as Seagreen, has been awarded the rights to develop a number of offshore wind farms in the Firth of Forth Round 3 Zone by The Crown Estate under the Third Round of the offshore wind licensing arrangements. As part of the development process Seagreen will be carrying out Environmental Impact Assessments for the windfarms. In order to inform these assessments Seagreen have been collecting and processing the required ecological data to characterise the baseline conditions of the area. Nineteen months of boat-based surveys for marine mammals and seabirds have been carried out by ECON Ecology. SMRU Ltd were contracted to analyse the marine mammal data from these surveys. This report presents data on the encounter rate and distribution of sightings of marine mammals from the 19 surveys which took place between May 2010 and November 2011.

Harbour porpoise were the most commonly encountered cetacean species. Other cetacean species recorded included white-beaked dolphin and minke whale, with sightings of white-sided dolphins during one survey. Porpoise were recorded on most surveys, whereas white-beaked dolphins and minke whales were sighted mainly during the summer months. Both grey and harbour seals were also seen at sea; with grey seals recorded much more frequently than harbour seals. Encounter rates of both seal species were lowest in the winter; grey seals were sighted in highest numbers in summer whereas the seasonal pattern of harbour seal sightings was less clear. The sightings of the most commonly occurring species were concentrated in areas of shallower sandy banks such as Scalp Bank to the north of the zone and Marr Bank running NNW-SSE through the zone.

3 Introduction

The Firth of Forth Round 3 Zone was defined by The Crown Estate in 2009. The Zone boundary lies approximately 25km offshore of the Firth of Forth, Scotland. The area of the Zone is approximately 2,850km^2, and is situated immediately east of the Scottish Territorial Waters (STW) 12nm limit. Seagreen was awarded the rights to develop the Firth of Forth Zone in January 2010 and has a formal Zone Development Agreement (ZDA) with The Crown Estate. The ZDA provides the contractual programme milestones for the development of the Zone and identifies a generation capacity of up to 3,465MW to be delivered across the Zone.

As part of this process Seagreen have been collecting and processing the required ecological data to inform their Environmental Impact Assessment for the development sites within the zone. ECON Ecology Ltd were contracted by Seagreen to design and carry out boat based visual surveys of the area for birds and marine mammals and SMRU Ltd were contracted to analyse the marine mammal data from these surveys (May 2010-November 2011). This report summarises the encounter rates and distribution of marine mammals in the survey area by year, month and season over the full 19 surveys. Additionally, Density Surface Modelling (DSM) techniques have been applied to these data as part of an integrated analysis of combined datasets from other boat based and aerial surveys of the region. The results of this integrated analysis will be reported separately to FTOWDG.

4 Methods

ECON designed and implemented the surveys and the following description was supplied to SMRU Ltd by ECON. The following text is adapted from a word document supplied to SMRU Ltd entitled “Marine Mammal Recording Methodology”.

4.1 Aims & objectives

The aim of the marine mammal survey in the Firth of Forth Zone is to determine what species of marine mammal are likely to be present, and to detect any seasonal trends in their distribution and use of the area, for example migration, breeding, calving or pupping (JNCC, 2009).

4.2 Survey area and transect route

The survey was carried out once each month and followed the same transect lines as the ornithological survey, and was based on the same four block structure (East, West, North and South). The transect lines are 3.7 km apart, and as with the ornithological survey, there were four different routes, spaced at 300m from each other. The four routes were rotated with each route

used once per season (i.e. every four months) to ensure maximize coverage of the zone (Figure 1). Again, as with the ornithological surveys, the zone was divided into blocks to facilitate survey and weather logistics (North, South, East and West). Total transect length for all blocks ranges from 931-943 km (depending on the route used).

4.3 Survey methodology

The survey methodology broadly followed the recommendations set out by Diederichs et al. (2008) for ship-based transect line distance sampling. The main boat used for the survey work was the MV Clupea, a 32 m ex-fisheries research services vessel, operated by IDP, a commercial survey company (Figure 2).The ship platform was stable and the eye-level of the observer was approximately 5 m above sea surface. The ship moved at a speed of approximately 10 knots (5 to 15 knots). One dedicated JNCC-trained observer continuously scanned the area between the boat and the horizon, 90 degrees to each side of the front of the vessel (total range of 180 degrees) with binoculars and naked eye.

Every effort was made to ensure that the marine mammal survey was carried out in the most optimal sea conditions available in any single month. Whilst it was not possible to ensure that all days are of sea state 3 or below, the minimum visibility was always over 200m. In accordance with the JNCC standard methods, each sighting was recorded with location (latitude and longitude), time when first observed and time when sighting ended, species, number of animals observed, number of calves/pups, distance from the boat, and bearing and direction of movement. In addition, every sighting record includes identification features, behaviour and other observations (e.g. sex of seals, associations with seabirds etc.).

Location of the boat and time during the sighting was recorded instantly using a GPS device. Range is estimated using a range-finder stick and bearing was read from a compass in-built into the GPS device.

Field identification of marine mammals was based on the appearance (e.g. dorsal fin, tail fluke, sequence of body parts visible when surfacing, general shape, size and proportions and body markings in cetaceans; shape of head and snout, proportions of facial features in seals) and the behaviour of animals.

Detailed observations of marine mammal behaviour and interaction with other mammals and seabirds were recorded according to COWRIE guidelines (Camphuysen et al., 2004). Behaviour was broadly classed into the following: directional swimming (with direction), non-directional swimming, rapid swimming near the surface and resting at the surface (after Diederichs et al., 2008).

Additional data recorded continuously during the survey include depth, boat speed, sea state, wind force, wind speed, visibility, glare, precipitation and cloud cover.

4.4 Analysis

The numbers of sightings and individuals of each species during each monthly survey were calculated from the data provided by ECON (the file "FoF MMO MAMMALS MASTER.xls" supplied to SMRU Ltd by [Redacted] of Seagreen on the 19th December 2011.

Effort data for each survey was compiled from the file: "EffortDataRequirementsFoFsurveysFinal_SMRULtd.xlsx" supplied by [Redacted] of ECON to SMRU Ltd on the 8th of February 2012.

Encounter rates, expressed as sightings per unit effort (km) during each survey were calculated by dividing the total number of sightings on a given survey by the total effort (length of transect covered).

Sightings were also allocated to season and encounter rates per unit effort calculated according to the following:

Spring: March, April May

Summer: June, July, August

Autumn: September, October, November

Winter: December, January, February

Some surveys spanned two calendar months (i.e. started towards the end of one month and were completed near the beginning of the next month). For the purposes of analysis each survey was allocated to a month according to the month in which the survey started. Due to weather constraints survey days were not always contiguous and were sometimes spread thoughout the month. To take advantage of available weather windows occasionally subsequent surveys were stared on the same day that the previous survey had ended (particularly where the previous survey had continued into the following month).

5 Results

5.1 Visual effort

Nineteen surveys were carried out with dedicated marine mammal observation effort (Table 1). Over the 19 surveys, a total of 17017 km of survey effort was conducted (Table 2). The total effort during each survey was approximately equivalent, except for survey 11 (November 2010) when the south and west strata were not covered, and surveys 14 (February 2011) and 22 (October2011) when the south strata were not covered.

5.2 Marine mammal observations

5.2.1 Marine mammal observations

During 19 surveys, a total of 1282 observations of marine mammals were recorded (Table 3). Four species of cetacean and two species of seal were identified. The total number of individuals, based on best estimates of group sizes was 1642 (Table 4). Table 5 provides a summary of encounter rate, by survey and species for all surveys carried out.

The most commonly encountered marine mammal was the grey seal with a total of 992 sightings over all surveys. Grey seals were much more frequently recorded than harbour seals. Harbour porpoises were the most frequently recorded cetacean.

Sightings of single grey seals were most common, although there were 41 sightings of pairs of individuals and 56 sightings of groups between three and seven animals. For harbour seals, all sightings were of single individuals.

5.2.2 Marine mammal encounter rates

Harbour porpoises (Figure 3) were seen during most surveys, apart from June 2010, November 2010, May 2011 and October 2011. Group sizes of harbour porpoise ranged from one to 10 individuals (Figure 4). Single animals were most commonly sighted. Generally encounter rates were highest in the spring and summer and relatively low in autumn and winter (Figure 5). Overall, encounter rates were reduced in 2011 compared to the previous year's surveys, but this pattern is driven mainly by the high encounter rate in May 2010. There was a strong seasonal pattern to sightings of minke whales – being mainly encountered during the spring and summer months in both years (Figure 6), highest rates were in May 2010 and June 2011. Figure 7 shows minke whale sightings pooled by season. Minke whales were mostly recorded as single animals, although three animals were sighted together in May 2010 and two in June 2011.

White-beaked dolphins were also seen mainly in the summer months, although low numbers were also seen during surveys in September/October/December 2010 and January 2011 (Figure 8). Highest rates were in the summer in both years. White-beaked dolphins occurred most often in groups: with a mean group size of three and a maximum group size of 15 individuals (Figure 10).

Grey seals were seen in every month of the survey but encounter rates were highly variable between months, highest encounter rates were in June in both years (Figure 11). Encounter rates were generally low over the winter and spring and highest in the summer (Figure 12). Overall, encounter rates were reduced in 2011 compared to the previous year's surveys (Figure 11).

Harbour seals were seen in low numbers during most surveys in 2010, with the only exceptions being October and November. Harbour seal sightings were fewer in 2011, with none in February or April-August (Figure 13). Highest encounter rates were in May 2010 and Sept 2011. When pooled by season, encounter rates are lowest in winter, second lowest in summer and highest in spring and autumn (Figure 14).

