



Beatrice Offshore Wind Farm

Pre-construction Baseline Sandeel Survey – Technical Report

March 2014


Beatrice
Offshore Windfarm Ltd

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Beatrice Offshore Wind Farm

Sandeel Survey Results – Technical Report

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1 Executive Summary

This pre-construction Monitoring Report has been prepared by Beatrice Offshore Windfarm Ltd (BOWL) as part of the Project Environmental Monitoring Programme (PEMP) required as part of the Section 36 Consent. This report describes the pre-construction element of condition 27 of the PEMP in relation to sandeel and satisfies condition 36 of BOWL's Section 36 consent.

Sandeels are considered to be one of the most abundant fish species in the North Sea and are an important component of the food web as a source of prey for many fish, seabirds and marine mammal species.

Sandeel distribution is highly patchy and varies in relation to sediment type. Sandeels require a specific substratum, favouring seabed habitats containing a high proportion of coarse sand (particle size ≥ 0.25 to $< 2\text{mm}$) and low silt (particle size $< 0.63\mu\text{m}$) content. They are considered to be rare in sediments where the silt content is greater than 4% and absent where the silt content is greater than 10%.

Sandeels spend most of the year buried in the sediment and only emerge into the water column briefly in winter for spawning and for an extended feeding period in spring and summer. Spawning principally takes place in December and January. After spawning they remain buried in sand until April.

The survey methodology was designed in consultation with Marine Scotland Science (MSS) and Marine Scotland Licensing and Operations Team (MS-LOT). In line with best practise and in agreement with MSS, the survey was undertaken during night hours from the 27th February to the 5th March 2014, when the majority of sandeels were expected to be buried in the sediment. A total of 103 stations were sampled, using a modified shellfish dredge (sandeel dredge).

The results of the sandeel survey indicate an overall patchy distribution of sandeels across the BOWL site. A total of 497 sandeels were caught in 82 out of 103 stations in relatively low numbers.

Three species of sandeels (Ammodytidae) were caught during the survey:

- Raitt's sandeel (*Ammodytes marinus*);
- Smooth sandeel (*Gymnammodytes semisquamatus*); and
- Greater sandeel (*Hyperoplus lanceolatus*).

The highest numbers of sandeels were found in dredge samples from the central eastern and southern areas of the site. *A. marinus* was the most abundant species caught, accounting for 77.5% of the total sandeel catch. A total of 111 *G. semisquamatus* and one *H. lanceolatus* were recorded. The greatest number of individuals (36) were recorded at station SD28 (in the central eastern portion of the site).

While sandeels were caught over most of the BOWL site, the relatively low sandeel catches recorded during the survey suggest that there are not areas supporting important sandeel populations in the BOWL site.

2 Introduction

This pre-construction Monitoring Report has been prepared by Beatrice Offshore Windfarm Ltd (BOWL) as part of the Project Environmental Monitoring Programme (PEMP) required as part of the Section 36 Consent.

This report describes the pre-construction element of condition 27 PEMP in relation to sandeel. The completion of this survey also satisfies condition 36 of BOWL's Section 36 consent in that a baseline sandeel survey was undertaken in February and March 2014 prior to commencement of the development. The report complies with the Section 36 conditions and potential marine licence conditions. This report has been written by Brown and May Marine Ltd (BMM).

The following report details the findings of the sandeel survey undertaken between the 27th February and 5th March 2014 within the BOWL development area.

In line with BOWL's Section 36 Consent Marine Scotland Licensing and Operations Team (MS-LOT) in consultation Marine Scotland Science (MSS) requested that BOWL conduct a post-consent / pre-construction sandeel survey to ascertain the distribution of sandeels across the site and to provide additional baseline information (MSS, 2014). The aim of this survey was to establish the abundance and distribution of sandeels within the BOWL development area.

Studies in relation to sandeel abundances and distribution in the North Sea have mainly been undertaken in areas which support seabird colonies, such as the Firth of Forth, and in areas which support important commercial fisheries such as the Dogger Bank. There is little current information, however, available on the distribution and abundance of sandeels in the Moray Firth. Given the paucity of site specific sandeel information within the BOWL site, the developer commissioned a sandeel survey to obtain information on the abundance and distribution of sandeels across the BOWL development area.

The survey methodology (LF000005-REP-060 - BOWL Cod_Sandeel_Survey_Methodology) was submitted to MSS and MS-LOT in January 2014 for consultation and agreement (Pers. com. G. Jones, 29/01/2014). Following consultation with MSS it was agreed that the survey could be undertaken towards the end of February or early March.

A dispensation from MSS, in accordance with the terms of Section 9 of the Sea Fish Conservation Act 1967 and Article 43 of Council Regulation No. 850/98 related to days at sea, was obtained prior to commencement of this survey.

A summary of the Health and Safety performance of the survey is provided in Section 9.1 - Appendix 1.

3 Background Information

Sandeels are considered to be the most abundant fish species in the North Sea. ICES have defined seven sandeel assessment areas (SA) in the North Sea, shown in Figure 3.1. The sandeel population of the Moray Firth is part of assessment area SA 4 (ICES 2010, ICES 2013).

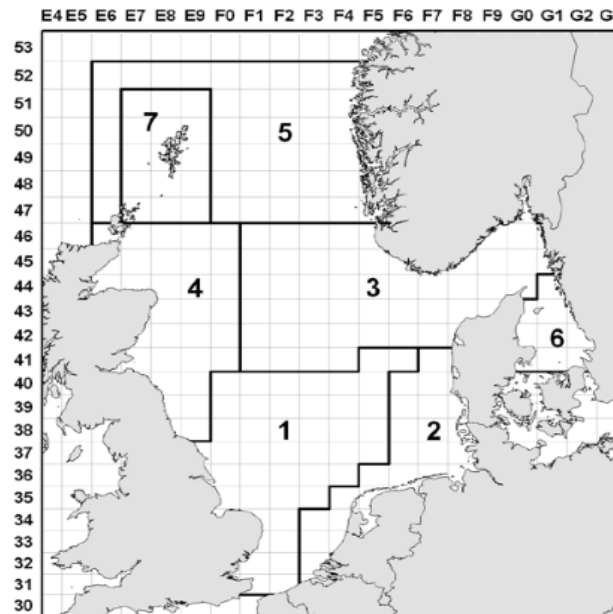


Figure 3.1 Map of ICES sandeel assessment areas (ICES 2013)

There is a seasonal sandeel fishery in the North Sea, which developed in the 1970s with annual landings rapidly increasing to over one million tonnes (t) in 1988. Fishing for sandeel takes place mainly during the summer months, especially throughout May, June and July, and is focused on the Dogger Bank, the Wee Bankie off Scotland, and in the central North Sea. They are taken by demersal and pelagic trawlers using fine-meshed gears with cod-ends of $\leq 16\text{mm}$ (Bell *et al.*, 2004; NSRAC, 2012).

Landings throughout the North Sea remained consistently high until 2002 when reduced total allowable catches (TACs) resulted in lower total annual catches. Landings from SA 4 peaked in 1996 at 162,338 t. There was a significant decrease in landings from SA4 after 2003 with landings of $<1,000$ t recorded between 2006 -2011 (ICES 2013). Due to concern over the potential detrimental effects of the sandeel fishery on seabirds and mammals, there has been a moratorium on sandeel fisheries off the north-eastern UK coast since 2000 (Lynam *et al.* 2013).

Five species of sandeel (Ammodytidae) have been identified in the North Sea: Raitt's sandeel (*Ammodytes marinus*), greater sandeel (*Hyperoplus lanceolatus*), smooth sandeel (*Gymnammodytes semisquamatus*), lesser sandeel (*Ammodytes tobianus*) and Corbin's sandeel (*Hyperoplus immaculatus*). Of these, *A. marinus* is considered to be by far the most abundant species (Heath *et al.* 2011). Sandeels are understood to be a key component of the diet of seabirds, fish and marine mammal species (Wright & Bailey 1996, Wright & Begg 1997, Wanless *et al.* 1998, Furness 2002, Pierce *et al.* 2004, Santos *et al.* 2005, Wanless 2005, ICES 2006a, ICES 2006b, ICES 2009, ICES 2010, MSS 2010, Walters 2011).

Adult sandeels remain burrowed in the substrate during winter in response to decreased food availability, day length and temperature. They emerge in spring and summer to feed during the day when the availability of zooplankton prey increases (Van der Kooij *et al.* 2008). Sandeel emerge briefly from hibernation to spawn in December and January (Gauld & Hutcheon 1990, Bergstad *et al.* 2001, Winslade 1974). Females lay adhesive eggs that stick to the substrate and planktonic larvae hatch during February and March (Macer 1965, Langham 1971, Wright & Bailey 1996).

Late autumn or early spring is the most appropriate time of year to undertake sandeel surveys, when sandeels are burrowed in the substrate and the night-time periods are longer (Greenstreet *et al.* 2010). Due to sandeels exhibiting diurnal patterns of activity, with swimming activity confined to daylight hours depending on prey availability, surveys are best undertaken after dusk when the sandeels have buried in to the substrate (van der Kooij *et al.* 2008, Winslade 1974). According to Greenstreet *et al.* (2010) surveying at night also reduces the chances of sandeels detecting the dredge visually.

The BOWL site falls within defined high intensity spawning grounds and at the edge of low intensity nursery grounds for sandeels (Ellis *et al.* 2010). Spawning grounds are shown in Figure 3.2 together with the results of recent egg and larval surveys, as presented in Ellis *et al.* (2010). In addition, Figure 3.3 shows the extent of sandeel nursery grounds and juvenile catch rates recorded in groundfish surveys (Ellis *et al.* 2010).

Sandeels require a specific substrate and it is understood that sandeel distribution and spawning grounds will occupy discrete patchy areas rather than be continuous throughout the BOWL site.

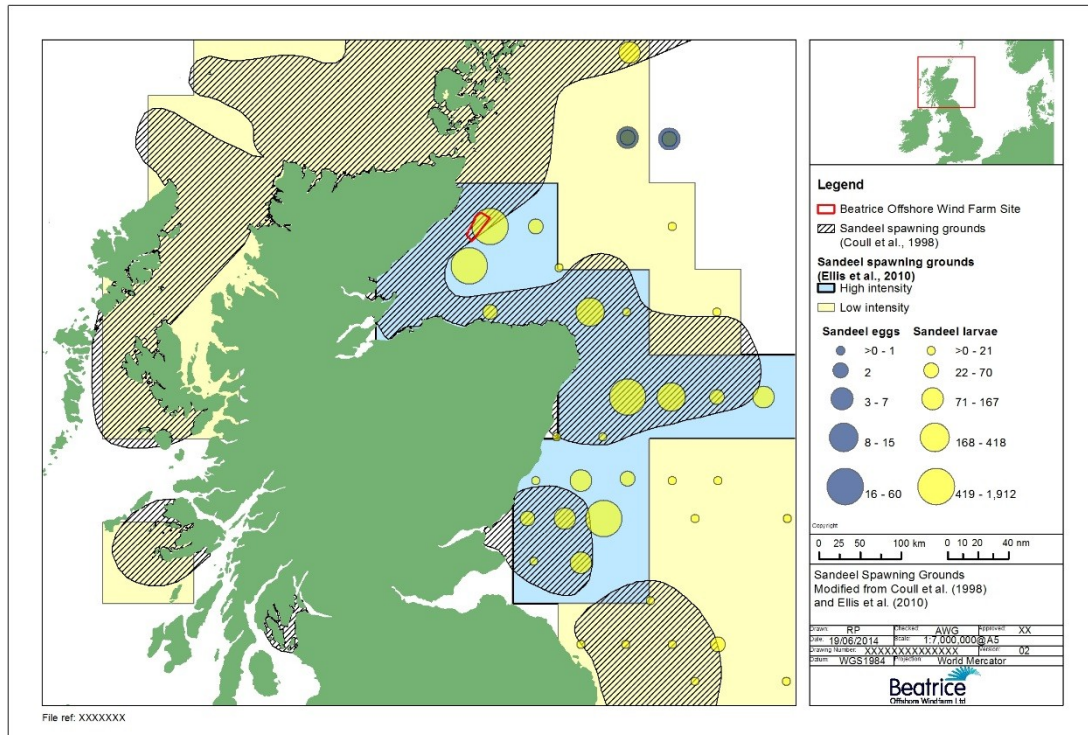


Figure 3.2 Sandeel spawning grounds (modified from Ellis *et al.* 2010 and Coull *et al.* 1998)

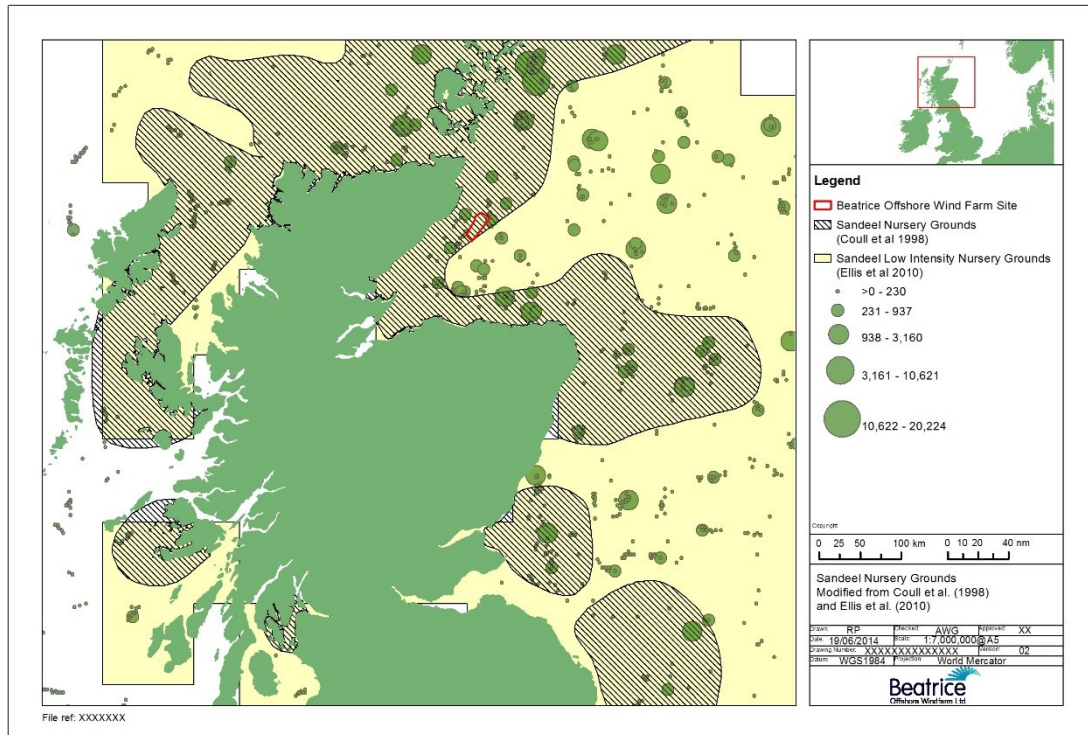


Figure 3.3 Sandeel nursery grounds (modified from Ellis *et al.* 2010 and Coull *et al.* 1998)

3.1 Sandeel sediment preference

Sandeel distribution is highly patchy and varies in relation to sediment type (Wright 1999). Sandeels do not maintain permanent burrow openings and have to ventilate their gills with interstitial water. The presence of fine particles of silt rich sediments in the interstitial water clogs gills and inhibits respiration. In addition, if the interstitial spaces between sand and gravel particles were occupied by silt particles, the rate of exchange of interstitial water would be lower and oxygen supply inadequate (Holland *et al.* 2005).

