



## **Rampion Offshore Wind Farm**



### **ES Section 8 – Fish & Shellfish Ecology - Appendix 8.4**

**Brown & May Marine Ltd**

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**E.ON Climate & Renewables UK Rampion Offshore Wind Limited**

# **Rampion Offshore Wind Farm**

## **Fish and Shellfish Characterisation Survey**

### **Commercial Beam Trawl**

**23<sup>rd</sup> – 28<sup>th</sup> April 2012**

**Undertaken by  
Brown & May Marine Ltd**

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## 1.0 Summary

In order to establish the abundance and composition of fish and shellfish within the area, a commercial beam trawl survey was undertaken in and adjacent to the Rampion offshore wind farm between the 23<sup>rd</sup> and 28<sup>th</sup> April 2012. Five of the six commercial target species were identified; Dover sole (*Solea solea*), lemon sole (*Microstomus kitt*), plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*) and black sea bream (*Spondylus cantharus*). No cod (*Gadus morhua*) were caught during this survey.

A total of 39 fish species were caught; 38 species within the wind farm and 26 at the reference stations. The most abundant species caught in the wind farm was *P. platessa*, followed by lesser spotted dogfish (*Scyliorhinus canicula*) and then *S. solea*. It was also found that *P. platessa* was the most frequently recorded species caught at the reference stations, followed by bib (*Trisopterus luscus*) and then *S. solea*. Overall, the total catch rate for fish species caught in the commercial beam trawl was greater at the reference stations than within the wind farm.

Catch rates for *M. merlangus* and *M. kitt* were greatest within the wind farm, whereas for *S. cantharus* the catch rate was greatest at the reference stations. Within the wind farm, 24 undulate ray (*Raja undulata*) were recorded, and a single individual was caught at the reference stations. It should be noted that *P. platessa*, *S. solea*, *M. merlangus*, anglerfish (*Lophius piscatorius*) and herring (*Clupea harengus*) are also listed as UK BAP species.

Five species of fish were caught with a set MLS. The *P. platessa* caught within the wind farm and at the reference stations were approximately evenly divided below and above the MLS. Most of the *S. solea* caught at the reference stations and within the wind farm were above the MLS; whereas most of the *M. merlangus* caught in both sampling areas were below the MLS. All other species were caught in relatively low numbers.

At the reference stations the sex percentage of *P. platessa* and *M. kitt* was approximately equal, whereas within the wind farm a greater proportion was female. The greatest numbers of *S. solea* and *M. merlangus* caught at the reference stations and within the wind farm were female. One male *S. cantharus* was identified at the reference stations and three females were identified within the wind farm.

The greatest proportion of the *P. platessa* caught both at the reference stations and within the wind farm and of the *M. kitt* caught within the wind farm was represented by spent individuals. The greatest proportion of the *M. kitt* caught at the reference stations was maturing individuals. The highest proportion of the *S. solea* caught at the reference stations and within the wind farm were maturing females. At the reference stations and within the wind farm, the majority of the *M. merlangus* caught were immature individuals. Of the *S. cantharus* identified at the reference stations, six were immature, and one was a maturing male. Within the wind farm, seven immature individuals and two maturing female *S. cantharus* were identified.

A total of nine commercial shellfish species were caught; eight within the wind farm and nine species at the reference stations. Overall, whelk (*Buccinum undatum*) was the most abundant species caught, followed by king scallop (*Pecten maximus*) and then cuttlefish (*Sepia officinalis*). Overall, the total catch rate was higher at the reference stations than within the wind farm.

## Introduction

The following report details the findings of the fish and shellfish characterisation survey, undertaken in and adjacent to the Rampion offshore wind farm between the 23<sup>rd</sup> and 28<sup>th</sup> April 2012, using a commercial 4.5-metre beam trawl.

The survey methodology, vessel and sampling gear detailed were agreed in consultation with Cefas and the Marine Management Organisation (MMO). A dispensation from the MMO for the Provisions of Council Regulations 850/98 to catch and retain undersize fish for scientific research and 43/2009 specifically related to days at sea was obtained prior to commencement of the survey. A summary of the health and safety performance of the survey is provided in Appendix 1.

The aim of the survey was to establish the abundance and composition of fish and shellfish species within the area. It should be noted that Cefas have defined cod (*Gadus morhua*), Dover sole (*Solea solea*), lemon sole (*Microstomus kitt*), plaice (*Pleuronectes platessa*), whiting (*Merlangius merlangus*) and black sea bream (*Spondylusoma cantharus*) as target species within the area. Cefas also highlighted the status of the undulate ray (*Raja undulata*) as a UK Biodiversity Action Plan (BAP) species.

## 2.0 Planned Scope of Work

The planned scope of works for the April 2012 fish and shellfish characterisation survey are detailed below, and illustrated overleaf in Figure 2.1. The sampling locations replicate those in the previous surveys undertaken in November 2011 and February 2012.

- **Commercial Beam Trawls**
  - 18 tows of approximately 20 minutes duration within the Rampion offshore wind farm and six reference tows in adjacent areas
- **Commercial Beam Trawl Sample Analysis - Fish**
  - Number of individuals and catch rate by species
  - Average length and length distribution by species
    - Finfish & sharks (except herring; *Clupea harengus* & sprat; *Sprattus sprattus*): individual lengths (nearest cm below)
    - *C. harengus* & *S. sprattus*: individual lengths (nearest ½cm below)
    - Rays: individual length and wing-width (nearest cm below)
  - Percentage of individuals above and below the minimum landing size (MLS) by species
  - Sex percentage of target species (see above) and elasmobranchs
  - Spawning condition of target species
    - Finfish species: Cefas Standard Maturity Key - Five Stage
- **Commercial Beam Trawl Sample Analysis – Shellfish**
  - Number of individuals and catch rate by species
  - Average length by species

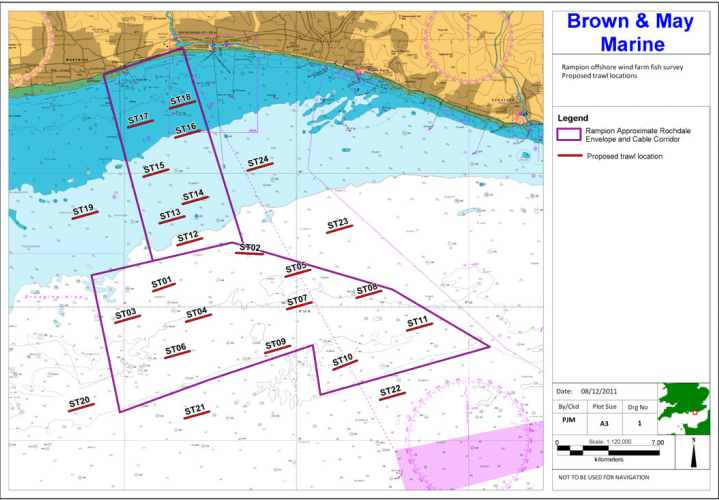


Figure 2.1 Proposed Trawl Locations

### 3.0 Methodology

#### 3.1 Survey Vessel

The vessel chartered for the survey, “Sara Lena” (Figure 3.1), is a Shoreham-based commercial trawler whose skipper has experience of fishing in the survey area. The specifications of the vessel are given in Table 3.1 below.



Figure 3.1 Survey Vessel “Sara Lena”

Table 3.1 Survey Vessel Specifications

| SURVEY VESSEL SPECIFICATIONS |                                                    |
|------------------------------|----------------------------------------------------|
| Length                       | 18m                                                |
| Beam                         | 6.2m                                               |
| Draft                        | 3.1m                                               |
| Main engine                  | Cummins engine NT855-M 221KW(300HP)                |
| Gearbox                      | 7:1                                                |
| Propeller                    | Fixed pitched, 1900mm diameter, enclosed in nozzle |
| GPS                          | 2 x Furuno GPS Navigator                           |
| Plotters                     | Olex Plotter with Electronic Charts                |
| Sounder                      | Furuno                                             |

### 3.2 Sampling Gears

Sampling was undertaken using twin commercial 4.5m beam trawls (Figure 3.2); the specifications of which are given in Table 3.2 below.



Figure 3.2 One of Two Commercial Beam Trawls Used

Table 3.2 Commercial Beam Trawl Specifications

| COMMERCIAL BEAM TRAWL SPECIFICATIONS |        |
|--------------------------------------|--------|
| Beam width                           | 4.5m   |
| Headline height                      | 0.375m |
| Shoe length                          | 71cm   |
| Rubber wheel width                   | 45cm   |
| Cod-end liner                        | 80mm   |

### 3.3 Positioning and Navigation

The position of the vessel was tracked at all times using a Garmin GPSMap 620 with an EGNOS differential connected to an external Garmin GA30 antenna. The trawl start times and positions were recorded when the winch stopped paying out the gear, similarly the trawl end times and positions were taken when hauling of the gear commenced.

The start and end times, durations and co-ordinates of each beam trawl and the vessel tracks whilst towing the beam trawl are given in Section 3.5 overleaf.

### 3.4 Sampling Operations

The survey was undertaken between the 23<sup>rd</sup> and 28<sup>th</sup> April 2012. A summarised log of events is given in Table 3.3 below.

It should be noted that the beam trawls at stations BT15 and BT17 were relocated due to the presence of static gear.