5.2.3 Distribution of marine mammal observations across survey areas

Marine mammal sightings were distributed across the whole site. Harbour porpoise sightings (Figure 15) were widely distributed with concentrations of sightings in the northern part of the site around Scalp Bank and in the central and southern parts of Marr Bank. Examination of the distribution of sightings seasonally suggests they were sighted most commonly in the northern part of the site in the summer, and more centrally and southerly in the spring (Figure 16).

White-beaked dolphins were most often seen in the further offshore, easterly region of the site (Figure 17). Minke whales were seen throughout the survey area (Figure 18), with slightly more sightings in the northern part of the survey area. Both grey and harbour seals (Figure 19) sightings showed a striking spatial pattern, being concentrated to the north of the site (Scalp Bank) and on two parallel concentrations of sightings running approximately NNW through the site, following Marr Bank and Wee Bankie with another concentration in the south east corner of the site (Berwick Bank). There were no obvious seasonal differences in the distribution of seal sightings (Figure 20).

The locations of sightings unattributed to species are shown in Figure 21.

6 Discussion and conclusions

6.1 Marine mammal encounter rates and distribution

The simple analyses presented in this report do not address two important issues that need to be considered when estimating abundance of marine mammals from line transect surveys: the variance in encounter rate and the decrease in detectability with distance from the observer (Buckland et al., 2001). Therefore it is important to note that the data presented here do not give a reliable indication of absolute abundance but are intended only to provide a crude measure of relative abundance and distribution and how these vary seasonally. A concurrent analysis being carried out for the Forth and Tay Offshore Wind Developers Group (FTOWDG) which incorporates the data from Seagreen surveys with those from the other windfarm sites in the region. This study will fully address these issues and provide robust estimates of density for the Firth of Forth Zone and surrounding area for the species with large enough sample sizes.

6.1.1 Harbour porpoise

The harbour porpoise was the most commonly encountered cetacean species. They were recorded on all surveys and in all parts of the site. The distribution of sightings was particularly high near the Scalp Bank to the north of the site and Marr Bank running down the centre of the site. These areas may represent good foraging grounds due to the shallower sandy banks providing good habitat for prey species such as sand eel and whiting, both of which have been recorded as important constituents of the diet of harbour porpoises on the east coast of Scotland, with the relative proportion of each of these in the diet changing seasonally (Santos et al., 2004)

6.1.2 Minke whale

The seasonal movements of minke whales are not well-understood, but the observations from this study are in line with previous studies of Aberdeenshire coastal waters that reported minke whales to be highly seasonal in occurrence with sightings mainly in the summer months (e.g. Weir et al., 2007).

6.1.3 White-beaked dolphin

White-beaked dolphins were recorded more often during the summer. This seasonal peak is in line with a previous study that also found white-beaked dolphins to be present in Aberdeenshire waters during June-August with the main peak in August (Weir et al., 2007). However, the previous study by Weir et al., (2007) was restricted to coastal waters, although they did note a preference for white-

beaked dolphins to be sighted most often in areas where the relatively deeper 20m isobaths occurred adjacent to the coast.

6.1.4 Grey seal

Grey seal sighting rates were lowest over the autumn and winter. Breeding and pupping in grey seals occurs during October-December on the east coast of Scotland. During these months the number of seals at sea might be expected to be low as a large proportion of the population will be hauled out to breed. Encounter rates of grey seals at sea peaked during June in both years – this is likely to be related to the capital breeding habit of grey seals and possibly indicative of a period of intense foraging where adult seals are at-sea gaining energy reserves prior to the breeding season. There was no clear seasonal pattern in the distribution of sightings, but overall the spatial distribution of sightings corresponds with patterns of at sea usage derived from telemetry studies (Sparling et al. 2012). They were concentrated over sandy shallow banks such as Scalp Bank, Marr Bank, Wee Bankie and Berwick Bank. These areas are thought to be important areas for sandeels, an important part of grey seal diet in the region.

6.1.5 Harbour seal

Harbour seals spend less time at sea during June-July when they breed and in August when they moult. This pattern is reflected to some extent in the monthly and seasonal encounter rates although overall encounter rates were lower in the winter.

6.2 Critique of survey methodology

6.2.1 Marine mammals

The methodology employed followed standard methods for visual line transect surveys. Although the use of only a single marine mammal observer may result in issues with observer fatigue, particularly on the large areas covered in this survey.

Effort data were supplied to SMRU Ltd as the start and end points for each transect covered on a given day. Some boat tracks were supplied but not in a format that allowed easy recreation of all survey effort, instead the start and end points of each survey track were used to estimate the distance covered during each survey. The positions of some sightings made it clear that the boat had deviated from a straight line (designed tracks) on occasion but for the purposes of this analysis effort was calculated as the straight line distance between start and end points. This may result in a slight

underestimate of length of survey compared to actual boat tracks and thus a slight overestimate of encounter rates.

SMRU Ltd was not provided with any associated environmental data for the surveys so it was not possible to allocate sea state and other environmental covariates to periods of effort. Because these surveys were primarily designed for collecting bird data, it is possible that surveys were carried out in sea states that are suboptimal for sighting marine mammals. Seabird surveys are generally carried out in sea states of up to 4 whereas marine mammals are surveyed only in sea states up to 3, and for harbour porpoise, sea states of up to 2 are recommended. It is possible that encounter rates may be biased downwards if portions of the survey were carried out in sea states above 3.

There were also multiple instances of inconsistencies in the data provided to SMRU Ltd. These mostly consisted of suspected typing errors, for example, where the position and time of a particular sighting corresponded to a line different to the one recorded for the sighting. These errors were identified and corrected whenever possible. A number of errors could not be corrected with the information available – mostly relating to matches between the sightings data and the effort data. These were detailed in an email to ECON (Seagreen cc'd) from SMRU Ltd on the 16th February 2012. At the time of writing there has been no reply. While not an issue for the basic analyses presented in this report these sightings will need to be omitted from any further analysis and this may result in small errors in the integrated spatial analysis currently carried out for FTWODG.

6.3 Key impacts and mitigation / monitoring measures

This report outlines the data collected over 19 months of boat-based marine mammal and bird surveys to feed into characterisation of the Round 3 Zone. It helps provide a baseline of presence and distribution of species to help inform the mitigation and monitoring measures that may be required during the construction and post construction phases. These may include changes in distribution due to noise effects or habitat change.

Use of the current survey methodology and survey design pre, during and post construction is unlikely to be appropriate for an impact monitoring strategy, particularly during the construction phase where noise related impacts would be predicted to occur out with the range of the area covered by these surveys. Furthermore, the precision in line transect surveys is generally quite poor due to a high degree of natural variability in sightings rates. Therefore the ability to detect change using these data as a baseline is limited.

The design of impact monitoring studies (including collection of an appropriate preconstruction post consent baseline) will need to be carefully considered along with the impact assessment to

determine the appropriate measures for future monitoring, especially with reference to protected species, designated sites and potential cumulative effects. Impact monitoring may be most usefully and cost effectively progressed in collaboration with the other developers planning to construct offshore wind farms in the region.

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8 Tables

Table 1: Summary of survey details for the 19 boat-based surveys conducted at the Firth of Forth R3 Zone.

Month	Year	Survey Identifier	Number of survey days	Dates
May	2010	5	5	18/05/2010-22/05/2010
June	2010	6	5	13/06/2010-17/06/2010
July	2010	7	6	10/07/2010-15/07/2010
August	2010	8	5	05/08/2010-09/08/2010
September	2010	9	6	18/09/2010-27/09/2010
October	2010	10	7	07/10/2010-13/10/2010
November	2010	11	5	06/11/2010-16/11/2010
December	2010	12	10	03/12/2010-30/12/2010
January	2011	13	9	13/01/2011-30/01/2011
February	2011	14	6	10/02/2011-01/03/2011
March	2011	15	8	01/03/2011-15/03/2011
April	2011	16	6	09/04/2011-15/04/2011
May	2011	17	5	04/05/2011-28/05/2011
June	2011	18	4	10/06/2011-16/06/2011
July	2011	19	5	09/07/2011-13/07/2011
August	2011	20	6	01/08/2011-06/08/2011
September	2011	21	8	17/09/2011-30/09/2011
October	2011	22	7	27/10/2011-05/11/2011
November	2011	23	11	05/11/2011-20/11/2011

Table 2: Survey Effort (km) completed during each survey.

Month	Survey Identifier	Total km
May	5	934.4
June	6	939.0
July	7	943.2
August	8	928.2
September	9	935.0
October	10	939.0
November	11	518.7
December	12	943.2
January	13	935.5
February	14	748.6
March	15	936.1
April	16	940.7
May	17	936.4
June	18	937.4
July	19	936.1
August	20	940.7
September	21	935.5
October	22	748.9
November	23	940.7
	Total	**17017.4**

Table 3: Summary of the number of sightings of each species recorded during surveys for each species by month.