Sandeels are known to occupy areas on the sloping edges of sandbanks, showing a preference for depths of 20 to 70m, although they have been recorded between depths of 15 and 120m (Greenstreet *et al.* 2010, Wright *et al.* 1998). A study in the Firth of Forth by Holland *et al.* (2005) determined that *A. marinus* require a very specific substratum, favouring seabed habitats containing a high proportion of medium and coarse sand (particle size ≥ 0.25 to $< 2\text{mm}$) and low silt content. Overall, sandeels are considered to be rare in sediments where the silt content (particle size $< 0.63\mu\text{m}$) is greater than 4%, and absent where the silt content is greater than 10% (Holland *et al.* 2005, Wright *et al.* 2000).

3.2 CMACS Benthic Environmental Survey

In October and November 2010, CMACS undertook a benthic survey within the BOWL site using a benthic grab, drop down camera and scientific 2m beam trawl (CMACS 2011).

CMACS undertook grab sampling at 89 stations with the BOWL site. The distribution of seabed sediment types, based on the British Geological Survey (BGS) classification system, are shown in Figure 3.4. In addition, the percentage contribution of sand, mud and gravel are shown in Figure 3.5. The results of the survey show four groups of sediments found across the BOWL site; 1) sand, 2) slightly gravelly sand, 3) gravelly sand and 4) sandy gravel.

From the particle size analysis data, CMACS (2011) have described the sediment in the north of the BOWL site as being predominantly composed of medium sand and slightly gravelly sand, although finer sediments with mud content were also found in this area. The central western portion of the site comprised of medium sand whereas the central eastern portion was made up of sandy gravel, gravelly sand and slightly gravelly sand. The southern portion of the site comprised of medium and coarse sand, slightly gravelly sand and gravelly sand.

Scientific 2m beam trawls were undertaken by CMACS at 14 stations within the BOWL site. *H. lanceolatus* (45 individuals) and *A. tobianus* (34) were recorded throughout the site with the greatest number of individuals recorded in the central eastern portion of the site (Figure 3.6). It should be noted that the interpretation of the figure below should take account of the limitations of the data used. The number of sandeels caught in beam trawl samples are indicative of presence by species and should not to be used for quantitative analysis, as the sampling methods (e.g. beam trawl) and survey design (e.g. locations and sampling time) were not aimed at mapping sandeel populations but at describing the benthic and epi-benthic community in the area.

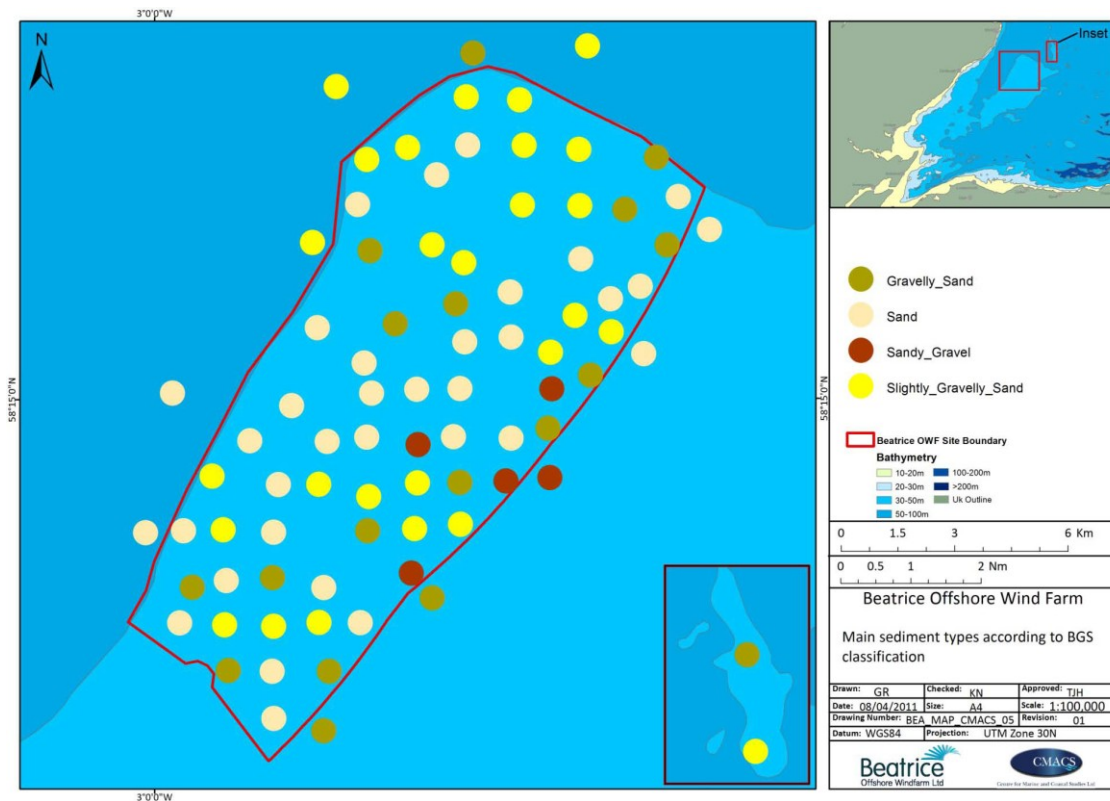


Figure 3.4 Main sediment types according to BGS classification (CMACS 2011)

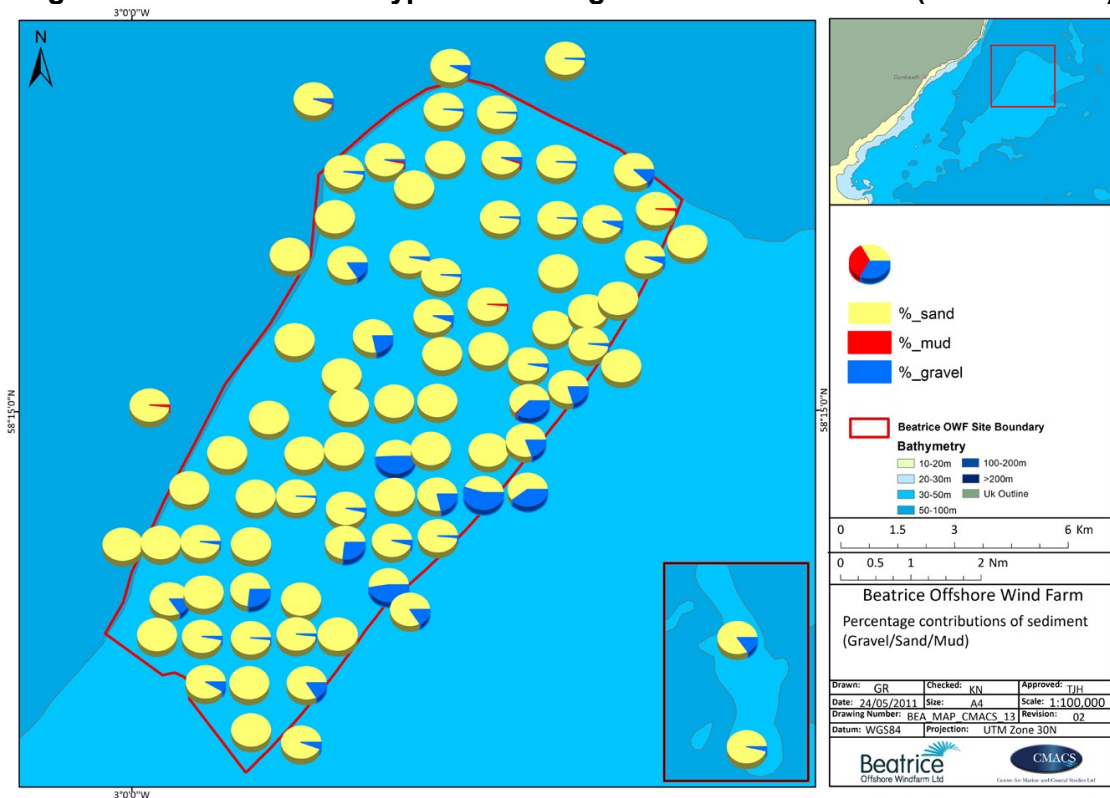


Figure 3.5 Percentage contributions of mud, sand and gravel (CMACS 2011)

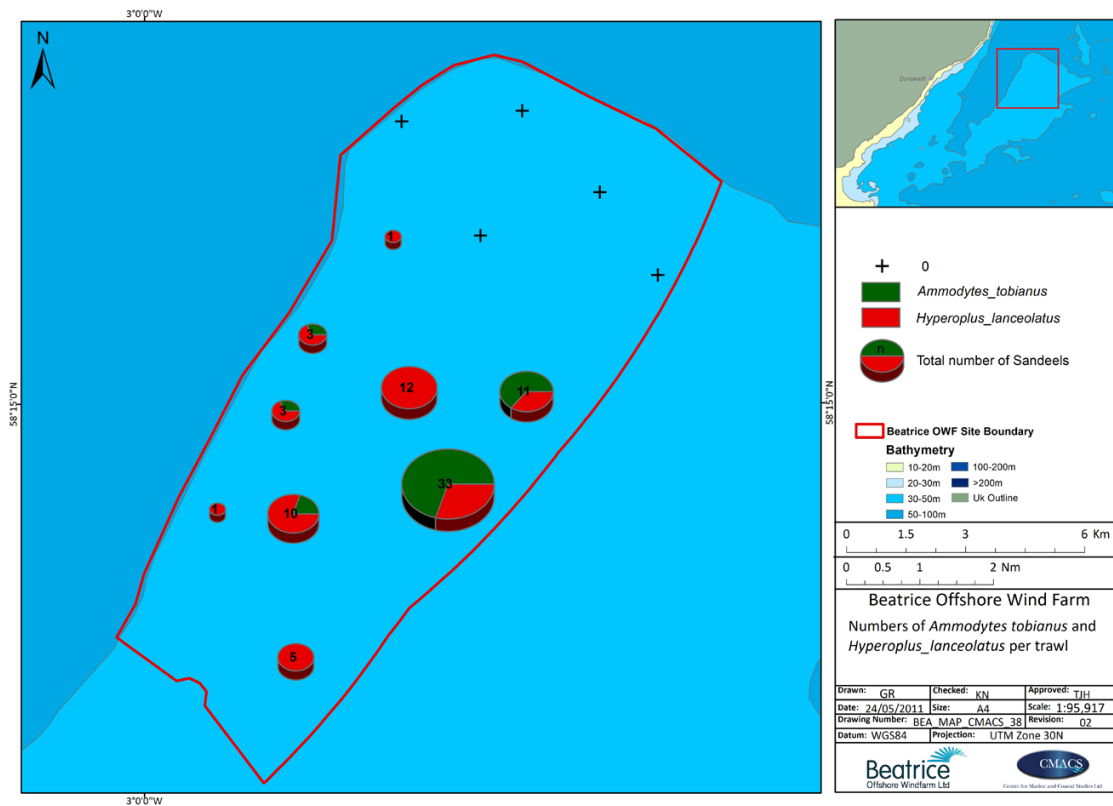


Figure 3.6 Lesser and greater sandeel (*Ammodytes tobianus* and *Hyperoplus lanceolatus*) abundances recorded during trawl survey; numbers refer to total sandeels recorded at that station (CMACS 2011)

4 Scope of Works

The scope of works for the sandeel survey are detailed below with the sampling stations illustrated in Figure 4.1. Sampling locations were based on a 2.1km² grid, overlaid on the BOWL site, giving a total of 103 sampling stations.

The scope of works were:

- Sandeel dredge:
 - 103 tows of approximately 500m within the BOWL site.
- Sample analysis:
 - Number of individuals, catch rates by per unit effort (catch rate) and per m² (density) per species;
 - Length (mm) distribution by species; and
 - Weight (g) distribution by species.