**Table 3.3 Summarised Log of Events**

|                                                                    |
|--------------------------------------------------------------------|
| <b>Monday 23rd April 2012</b>                                      |
| Vessel inspection and audit                                        |
| Safety briefing                                                    |
| Mobilise survey                                                    |
| Weather day in port                                                |
| <b>Tuesday 24th April 2012</b>                                     |
| Beam Trawls: BT20, BT21, BT22, BT11, BT08, BT10, BT09 and BT07     |
| Return to Shoreham                                                 |
| <b>Wednesday 25th April 2012</b>                                   |
| Weather day in port                                                |
| <b>Thursday 26th April 2012</b>                                    |
| Weather day in port                                                |
| <b>Friday 27th April 2012</b>                                      |
| Beam Trawls: BT16, BT15, BT19, BT13, BT12, BT01, BT03, BT06, BT04, |
| BT15 relocated to avoid static gear                                |
| Night at sea                                                       |
| <b>Saturday 28th April 2012</b>                                    |
| Beam Trawls: BT14, BT24, BT18 and BT17                             |
| BT17 relocated to avoid static gear                                |
| Return to Shoreham                                                 |
| Demobilise survey                                                  |

### 3.5 Commercial Beam Trawl Sampling

The total catch from both beam trawls was boxed, labelled and photographed. All individuals of the target fish species (*G. morhua*, *S. solea*, *M. kitt*, *P. platessa*, *M. merlangus* and *S. cantharus*) were retained.

The following sample analysis was undertaken aboard the vessel before returning all non-target individuals to the sea:

Fish:

- Total length (nearest cm below) for all non-target fish species/species of conservation interest (e.g. *R. undulata*)
- Wing-width for all skates and rays
- Sex of all elasmobranchs

Shellfish:

- Carapace width for all edible crab (*Cancer pagurus*) and velvet crab (*Necora puber*)
- Carapace length for all lobster (*Homarus gammarus*)
- Mantle length for all cephalopods
- Shell height for all whelk (*Buccinum undatum*)
- Shell width for all King (*Pecten maximus*) and Queen scallop (*Aequipecten opercularis*)

The target fish species were boxed, labelled, photographed, iced and stored at +2°C before transportation to Cefas (Lowestoft) for length, sex and spawning condition analysis at the end of the survey, in line with the agreed scope of works. The Cefas standard five-stage maturity key used is given in Table 3.4 overleaf.

The start and end times, co-ordinates and the duration of each beam trawl are given in Table 3.5; wind farm and reference tows are highlighted in red and green respectively. The vessel tracks whilst towing the beam trawl are given in Figure 3.3. Also illustrated are the locations where the beam trawl was relocated.

For the purposes of data analysis, catch rates have been calculated to allow for quantitative comparisons to be made between the numbers of individuals caught per hour at each station (see Table 4.1).

Table 3.4 Cefas Standard Five Stage Maturity Key

| Maturity Stage    | Male                                                                                                                                                                                                                | Female                                                                                                                                                                                                                    |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>I Immature</b> | Roundfish – testes very thin ribbon lying along an unbranched blood vessel.<br>Flatfish – testes tight up against back of gut cavity and very small, not usually larger than 10mm x 2mm.<br>No sign of development. | Roundfish – ovaries small, elongated, whitish, translucent.<br>Flatfish – ovaries small, ovary wall thin and easily broken, internally yellowish-orange (although can be variable).<br>No sign of development.            |
| <b>M Maturing</b> | Colour is progressing towards creamy white and the testes are filling more and more of the body cavity.<br>Roundfish – may be many lobed<br>Flatfish – at latest phase the testes can become bulbous.               | Eggs are beginning to develop.<br>Roundfish – the ovaries are filling more and more of the body cavity.<br>Flatfish – ovaries are extending down the side of the body of the fish.<br>There are no signs of hyaline eggs. |
| <b>H Hyaline</b>  | No equivalent stage.                                                                                                                                                                                                | Hyaline eggs present, one or many.<br>Ovaries will not run, even under moderate pressure.                                                                                                                                 |
| <b>R Running</b>  | Will extrude sperm under light pressure to advanced stage of extruding sperm freely with some sperm still in the gonad.<br>Flatfish – sperm evident in ducts.                                                       | Will extrude under light pressure to advanced stage of extruding eggs freely with some eggs still in the gonad.                                                                                                           |
| <b>S Spent</b>    | Testes shrunken with little sperm in the gonads but often some in the gonoducts which can be extruded under light pressure. The gonad can shrink back to very small size.<br>Flatfish gonad becomes knobby.         | Ovaries shrunken with few residual eggs and slime.<br>Ovaries become tighter, no sign of egg development.                                                                                                                 |

Table 3.5 Start and End Times (GMT), Durations and Co-ordinates of each Commercial Beam Trawl

| Station | Date       | Start      |             |           |           | End        |             |           |           | Duration (hh:mm:ss) |
|---------|------------|------------|-------------|-----------|-----------|------------|-------------|-----------|-----------|---------------------|
|         |            | Time (GMT) | UTM30N      |           | Depth (m) | Time (GMT) | UTM30N      |           | Depth (m) |                     |
|         |            |            | Latitude    | Longitude |           |            | Latitude    | Longitude |           |                     |
| BT01    | 27/04/2012 | 14:42:56   | 5,616,711.8 | 689,445.9 | 30.8      | 15:02:48   | 5,618,025.1 | 691,759.5 | 32.8      | 00:19:52            |
| BT02    |            | 18:23:46   | 5,620,051.3 | 695,668.8 | 27.8      | 18:43:16   | 5,620,076.8 | 698,000.0 | 27.6      | 00:19:30            |
| BT03    |            | 15:33:27   | 5,616,020.6 | 690,508.0 | 33.5      | 15:53:47   | 5,614,709.5 | 688,068.7 | 31.9      | 00:20:20            |
| BT04    |            | 17:28:09   | 5,615,838.0 | 693,854.2 | 40.6      | 17:48:02   | 5,616,383.3 | 696,159.5 | 34.8      | 00:19:53            |
| BT05    |            | 19:04:01   | 5,618,858.6 | 698,790.2 | 31.1      | 19:24:01   | 5,619,274.0 | 701,296.7 | 28.2      | 00:20:00            |
| BT06    |            | 16:37:55   | 5,613,180.4 | 692,336.1 | 49.4      | 16:58:07   | 5,614,413.1 | 694,368.0 | 42.6      | 00:20:12            |
| BT07    | 24/04/2012 | 14:47:08   | 5,616,393.5 | 699,622.2 | 45.9      | 15:06:45   | 5,617,004.2 | 701,853.3 | 47.6      | 00:19:37            |
| BT08    |            | 11:50:59   | 5,617,780.0 | 706,813.4 | 31.9      | 12:10:58   | 5,617,454.1 | 704,993.7 | 33.1      | 00:19:59            |
| BT09    |            | 13:47:26   | 5,614,278.4 | 700,818.5 | 50.9      | 14:07:20   | 5,613,161.1 | 698,424.8 | 54.9      | 00:19:54            |
| BT10    |            | 12:51:20   | 5,613,415.0 | 705,630.7 | 52.9      | 13:11:12   | 5,612,490.8 | 703,620.6 | 49.0      | 00:19:52            |
| BT11    |            | 10:47:43   | 5,616,049.9 | 710,166.8 | 40.6      | 11:07:24   | 5,615,379.1 | 708,572.9 | 49.6      | 00:19:41            |
| BT12    | 27/04/2012 | 13:04:44   | 5,620,503.6 | 691,947.5 | 24.4      | 13:24:33   | 5,621,403.0 | 694,490.7 | 25.3      | 00:19:49            |
| BT13    |            | 12:01:40   | 5,623,088.0 | 687,853.9 | 21.1      | 12:21:29   | 5,623,088.0 | 687,853.9 | 21.8      | 00:19:49            |
| BT14    | 28/04/2012 | 06:10:32   | 5,624,215.0 | 694,306.7 | 21.2      | 06:30:43   | 5,625,749.1 | 696,325.1 | 19.2      | 00:20:11            |
| BT15    | 27/04/2012 | 09:37:58   | 5,626,580.4 | 686,131.4 | 10.6      | 09:57:38   | 5,626,021.4 | 688,329.5 | 12.3      | 00:19:40            |
| BT16    |            | 07:35:52   | 5,628,431.9 | 691,303.6 | 11.7      | 07:55:46   | 5,629,181.5 | 693,892.7 | 11.6      | 00:19:54            |
| BT17    | 28/04/2012 | 10:28:22   | 5,628,419.3 | 687,806.3 | 9.4       | 10:48:29   | 5,627,301.6 | 688,827.7 | 10.8      | 00:20:07            |
| BT18    |            | 09:14:06   | 5,630,122.2 | 690,722.8 | 7.9       | 09:33:52   | 5,630,401.5 | 693,263.3 | 9.5       | 00:19:46            |
| BT19    | 27/04/2012 | 11:03:21   | 5,622,514.2 | 686,724.4 | 16.9      | 11:23:32   | 5,623,088.0 | 687,853.9 | 18.0      | 00:20:11            |
| BT20    | 24/04/2012 | 06:36:30   | 5,608,667.5 | 684,610.8 | 47.6      | 06:56:24   | 5,609,387.4 | 686,556.9 | 44.8      | 00:19:54            |
| BT21    |            | 07:52:50   | 5,608,777.8 | 693,204.1 | 56.9      | 08:12:52   | 5,609,783.3 | 695,525.5 | 54.9      | 00:20:02            |
| BT22    |            | 09:18:28   | 5,610,578.9 | 706,819.1 | 59.7      | 09:38:15   | 5,611,616.7 | 709,279.8 | 56.5      | 00:19:47            |

| Station | Date       | Start         |             |           |              | End           |             |           |              | Duration<br>(hh:mm:ss) |
|---------|------------|---------------|-------------|-----------|--------------|---------------|-------------|-----------|--------------|------------------------|
|         |            | Time<br>(GMT) | UTM30N      |           | Depth<br>(m) | Time<br>(GMT) | UTM30N      |           | Depth<br>(m) |                        |
|         |            |               | Latitude    | Longitude |              |               | Latitude    | Longitude |              |                        |
| BT23    | 27/04/2012 | 19:49:45      | 5,621,753.0 | 701,362.1 | 24.9         | 20:09:32      | 5,622,268.1 | 703,861.3 | 23.4         | 00:19:47               |
| BT24    | 28/04/2012 | 07:37:57      | 5,626,215.3 | 697,528.4 | 18.3         | 07:57:45      | 5,627,076.5 | 699,786.2 | 17.6         | 00:19:48               |