Month	Grey Seal	Harbour Seal	Harbour Porpoise	Minke Whale	White-beaked dolphin	White-sided dolphin	Unidentified dolphin	Unidentified seal	Unidentified whale	Total
May-10	159	5	27	16	2	0	5	19	1	234
Jun-10	179	3	0	13	18	0	0	1	0	214
Jul-10	74	1	6	0	5	0	2	2	0	90
Aug-10	42	2	14	4	0	0	0	1	0	63
Sep-10	42	3	3	3	1	1	2	12	1	68
Oct-10	52	0	2	0	1	0	0	2	0	57
Nov-10	2	0	0	1	0	0	0	2	0	5
Dec-10	22	1	6	0	2	0	0	8	0	39
Jan-11	8	1	2	0	2	0	1	2	0	16
Feb-11	13	0	6	0	0	0	2	5	0	26
Mar-11	25	2	12	0	0	0	1	7	0	48
Apr-11	15	0	8	3	0	0	1	3	0	30
May-11	21	0	0	1	8	0	1	5	0	36
Jun-11	136	0	14	15	18	0	2	11	1	197
Jul-11	39	0	4	1	7	0	3	6	0	60
Aug-11	50	0	5	0	3	0	0	1	0	59
Sep-11	14	5	2	0	2	0	0	4	0	27
Oct-11	2	1	0	0	0	0	1	2	0	6
Nov-11	6	0	1	0	0	0	0	0	0	7
TOTAL	**901**	**24**	**112**	**57**	**69**	**1**	**21**	**93**	**3**	**1282**

Table 4: Summary of the number of individuals of each species recorded during surveys for each species by month.

Month	Grey Seal	Harbour Seal	Harbour Porpoise	Minke Whale	White-beaked dolphin	White-sided dolphin	Unidentified dolphin	Unidentified seal	Unidentified whale	Total
May-10	179	5	46	20	12	0	25	20	1	308
Jun-10	210	3	0	13	54	0	0	1	0	281
Jul-10	83	1	8	0	25	0	3	2	0	122
Aug-10	48	2	16	4	0	0	0	1	0	71
Sep-10	42	3	3	3	2	10	4	12	1	80
Oct-10	52	0	4	0	2	0	0	2	0	60
Nov-10	2	0	0	1	0	0	0	2	0	5
Dec-10	22	1	17	0	4	0	0	9	0	53
Jan-11	8	1	2	0	4	0	3	2	0	20
Feb-11	13	0	8	0	0	0	7	5	0	33
Mar-11	27	2	23	0	0	0	1	8	0	64
Apr-11	15	0	12	3	0	0	3	3	0	36
May-11	22	0	0	1	29	0	2	5	0	59
Jun-11	152	0	21	16	60	0	2	12	1	264
Jul-11	41	0	5	1	15	0	4	6	0	72
Aug-11	54	0	6	0	10	0	0	1	0	71
Sep-11	14	5	2	0	4	0	0	4	0	29
Oct-11	2	1	0	0	0	0	2	2	0	7
Nov-11	6	0	1	0	0	0	0	0	0	7
TOTAL	**992**	**24**	**174**	**62**	**221**	**10**	**56**	**97**	**3**	**1642**

Table 5: Summary of marine mammal encounter rates during surveys for each species by month.

Month	Grey Seal	Harbour Seal	Harbour Porpoise	Minke Whale	White-beaked dolphin	White-sided dolphin	Unidentified dolphin	Unidentified seal	Unidentified whale	Total
May-10	0.170	0.005	0.029	0.017	0.002	0.000	0.005	0.020	0.001	**0.250**
Jun-10	0.191	0.003	0.000	0.014	0.019	0.000	0.000	0.001	0.000	**0.228**
Jul-10	0.078	0.001	0.006	0.000	0.005	0.000	0.002	0.002	0.000	**0.095**
Aug-10	0.045	0.002	0.015	0.004	0.000	0.000	0.000	0.001	0.000	**0.068**
Sep-10	0.045	0.003	0.003	0.003	0.001	0.001	0.002	0.013	0.001	**0.073**
Oct-10	0.055	0.000	0.002	0.000	0.001	0.000	0.000	0.002	0.000	**0.061**
Nov-10	0.004	0.000	0.000	0.002	0.000	0.000	0.000	0.004	0.000	**0.010**
Dec-10	0.023	0.001	0.006	0.000	0.002	0.000	0.000	0.008	0.000	**0.041**
Jan-11	0.009	0.001	0.002	0.000	0.002	0.000	0.001	0.002	0.000	**0.017**
Feb-11	0.017	0.000	0.008	0.000	0.000	0.000	0.003	0.007	0.000	**0.035**
Mar-11	0.027	0.002	0.013	0.000	0.000	0.000	0.001	0.007	0.000	**0.051**
Apr-11	0.016	0.000	0.009	0.003	0.000	0.000	0.001	0.003	0.000	**0.032**
May-11	0.022	0.000	0.000	0.001	0.009	0.000	0.001	0.005	0.000	**0.038**
Jun-11	0.145	0.000	0.015	0.016	0.019	0.000	0.002	0.012	0.001	**0.210**
Jul-11	0.042	0.000	0.004	0.001	0.007	0.000	0.003	0.006	0.000	**0.064**
Aug-11	0.053	0.000	0.005	0.000	0.003	0.000	0.000	0.001	0.000	**0.063**
Sep-11	0.015	0.005	0.002	0.000	0.002	0.000	0.000	0.004	0.000	**0.029**
Oct-11	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.003	0.000	**0.008**
Nov-11	0.006	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	**0.007**
TOTAL	**0.053**	**0.001**	**0.007**	**0.003**	**0.004**	**0.000**	**0.001**	**0.005**	**0.000**	0.075

9 Figures

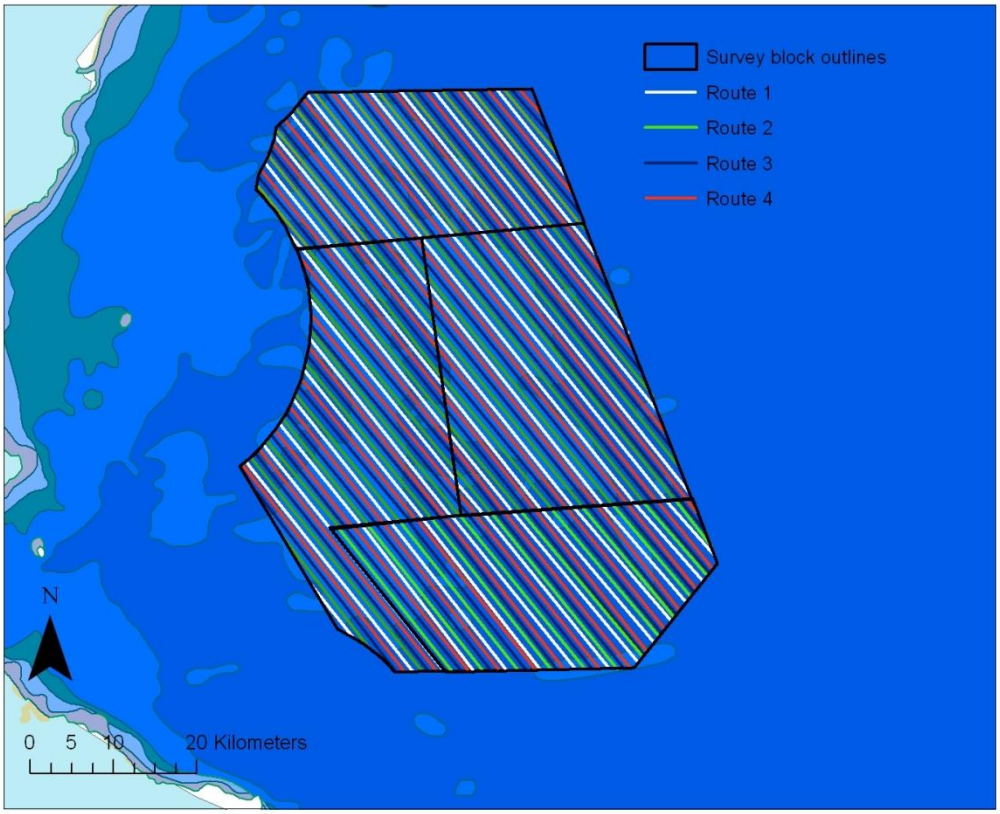

Figure 1: Firth of Forth survey area showing survey block outlines and the four survey routes. Map supplied by ECON.

Figure 2: The MV Clupea

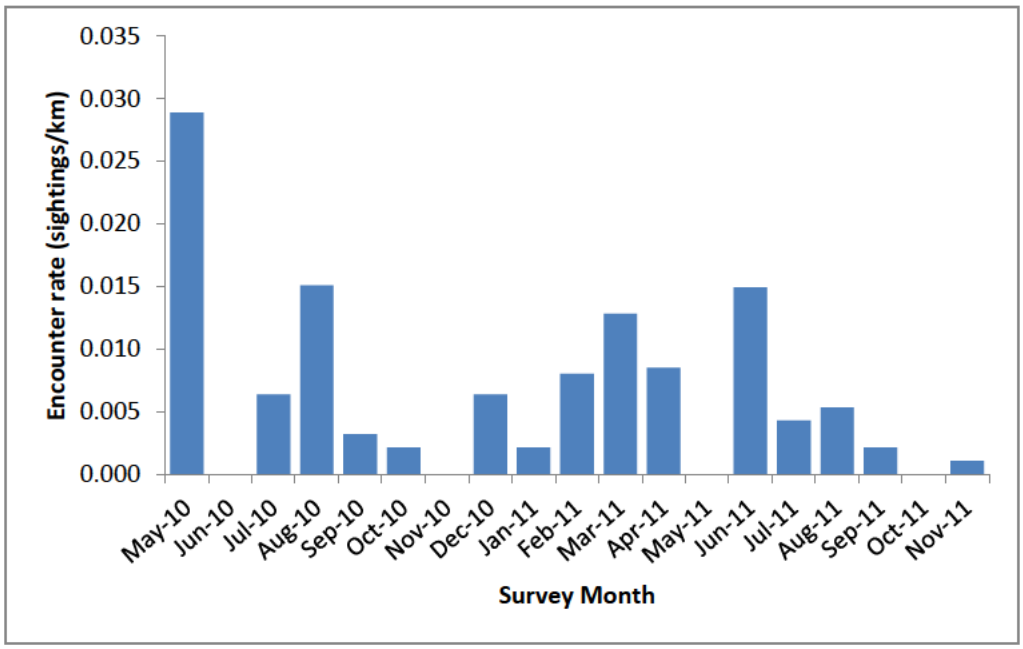

Figure 3: Encounter rate (sightings per km of survey effort) for harbour porpoises per survey month