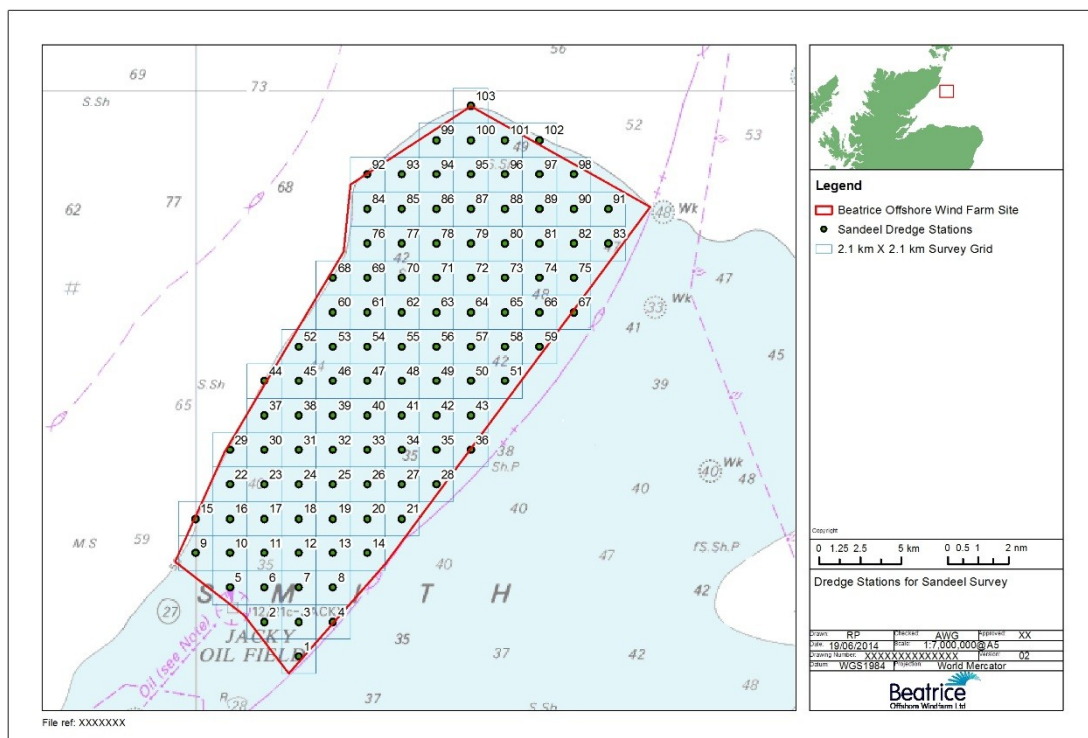


Figure 4.1 Sampling stations

5 Survey Methodology

The survey was undertaken from 27th February to 5th March 2014. A summarised log of events is given in Section 9.2 - Appendix 2.

The survey methodology was designed in consultation with MSS. A dispensation from MSS, in accordance with the terms of Section 9 of the Sea Fish Conservation Act 1967 and Article 43 of Council Regulation No. 850/98, to fish in Area IVab related to days at sea was obtained prior to commencement of this survey.

As previously mentioned (Section 3), sandeels spend the majority of the year buried in the seabed, emerging briefly to spawn in the winter and feed in late spring and summer. The survey was undertaken during night hours between the end of February and the beginning of March to ensure that the sandeels would be buried in the sediment and therefore be a more accurate measure of resident populations at each sampling site. MSS informed BOWL that the sandeel survey could take place between the end of February and early March 2014.

5.1 Survey Vessel

The vessel chartered for the survey, the "Seagull" (Figure 5.1), is a Fraserburgh based commercial trawler. The specifications of the vessel are given in Table 5.1.



Figure 5.1 Survey vessel "Seagull"

Table 5.1 Survey vessel specifications

Survey Vessel Specifications	
Length	27.41m
Beam	8.52m
Draft	4.9m
Main Engine	Deutz MWM Marine TBD620 V12, 1,340 kW
Gearbox	Hemidal HG47OF 7.07:1 reduction
Propeller	4 Blade Variable Pitch 2.9m diameter with a Kort Nozzle
GPS	1 x Dassault Sercel NR51, 1 x Furuno
Plotters	Sodena Plotter with Electronic Charts x 2
Sounder	Atlas 783 Colour
Scanmar	RX400 and Scanmate

5.2 Sampling Gear

A modified 1.24m shellfish dredge with a fixed tooth bar (6" teeth), 10mm mesh and a 6mm mesh cod-end liner was used for sampling. The modified gear (also known as a sandeel dredge) can be seen in Figure 5.2 and the specifications are given in Table 5.2. The dredges, steel bellies and nets were manufactured using the agreed specifications obtained from a meeting held with MS-LOT and MSS with their gear technician responsible for constructing the sandeel dredges used by MSS for their sandeel surveys (Meeting 3rd May 2011).



Figure 5.2 Modified 1.24m shellfish (sandeel) dredge

Table 5.2 Modified 1.24m shellfish (sandeel) dredge specifications

Modified 1.24m Shellfish Dredge Specifications	
Towing warp	Steel 14mm main with 24mm extension
Depth: payout ratio	approx. 3/4:1
Net	10mm mesh with 6mm cod end liner and chain mat
Estimated headline height	0.5m
Dredge width	1.24m
Tooth length	6"

5.3 Sampling Procedures

5.3.1 Positioning and Navigation

The position of the vessel was tracked at all times using a Garmin GPSMap 278 with an EGNOS differential connected to an external Garmin GA30 antenna. Dredge start times and positions were taken when the winch stopped paying out the gear. Similarly, dredge end times and positions were taken when hauling of the gear commenced. The vessel tracks whilst towing the sandeel dredge are illustrated in Figure 5.3. The start and end times, co-ordinates and duration of each sandeel dredge are given in Appendix 3.

5.3.2 Sandeel Dredge Sampling

The catch from each tow was emptied into a bucket, photographed and any sandeels present were retained. The sandeels from each dredge were removed from the sample, put into a labelled (station and date) polythene bag, sealed with cable ties and frozen for subsequent onshore species identification, numeration, length and biomass analysis by Jacobs Engineering Ltd. All bycatch species were identified, counted, measured and returned to the sea.

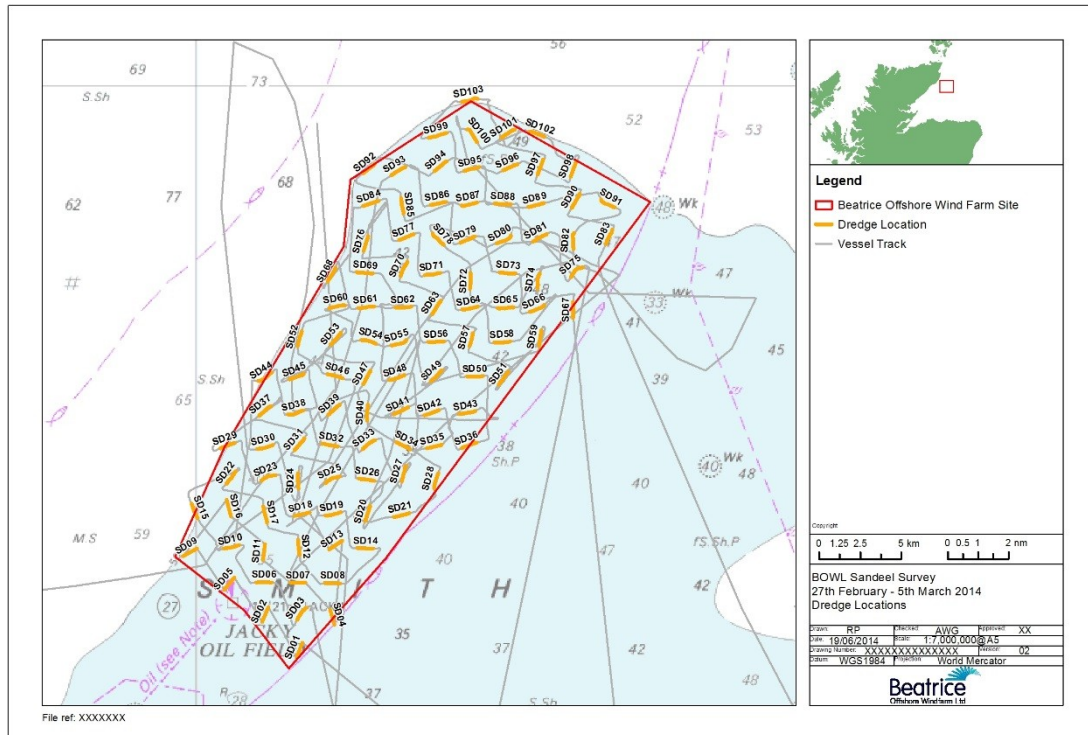


Figure 5.3 Vessel tracks whilst towing the sandeel dredge

6 Sandeel Dredge Results

6.1 Sandeel Abundance and Distribution

The total number of individuals caught, catch rate (number of individuals caught per hour) and the density (number of individuals caught per m²) by species is given in Table 6.1. The catch rate by species and station, where sandeels were caught, is given in Figure 6.1. The spatial distribution of sandeel species caught during the survey is shown in Figure 6.2.

The raw data along with the total numbers of individuals caught by station, together with the catch rate and density are provided in Section 9.4. Sandeel densities for each sample were calculated by dividing the total number of sandeels caught in the area swept (dredge width; 1.24m, multiplied by tow track length in metres).

A total of 497 sandeels were caught in 82 out of 103 stations in relatively low numbers, with a maximum of 36 individuals caught at a single station.

Three species of sandeels (Ammodytidae) were caught during the survey:

- Raitt's sandeel (*Ammodytes marinus*);
- Smooth sandeel (*Gymnammodytes semisquamatus*); and
- Greater sandeel (*Hyperoplus lanceolatus*).

The most abundant species caught during the survey was *A. marinus* (385 individuals), accounting for 77.5% of the total sandeel catch. A total of 111 *G. semisquamatus* (22.3%) and one *H. lanceolatus* was recorded. The greatest number of individuals were recorded at station SD28 (36) with a catch rate of 313.1/hr and a density of 0.057/m².

As shown in Figure 6.1, the highest abundances of sandeels were caught in the southern area of the BOWL site, with a patchy distribution of lower abundances caught throughout the remainder of the site.

Table 6.1 Total numbers of individuals, catch rate and density by species

Common Name	Scientific Name	Number of Individuals Caught	Catch Rate (No. of individuals caught per hour)	Density (No. of individuals caught per m ²)
Raitt's Sandeel	<i>Ammodytes marinus</i>	385	31.629	0.006
Smooth Sandeel	<i>Gymnammodytes semisquamatus</i>	111	9.119	0.002
Greater Sandeel	<i>Hyperoplus lanceolatus</i>	1	0.082	0.000
Total		497		