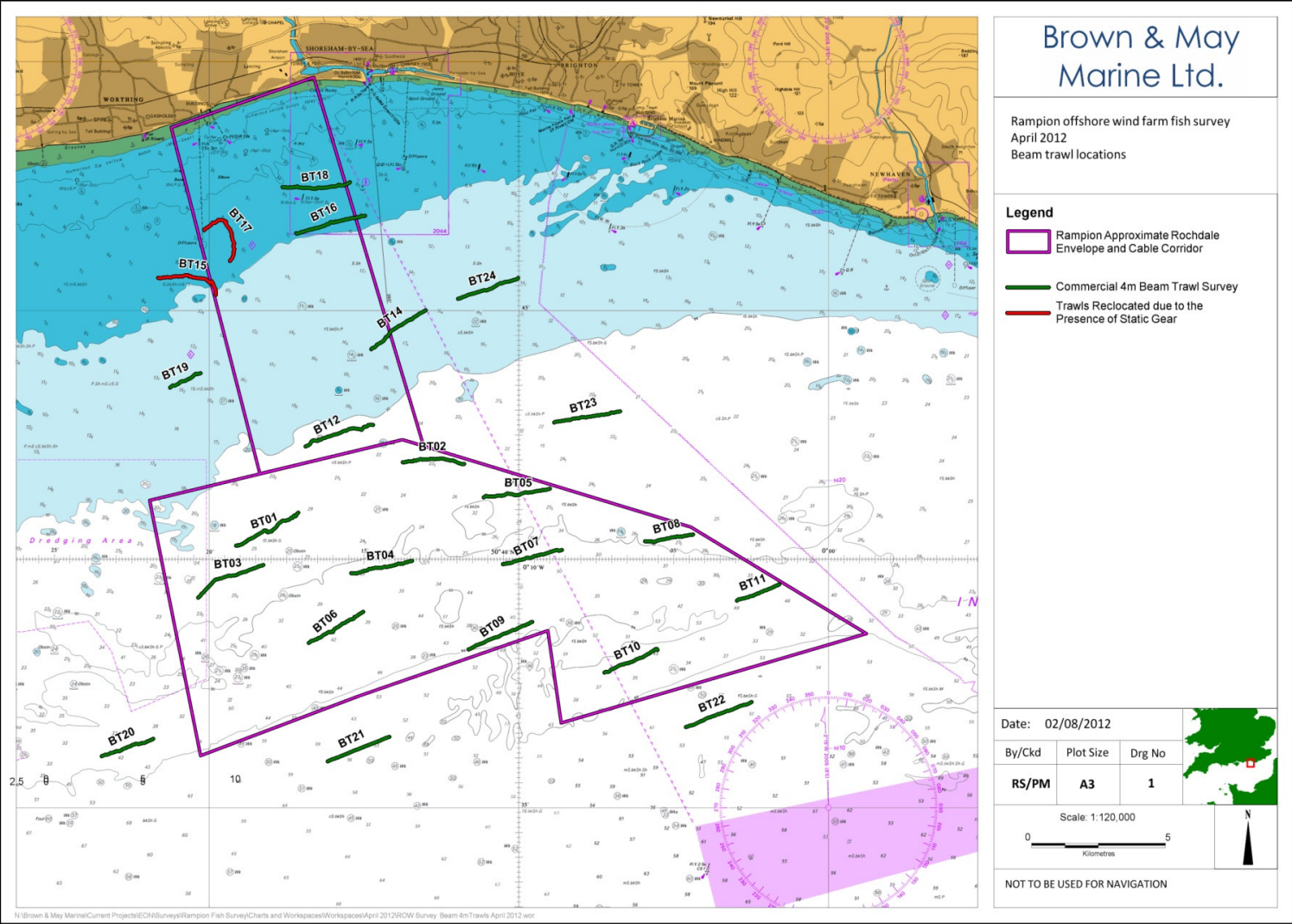


Figure 3.3 Commercial Beam Trawl Tow Tracks

## 4.0 Commercial Beam Trawl Results – Fish Species

### 4.1 Abundance and Catch Rates

The total number of individuals caught and the catch rate (number of individuals caught per hour) by species and sampling area are given in Table 4.1 below and illustrated in Figure 4.1. The catch rates by sampling area for the five target species are illustrated in Figure 4.2. The catch rates by species and station are illustrated in Figure 4.3 for the most abundant species, and in Figure 4.4 for the five target species (green and red boxes denote reference and wind farm stations respectively).

A total of 39 species were caught; 26 species at the reference stations and 38 within the wind farm. Overall, *P. platessa* was the most abundant species caught, followed by bib (*Trisopterus luscus*) and lesser spotted dogfish (*Scyliorhinus canicula*), and then *S. solea*.

*P. platessa* was the most prevalent species caught at the reference stations (309 individuals), with a catch rate of 155.2 individuals per hour (/hr), followed by *T. luscus* (84; 42.2/hr) and then *S. solea* (68; 34.1/hr). *P. platessa* was also the most abundant species found within the wind farm (724, 121.3/hr), followed by *S. canicula* (123; 20.6/hr) and then *S. solea* (112; 18.8/hr).

*M. merlangus* were recorded in both sampling areas, with greater numbers found within the wind farm (98, 16.4/hr), and the greatest catch rate by station found at station BT07 within the wind farm (116.2/hr).

*M. kitt* were found in both sampling areas, with greater numbers recorded within the wind farm (47, 7.9/hr), and the highest catch rate by station recorded at BT08 within the wind farm (66.1/hr).

*S. cantharus* were found in both sampling areas, with a greater catch rate at the reference stations (3.5/hr). The highest catch rate by station was found at reference station BT19 (17.8/hr).

One *R. undulata* was found at the reference stations (BT19), and 24 were recorded within the wind farm at a total of 11 stations.

Overall, the total catch rate for the fish caught in the commercial beam trawl was greater at the reference stations (394.7/hr) than within the wind farm (310.3/hr).

**Table 4.1 Number of Individuals Caught and Catch Rate by Species and Sampling Area**

| Species                |                              | Number of Individuals Caught |           |       | Catch Rate (Number of Individuals Caught per Hour) |           |
|------------------------|------------------------------|------------------------------|-----------|-------|----------------------------------------------------|-----------|
| Common Name            | Scientific Name              | Reference                    | Wind Farm | Total | Reference                                          | Wind Farm |
| Plaice                 | <i>Pleuronectes platessa</i> | 309                          | 724       | 1,033 | 155.2                                              | 121.3     |
| Bib                    | <i>Trisopterus luscus</i>    | 84                           | 97        | 181   | 42.2                                               | 16.3      |
| Lesser Spotted Dogfish | <i>Scyliorhinus canicula</i> | 58                           | 123       | 181   | 29.1                                               | 20.6      |
| Dover Sole             | <i>Solea solea</i>           | 68                           | 112       | 180   | 34.1                                               | 18.8      |
| Dab                    | <i>Limanda limanda</i>       | 47                           | 108       | 155   | 23.6                                               | 18.1      |
| Lesser Weever          | <i>Echiichthys vipera</i>    | 35                           | 108       | 143   | 17.6                                               | 18.1      |
| Common Dragonet        | <i>Callionymus lyra</i>      | 28                           | 98        | 126   | 14.1                                               | 16.4      |
| Whiting                | <i>Merlangius merlangus</i>  | 25                           | 98        | 123   | 12.6                                               | 16.4      |
| Tub Gurnard            | <i>Trigla lucerna</i>        | 11                           | 52        | 63    | 5.5                                                | 8.7       |
| Lemon Sole             | <i>Microstomus kitt</i>      | 14                           | 47        | 61    | 7.0                                                | 7.9       |