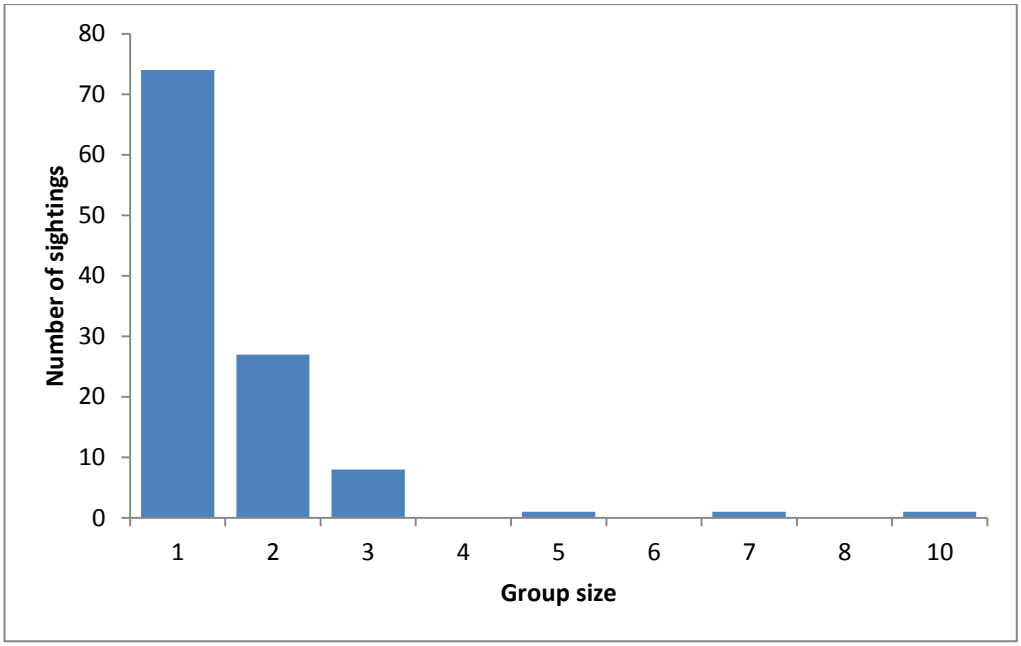

Figure 4: Group sizes of harbour porpoise sightings seen during the 19 surveys. Mean group size was 1.6.

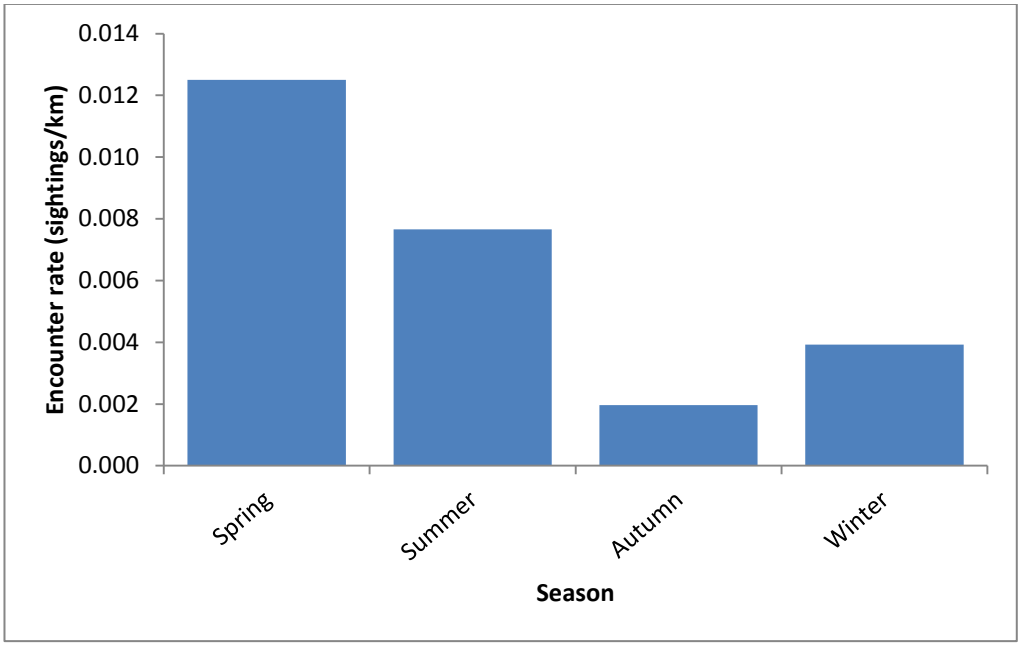

Figure 5: Encounter rate (sightings per km of survey effort) for harbour porpoises by season.

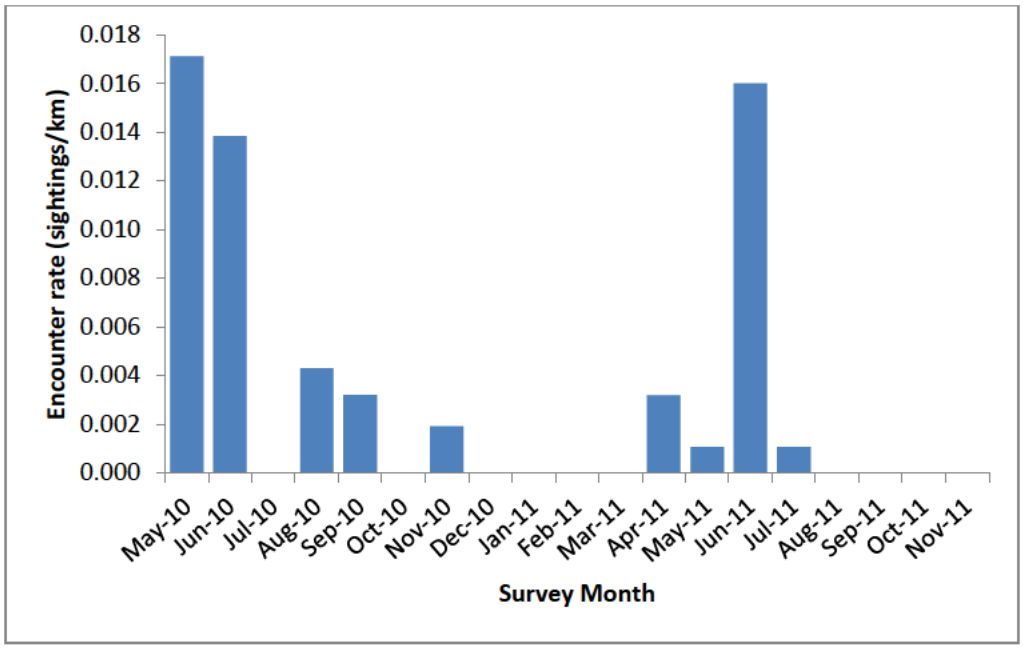

Figure 6: Encounter rate (sightings per km of survey effort) for minke whales per survey month

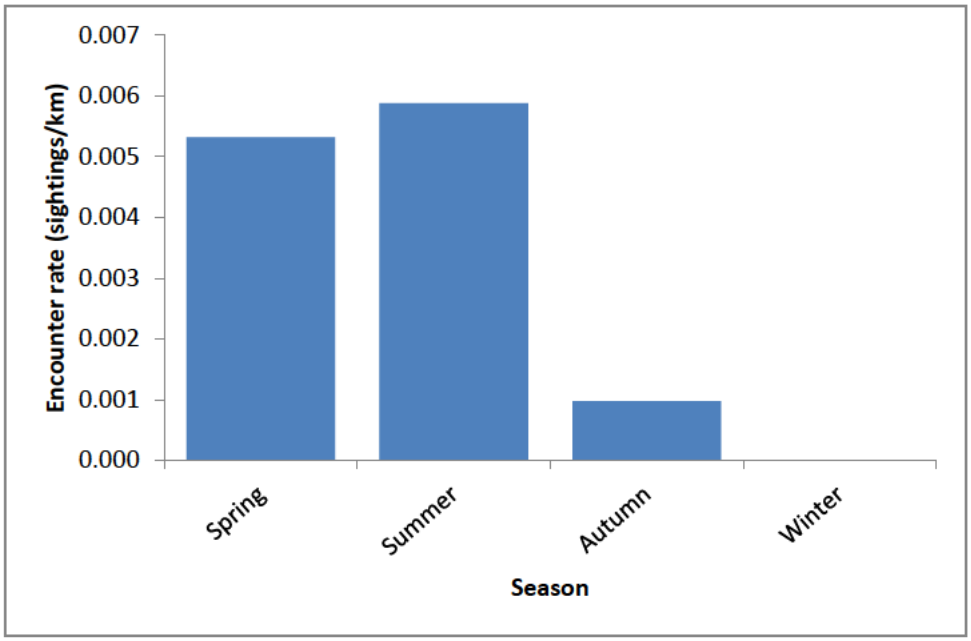

Figure 7: Encounter rate (sightings per km of survey effort) for minke whales by season.