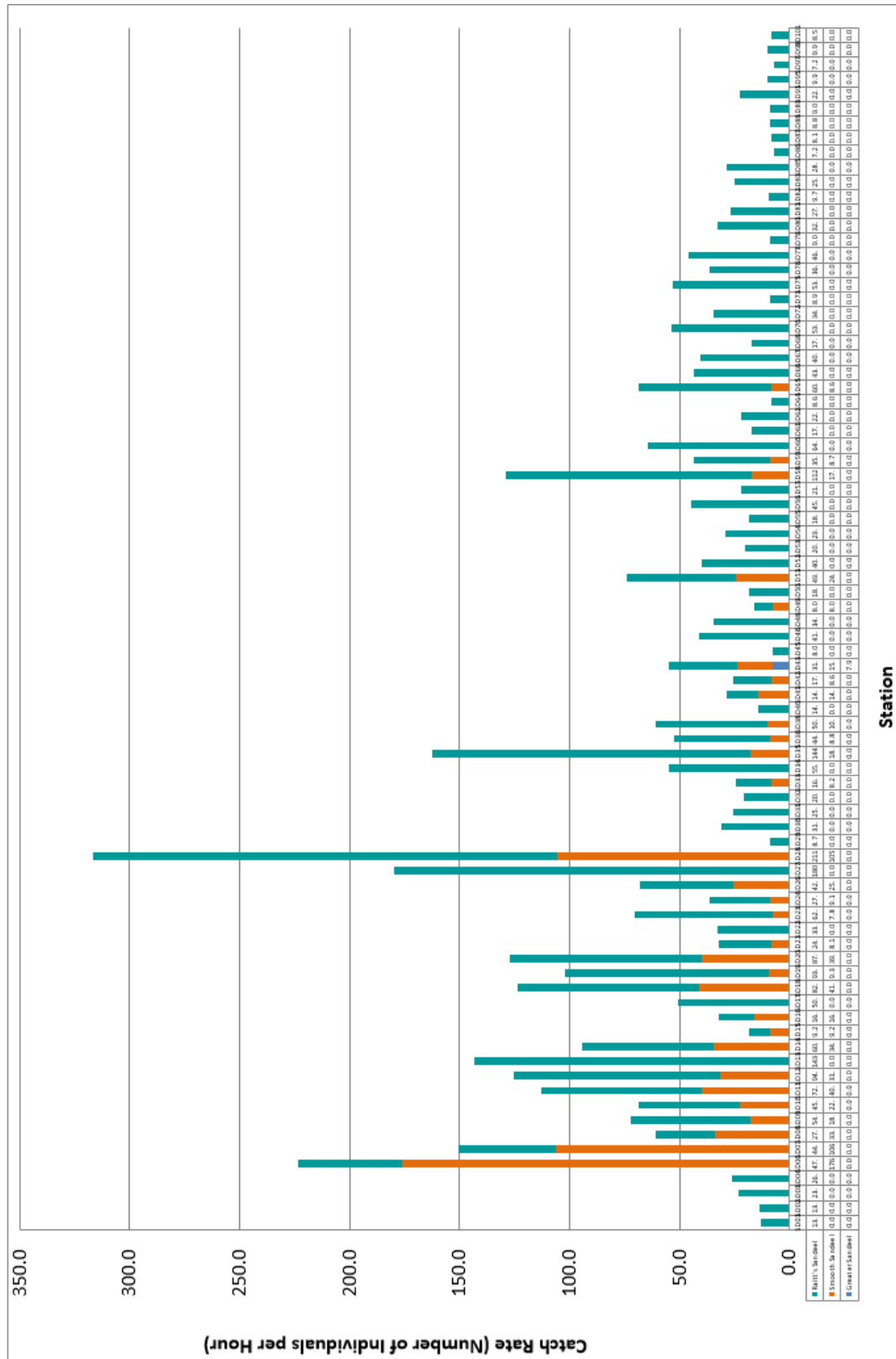
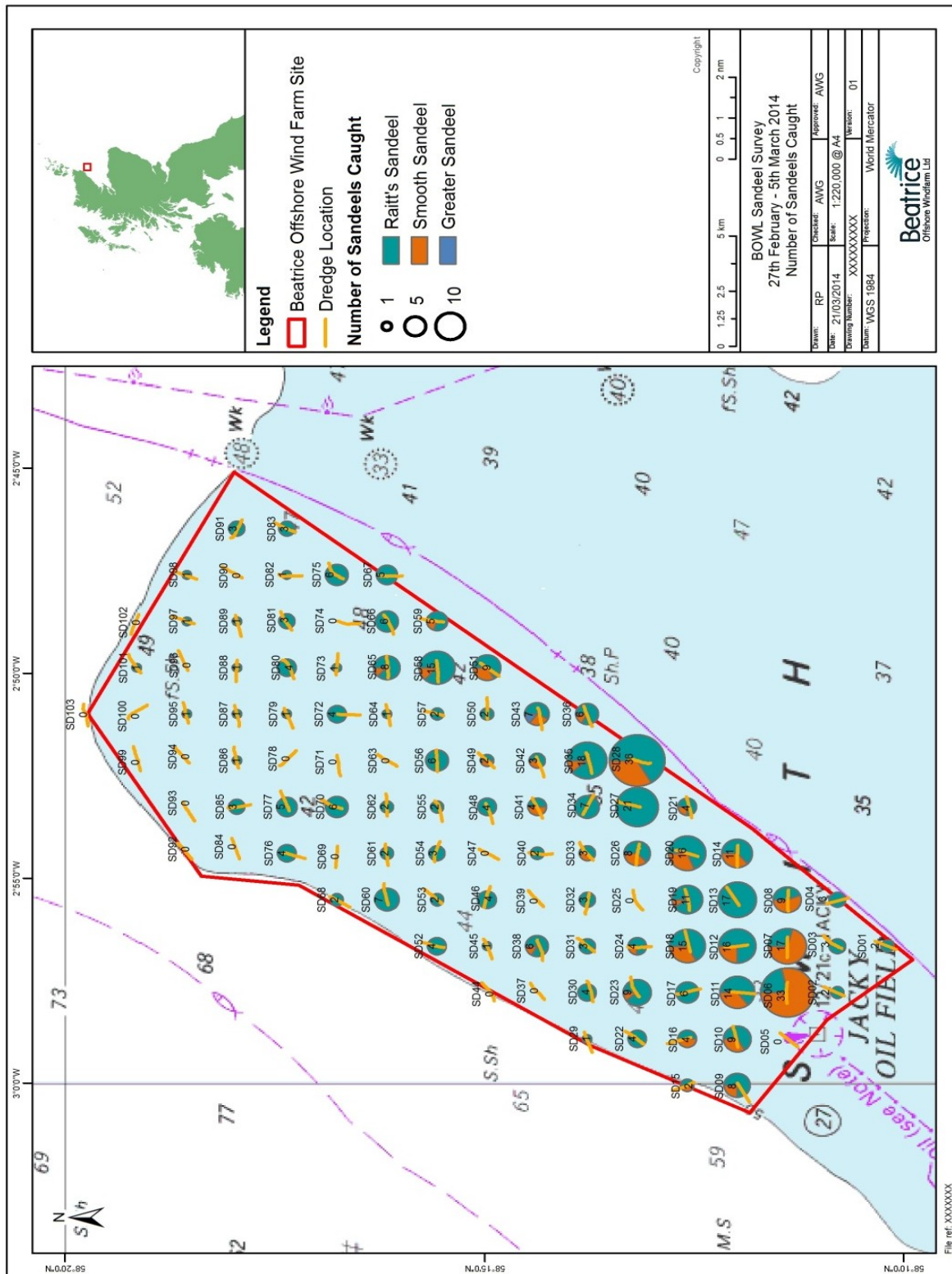


Figure 6.1 Catch rate by species and station



6.2 Sandeel Length Distribution

The length range (mm) by species is given below in Table 6.2. The length distributions of *A. marinus* and *G. semisquamatus* caught during the survey, expressed as the catch rate (number of individuals caught per hour) by length (mm) are shown in Figure 6.3 and Figure 6.4.

The greatest numbers of *A. marinus* caught were between 100.0 and 119.9mm in length. The majority of *G. semisquamatus* ranged in length between 60.0 and 109.9mm. One *H. lanceolatus* was caught in the survey with a length of 266.0mm.

Table 6.2 Length ranges by species

Species		Length Range (mm)	
Common Name	Scientific Name	Min.	Max.
Raitt's Sandeel	<i>Ammodytes marinus</i>	51.0	180.0
Smooth Sandeel	<i>Gymnammodytes semisquamatus</i>	52.0	228.0
Greater Sandeel	<i>Hyperoplus lanceolatus</i>	266.0	266.0

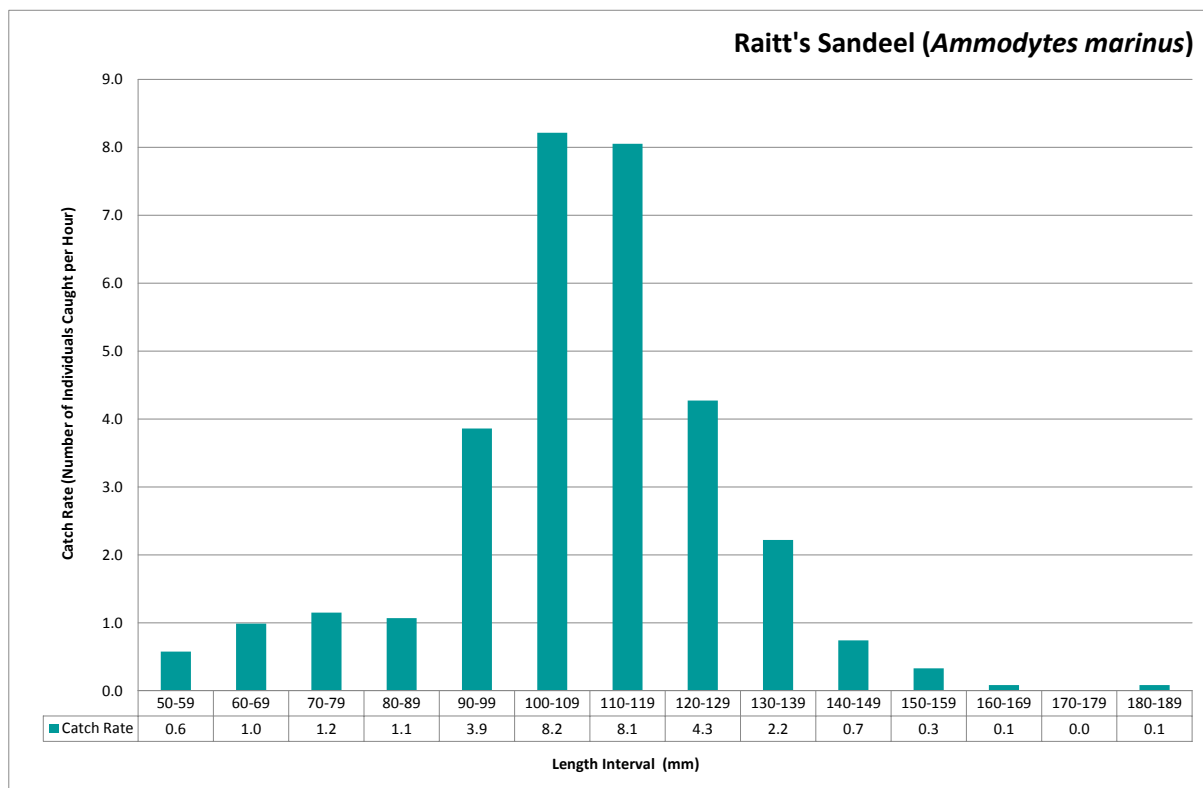


Figure 6.3 Raitt's sandeel (*A. marinus*) length distribution

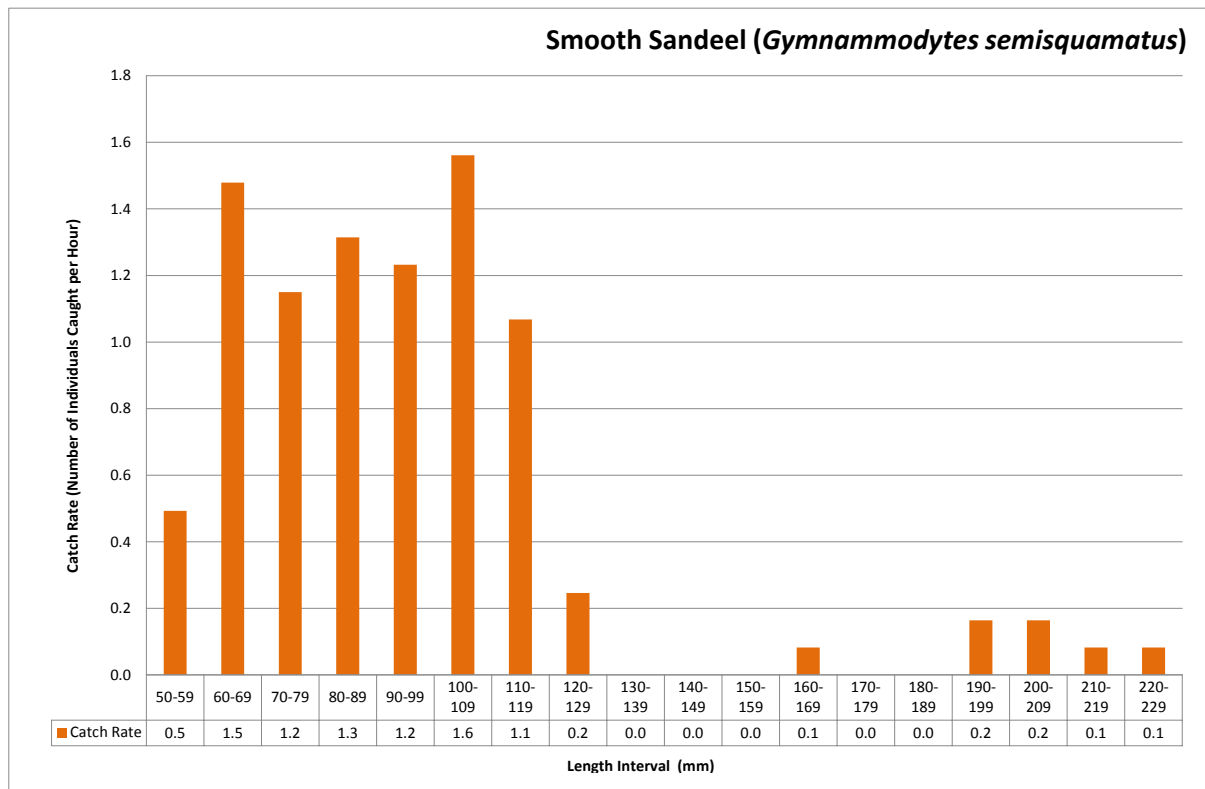


Figure 6.4 Smooth sandeel (*G. semisquamatus*) length distribution

6.3 Wet (defrosted) Weight Distribution

The wet (defrosted) weight range (g), by species is given below in Table 6.3. The weight distributions of *A. marinus* and *G. semisquamatus* caught during the survey, expressed as the catch rate (number of individuals caught per hour) by wet (defrosted) weight (g) are shown in Figure 6.5 and Figure 6.6.

The greatest numbers of *A. marinus* caught had a wet weight of between 2.0 and 5.9g. The majority of *G. semisquamatus* recorded a wet weight of between 0.2 and 1.9g. One *H. lanceolatus* was caught during the survey, with a wet weight of 66.0g.