| Species                                            |                               | Number of Individuals Caught |           |       | Catch Rate (Number of Individuals Caught per Hour) |           |
|----------------------------------------------------|-------------------------------|------------------------------|-----------|-------|----------------------------------------------------|-----------|
| Common Name                                        | Scientific Name               | Reference                    | Wind Farm | Total | Reference                                          | Wind Farm |
| Thornback Ray                                      | <i>Raja clavata</i>           | 18                           | 37        | 55    | 9.0                                                | 6.2       |
| Solenette                                          | <i>Buglossidium luteum</i>    | 18                           | 35        | 53    | 9.0                                                | 5.9       |
| Starry Smoothhound                                 | <i>Mustelus asterias</i>      | 9                            | 41        | 50    | 4.5                                                | 6.9       |
| Poor Cod                                           | <i>Trisopterus minutus</i>    | 11                           | 34        | 45    | 5.5                                                | 5.7       |
| Scaldfish                                          | <i>Arnoglossus laterna</i>    | 18                           | 23        | 41    | 9.0                                                | 3.9       |
| Spotted Ray                                        | <i>Raja montagui</i>          | 9                            | 17        | 26    | 4.5                                                | 2.8       |
| Undulate Ray                                       | <i>Raja undulata</i>          | 1                            | 24        | 25    | 0.5                                                | 4.0       |
| Pogge                                              | <i>Agonus cataphractus</i>    | 8                            | 11        | 19    | 4.0                                                | 1.8       |
| Black Sea Bream                                    | <i>Spondylusoma cantharus</i> | 7                            | 9         | 16    | 3.5                                                | 1.5       |
| Brill                                              | <i>Scophthalmus rhombus</i>   | 2                            | 12        | 14    | 1.0                                                | 2.0       |
| Flounder                                           | <i>Platichthys flesus</i>     | 0                            | 10        | 10    | 0.0                                                | 1.7       |
| Common Blenny                                      | <i>Lipophrys pholis</i>       | 0                            | 4         | 4     | 0.0                                                | 0.7       |
| Cuckoo Ray                                         | <i>Raja naevus</i>            | 0                            | 4         | 4     | 0.0                                                | 0.7       |
| Blonde Ray                                         | <i>Raja brachyura</i>         | 1                            | 2         | 3     | 0.5                                                | 0.3       |
| Cuckoo Wrasse                                      | <i>Labrus mixtus</i>          | 1                            | 2         | 3     | 0.5                                                | 0.3       |
| John Dory                                          | <i>Zeus faber</i>             | 0                            | 3         | 3     | 0.0                                                | 0.5       |
| Anglerfish                                         | <i>Lophius piscatorius</i>    | 0                            | 3         | 3     | 0.0                                                | 0.5       |
| Sea Bass                                           | <i>Dicentrarchus labrax</i>   | 1                            | 2         | 3     | 0.5                                                | 0.3       |
| Turbot                                             | <i>Psetta maxima</i>          | 1                            | 2         | 3     | 0.5                                                | 0.3       |
| Corkwing Wrasse                                    | <i>Crenilabrus melops</i>     | 0                            | 2         | 2     | 0.0                                                | 0.3       |
| Red Mullet                                         | <i>Mullus surmuletus</i>      | 1                            | 1         | 2     | 0.5                                                | 0.2       |
| Greater Pipefish                                   | <i>Syngnathus acus</i>        | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Greater Sandeel                                    | <i>Hyperoplus lanceolatus</i> | 1                            | 0         | 1     | 0.5                                                | 0.0       |
| Herring                                            | <i>Clupea harengus</i>        | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Red Gurnard                                        | <i>Aspitrigla cuculus</i>     | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Scale Rayed Wrasse                                 | <i>Acantholabrus palloni</i>  | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Thickback Sole                                     | <i>Microchirus variegatus</i> | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Topknot                                            | <i>Zeugopterus punctatus</i>  | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Viviparous Blenny                                  | <i>Zoarces viviparus</i>      | 0                            | 1         | 1     | 0.0                                                | 0.2       |
| Total Number of Individuals                        |                               | 786                          | 1,852     | 2,638 |                                                    |           |
| Catch Rate (Number of Individuals Caught per Hour) |                               | 394.7                        | 310.3     | 331.4 |                                                    |           |
| Total Number of Species                            |                               | 26                           | 38        | 39    |                                                    |           |

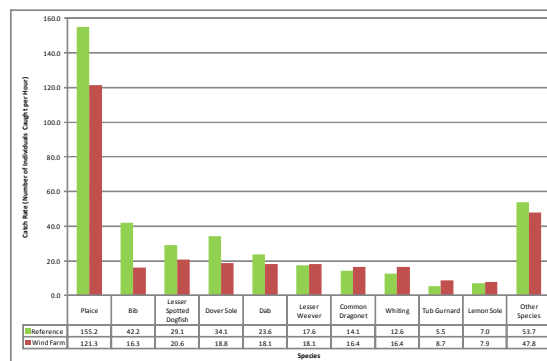


Figure 4.1 Catch Rate by Species and Sampling Area

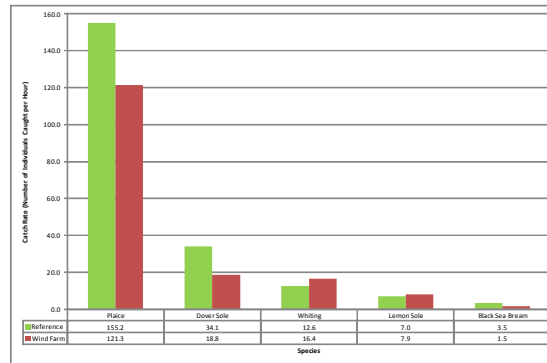


Figure 4.2 Catch Rate by Species and Sampling Area for the Target Species

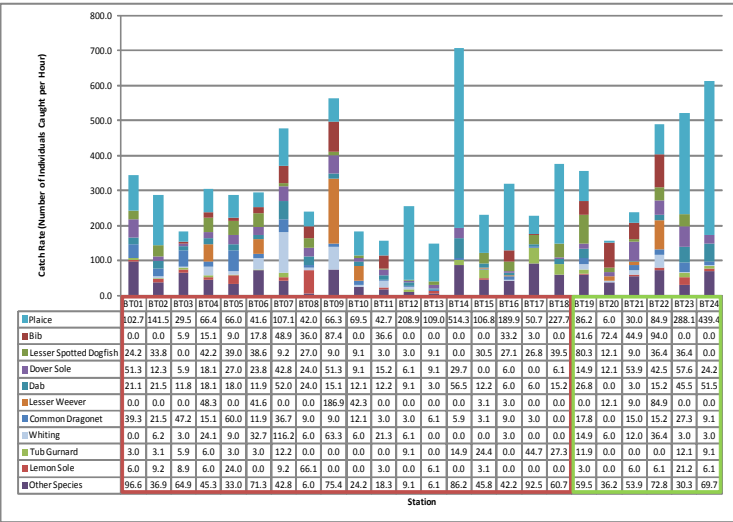


Figure 4.3 Catch Rate by Species and Station

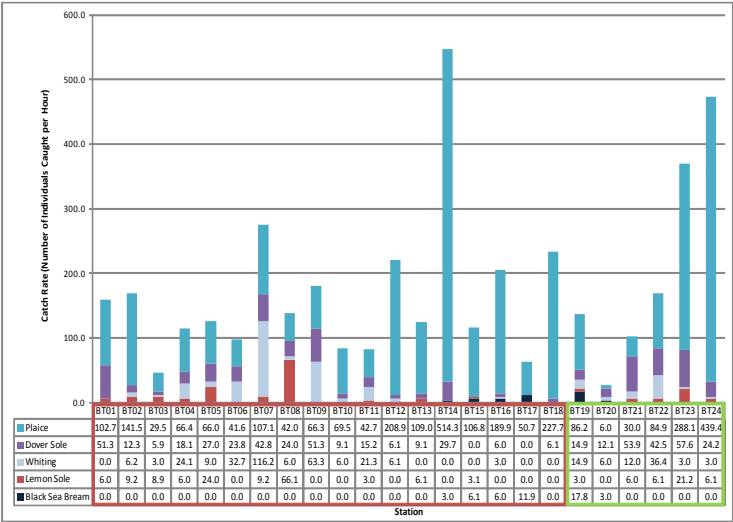


Figure 4.4 Catch Rate by Species and Station for the Target Species

## 4.2 Length Distribution

The average length (cm) by sampling area (reference and wind farm), and length range by species is given in Table 4.2 below. In addition, the length and wing-width range for skates and rays are given overleaf in Table 4.3. It should be noted that lesser weever (*Echiichthys vipera*) are poisonous and are not measured as a safety precaution, and as such they are omitted from Table 4.2 below.