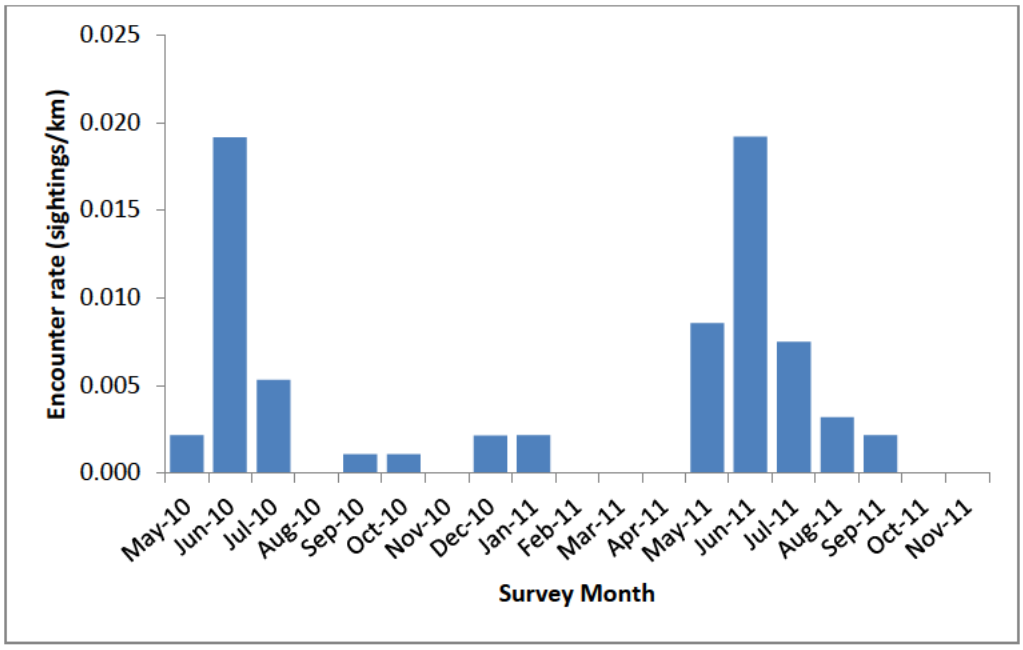

Figure 8: Encounter rate (sightings per km of survey effort) for white-beaked dolphins per survey month

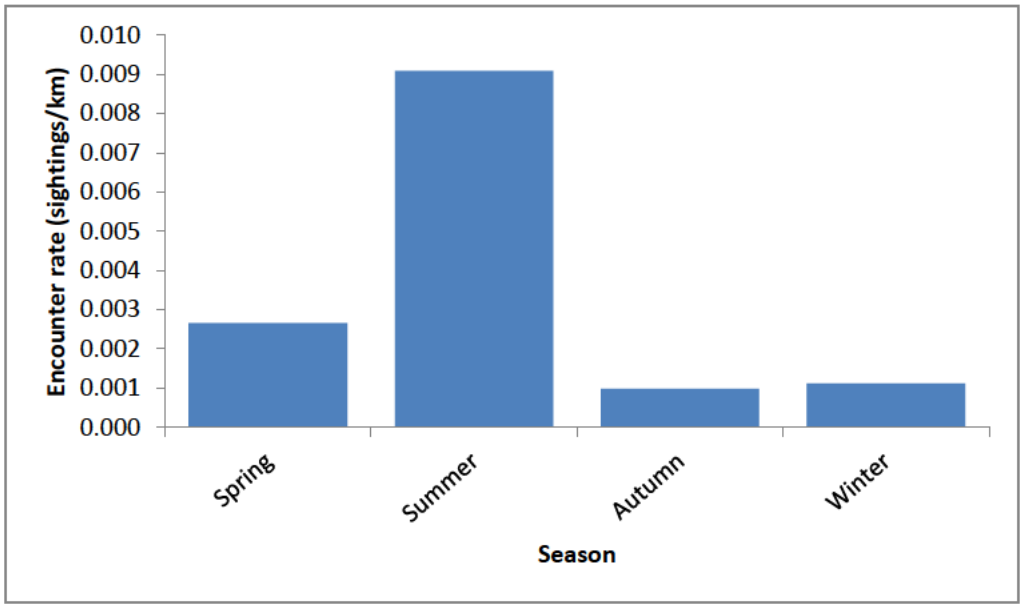

Figure 9: Encounter rate (sightings per km of survey effort) for white-beaked dolphins by season.

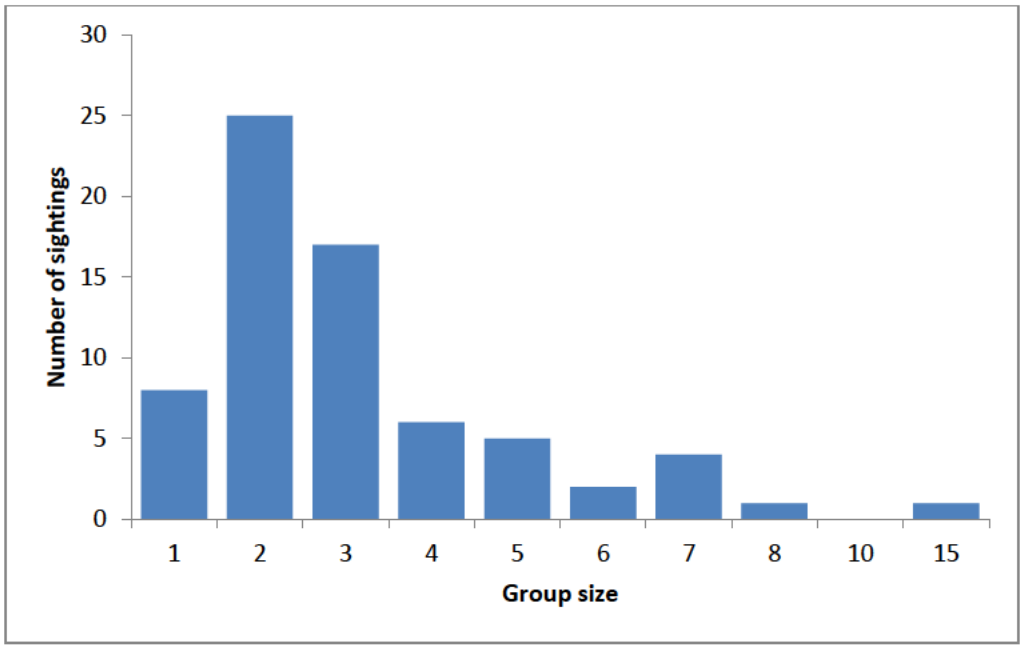

Figure 10: Group sizes of white-beaked dolphin sightings seen during the 19 surveys.

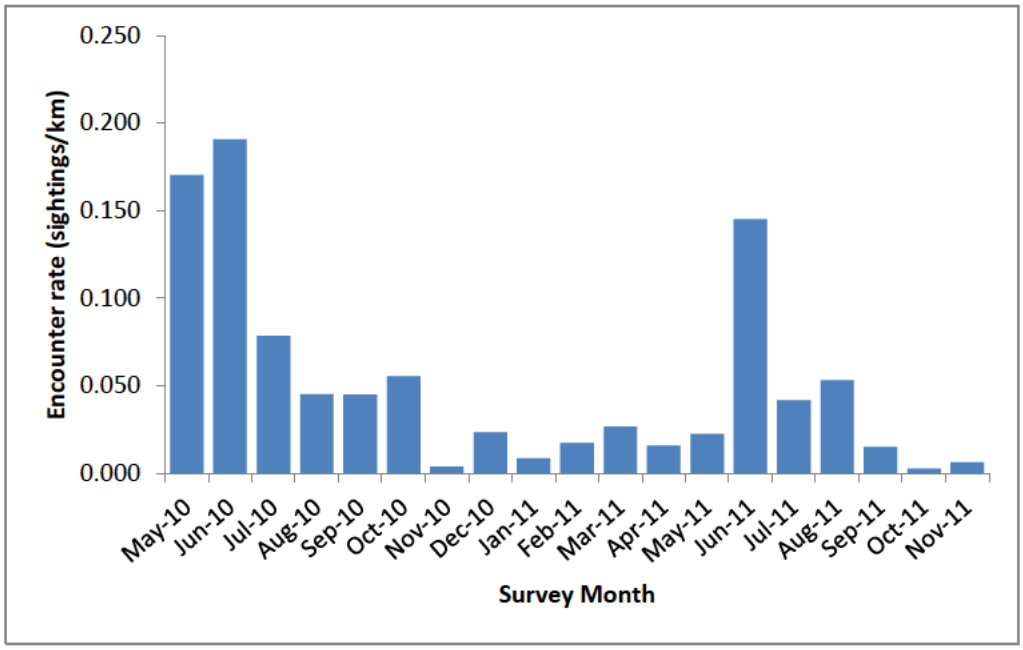

Figure 11: Encounter rate (sightings per km of survey effort) for grey seals per survey month