Table 6.3 Wet (defrosted) weight ranges by species

Species		Wet (defrosted) Weight (g)	
Common Name	Scientific Name	Min.	Max.
Raitt's sandeel	<i>Ammodytes marinus</i>	0.2	14.8
Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	0.2	31.7
Greater sandeel	<i>Hyperoplus lanceolatus</i>	66.0	66.0

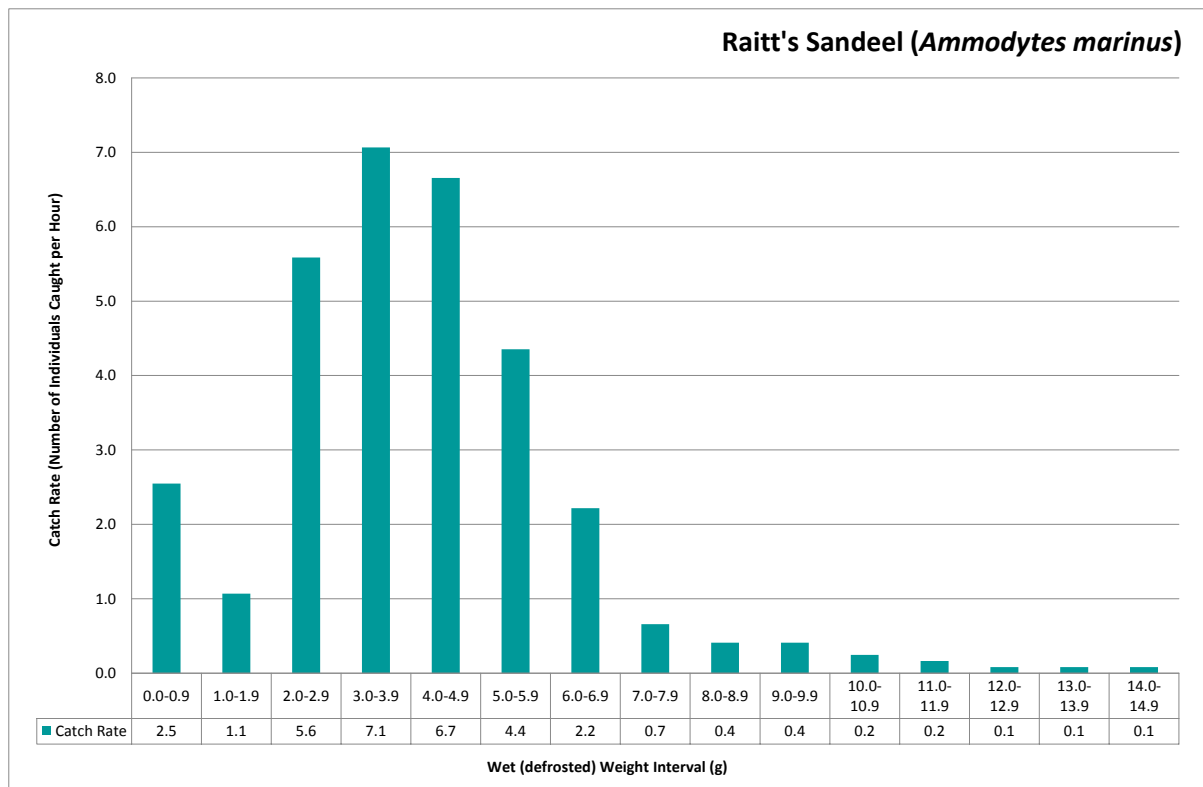


Figure 6.5 Raitt's sandeel (*A. marinus*) wet (defrosted) weight distribution

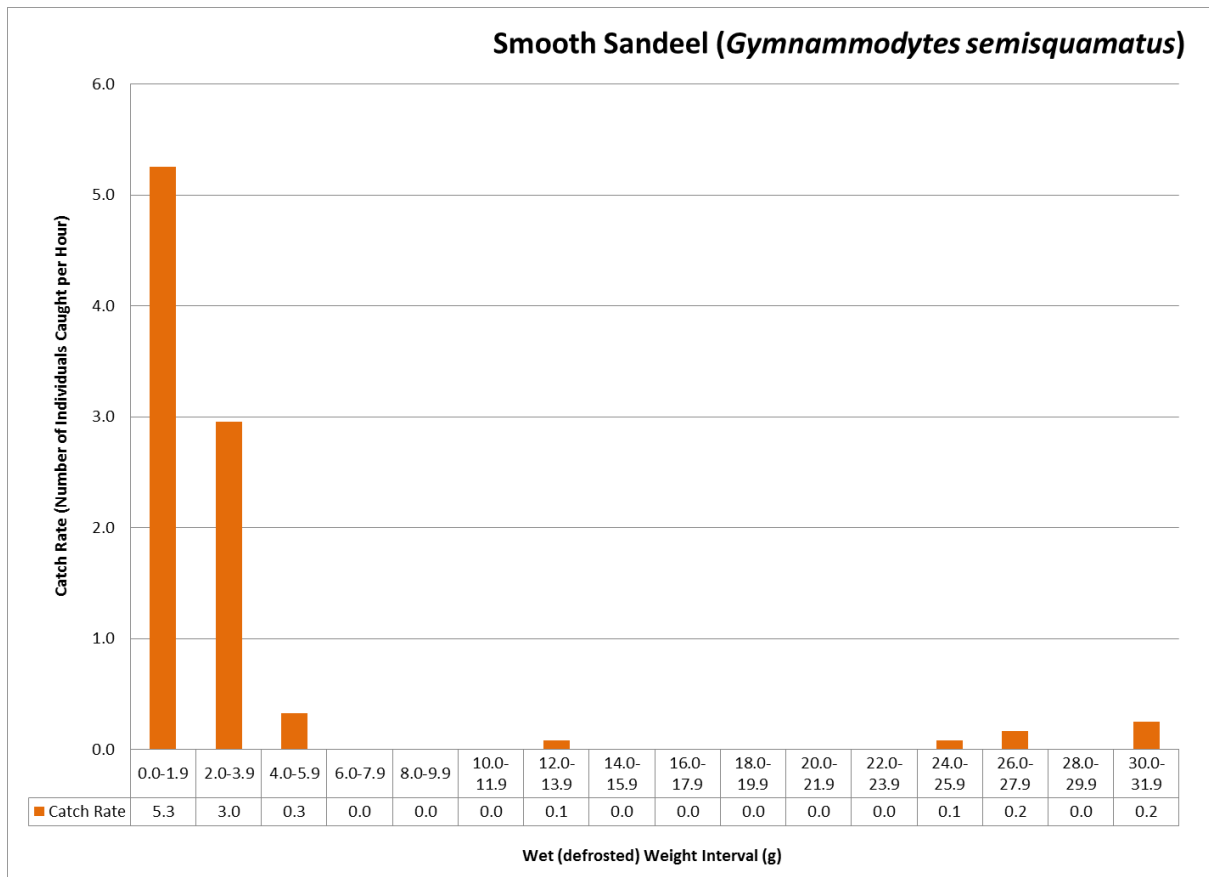


Figure 6.6 Smooth sandeel (*G. semisquamatus*) wet (defrosted) weight distribution

7 Conclusion

The results of the sandeel survey indicate an overall patchy distribution and low abundance of sandeels across the BOWL site. A total of 497 sandeels were caught in 82 out of the 103 stations sampled, in relatively low numbers, with a maximum of 36 individuals caught at a single station. The highest numbers of sandeels were found in dredge samples from central eastern and southern portions of the site. *A. marinus* was the most abundant species, accounting for 77.5% of the total sandeel catch, followed by *G. semisquamatus* (111 individuals, 22.3%) with one *H. lanceolatus* recorded. The greatest number of individuals were recorded at station SD28 (36).

It is acknowledged that sandeel distribution can be extremely patchy and suitable habitats may render zero catch samples. Areas considered to potentially constitute suitable habitat for sandeels are widespread throughout the Moray Firth and zero catch rates should not be taken as an indication of unsuitable habitat. However, the survey design, approved by MSS, is of a sufficiently high resolution to produce robust data that provides confidence in the observed results.

The relatively low sandeel catches recorded in the survey suggest that there are not extensive areas supporting important sandeel populations in the BOWL site.

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9 Appendices

9.1 Appendix 1 – Health and Safety

9.1.1 *Personnel*

Brown and May Marine (BMM) staff 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- VII/1** before boarding any vessel conducting works for the company. Employees are also required to have valid medical certificates (ENG1), Safety Awareness, Basic Fire Fighting and Basic First Aid certificates before participating in offshore works.

9.1.2 *Vessel Induction*

Before boarding the survey team were shown how to safely board and disembark the vessel. Prior to departure the skipper briefed surveyors on the whereabouts of the safety equipment, including the life raft, emergency flares and fire extinguishers, and the location of the emergency muster point. The safe deck areas, man-overboard procedures and emergency alarms were also discussed. The survey team was warned about the possible hazards, such as slippery decks and obstructions whilst aboard. Surveyors 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.

9.1.3 *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 fish room and the wheelhouse to ensure these areas were clear of hazards such as clutter and obstructions.

9.1.4 *Post Trip Survey Review*

Upon completion of the survey a “Post Trip Survey Review” was filled, see Table 9.1.

Table 9.1 Post trip survey review

Project: BOWL Sandeel Survey February/March 2014	Vessel: Seagull
Surveyors: Alex Winrow-Giffin / Richard Preston	Skipper: Gary Mutch
Survey Area: Moray Firth	Total Time at Sea: 7 Days
Dates at Sea: 27/02/14 - 05/03/14	

	Comments	Actions
Did vessel comply with pre trip safety audits?	Yes (audited by Noble Denton 12/02/14)	N/A
Skipper and crew attitude to safety?	Good	N/A
Vessel machinery failures?	Yes – Engine problems encountered on the steam out to the site.	Returned to port and engineer called to resolve the issue. Incident Report 001
Safety equipment failures?	None	N/A
Accidents?	Yes – Slip/trip/fall Skipper slipped going up the ladder into the wheelhouse, falling forward and knocking the side of his face on the back of chair. Two small cuts on face.	Washed and dried cut and applied cold pack to face to ease swelling. Incident Report 002 (Accident Report 001)
Injuries?	Two small cuts – see above	None – Incident report produced

9.2 Appendix 2 - Log of Events

A summarised log of events is given below in Table 9.2 for the sandeel survey.

Table 9.2 Summarised log of events

Thursday 27th February 2014
Vessel departed port at 1130 and arrived on site at 1715 to begin sandeel survey, starting with weather contingency stations.
Sandeel dredges (no. sandeel): SD01 (2 x sandeel), SD02 (3), SD05 (7), SD09 (1), SD16 (4), SD11 (14), SD07 (19), SD04 (3), SD13 (17), SD18 (15), SD23 (9), SD29 (1), SD37 (0), SD31 (3), SD25 (0)
Weather: BF 4, moderate
Overnight at sea
Friday 28th February 2014
Sandeel dredges (no. sandeel): SD20 (16 x sandeel), SD27 (21), SD33 (3), SD39 (0), SD45 (1), SD53 (2), SD47 (0), SD43 (7), SD35 (18), SD41 (4), SD49 (4), SD55 (2), SD61 (2), SD68 (2), SD76 (4), SD70 (6), SD63 (0), SD57 (1), SD51 (9), SD59 (5).
Weather: BF 5, moderate
Overnight at sea
Saturday 1st March 2014
Sandeel dredges (no. sandeel): SD100 (0 sandeel), SD102 (0), SD98 (1), SD96 (0), SD94 (0), SD92 (0), SD85 (3), SD87 (1), SD89 (1), SD91 (3), SD82 (1), SD80 (4), SD78 (0), SD72 (4), SD65 (8), SD74 (0), SD67
Ceased sampling due to increasing weather conditions. Steamed inshore for shelter.
Weather: BF 3 – 7/8, slight increasing to rough/very rough
Overnight at sea
Sunday 2nd March 2014
Steamed to Macduff, arrived in port at 1150. Client rep. Marc Browne departed vessel.
24 hour weather day (night) in port
Weather: BF 5 – 7 (SE), rough to very rough
Overnight on vessel
Monday 3rd March 2014
Vessel departed Macduff at 1310 and steamed to survey area to continue with sandeel survey.
Sandeel dredges (no. sandeel): SD03 (3), SD06 (33), SD10 (9), SD15 (2), SD22 (4), SD17 (6), SD12 (16), SD08 (9), SD14 (11), SD19 (11), SD24 (4), SD30 (4), SD44 (0), SD38 (6), SD32 (4), SD26 (8), SD21 (4), SD28 (36), SD34 (7), SD40 (2).
Weather: BF 3-4, slight
Overnight at sea
Tuesday 4th March 2014
Sandeel dredges (no. sandeel):: SD46 (4), SD52 (4), SD60 (7), SD54 (3), SD48 (4), SD42 (3), SD36 (4), SD50 (2), SD56 (6), SD62 (2), SD69 (0), SD84 (0), SD77 (5), SD71 (0), SD64 (1), SD58 (15), SD66 (6), SD73 (1), SD79 (1), SD86 (1), SD93 (0)
Weather: BF 4 - 5, moderate
Overnight at sea
Wednesday 5th March 2014
Sandeel dredges (no. sandeel):: SD75 (5), SD81 (3), SD88 (1), SD95 (1), SD99 (0), SD103 (0), SD101 (1), SD97 (1), SD90 (0), SD83 (3). Sandeel survey completed.
Steamed overnight to Fraserburgh.
Weather: BF5/6, moderate to rough
Overnight at sea

9.3 Appendix 3 – Times and Coordinates

The date, times, coordinates and depth for each station is given below in Table 9.3.