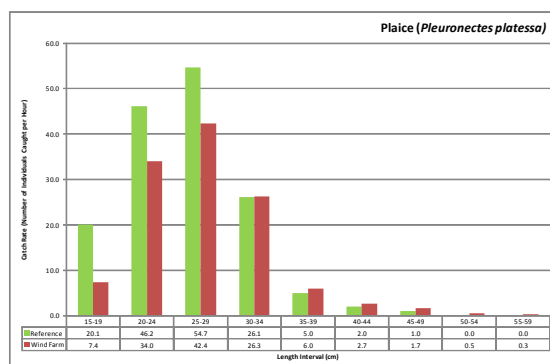
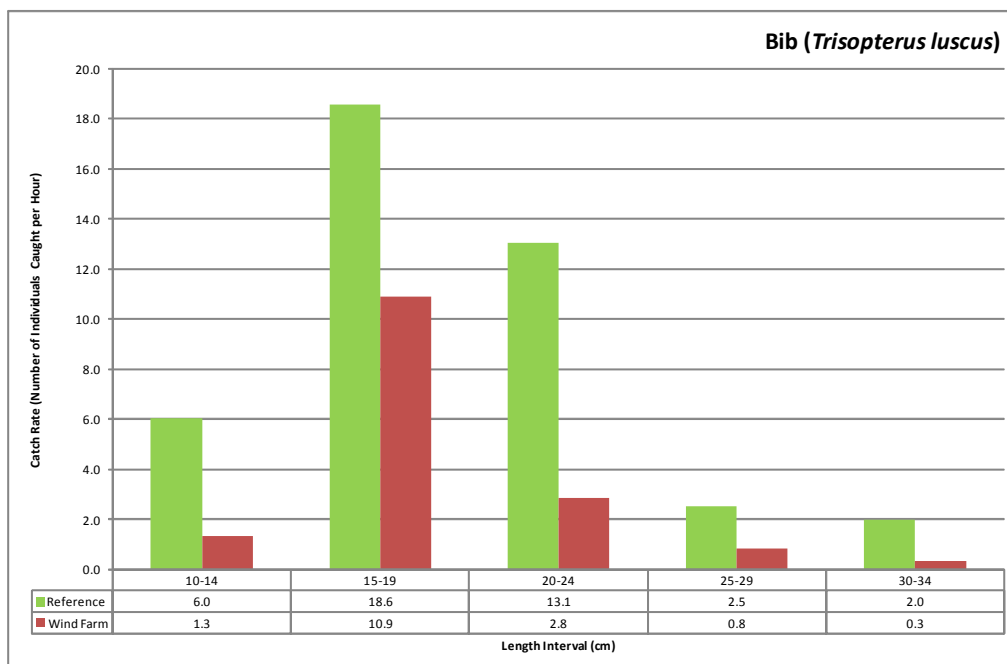
The length distributions for the most abundant species caught (>150 individuals), expressed as the catch rate (number of individuals caught per hour) by length (cm) and by sampling area are shown in Figure 4.5 to Figure 4.9. In addition, the length distributions for *M. merlangus*, *M. kitt* and *S. cantharus* are given in Figure 4.10 to Figure 4.12. The wing-width distribution of *R. undulata* is shown Figure 4.13.

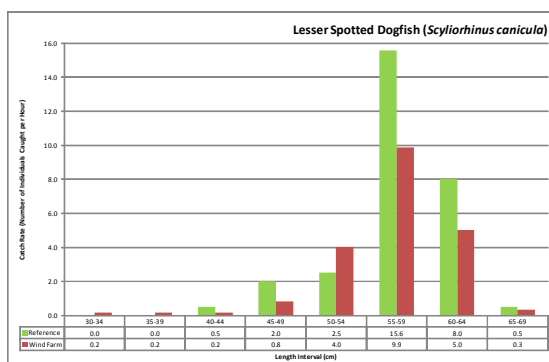
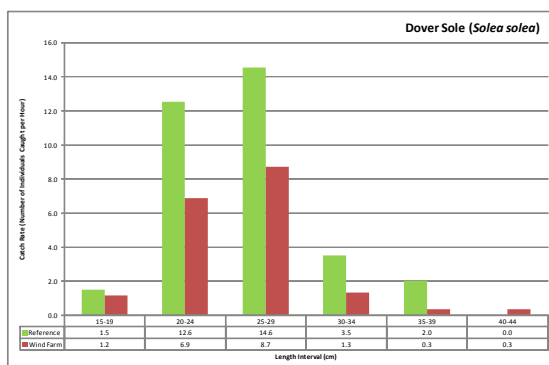
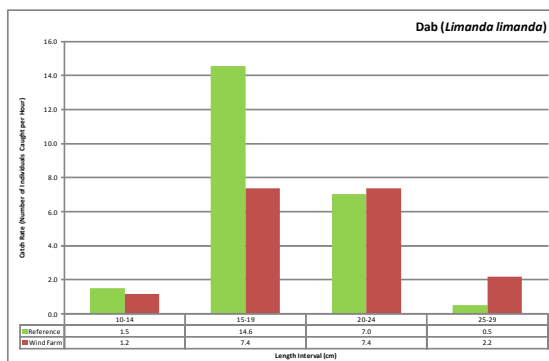
**Table 4.2 Average Length and Length Range by Species and Sampling Area**

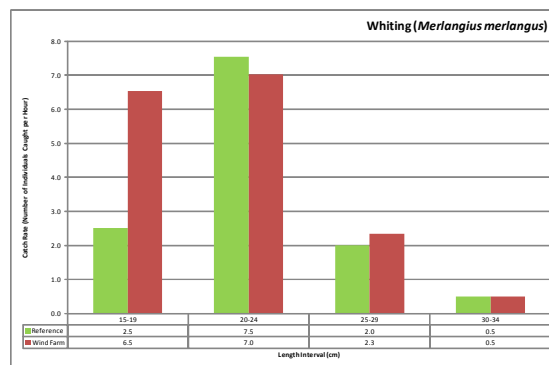
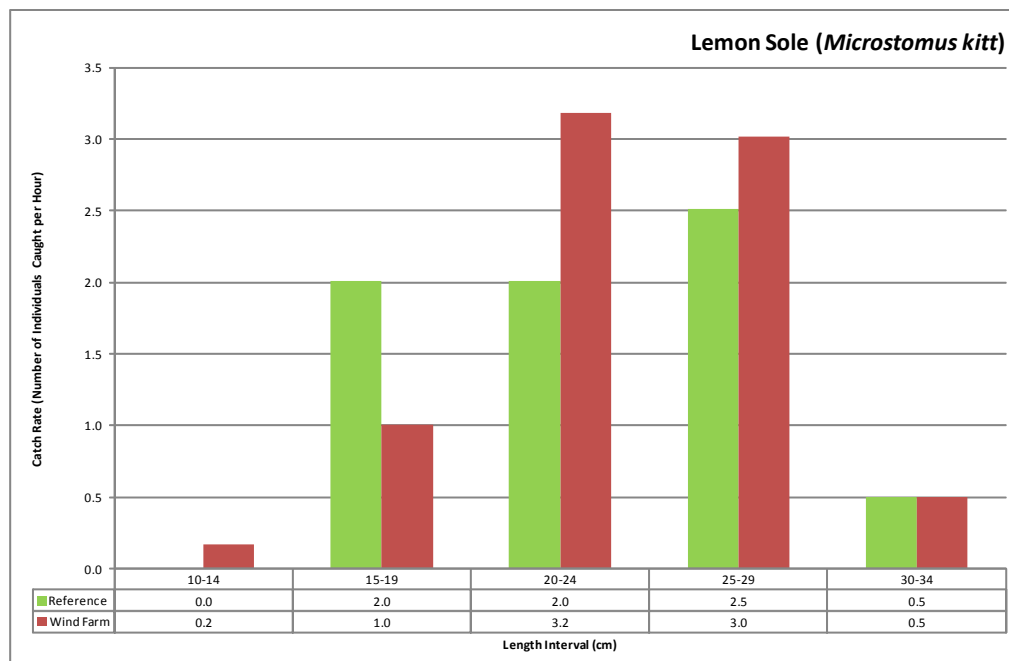
| Species                |                               | Average Length (cm) |           | Length Range (cm) |      |
|------------------------|-------------------------------|---------------------|-----------|-------------------|------|
| Common Name            | Scientific Name               | Reference           | Wind Farm | Min.              | Max. |
| Anglerfish             | <i>Lophius piscatorius</i>    | -                   | 32.0      | 26.0              | 36.0 |
| Bib                    | <i>Trisopterus luscus</i>     | 19.2                | 18.2      | 11.0              | 34.0 |
| Black Sea Bream        | <i>Spondylusoma cantharus</i> | 15.4                | 16.6      | 9.0               | 30.0 |
| Brill                  | <i>Scophthalmus rhombus</i>   | 45.0                | 38.8      | 23.0              | 55.0 |
| Common Blenny          | <i>Lipophrys pholis</i>       | -                   | 10.0      | 9.0               | 11.0 |
| Common Dragonet        | <i>Callionymus lyra</i>       | 20.6                | 20.2      | 9.0               | 28.0 |
| Corkwing Wrasse        | <i>Crenilabrus melops</i>     | -                   | 13.0      | 12.0              | 14.0 |
| Cuckoo Wrasse          | <i>Labrus mixtus</i>          | 18.0                | 18.5      | 17.0              | 20.0 |
| Dab                    | <i>Limanda limanda</i>        | 18.4                | 19.9      | 11.0              | 29.0 |
| Dover Sole             | <i>Solea solea</i>            | 26.4                | 25.3      | 17.0              | 40.0 |
| Flounder               | <i>Platichthys flesus</i>     | -                   | 28.5      | 24.0              | 34.0 |
| Greater Pipefish       | <i>Syngnathus acus</i>        | -                   | 39.0      | 39.0              | 39.0 |
| Greater Sandeel        | <i>Hyperoplus lanceolatus</i> | 28.0                | -         | 28.0              | 28.0 |
| Herring                | <i>Clupea harengus</i>        | -                   | 11.0      | 11.0              | 11.0 |
| John Dory              | <i>Zeus faber</i>             | -                   | 20.7      | 16.0              | 23.0 |
| Lemon Sole             | <i>Microstomus kitt</i>       | 22.9                | 23.6      | 12.0              | 32.0 |
| Lesser Spotted Dogfish | <i>Scyliorhinus canicula</i>  | 57.0                | 56.6      | 30.0              | 68.0 |
| Plaice                 | <i>Pleuronectes platessa</i>  | 25.8                | 27.4      | 15.0              | 58.0 |
| Pogge                  | <i>Agonus cataphractus</i>    | 12.0                | 11.5      | 10.0              | 15.0 |
| Poor Cod               | <i>Trisopterus minutus</i>    | 14.6                | 12.7      | 10.0              | 19.0 |
| Red Gurnard            | <i>Aspitrigla cuculus</i>     | -                   | 33.0      | 33.0              | 33.0 |
| Red Mullet             | <i>Mullus surmuletus</i>      | 19.0                | 19.0      | 19.0              | 19.0 |
| Scaldfish              | <i>Arnoglossus laterna</i>    | 13.4                | 14.4      | 8.0               | 20.0 |
| Scale Rayed Wrasse     | <i>Acanthalabrus palloni</i>  | -                   | 11.0      | 11.0              | 11.0 |
| Sea Bass               | <i>Dicentrarchus labrax</i>   | 53.0                | 32.0      | 31.0              | 53.0 |
| Solenette              | <i>Buglossidium luteum</i>    | 9.6                 | 9.9       | 7.0               | 13.0 |
| Starry Smoothhound     | <i>Mustelus asterias</i>      | 43.4                | 49.5      | 34.0              | 78.0 |
| Thickback Sole         | <i>Microchirus variegatus</i> | -                   | 14.0      | 14.0              | 14.0 |
| Topknot                | <i>Zeugopterus punctatus</i>  | -                   | 12.0      | 12.0              | 12.0 |
| Tub Gurnard            | <i>Trigla lucerna</i>         | 26.4                | 25.9      | 16.0              | 35.0 |
| Turbot                 | <i>Psetta maxima</i>          | 42.0                | 39.5      | 39.0              | 42.0 |
| Viviparous Blenny      | <i>Zoarces viviparus</i>      | -                   | 18.0      | 18.0              | 18.0 |
| Whiting                | <i>Merlangius merlangus</i>   | 22.0                | 21.2      | 15.0              | 30.0 |