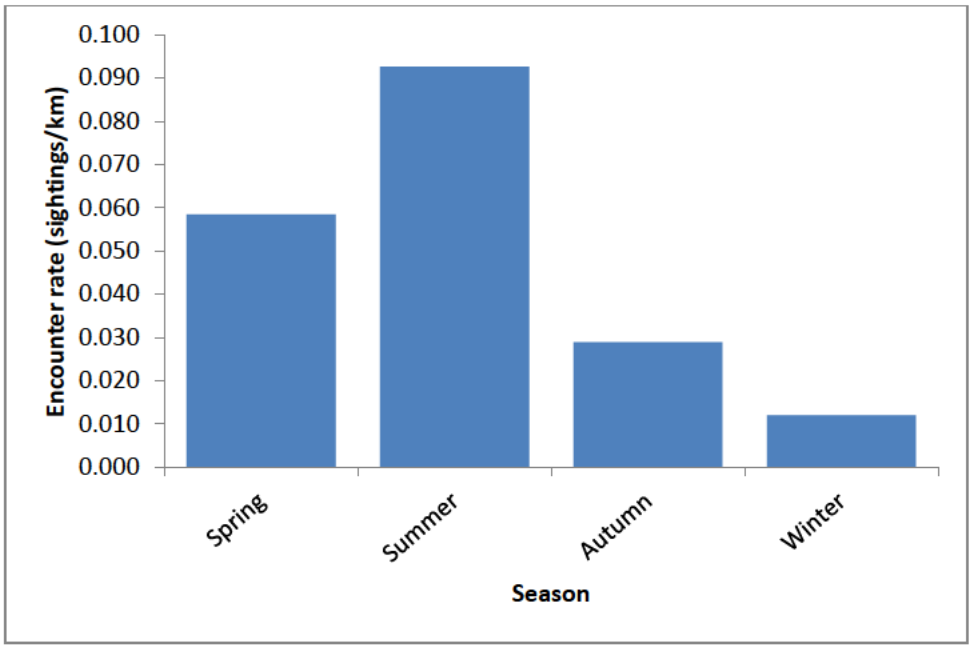

Figure 12: Encounter rate (sightings per km of survey effort) for grey seals by season.

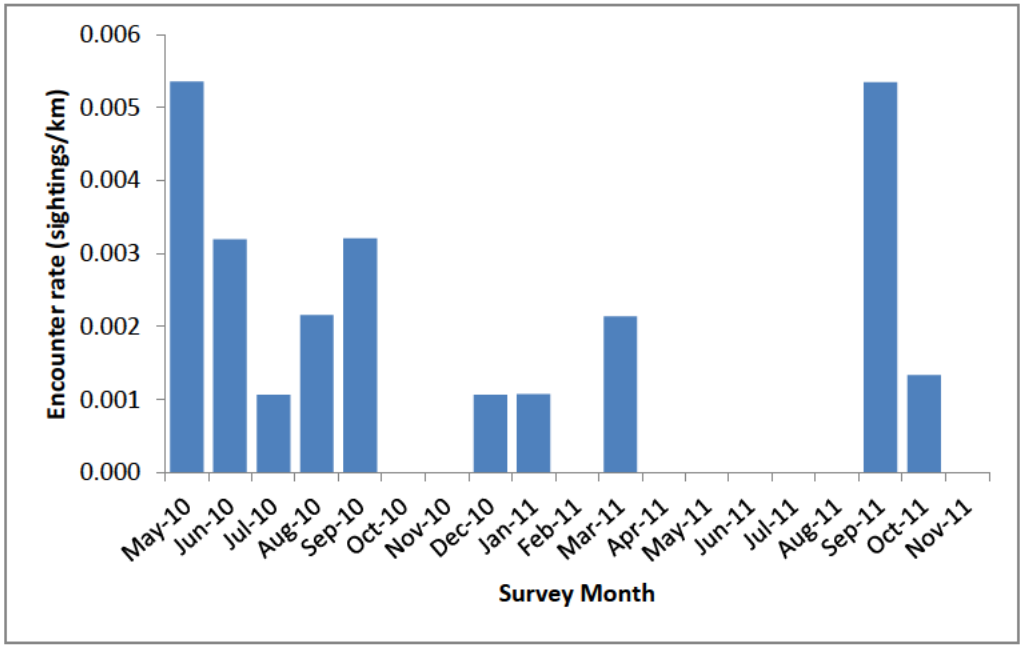

Figure 13: Encounter rate (sightings per km of survey effort) for harbour seals per survey month.

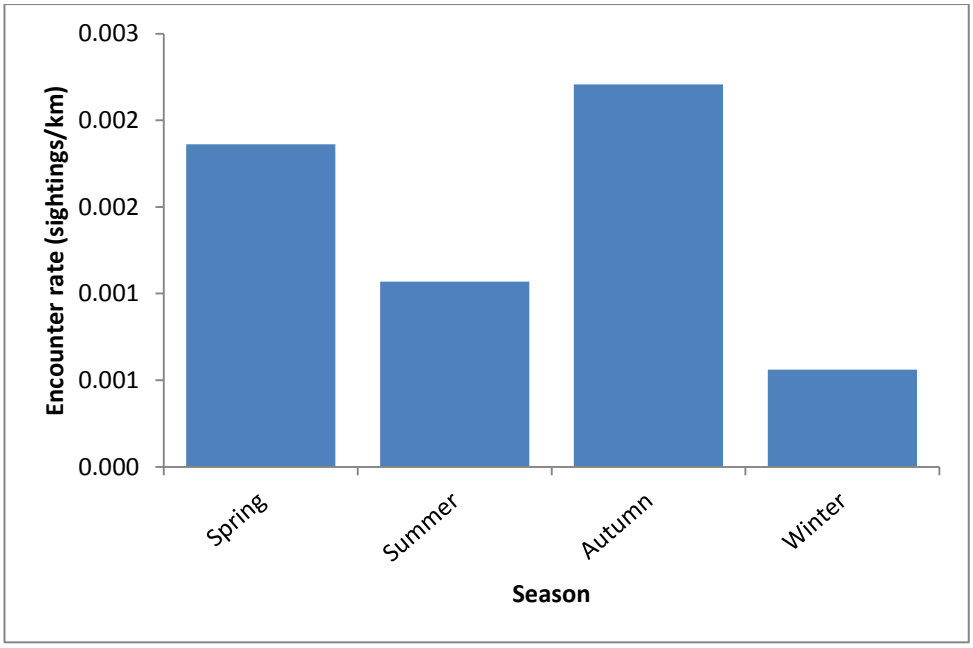

Figure 14: Encounter rate (sightings per km of survey effort) for harbour seals per season.

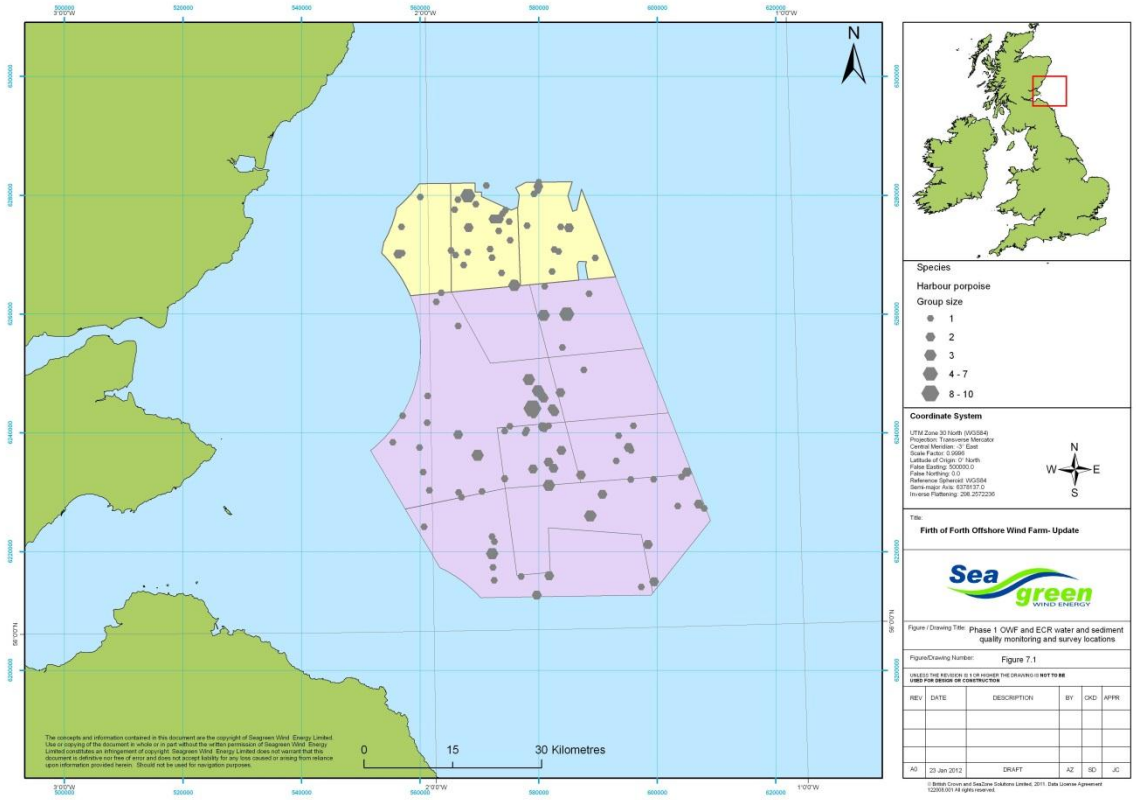

Figure 15: Positions and group sizes of all harbour porpoise sightings recorded during all surveys.