Table 9.3 Start and end times, coordinates, duration and tow length of each sandeel dredge

Station	Date	Dredge Start				Dredge End				Duration (mm:ss)	Tow Length (m)
		Time (GMT)	UTM30N		Depth (m)	Time (GMT)	UTM30N		Depth (m)		
			Latitude	Longitude			Latitude	Longitude			
SD001	27/02/2014	17:32:34	58° 10.345	-2° 56.540	40.9	17:41:47	58° 10.088	-2° 56.733	40.9	09:13	511.9
SD002	27/02/2014	18:05:27	58° 10.957	-2° 57.649	40.6	18:14:13	58° 10.710	-2° 57.867	39.5	08:46	505.4
SD003	03/03/2014	17:44:26	58° 10.955	-2° 56.395	41.5	17:52:04	58° 10.739	-2° 56.714	40.7	07:38	517.8
SD004	27/02/2014	22:06:04	58° 10.918	-2° 55.624	45.5	22:12:57	58° 10.654	-2° 55.484	43.9	06:53	510.3
SD005	27/02/2014	18:39:38	58° 11.478	-2° 58.777	41.3	18:48:29	58° 11.265	-2° 59.111	41.8	08:51	513.8
SD006	03/03/2014	18:05:00	58° 11.390	-2° 57.535	40.4	18:11:46	58° 11.392	-2° 58.055	40.2	06:46	511.0
SD007	27/02/2014	21:36:57	58° 11.388	-2° 56.432	41.5	21:45:49	58° 11.390	-2° 56.938	43.3	08:52	495.8
SD008	03/03/2014	20:14:42	58° 11.379	-2° 55.806	41.5	20:21:19	58° 11.376	-2° 55.293	40.4	06:37	504.0
SD009	27/02/2014	19:09:59	58° 11.984	-2° 59.999	44.0	19:17:52	58° 11.845	-3° 00.464	49.3	07:53	524.1
SD010	03/03/2014	18:25:06	58° 12.038	-2° 58.615	38.4	18:32:12	58° 11.978	-2° 59.124	39.6	07:06	512.1
SD011	27/02/2014	20:14:52	58° 12.058	-2° 57.772	41.7	20:22:19	58° 11.781	-2° 57.825	41.5	07:27	515.7
SD012	03/03/2014	19:54:13	58° 12.137	-2° 56.680	40.9	20:01:51	58° 11.862	-2° 56.627	39.8	07:38	513.5
SD013	27/02/2014	22:46:22	58° 12.115	-2° 55.218	43.1	22:53:28	58° 11.965	-2° 55.662	43.9	07:06	516.5
SD014	03/03/2014	20:37:09	58° 11.982	-2° 54.195	41.7	20:44:08	58° 11.988	-2° 54.721	39.3	06:59	515.6
SD015	03/03/2014	18:45:41	58° 12.506	-2° 59.979	50.8	18:52:11	58° 12.761	-3° 00.179	58.8	06:30	512.6
SD016	27/02/2014	19:50:09	58° 12.823	-2° 59.030	47.1	19:57:38	58° 12.543	-2° 58.882	41.5	07:29	540.8
SD017	03/03/2014	19:35:49	58° 12.708	-2° 57.822	41.5	19:42:54	58° 12.428	-2° 57.697	40.6	07:05	536.8
SD018	27/02/2014	23:12:00	58° 12.610	-2° 56.289	44.4	23:19:17	58° 12.550	-2° 56.793	43.9	07:17	505.2
SD019	03/03/2014	20:57:38	58° 12.611	-2° 55.273	44.2	21:04:05	58° 12.556	-2° 55.784	42.9	06:27	512.8
SD020	28/02/2014	17:35:05	58° 12.723	-2° 54.315	42.8	17:42:38	58° 12.456	-2° 54.473	43.5	07:33	521.9
SD021	04/03/2014	01:18:18	58° 12.532	-2° 53.526	44.6	01:25:42	58° 12.596	-2° 53.014	43.5	07:24	518.2
SD022	03/03/2014	19:11:03	58° 13.326	-2° 58.730	46.6	19:18:18	58° 13.104	-2° 59.049	48.8	07:15	520.4
SD023	27/02/2014	23:38:40	58° 13.259	-2° 57.406	46.2	23:46:19	58° 13.159	-2° 57.892	46.4	07:39	522.7
SD024	03/03/2014	22:13:56	58° 13.293	-2° 56.673	45.9	22:20:33	58° 13.016	-2° 56.664	44.8	06:37	518.4
SD025	28/02/2014	02:00:40	58° 13.229	-2° 55.297	41.7	02:07:42	58° 13.116	-2° 55.777	43.9	07:02	530.1
SD026	04/03/2014	00:12:21	58° 13.195	-2° 54.682	44.2	00:19:21	58° 13.157	-2° 54.169	43.9	07:00	517.1
SD027	28/02/2014	18:06:20	58° 13.414	-2° 53.113	40.6	18:13:09	58° 13.146	-2° 53.263	40.2	06:49	526.3
SD028	04/03/2014	01:37:56	58° 13.026	-2° 52.195	43.1	01:44:50	58° 13.285	-2° 52.066	44.8	06:54	501.5
SD029	28/02/2014	00:05:55	58° 13.816	-2° 58.752	54.6	00:13:40	58° 13.720	-2° 59.243	62.1	07:45	513.9
SD030	03/03/2014	22:42:29	58° 13.782	-2° 57.505	45.9	22:49:28	58° 13.709	-2° 58.014	45.0	06:59	521.2
SD031	28/02/2014	01:29:52	58° 13.895	-2° 56.465	46.2	01:38:33	58° 13.689	-2° 56.796	44.6	08:41	503.9
SD032	03/03/2014	23:52:32	58° 13.798	-2° 55.879	45.9	23:59:51	58° 13.754	-2° 55.372	45.5	07:19	510.0
SD033	28/02/2014	18:31:04	58° 13.867	-2° 54.129	41.3	18:38:40	58° 13.706	-2° 54.560	41.7	07:36	526.2
SD034	04/03/2014	01:55:14	58° 13.703	-2° 52.979	45.1	02:01:52	58° 13.827	-2° 53.441	45.0	06:38	507.7
SD035	28/02/2014	22:06:07	58° 13.791	-2° 51.943	47.7	22:12:56	58° 13.721	-2° 52.444	45.3	06:49	510.5

Station	Date	Dredge Start				Dredge End				Duration (mm:ss)	Tow Length (m)
		Time (GMT)	UTM30N		Depth (m)	Time (GMT)	UTM30N		Depth (m)		
			Latitude	Longitude			Latitude	Longitude			
SD036	04/03/2014	19:56:37	58° 13.720	-2° 51.294	43.9	20:02:31	58° 13.817	-2° 50.803	42.4	05:54	514.5
SD037	28/02/2014	01:01:47	58° 14.455	-2° 57.561	47.3	01:10:18	58° 14.287	-2° 57.959	48.2	08:31	501.2
SD038	03/03/2014	23:31:25	58° 14.308	-2° 57.008	47.5	23:39:49	58° 14.381	-2° 56.505	48.2	08:24	517.7
SD039	28/02/2014	18:59:15	58° 14.482	-2° 55.300	47.7	19:06:14	58° 14.300	-2° 55.690	48.2	06:59	511.7
SD040	04/03/2014	02:13:29	58° 14.197	-2° 54.402	45.9	02:21:06	58° 14.477	-2° 54.383	47.5	07:37	524.4
SD041	28/02/2014	22:33:20	58° 14.434	-2° 53.045	45.0	22:40:52	58° 14.310	-2° 53.535	47.1	07:32	533.4
SD042	04/03/2014	19:34:40	58° 14.294	-2° 52.529	40.9	19:40:28	58° 14.384	-2° 52.042	43.1	05:48	507.1
SD043	28/02/2014	21:39:42	58° 14.367	-2° 50.851	45.7	21:46:40	58° 14.315	-2° 51.380	45.5	06:58	530.9
SD044	03/03/2014	23:09:59	58° 14.889	-2° 57.989	59.6	23:17:31	58° 15.037	-2° 57.548	53.9	07:32	524.2
SD045	28/02/2014	19:24:36	58° 15.016	-2° 56.485	46.2	19:31:08	58° 14.913	-2° 56.966	46.2	06:32	513.1
SD046	04/03/2014	17:48:33	58° 14.933	-2° 55.201	48.2	17:55:49	58° 15.006	-2° 55.710	47.7	07:16	518.1
SD047	28/02/2014	20:18:30	58° 15.068	-2° 54.294	49.3	20:24:28	58° 14.835	-2° 54.538	48.1	05:58	494.2
SD048	04/03/2014	19:14:23	58° 14.904	-2° 53.669	43.1	19:20:21	58° 14.990	-2° 53.172	43.3	05:58	513.6
SD049	28/02/2014	23:03:19	58° 15.077	-2° 51.936	45.9	23:09:25	58° 14.886	-2° 52.314	45.0	06:06	513.9
SD050	04/03/2014	20:19:53	58° 14.974	-2° 50.592	44.0	20:26:23	58° 14.965	-2° 51.113	43.1	06:30	510.5
SD051	01/03/2014	02:44:15	58° 15.049	-2° 49.752	47.0	02:52:14	58° 14.827	-2° 50.071	46.0	07:59	518.0
SD052	04/03/2014	18:09:15	58° 15.486	-2° 56.687	47.5	18:14:45	58° 15.751	-2° 56.556	49.9	05:30	510.7
SD053	28/02/2014	19:53:29	58° 15.723	-2° 55.269	48.4	20:00:27	58° 15.511	-2° 55.614	48.1	06:58	518.5
SD054	04/03/2014	18:54:43	58° 15.594	-2° 54.604	47.7	19:01:35	58° 15.534	-2° 54.103	47.9	06:52	510.1
SD055	28/02/2014	23:26:44	58° 15.596	-2° 53.115	50.4	23:33:15	58° 15.505	-2° 53.614	51.4	06:31	531.4
SD056	04/03/2014	20:39:45	58° 15.577	-2° 51.872	45.5	20:46:37	58° 15.563	-2° 52.397	46.2	06:52	514.7
SD057	01/03/2014	02:22:33	58° 15.720	-2° 50.917	46.0	02:27:56	58° 15.490	-2° 51.035	45.5	05:23	446.2
SD058	04/03/2014	23:58:13	58° 15.554	-2° 50.215	47.7	00:05:13	58° 15.574	-2° 49.691	48.2	07:00	516.4
SD059	01/03/2014	03:10:49	58° 15.767	-2° 48.663	46.2	03:17:48	58° 15.492	-2° 48.748	47.1	06:59	519.9
SD060	04/03/2014	18:28:41	58° 16.201	-2° 55.135	47.5	18:36:56	58° 16.151	-2° 55.655	47.1	08:15	520.7
SD061	28/02/2014	23:47:24	58° 16.182	-2° 54.164	52.4	23:54:46	58° 16.152	-2° 54.690	51.0	07:22	518.7
SD062	04/03/2014	20:57:51	58° 16.177	-2° 52.948	52.3	21:04:52	58° 16.162	-2° 53.487	50.4	07:01	529.2
SD063	01/03/2014	01:56:49	58° 16.277	-2° 51.976	52.4	02:03:31	58° 16.048	-2° 52.268	51.7	06:42	514.0
SD064	04/03/2014	23:37:49	58° 16.125	-2° 51.281	49.5	23:44:44	58° 16.177	-2° 50.770	49.2	06:55	510.9
SD065	01/03/2014	21:54:09	58° 16.155	-2° 50.109	50.6	22:00:55	58° 16.167	-2° 49.585	51.7	06:46	519.6
SD066	05/03/2014	00:46:18	58° 16.206	-2° 48.573	51.7	00:53:02	58° 16.086	-2° 49.046	50.8	06:44	518.6
SD067	01/03/2014	22:31:34	58° 16.253	-2° 47.625	53.4	22:38:11	58° 15.981	-2° 47.625	50.3	06:37	506.8
SD068	01/03/2014	00:12:15	58° 16.852	-2° 55.450	55.7	00:18:46	58° 16.608	-2° 55.707	54.6	06:31	520.4
SD069	04/03/2014	22:12:44	58° 16.756	-2° 54.218	48.4	22:19:24	58° 16.774	-2° 54.736	49.2	06:40	507.8
SD070	01/03/2014	01:32:49	58° 16.951	-2° 53.088	52.6	01:40:11	58° 16.700	-2° 53.305	51.7	07:22	517.6
SD071	04/03/2014	23:17:51	58° 16.720	-2° 52.503	52.3	23:24:29	58° 16.759	-2° 51.998	53.2	06:38	502.6
SD072	01/03/2014	21:38:08	58° 16.757	-2° 50.996	53.0	21:44:19	58° 16.483	-2° 51.013	51.0	06:11	509.7
SD073	05/03/2014	01:08:08	58° 16.750	-2° 49.522	53.4	01:15:20	58° 16.771	-2° 50.039	52.6	07:12	507.5
SD074	01/03/2014	22:13:55	58° 16.756	-2° 48.726	53.9	22:20:15	58° 16.484	-2° 48.793	52.8	06:20	517.0
SD075	05/03/2014	17:46:11	58° 16.861	-2° 47.313	51.2	17:54:31	58° 16.688	-2° 47.701	52.3	08:20	533.0
SD076	01/03/2014	01:09:42	58° 17.403	-2° 54.380	54.5	01:17:05	58° 17.143	-2° 54.515	51.7	07:23	504.1
SD077	04/03/2014	22:57:23	58° 17.332	-2° 53.352	51.0	23:04:10	58° 17.433	-2° 52.875	52.4	06:47	504.1