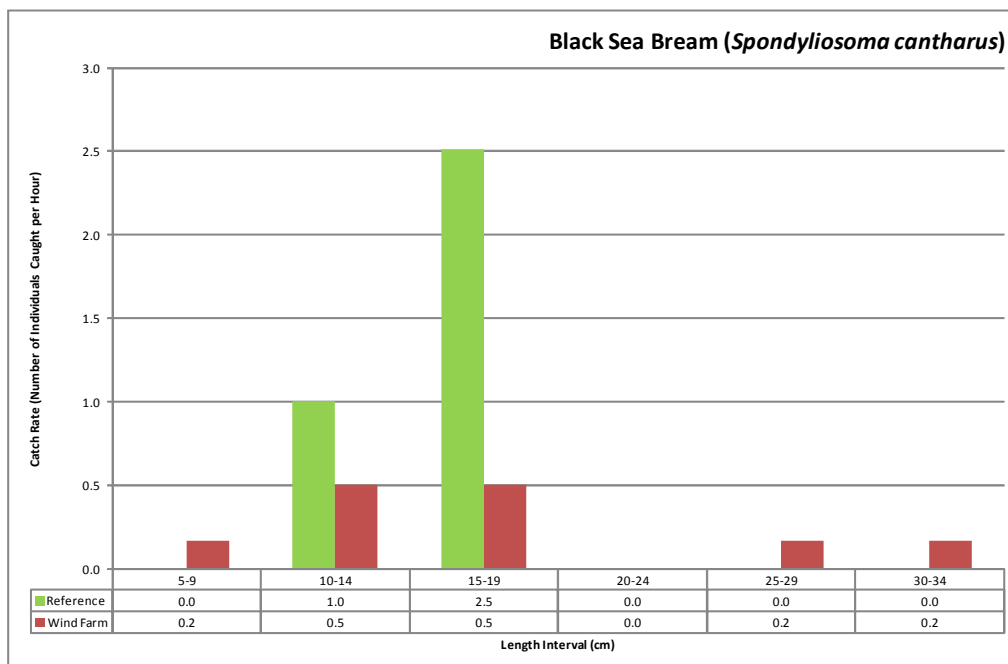
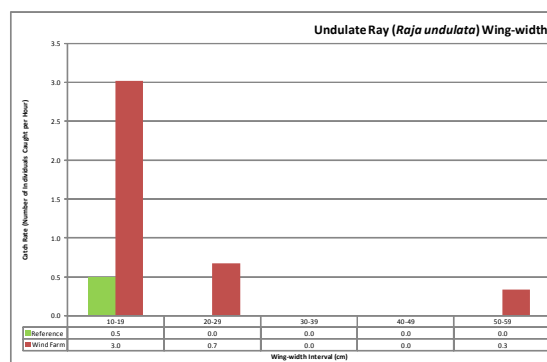
Table 4.3 Average Length, Length Range and Wing-width Range for Ray Species and Sampling Area

| Species       |                       | Average Length (cm) |           | Length Range (cm) |      | Wing-width Range (cm) |      |
|---------------|-----------------------|---------------------|-----------|-------------------|------|-----------------------|------|
| Common Name   | Scientific Name       | Reference           | Wind Farm | Min.              | Max. | Min.                  | Max. |
| Blonde Ray    | <i>Raja brachyura</i> | 40.0                | 38.0      | 28.0              | 48.0 | 19.0                  | 31.0 |
| Cuckoo Ray    | <i>Raja naevus</i>    | 0.0                 | 35.0      | 32.0              | 37.0 | 21.0                  | 25.0 |
| Spotted Ray   | <i>Raja montagui</i>  | 33.2                | 27.3      | 13.0              | 65.0 | 8.0                   | 48.0 |
| Thornback Ray | <i>Raja clavata</i>   | 35.7                | 30.7      | 11.0              | 67.0 | 9.0                   | 47.0 |
| Undulate Ray  | <i>Raja undulata</i>  | 26.0                | 31.5      | 17.0              | 93.0 | 11.0                  | 58.0 |

Figure 4.5 Plaice (*P. platessa*) Length DistributionFigure 4.6 Bib (*T. luscus*) Length Distribution

Figure 4.7 Lesser Spotted Dogfish (*S. canicula*) Length DistributionFigure 4.8 Dover Sole (*S. solea*) Length DistributionFigure 4.9 Dab (*L. limanda*) Length Distribution

Figure 4.10 Whiting (*M. merlangus*) Length DistributionFigure 4.11 Lemon Sole (*M. kitt*) Length Distribution

Figure 4.12 Black Sea Bream (*S. cantharus*) Length DistributionFigure 4.13 Undulate Ray (*R. undulata*) Wing-width Distribution

### 4.3 Minimum Landing Sizes

Minimum landing sizes (MLS) for fish and shellfish species are set by the EC under Regulation No. 850/98 (Annex XII) and by the local Inshore Fisheries and Conservation Authorities in waters within their jurisdictions. The Rampion offshore wind farm is located within the boundaries of the Sussex Inshore Fisheries and Conservation Authority (S-IFCA) and therefore the MLS's for fish and shellfish species set by this authority apply.

The five fish species caught for which a MLS has been set are given in Table 4.4, along with their presence or absence at the reference stations and within the wind farm.

**Table 4.4 Minimum Landing Sizes (MLS) by Species**

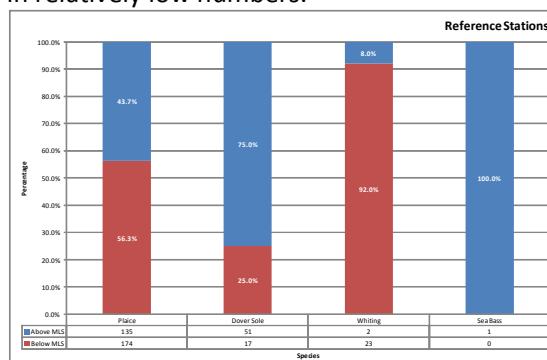
| Species     |                              | MLS (cm) | Presence  |           |
|-------------|------------------------------|----------|-----------|-----------|
| Common Name | Scientific Name              | S-IFCA   | Reference | Wind Farm |
| Dover Sole  | <i>Solea solea</i>           | 24       | ✓         | ✓         |
| Herring     | <i>Clupea harengus</i>       | 20       | -         | ✓         |
| Plaice      | <i>Pleuronectes platessa</i> | 27       | ✓         | ✓         |
| Sea Bass    | <i>Dicentrarchus labrax</i>  | 36       | ✓         | ✓         |
| Whiting     | <i>Merlangius merlangus</i>  | 27       | ✓         | ✓         |

Figure 4.14 and Figure 4.15 illustrate the percentage of individuals by species caught above and below their MLS at the reference stations and within the wind farm, respectively.

The *P. platessa* caught within the wind farm and at the reference stations were approximately evenly divided below and above the MLS.

Most of the *S. solea* caught at the reference stations (75.0%) and within the wind farm (72.3%) were above the MLS; whereas most of the *M. merlangus* caught in both sampling areas (92.0% and 91.8% respectively) were below the MLS.

All other species were caught in relatively low numbers.



**Figure 4.14 Percentage of Individuals Caught Below and Above their Set MLS by Species at the Reference Stations[LS2]**

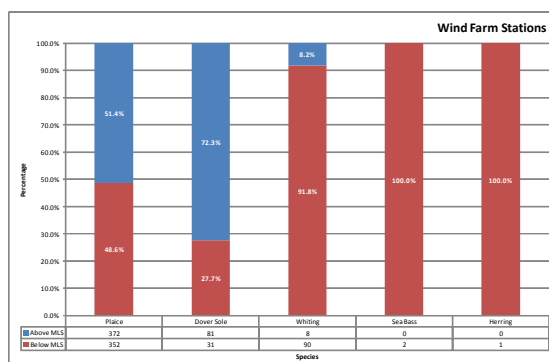


Figure 4.15 Percentage of Individuals Caught Below and Above their Set MLS by Species within the Wind Farm

#### 4.4 Sex Percentage

The sex percentages for the five target species caught during the survey are illustrated in Figure 4.16 and Figure 4.17 for reference and wind farm stations, respectively. It should be noted that Cefas were unable to confidently determine the sex of a number of individuals, and as such they have been categorised as 'unsexed'.