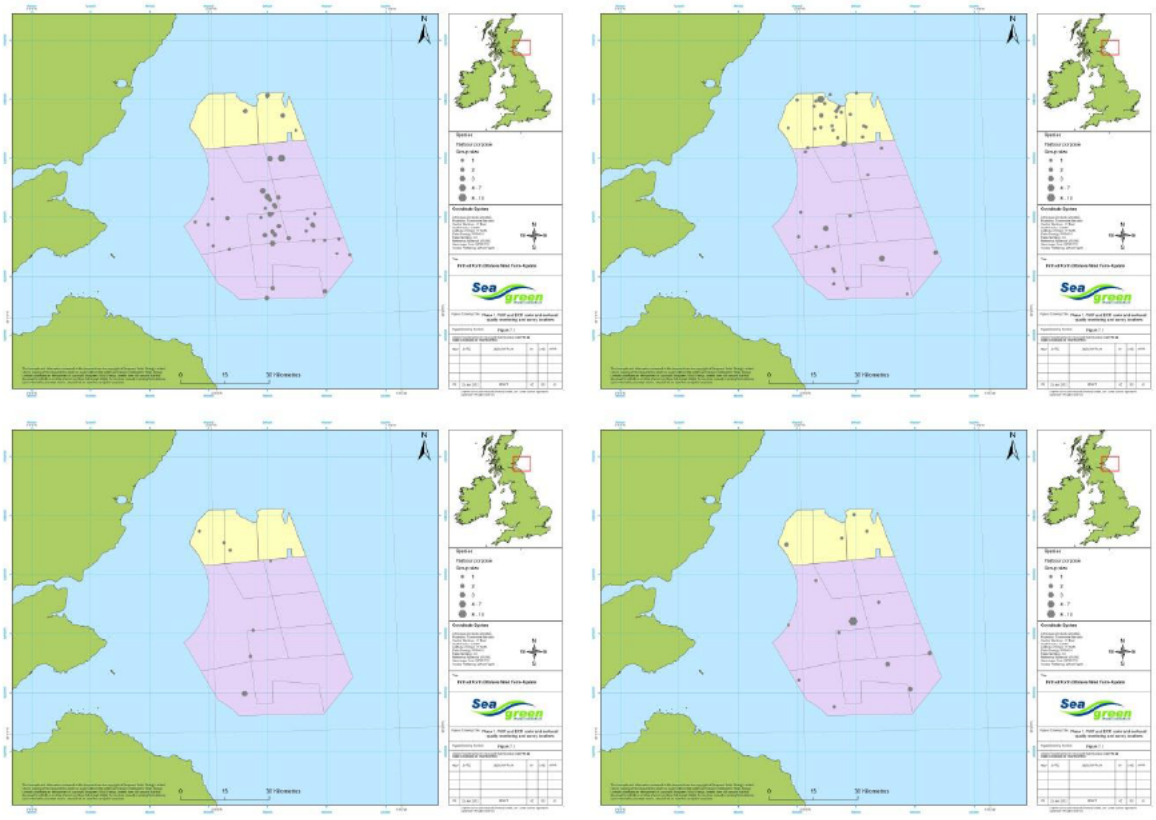

Figure 16: Positions of all harbour porpoise sightings in (a) Spring (March-May), (b) Summer (June-August), (c) Autumn (Sept-Nov) and (d) Winter (Dec-Feb).

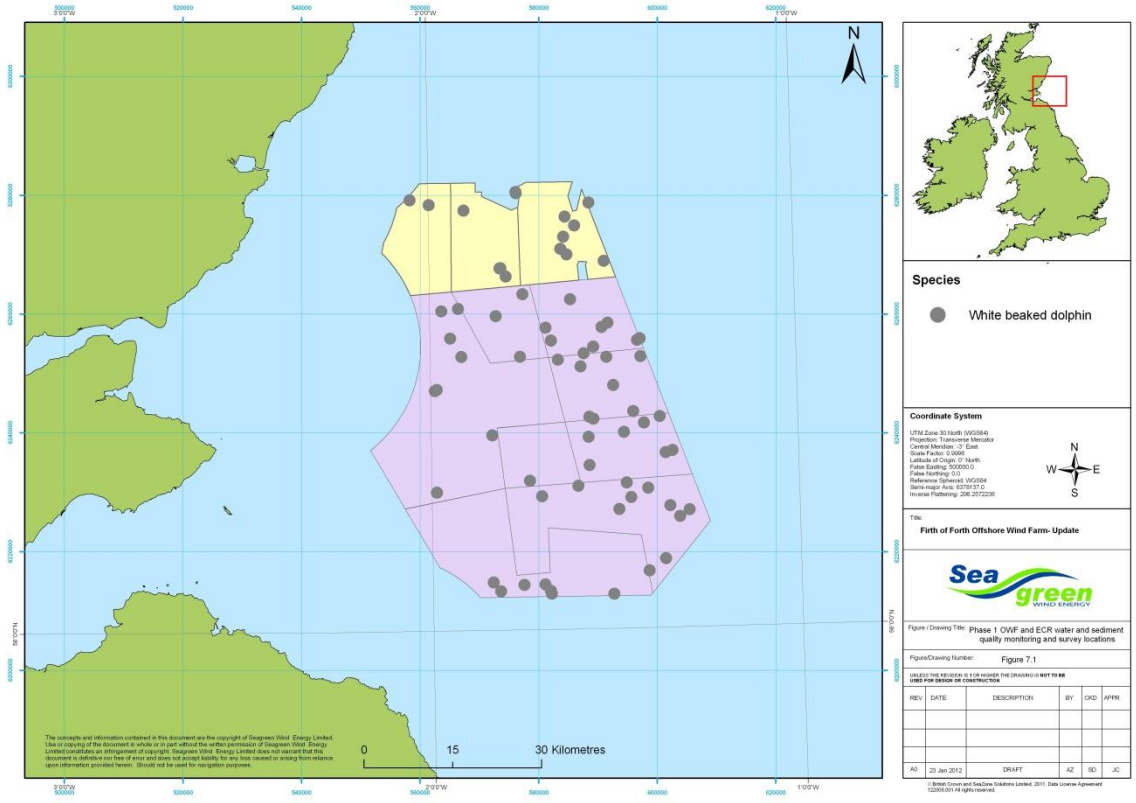

Figure 17: Positions of all white-beaked dolphin sightings recorded during all surveys

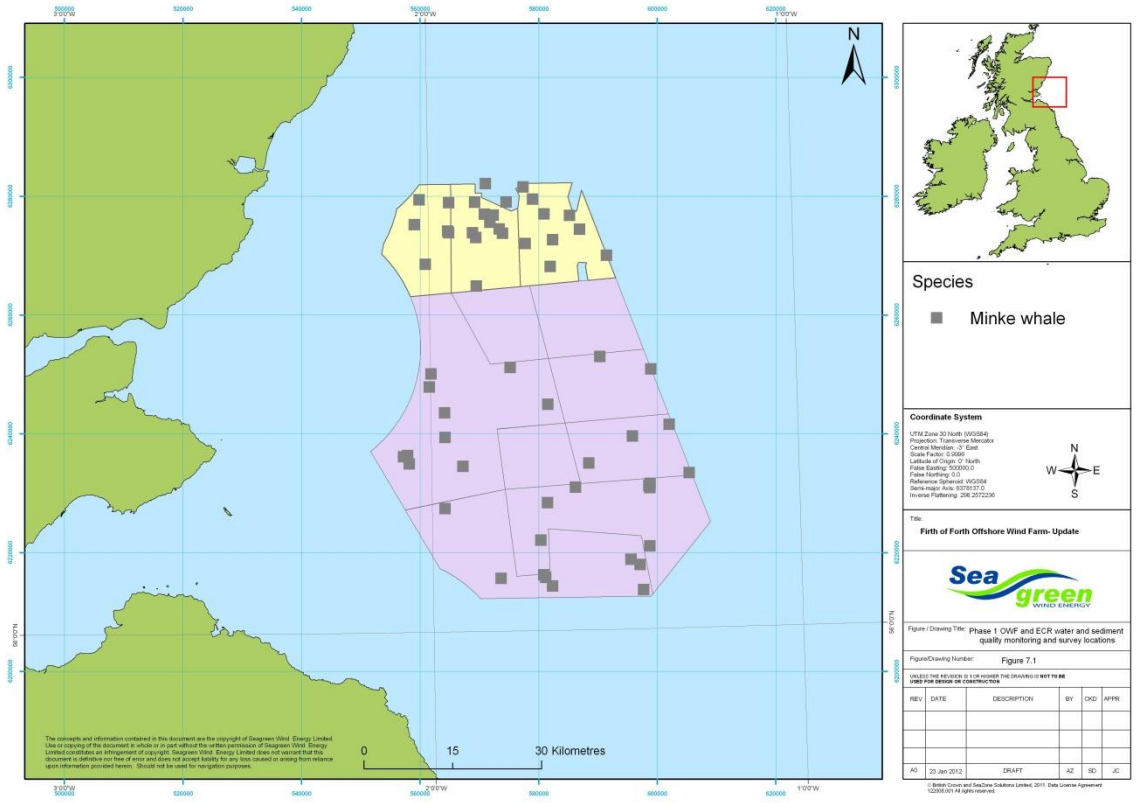

Figure 18: Positions of all minke whale sightings recorded during all surveys.