Station	Date	Dredge Start				Dredge End				Duration (mm:ss)	Tow Length (m)
		Time (GMT)	UTM30N		Depth (m)	Time (GMT)	UTM30N		Depth (m)		
			Latitude	Longitude			Latitude	Longitude			
SD078	01/03/2014	21:22:25	58° 17.446	-2° 52.253	54.8	21:29:03	58° 17.247	-2° 51.887	54.6	06:38	520.8
SD079	05/03/2014	01:30:41	58° 17.390	-2° 50.860	55.4	01:38:37	58° 17.285	-2° 51.342	55.6	07:56	511.0
SD080	01/03/2014	21:02:38	58° 17.408	-2° 49.679	54.3	21:08:43	58° 17.274	-2° 50.138	52.8	06:05	537.3
SD081	05/03/2014	18:10:10	58° 17.432	-2° 48.495	53.7	18:18:32	58° 17.300	-2° 48.945	53.2	08:22	512.3
SD082	01/03/2014	20:40:26	58° 17.455	-2° 47.586	53.4	20:46:30	58° 17.176	-2° 47.622	53.5	06:04	536.0
SD083	05/03/2014	21:54:53	58° 17.508	-2° 46.331	51.7	22:01:45	58° 17.267	-2° 46.547	51.4	06:52	517.7
SD084	04/03/2014	22:37:18	58° 17.921	-2° 54.529	65.3	22:44:16	58° 18.011	-2° 54.029	62.3	06:58	516.1
SD085	01/03/2014	19:26:35	58° 18.058	-2° 53.288	53.7	19:32:54	58° 17.789	-2° 53.206	51.0	06:19	506.6
SD086	05/03/2014	01:56:10	58° 17.987	-2° 51.802	55.9	02:03:30	58° 17.936	-2° 52.316	55.4	07:20	513.5
SD087	01/03/2014	19:45:12	58° 17.930	-2° 51.295	53.5	19:51:45	58° 17.980	-2° 50.787	53.7	06:33	513.0
SD088	05/03/2014	18:31:45	58° 17.948	-2° 49.681	53.0	18:39:02	58° 17.965	-2° 50.207	54.1	07:17	518.7
SD089	01/03/2014	20:02:38	58° 17.904	-2° 49.098	54.5	20:09:09	58° 17.969	-2° 48.593	54.3	06:31	509.0
SD090	05/03/2014	21:33:19	58° 18.129	-2° 47.407	55.7	21:40:41	58° 17.890	-2° 47.671	53.0	07:22	515.3
SD091	01/03/2014	20:22:12	58° 18.030	-2° 46.706	53.4	20:28:27	58° 17.893	-2° 46.256	52.8	06:15	521.0
SD092	01/03/2014	19:07:50	58° 18.655	-2° 54.146	69.5	19:13:50	58° 18.486	-2° 54.542	68.5	06:00	497.5
SD093	05/03/2014	02:18:58	58° 18.594	-2° 53.147	64.3	02:26:05	58° 18.454	-2° 53.606	66.5	07:07	519.5
SD094	01/03/2014	18:48:39	58° 18.695	-2° 51.791	55.6	18:55:23	58° 18.521	-2° 52.190	54.8	06:44	507.0
SD095	05/03/2014	18:51:41	58° 18.592	-2° 50.715	55.4	18:59:14	58° 18.530	-2° 51.215	55.4	07:33	505.0
SD096	01/03/2014	18:31:09	58° 18.649	-2° 49.452	54.3	18:37:34	58° 18.533	-2° 49.933	53.0	06:25	517.1
SD097	05/03/2014	21:09:59	58° 18.723	-2° 48.602	54.6	21:18:01	58° 18.460	-2° 48.793	55.2	08:02	528.2
SD098	01/03/2014	18:11:50	58° 18.690	-2° 47.512	54.3	18:18:42	58° 18.431	-2° 47.704	53.7	06:52	518.4
SD099	05/03/2014	19:13:19	58° 19.186	-2° 51.791	58.7	19:21:44	58° 19.101	-2° 52.383	59.4	08:25	603.9
SD100	01/03/2014	17:34:28	58° 19.243	-2° 51.116	55.7	17:40:54	58° 19.022	-2° 50.779	55.4	06:26	548.1
SD101	05/03/2014	20:45:28	58° 19.241	-2° 49.545	57.8	20:54:06	58° 19.098	-2° 49.993	59.4	08:38	519.5
SD102	01/03/2014	17:53:01	58° 19.211	-2° 49.054	55.6	17:59:32	58° 19.121	-2° 48.567	55.4	06:31	505.0
SD103	05/03/2014	19:37:20	58° 19.723	-2° 51.285	58.1	19:44:27	58° 19.774	-2° 50.761	60.1	07:07	536.1

9.4 Appendix 4 – Raw Data

Table 9.4 Sandeels caught by station, species, length and weight

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
SD01	Raitt's sandeel	<i>Ammodytes marinus</i>	112	5.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.47
SD02	Raitt's sandeel	<i>Ammodytes marinus</i>	91	2.40
	Raitt's sandeel	<i>Ammodytes marinus</i>	94	2.46
SD03	Raitt's sandeel	<i>Ammodytes marinus</i>	88	2.33
	Raitt's sandeel	<i>Ammodytes marinus</i>	92	2.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	4.67
SD04	Raitt's sandeel	<i>Ammodytes marinus</i>	94	2.25
	Raitt's sandeel	<i>Ammodytes marinus</i>	99	2.11
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	4.78
SD06	Raitt's sandeel	<i>Ammodytes marinus</i>	79	0.78
	Raitt's sandeel	<i>Ammodytes marinus</i>	81	0.91
	Raitt's sandeel	<i>Ammodytes marinus</i>	87	1.66
	Raitt's sandeel	<i>Ammodytes marinus</i>	95	2.54
	Raitt's sandeel	<i>Ammodytes marinus</i>	97	2.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.81
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.25
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	57	0.25
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	59	0.30
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	59	0.36
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	60	0.32
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	60	0.32
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	62	0.45
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	62	0.45
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	62	0.48
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	65	0.48
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	68	0.57
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	68	0.65
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	69	0.70
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	70	0.62
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	70	0.63
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	75	0.84
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	75	0.95
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	77	0.85
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	78	0.98
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	79	0.85
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	82	1.06
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	83	1.29
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	86	1.29
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	90	1.67
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	97	2.08
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	111	3.33
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	115	3.77
SD07	Raitt's sandeel	<i>Ammodytes marinus</i>	57	0.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	90	2.15
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	2.78
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	3.88
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	4.44

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	56	0.35
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	60	0.47
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	67	0.65
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	68	0.75
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	71	0.82
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	75	1.00
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	79	1.02
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	84	1.30
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	100	2.48
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	101	2.43
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	105	2.93
SD08	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	106	2.99
	Raitt's sandeel	<i>Ammodytes marinus</i>	64	0.36
	Raitt's sandeel	<i>Ammodytes marinus</i>	75	0.98
	Raitt's sandeel	<i>Ammodytes marinus</i>	90	2.18
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	4.13
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	60	0.54
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	93	1.94
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	97	2.11
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	106	2.60
SD09	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	112	3.63
	Raitt's sandeel	<i>Ammodytes marinus</i>	72	0.59
	Raitt's sandeel	<i>Ammodytes marinus</i>	73	0.90
	Raitt's sandeel	<i>Ammodytes marinus</i>	75	0.82
	Raitt's sandeel	<i>Ammodytes marinus</i>	84	1.14
	Raitt's sandeel	<i>Ammodytes marinus</i>	96	2.80
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	4.19
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	81	0.99
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	92	1.61
SD10	Raitt's sandeel	<i>Ammodytes marinus</i>	66	0.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	86	2.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	98	2.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	98	3.15
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	4.46
	Raitt's sandeel	<i>Ammodytes marinus</i>	134	4.89
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	61	0.48
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	74	1.26
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	77	0.95
SD11	Raitt's sandeel	<i>Ammodytes marinus</i>	57	0.28
	Raitt's sandeel	<i>Ammodytes marinus</i>	73	0.77
	Raitt's sandeel	<i>Ammodytes marinus</i>	85	1.71
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	3.38
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.84
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.91
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	4.45
	Raitt's sandeel	<i>Ammodytes marinus</i>	118	5.19
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	4.23
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	69	0.67
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	82	1.18
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	91	1.58
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	100	2.24
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	109	3.01
SD12	Raitt's sandeel	<i>Ammodytes marinus</i>	55	0.26

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Raitt's sandeel	<i>Ammodytes marinus</i>	55	0.30
	Raitt's sandeel	<i>Ammodytes marinus</i>	60	0.37
	Raitt's sandeel	<i>Ammodytes marinus</i>	93	2.48
	Raitt's sandeel	<i>Ammodytes marinus</i>	97	2.74
	Raitt's sandeel	<i>Ammodytes marinus</i>	99	2.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.90
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	2.75
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	6.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	127	6.58
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	107	2.92
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	112	3.49
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	115	3.64
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	126	5.16
SD13	Raitt's sandeel	<i>Ammodytes marinus</i>	61	0.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	62	0.36
	Raitt's sandeel	<i>Ammodytes marinus</i>	62	0.41
	Raitt's sandeel	<i>Ammodytes marinus</i>	62	0.46
	Raitt's sandeel	<i>Ammodytes marinus</i>	64	0.49
	Raitt's sandeel	<i>Ammodytes marinus</i>	71	0.66
	Raitt's sandeel	<i>Ammodytes marinus</i>	71	0.75
	Raitt's sandeel	<i>Ammodytes marinus</i>	73	0.84
	Raitt's sandeel	<i>Ammodytes marinus</i>	73	1.03
	Raitt's sandeel	<i>Ammodytes marinus</i>	75	0.83
	Raitt's sandeel	<i>Ammodytes marinus</i>	94	2.55
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.72
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	2.89
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	2.61
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.49
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	5.30
SD14	Raitt's sandeel	<i>Ammodytes marinus</i>	51	0.24
	Raitt's sandeel	<i>Ammodytes marinus</i>	60	0.45
	Raitt's sandeel	<i>Ammodytes marinus</i>	77	1.65
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.97
	Raitt's sandeel	<i>Ammodytes marinus</i>	107	3.59
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	4.91
	Raitt's sandeel	<i>Ammodytes marinus</i>	138	9.56
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	80	1.17
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	85	1.53
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	86	1.58
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	113	3.49
SD15	Raitt's sandeel	<i>Ammodytes marinus</i>	90	2.20
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	89	1.44
SD16	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.07
	Raitt's sandeel	<i>Ammodytes marinus</i>	126	5.59
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	98	2.30
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	117	3.68
SD17	Raitt's sandeel	<i>Ammodytes marinus</i>	90	2.28
	Raitt's sandeel	<i>Ammodytes marinus</i>	91	2.23
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	2.85
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.58

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
SD18	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.65
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	5.96
	Raitt's sandeel	<i>Ammodytes marinus</i>	57	0.29
	Raitt's sandeel	<i>Ammodytes marinus</i>	63	0.51
	Raitt's sandeel	<i>Ammodytes marinus</i>	89	1.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.80
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.44
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	5.60
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	4.31
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	3.90
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.71
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.53
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	52	0.16
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	69	0.65
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	81	1.26
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	95	1.88
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	103	2.23
SD19	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.82
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	4.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	3.75
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	4.30
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.43
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.76
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.98
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	5.84
	Raitt's sandeel	<i>Ammodytes marinus</i>	143	9.30
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	86	1.57
SD20	Raitt's sandeel	<i>Ammodytes marinus</i>	61	0.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	93	2.10
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	3.51
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.25
	Raitt's sandeel	<i>Ammodytes marinus</i>	107	3.56
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.66
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.41
	Raitt's sandeel	<i>Ammodytes marinus</i>	123	6.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	5.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.11
	Raitt's sandeel	<i>Ammodytes marinus</i>	132	6.36
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	64	0.50
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	92	1.76
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	102	2.41
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	102	2.55
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	108	2.68
SD21	Raitt's sandeel	<i>Ammodytes marinus</i>	96	1.70
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	3.94
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	3.19
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	115	3.56
SD22	Raitt's sandeel	<i>Ammodytes marinus</i>	85	1.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.79
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	3.59
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	5.56
SD23	Raitt's sandeel	<i>Ammodytes marinus</i>	90	2.29

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Raitt's sandeel	<i>Ammodytes marinus</i>	93	2.56
	Raitt's sandeel	<i>Ammodytes marinus</i>	98	3.17
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.48
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	5.10
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	5.27
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	83	1.16
SD24	Raitt's sandeel	<i>Ammodytes marinus</i>	84	1.16
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.09
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	3.93
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	87	1.60
SD26	Raitt's sandeel	<i>Ammodytes marinus</i>	104	2.66
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	5.21
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	5.63
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.98
	Raitt's sandeel	<i>Ammodytes marinus</i>	142	7.89
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	89	1.68
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	105	2.91
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	114	3.37
SD27	Raitt's sandeel	<i>Ammodytes marinus</i>	90	1.73
	Raitt's sandeel	<i>Ammodytes marinus</i>	92	2.49
	Raitt's sandeel	<i>Ammodytes marinus</i>	97	2.40
	Raitt's sandeel	<i>Ammodytes marinus</i>	98	2.92
	Raitt's sandeel	<i>Ammodytes marinus</i>	99	2.51
	Raitt's sandeel	<i>Ammodytes marinus</i>	101	4.22
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	3.16
	Raitt's sandeel	<i>Ammodytes marinus</i>	107	3.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	3.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	4.01
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.57
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.78
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	5.33
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	5.41
	Raitt's sandeel	<i>Ammodytes marinus</i>	118	4.41
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	4.88
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	5.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	5.45
	Raitt's sandeel	<i>Ammodytes marinus</i>	131	5.51
	Raitt's sandeel	<i>Ammodytes marinus</i>	136	6.68
	Raitt's sandeel	<i>Ammodytes marinus</i>	139	7.66
SD28	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.96
	Raitt's sandeel	<i>Ammodytes marinus</i>	100	3.22
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.14
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	3.39
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.84
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.94
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	5.05
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	6.09
	Raitt's sandeel	<i>Ammodytes marinus</i>	123	6.22
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.45
	Raitt's sandeel	<i>Ammodytes marinus</i>	130	5.89
	Raitt's sandeel	<i>Ammodytes marinus</i>	130	6.04