At the reference stations the sex percentage of *P. platessa* and *M. kitt* was approximately even, whereas within the wind farm a greater proportion was female (64.4% and 57.4% respectively).

The greatest numbers of *S. solea* and *M. merlangus* caught at the reference stations (63.2% and 48.0% respectively) and within the wind farm (67.9% and 44.9% respectively) were female.

One male *S. cantharus* was identified at the reference stations and three females were identified within the wind farm.

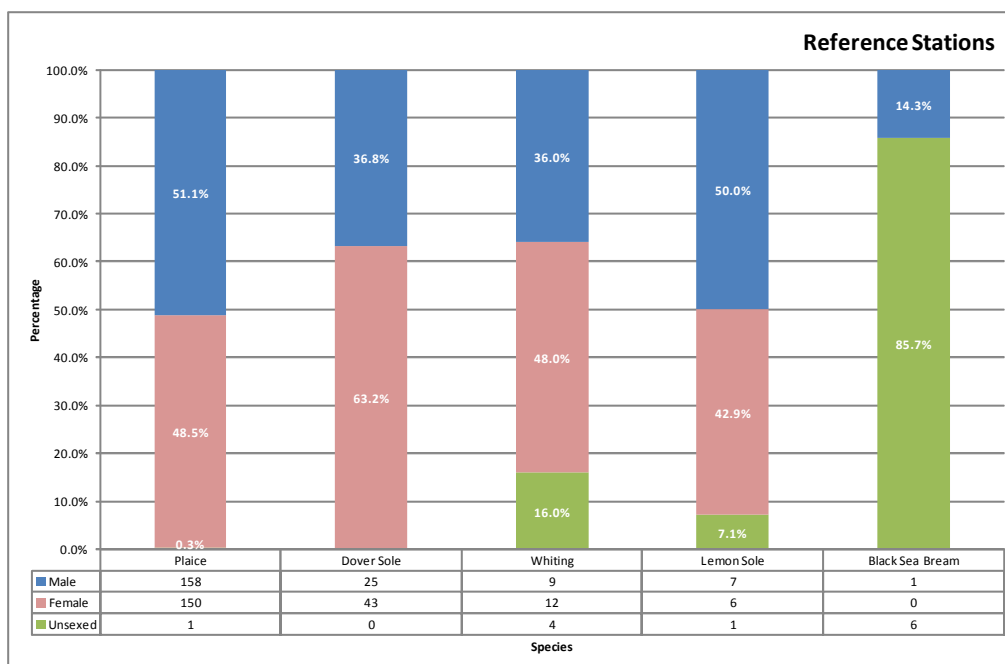


Figure 4.16 Sex Percentage by Species caught at the Reference Stations

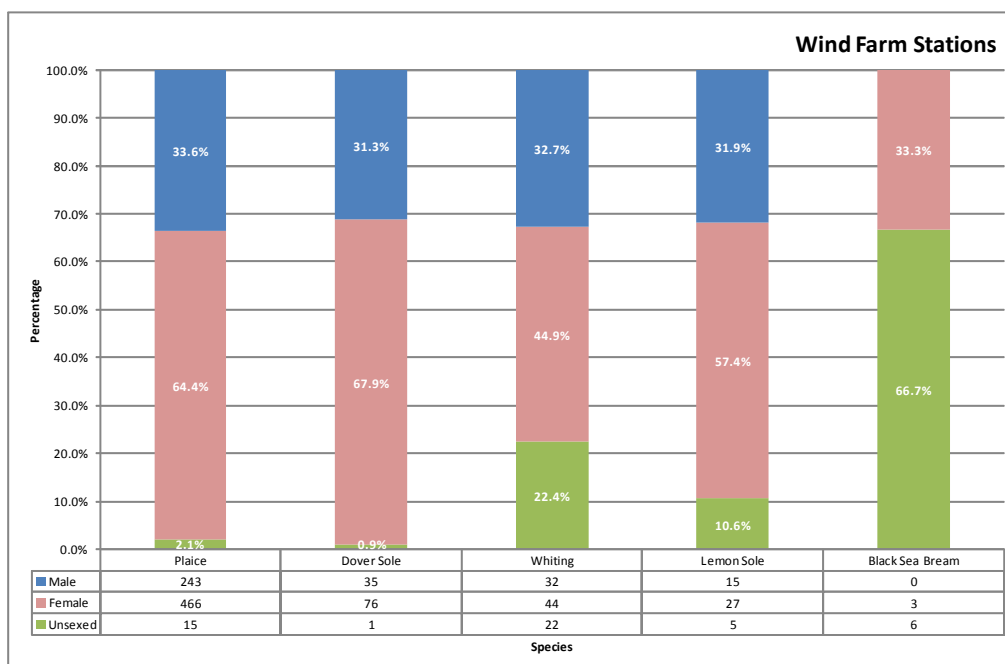


Figure 4.17 Sex Percentage by Species caught at stations within the Wind Farm

#### 4.5 Spawning Condition

The sex, spawning condition and length range of the five target species caught are given in Table 4.5 to Table 4.9. Where a stage of maturity was not identified it has not been included in the following tables. It should be noted that Cefas were unable to confidently determine the sex of a number of individuals, and as such they have been categorised as 'unsexed'.

The greatest proportion of the *P. platessa* caught at both the reference stations (86.7%) and within the wind farm (84.9%) was represented by spent individuals.

The highest proportion of the *S. solea* caught at the reference stations (48.5%) and within the wind farm (54.1%) were maturing females.

At the reference stations (80.0%) and within the wind farm (75.0%) the majority of the *M. merlangus* caught were immature individuals.

Most of the *M. kitt* caught at the reference stations were maturing individuals (69.2%), whereas within the wind farm the highest proportion was represented by spent individuals (54.8%).

Of the *S. cantharus* identified at the reference stations, six were immature, and one was a maturing male. Within the wind farm, seven immature individuals and two maturing female *S. cantharus* were identified.

Table 4.5 Plaice (*P. platessa*) Spawning Condition

| Plaice |          |               |           |       |                  |                   |      |
|--------|----------|---------------|-----------|-------|------------------|-------------------|------|
| Sex    | Maturity | Sampling Area |           | Total | % of Total Catch | Length Range (cm) |      |
|        |          | Reference     | Wind Farm |       |                  | Min.              | Max. |
| Female | Immature | 24            | 52        | 76    | 7.5%             | 17                | 25   |
|        | Maturing | 15            | 48        | 63    | 6.2%             | 20                | 33   |
|        | Spent    | 111           | 366       | 477   | 46.9%            | 17                | 58   |
| Male   | Maturing | 2             | 7         | 9     | 0.9%             | 15                | 29   |
|        | Spent    | 156           | 236       | 392   | 38.5%            | 16                | 38   |

Table 4.6 Dover Sole (*S. solea*) Spawning Condition

| Dover Sole |          |               |           |       |                  |                   |      |
|------------|----------|---------------|-----------|-------|------------------|-------------------|------|
| Sex        | Maturity | Sampling Area |           | Total | % of Total Catch | Length Range (cm) |      |
|            |          | Reference     | Wind Farm |       |                  | Min.              | Max. |
| Female     | Immature | 2             | 6         | 8     | 4.5%             | 18                | 23   |
|            | Maturing | 33            | 60        | 93    | 52.0%            | 18                | 40   |
|            | Spent    | 8             | 10        | 18    | 10.1%            | 22                | 39   |
| Male       | Maturing | 0             | 4         | 4     | 2.2%             | 17                | 31   |
|            | Spent    | 25            | 31        | 56    | 31.3%            | 17                | 30   |

Table 4.7 Whiting (*M. merlangus*) Spawning Condition

| Whiting |          |               |           |       |                  |                   |      |
|---------|----------|---------------|-----------|-------|------------------|-------------------|------|
| Sex     | Maturity | Sampling Area |           | Total | % of Total Catch | Length Range (cm) |      |
|         |          | Reference     | Wind Farm |       |                  | Min.              | Max. |
| Female  | Immature | 9             | 27        | 36    | 29.8%            | 15                | 26   |
|         | Maturing | 3             | 8         | 11    | 9.1%             | 20                | 28   |
|         | Hyaline  | 0             | 5         | 5     | 4.1%             | 23                | 30   |
|         | Spent    | 0             | 4         | 4     | 3.3%             | 26                | 30   |
| Male    | Immature | 7             | 25        | 32    | 26.4%            | 16                | 26   |
|         | Maturing | 0             | 2         | 2     | 1.7%             | 19                | 20   |
|         | Spent    | 2             | 5         | 7     | 5.8%             | 23                | 30   |
| Unsexed | Immature | 4             | 20        | 24    | 19.8%            | 15                | 23   |