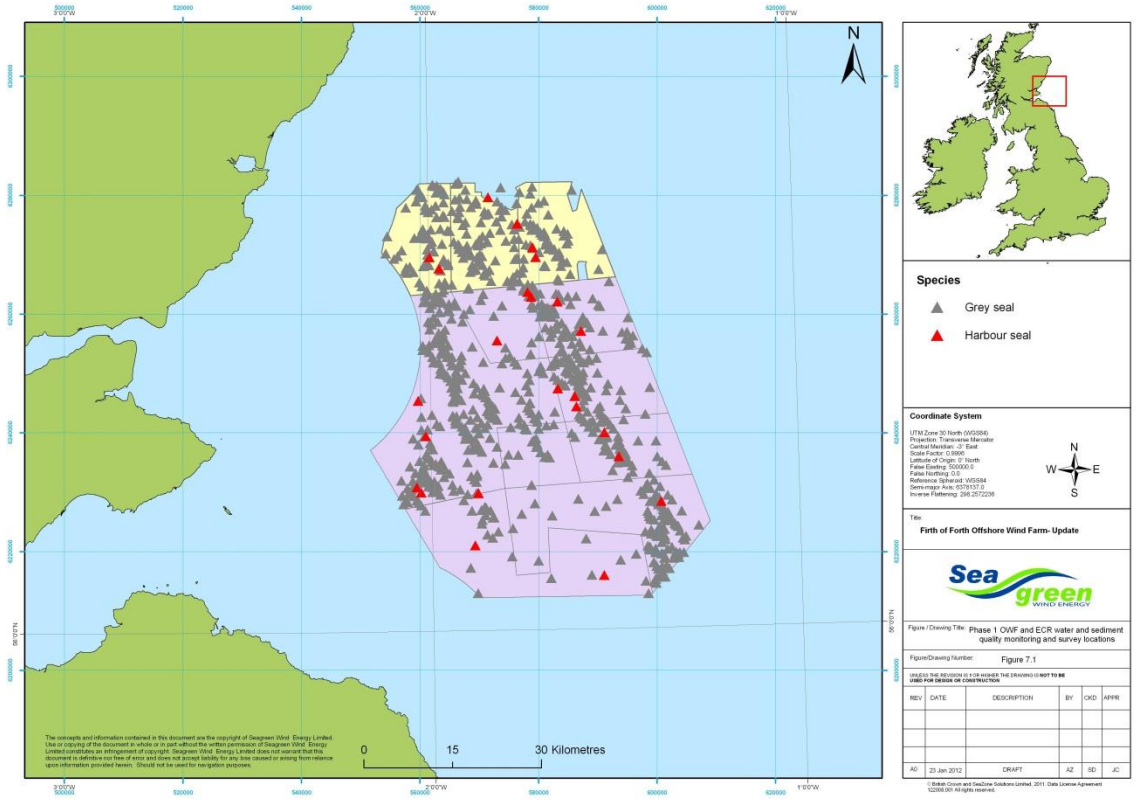

Figure 19: Positions of all seal sightings recorded during all surveys.

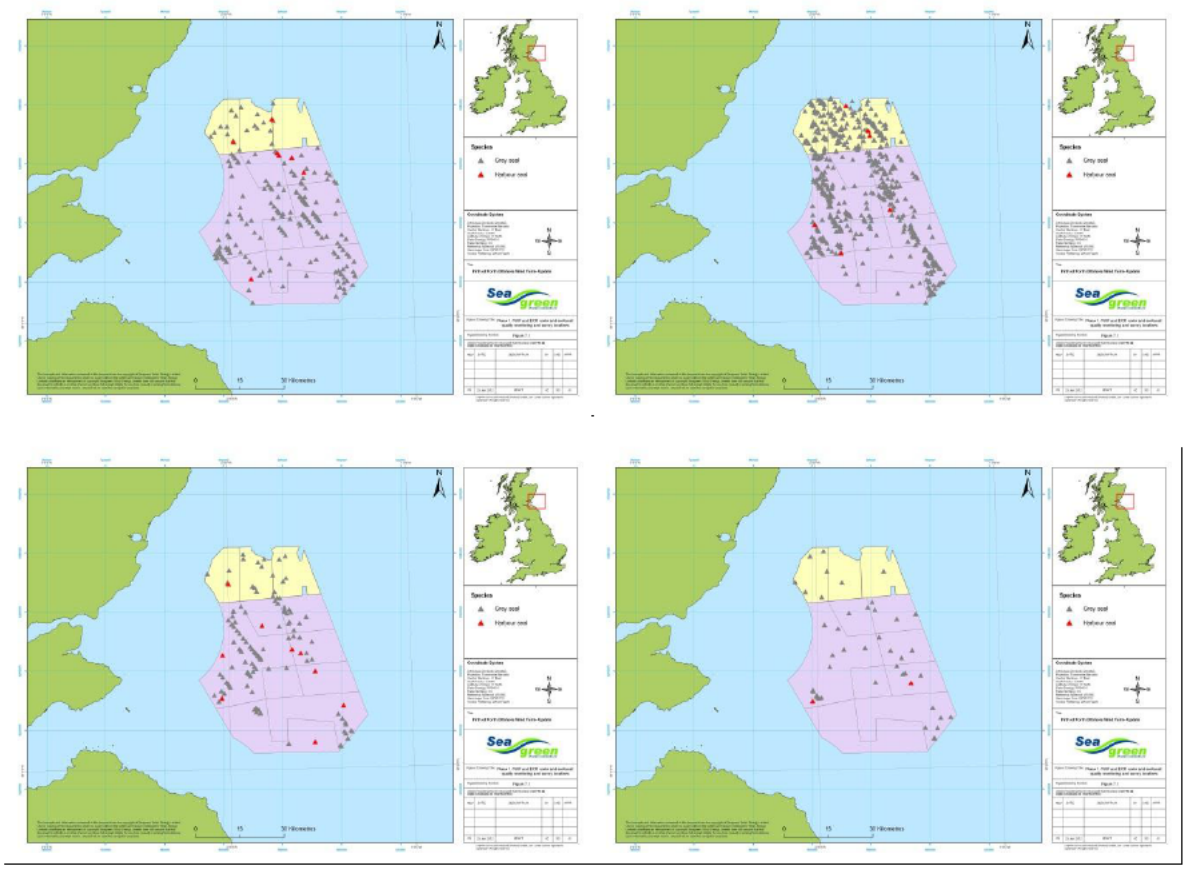

Figure 20: Positions of all seal sightings in (a) Spring (March-May), (b) Summer (June-August), (c) Autumn (Sept-Nov) and (d) Winter (Dec-Feb).

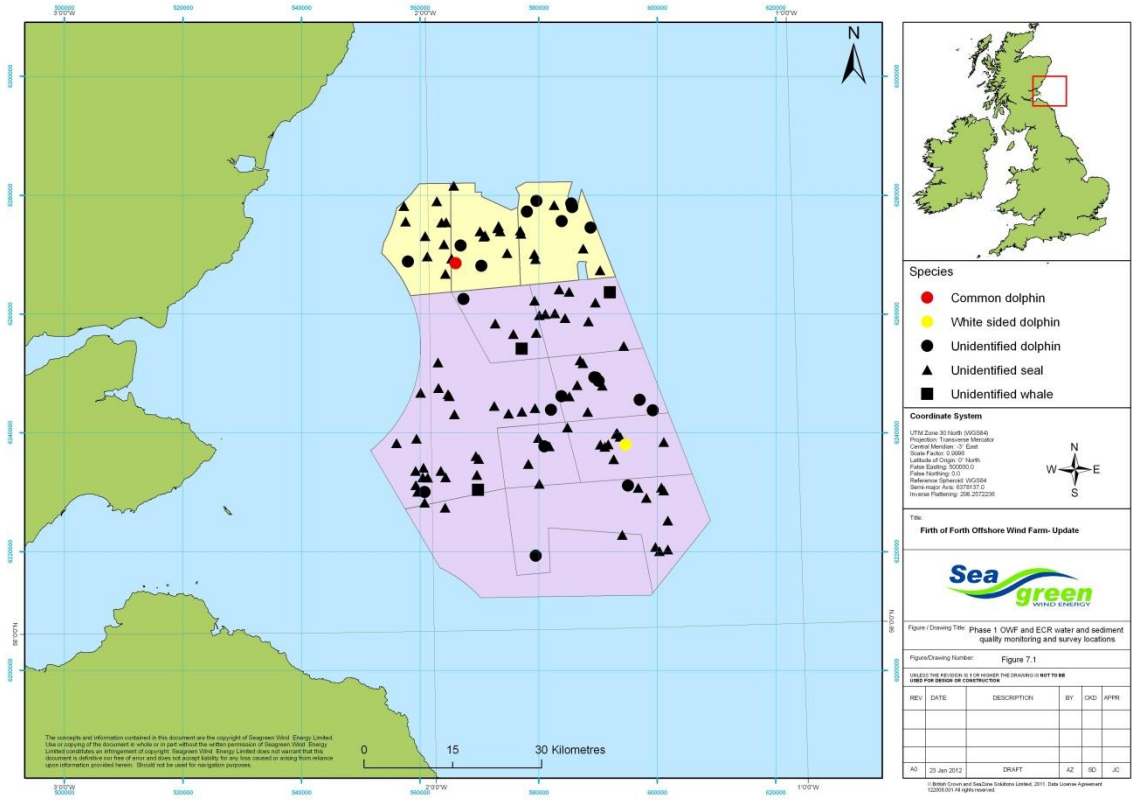

Figure 21: Positions of all other species and observations unassigned to species recorded during all surveys.