Table 4.8 Lemon Sole (*M. kitt*) Spawning Condition

| Lemon Sole |          |               |           |       |                  |                   |      |
|------------|----------|---------------|-----------|-------|------------------|-------------------|------|
| Sex        | Maturity | Sampling Area |           | Total | % of Total Catch | Length Range (cm) |      |
|            |          | Reference     | Wind Farm |       |                  | Min.              | Max. |
| Female     | Immature | 0             | 1         | 1     | 1.8%             | 12                | 12   |
|            | Maturing | 4             | 10        | 14    | 25.5%            | 16                | 30   |
|            | Spent    | 2             | 16        | 18    | 32.7%            | 18                | 32   |
| Male       | Maturing | 5             | 8         | 13    | 23.6%            | 18                | 31   |
|            | Spent    | 2             | 7         | 9     | 16.4%            | 18                | 26   |

Table 4.9 Black Sea Bream (*S. cantharus*) Spawning Condition

| Black Sea Bream |          |               |           |       |                  |                   |      |
|-----------------|----------|---------------|-----------|-------|------------------|-------------------|------|
| Sex             | Maturity | Sampling Area |           | Total | % of Total Catch | Length Range (cm) |      |
|                 |          | Reference     | Wind Farm |       |                  | Min.              | Max. |
| Female          | Immature | 0             | 1         | 1     | 6.3%             | 17                | 17   |
|                 | Maturing | 0             | 2         | 2     | 12.5%            | 28                | 30   |
| Male            | Maturing | 1             | 0         | 1     | 6.3%             | 16                | 16   |
| Unsexed         | Immature | 6             | 6         | 12    | 75.0%            | 9                 | 19   |

## 5.0 Commercial Beam Trawl Results - Shellfish

### 5.1 Abundance and Catch Rates

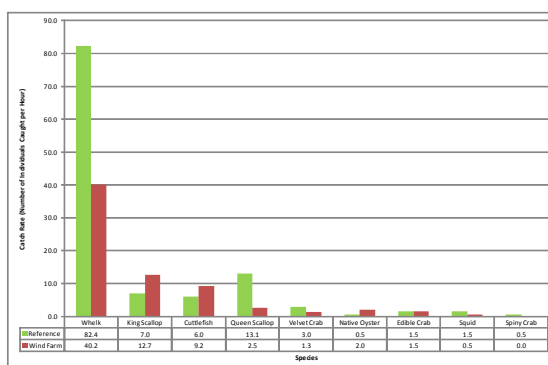
The total number of individuals caught and the catch rate (number of individuals caught per hour) by species and sampling area are given in Table 5.1 and illustrated in Figure 5.1 overleaf.

A total of nine commercial shellfish species were caught; eight within the wind farm and nine species at the reference stations. Overall, whelk (*Buccinum undatum*) was the most abundant species caught, followed by king scallop (*Pecten maximus*) and then cuttlefish (*Sepia officinalis*).

The total catch rate was higher at the reference stations (115.5/hr) than within the wind farm (70.0/hr).

**Table 5.1 Number of Individuals Caught and Catch Rate by Species and Sampling Area for Shellfish Species**

| Species                                                   |                                | Number of Individuals Caught |             |             | Catch Rate (Number of Individuals Caught per Hour) |           |
|-----------------------------------------------------------|--------------------------------|------------------------------|-------------|-------------|----------------------------------------------------|-----------|
| Common Name                                               | Scientific Name                | Reference                    | Wind Farm   | Total       | Reference                                          | Wind Farm |
| Whelk                                                     | <i>Buccinum undatum</i>        | 164                          | 240         | 404         | 82.4                                               | 40.2      |
| King Scallop                                              | <i>Pecten maximus</i>          | 14                           | 76          | 90          | 7.0                                                | 12.7      |
| Cuttlefish                                                | <i>Sepia officinalis</i>       | 12                           | 55          | 67          | 6.0                                                | 9.2       |
| Queen Scallop                                             | <i>Aequipecten opercularis</i> | 26                           | 15          | 41          | 13.1                                               | 2.5       |
| Velvet Crab                                               | <i>Necora puber</i>            | 6                            | 8           | 14          | 3.0                                                | 1.3       |
| Native Oyster                                             | <i>Ostrea edulis</i>           | 1                            | 12          | 13          | 0.5                                                | 2.0       |
| Edible Crab                                               | <i>Cancer pagurus</i>          | 3                            | 9           | 12          | 1.5                                                | 1.5       |
| Squid                                                     | <i>Loligo sp.</i>              | 3                            | 3           | 6           | 1.5                                                | 0.5       |
| Spiny Crab                                                | <i>Maja squinado</i>           | 1                            | 0           | 1           | 0.5                                                | 0.0       |
| <b>Total Number of Individuals</b>                        |                                | <b>230</b>                   | <b>418</b>  | <b>648</b>  |                                                    |           |
| <b>Catch Rate (Number of Individuals Caught per Hour)</b> |                                | <b>115.5</b>                 | <b>70.0</b> | <b>81.4</b> |                                                    |           |
| <b>Total Number of Species</b>                            |                                | <b>9</b>                     | <b>8</b>    | <b>9</b>    |                                                    |           |



**Figure 5.1 Catch Rate by Species and Sampling Area**

### 5.2 Average Length

The average length (cm) by sampling area (reference and wind farm) and length range by species is given in Table 5.2 below.

Table 5.2 Average Length/Width/Height by Species and Sampling Area

| Species          |                                | Average Length/Width/Height (cm) |           | Length/Width/Height Range (cm) |      |
|------------------|--------------------------------|----------------------------------|-----------|--------------------------------|------|
| Common Name      | Scientific Name                | Reference                        | Wind Farm | Min.                           | Max. |
| Cuttlefish*      | <i>Sepia officinalis</i>       | 20.7                             | 21.4      | 7.5                            | 32.0 |
| Edible Crab**    | <i>Cancer pagurus</i>          | 13.6                             | 14.8      | 11.0                           | 21.0 |
| King Scallop***  | <i>Pecten maximus</i>          | 12.5                             | 12.1      | 8.5                            | 14.7 |
| Squid*           | <i>Loligo sp.</i>              | 22.7                             | 7.4       | 5.6                            | 37.0 |
| Native Oyster*** | <i>Ostrea edulis</i>           | 12.3                             | 12.4      | 8.5                            | 16.5 |
| Queen Scallop*** | <i>Aequipecten opercularis</i> | 5.2                              | 4.7       | 3.8                            | 6.0  |
| Spiny Crab****   | <i>Maja squinado</i>           | 9.5                              | 0.0       | 9.5                            | 9.5  |
| Velvet Crab**    | <i>Necora puber</i>            | 0.0                              | 2.0       | 2.0                            | 2.0  |
| Whelk*****       | <i>Buccinum undatum</i>        | 7.2                              | 7.4       | 4.0                            | 11.0 |

\*mantle length, \*\*carapace width, \*\*\*shell width, \*\*\*\*carapace length, \*\*\*\*\*shell height

## 6.0 Appendix

### 6.1 Appendix 1 - Health and Safety

#### 6.1.1 Personnel

Brown and May Marine (BMM) staff protocol followed the standard health and safety protocol outlined in the BMM “Offshore Operational Procedures for Surveys using Commercial Fishing Vessels”.

All BMM staff have completed a Sea Survival course approved by the Maritime and Coastguard Agency, meeting the requirements laid down in: **STCW 95 Regulation VI/1 para 2.1.1 and STCW Code section A-VI/1** before boarding any vessel conducting works for the company. Employees are also required to have valid medical certificates (ENG1 or ML5), Seafish Basic First Aid, Seafish Fire Fighting and Prevention and Seafish Safety Awareness before participating in offshore works.

#### 6.1.2 Vessel Induction

Before boarding the survey team were shown how to safely board and disembark the vessel. Prior to departure the skipper briefed the BMM staff on the whereabouts of the safety equipment, including the life raft, emergency flares and fire extinguishers, and also the location of the emergency muster point. The safe deck areas, man-overboard procedures and emergency alarms were also discussed. The survey team were warned about the possible hazards, such as slippery decks and obstructions whilst aboard. The BMM staff were briefed about trawling operations and the need to keep clear of all winches when operational. All hazards were assessed prior to the survey in the BMM health and safety risk assessment.

#### 6.1.3 Daily Safety Checks

The condition of the life jackets, EPIRB's, and life raft were inspected daily. Also checked were the survey team working areas, including the wheelhouse to ensure these areas were clear of hazards such as clutter and obstructions.

#### 6.1.4 Post Trip Survey review

Upon completion of the survey a “Post Trip Survey Review” was filed, see Table 6.1 overleaf.

Table 6.1 Post Trip Survey Review

| <b>Project:</b> Rampion Offshore Wind Farm                  | <b>Vessel:</b> Sara Lena         |                                         |
|-------------------------------------------------------------|----------------------------------|-----------------------------------------|
| <b>Surveyors:</b> Jonathan Keer, Jake Laws                  | <b>Skipper:</b> Mark Webber      |                                         |
| <b>Survey Area:</b> English Channel                         | <b>Total Time at Sea:</b> 3 Days |                                         |
| <b>Dates at Sea:</b> 24/04/2012 and 27/04/2012 – 28/04/2012 |                                  |                                         |
|                                                             | Comments                         | Actions                                 |
| <b>Did vessel comply with pre trip safety audits?</b>       | Yes – Audited on 23/04/2012      | N/A                                     |
| <b>Skipper and crew attitude to safety?</b>                 | Very Good                        | Crew wore lifejackets for entire survey |
| <b>Vessel machinery failures?</b>                           | None                             | N/A                                     |
| <b>Safety equipment failures?</b>                           | None                             | N/A                                     |
| <b>Accidents?</b>                                           | None                             | N/A                                     |
| <b>Injuries?</b>                                            | None                             | N/A                                     |