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Raitt's sandeel	<i>Ammodytes marinus</i>	130	6.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	135	7.27
	Raitt's sandeel	<i>Ammodytes marinus</i>	135	7.38
	Raitt's sandeel	<i>Ammodytes marinus</i>	135	8.36
	Raitt's sandeel	<i>Ammodytes marinus</i>	137	8.31
	Raitt's sandeel	<i>Ammodytes marinus</i>	140	8.31
	Raitt's sandeel	<i>Ammodytes marinus</i>	141	9.07
	Raitt's sandeel	<i>Ammodytes marinus</i>	145	10.14
	Raitt's sandeel	<i>Ammodytes marinus</i>	146	10.71
	Raitt's sandeel	<i>Ammodytes marinus</i>	149	9.33
	Raitt's sandeel	<i>Ammodytes marinus</i>	153	10.86
	Raitt's sandeel	<i>Ammodytes marinus</i>	180	14.77
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	70	0.80
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	73	0.77
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	83	1.37
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	95	1.99
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	105	2.93
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	165	13.44
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	195	24.98
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	198	26.70
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	207	27.16
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	207	31.67
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	215	31.56
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	228	30.86
SD29	Raitt's sandeel	<i>Ammodytes marinus</i>	119	4.76
SD30	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.03
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	3.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	6.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	134	6.48
SD31	Raitt's sandeel	<i>Ammodytes marinus</i>	113	3.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	4.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.58
SD32	Raitt's sandeel	<i>Ammodytes marinus</i>	97	2.88
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	4.36
SD33	Raitt's sandeel	<i>Ammodytes marinus</i>	96	2.43
	Raitt's sandeel	<i>Ammodytes marinus</i>	138	7.38
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	97	2.19
SD34	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.47
	Raitt's sandeel	<i>Ammodytes marinus</i>	107	3.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.73
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.90
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.93
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	5.11
	Raitt's sandeel	<i>Ammodytes marinus</i>	126	6.41
SD35	Raitt's sandeel	<i>Ammodytes marinus</i>	94	2.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	95	2.83
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.15
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.79
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.60
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.29
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	3.18
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.72

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	5.08
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	5.34
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.35
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	5.64
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.79
	Raitt's sandeel	<i>Ammodytes marinus</i>	128	5.37
	Raitt's sandeel	<i>Ammodytes marinus</i>	133	7.44
	Raitt's sandeel	<i>Ammodytes marinus</i>	151	12.16
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	90	1.86
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	115	3.89
SD36	Raitt's sandeel	<i>Ammodytes marinus</i>	62	0.41
	Raitt's sandeel	<i>Ammodytes marinus</i>	101	3.13
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	3.97
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	3.71
	Raitt's sandeel	<i>Ammodytes marinus</i>	127	6.11
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	67	0.52
SD38	Raitt's sandeel	<i>Ammodytes marinus</i>	89	2.29
	Raitt's sandeel	<i>Ammodytes marinus</i>	101	2.39
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.62
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	3.57
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	4.97
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	92	1.85
SD40	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.28
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	6.46
SD41	Raitt's sandeel	<i>Ammodytes marinus</i>	95	2.72
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.72
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	58	0.30
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	104	2.65
SD42	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.47
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	6.59
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	118	3.20
SD43	Greater sandeel	<i>Hyperoplus lanceolatus</i>	266	66.00
	Raitt's sandeel	<i>Ammodytes marinus</i>	70	0.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.48
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	3.80
	Raitt's sandeel	<i>Ammodytes marinus</i>	148	9.80
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	100	2.22
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	120	4.19
SD45	Raitt's sandeel	<i>Ammodytes marinus</i>	104	3.41
SD46	Raitt's sandeel	<i>Ammodytes marinus</i>	99	3.28
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.50
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.16
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.85
SD48	Raitt's sandeel	<i>Ammodytes marinus</i>	108	4.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	5.06
	Raitt's sandeel	<i>Ammodytes marinus</i>	134	6.95
	Raitt's sandeel	<i>Ammodytes marinus</i>	92	2.38
SD49	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	105	2.76
	Raitt's sandeel	<i>Ammodytes marinus</i>	95	2.70
SD50	Raitt's sandeel	<i>Ammodytes marinus</i>	122	4.83
	Raitt's sandeel	<i>Ammodytes marinus</i>	98	2.84
SD51	Raitt's sandeel	<i>Ammodytes marinus</i>	100	3.15

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	4.05
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	3.97
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	5.28
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	5.47
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	105	2.93
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	116	4.35
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	125	4.76
SD52	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.50
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	3.70
	Raitt's sandeel	<i>Ammodytes marinus</i>	132	5.62
	Raitt's sandeel	<i>Ammodytes marinus</i>	137	7.28
SD53	Raitt's sandeel	<i>Ammodytes marinus</i>	113	4.24
	Raitt's sandeel	<i>Ammodytes marinus</i>	127	5.78
SD54	Raitt's sandeel	<i>Ammodytes marinus</i>	85	2.34
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	3.73
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	4.52
SD55	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.98
	Raitt's sandeel	<i>Ammodytes marinus</i>	107	3.90
SD56	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.11
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	4.16
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.33
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	6.10
	Raitt's sandeel	<i>Ammodytes marinus</i>	132	5.59
	Raitt's sandeel	<i>Ammodytes marinus</i>	160	13.25
SD57	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.79
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	5.86
SD58	Raitt's sandeel	<i>Ammodytes marinus</i>	92	2.72
	Raitt's sandeel	<i>Ammodytes marinus</i>	96	2.62
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	3.15
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.18
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.47
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	3.86
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	4.04
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.95
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	3.40
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	5.74
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	5.65
	Raitt's sandeel	<i>Ammodytes marinus</i>	130	6.81
	Raitt's sandeel	<i>Ammodytes marinus</i>	140	7.87
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	96	2.03
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	104	2.86
SD59	Raitt's sandeel	<i>Ammodytes marinus</i>	96	2.32
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.22
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	4.48
	Raitt's sandeel	<i>Ammodytes marinus</i>	151	11.05
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	91	1.90
SD60	Raitt's sandeel	<i>Ammodytes marinus</i>	93	2.05
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	3.12
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.89
	Raitt's sandeel	<i>Ammodytes marinus</i>	111	4.14
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	5.08
	Raitt's sandeel	<i>Ammodytes marinus</i>	129	6.66
	Raitt's sandeel	<i>Ammodytes marinus</i>	139	8.46

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
SD61	Raitt's sandeel	<i>Ammodytes marinus</i>	119	5.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	122	6.64
SD62	Raitt's sandeel	<i>Ammodytes marinus</i>	120	4.09
	Raitt's sandeel	<i>Ammodytes marinus</i>	128	5.27
SD64	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.71
SD65	Raitt's sandeel	<i>Ammodytes marinus</i>	100	3.55
	Raitt's sandeel	<i>Ammodytes marinus</i>	101	3.30
	Raitt's sandeel	<i>Ammodytes marinus</i>	102	3.20
	Raitt's sandeel	<i>Ammodytes marinus</i>	104	3.15
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	4.98
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	4.73
	Raitt's sandeel	<i>Ammodytes marinus</i>	128	5.51
	Smooth sandeel	<i>Gymnammodytes semisquamatus</i>	116	3.96
SD66	Raitt's sandeel	<i>Ammodytes marinus</i>	55	0.18
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	3.03
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.55
	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.58
	Raitt's sandeel	<i>Ammodytes marinus</i>	119	4.85
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.00
SD67	Raitt's sandeel	<i>Ammodytes marinus</i>	94	2.19
	Raitt's sandeel	<i>Ammodytes marinus</i>	96	2.58
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	3.65
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	4.86
	Raitt's sandeel	<i>Ammodytes marinus</i>	121	4.40
SD68	Raitt's sandeel	<i>Ammodytes marinus</i>	82	1.69
	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.62
SD70	Raitt's sandeel	<i>Ammodytes marinus</i>	101	3.09
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.36
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	4.45
	Raitt's sandeel	<i>Ammodytes marinus</i>	117	4.97
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.30
	Raitt's sandeel	<i>Ammodytes marinus</i>	125	5.05
SD72	Raitt's sandeel	<i>Ammodytes marinus</i>	98	3.18
	Raitt's sandeel	<i>Ammodytes marinus</i>	112	4.44
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	5.29
	Raitt's sandeel	<i>Ammodytes marinus</i>	124	5.95
SD73	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.42
SD75	Raitt's sandeel	<i>Ammodytes marinus</i>	100	2.89
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	4.08
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	4.34
	Raitt's sandeel	<i>Ammodytes marinus</i>	116	5.24
	Raitt's sandeel	<i>Ammodytes marinus</i>	120	4.88
	Raitt's sandeel	<i>Ammodytes marinus</i>	127	4.63
SD76	Raitt's sandeel	<i>Ammodytes marinus</i>	101	3.39
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	3.01
	Raitt's sandeel	<i>Ammodytes marinus</i>	131	6.36
	Raitt's sandeel	<i>Ammodytes marinus</i>	132	4.77
SD77	Raitt's sandeel	<i>Ammodytes marinus</i>	78	1.61
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.13
	Raitt's sandeel	<i>Ammodytes marinus</i>	105	3.20
	Raitt's sandeel	<i>Ammodytes marinus</i>	108	4.74
	Raitt's sandeel	<i>Ammodytes marinus</i>	133	6.32
SD79	Raitt's sandeel	<i>Ammodytes marinus</i>	114	4.93

Station	Common name	Scientific name	Standard length (mm)	Wet (defrosted) weight (g)
SD80	Raitt's sandeel	<i>Ammodytes marinus</i>	106	3.67
	Raitt's sandeel	<i>Ammodytes marinus</i>	109	3.33
	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.05
	Raitt's sandeel	<i>Ammodytes marinus</i>	137	8.35
SD81	Raitt's sandeel	<i>Ammodytes marinus</i>	112	4.42
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	3.77
	Raitt's sandeel	<i>Ammodytes marinus</i>	113	5.11
SD82	Raitt's sandeel	<i>Ammodytes marinus</i>	123	5.18
SD83	Raitt's sandeel	<i>Ammodytes marinus</i>	101	2.94
	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.62
	Raitt's sandeel	<i>Ammodytes marinus</i>	126	6.38
SD85	Raitt's sandeel	<i>Ammodytes marinus</i>	103	3.39
	Raitt's sandeel	<i>Ammodytes marinus</i>	118	4.75
	Raitt's sandeel	<i>Ammodytes marinus</i>	131	6.33
SD86	Raitt's sandeel	<i>Ammodytes marinus</i>	114	5.05
SD87	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.22
SD88	Raitt's sandeel	<i>Ammodytes marinus</i>	110	4.42
SD89	Raitt's sandeel	<i>Ammodytes marinus</i>	95	2.45
SD91	Raitt's sandeel	<i>Ammodytes marinus</i>	113	4.52
	Raitt's sandeel	<i>Ammodytes marinus</i>	115	5.21
	Raitt's sandeel	<i>Ammodytes marinus</i>	152	11.64
SD95	Raitt's sandeel	<i>Ammodytes marinus</i>	81	1.56
SD97	Raitt's sandeel	<i>Ammodytes marinus</i>	116	4.82
SD98	Raitt's sandeel	<i>Ammodytes marinus</i>	93	2.26
SD101	Raitt's sandeel	<i>Ammodytes marinus</i>	103	2.94

Table 9.5 Sandeel catch data

Station	No. of individuals				Catch rate (no. of individuals caught per hour)			Density (no. of individuals caught per m ²)		
	Raitt's sandeel	Smooth sandeel	Greater sandeel	Total	Raitt's sandeel	Smooth sandeel	Greater sandeel	Raitt's sandeel	Smooth sandeel	Greater sandeel
SD01	2	0	0	2	13.0	0.0	0.0	0.0032	0.0000	0.0000
SD02	2	0	0	2	13.7	0.0	0.0	0.0032	0.0000	0.0000
SD03	3	0	0	3	23.6	0.0	0.0	0.0047	0.0000	0.0000
SD04	3	0	0	3	26.2	0.0	0.0	0.0047	0.0000	0.0000
SD05	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD06	7	26	0	33	62.1	230.5	0.0	0.0110	0.0410	0.0000
SD07	5	12	0	17	33.8	81.2	0.0	0.0081	0.0195	0.0000
SD08	4	5	0	9	36.3	45.3	0.0	0.0064	0.0080	0.0000
SD09	6	2	0	8	45.7	15.2	0.0	0.0092	0.0031	0.0000
SD10	6	3	0	9	50.7	25.4	0.0	0.0094	0.0047	0.0000
SD11	9	5	0	14	72.5	40.3	0.0	0.0141	0.0078	0.0000
SD12	12	4	0	16	94.3	31.4	0.0	0.0188	0.0063	0.0000
SD13	17	0	0	17	143.7	0.0	0.0	0.0265	0.0000	0.0000
SD14	7	4	0	11	60.1	34.4	0.0	0.0109	0.0063	0.0000
SD15	1	1	0	2	9.2	9.2	0.0	0.0016	0.0016	0.0000
SD16	2	2	0	4	16.0	16.0	0.0	0.0030	0.0030	0.0000
SD17	6	0	0	6	50.8	0.0	0.0	0.0090	0.0000	0.0000
SD18	10	5	0	15	82.4	41.2	0.0	0.0160	0.0080	0.0000
SD19	10	1	0	11	93.0	9.3	0.0	0.0157	0.0016	0.0000
SD20	11	5	0	16	87.4	39.7	0.0	0.0170	0.0077	0.0000
SD21	3	1	0	4	24.3	8.1	0.0	0.0047	0.0016	0.0000
SD22	4	0	0	4	33.1	0.0	0.0	0.0062	0.0000	0.0000
SD23	8	1	0	9	62.7	7.8	0.0	0.0123	0.0015	0.0000
SD24	3	1	0	4	27.2	9.1	0.0	0.0047	0.0016	0.0000
SD25	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD26	5	3	0	8	42.9	25.7	0.0	0.0078	0.0047	0.0000
SD27	21	0	0	21	184.8	0.0	0.0	0.0322	0.0000	0.0000
SD28	24	12	0	36	208.7	104.3	0.0	0.0386	0.0193	0.0000
SD29	1	0	0	1	7.7	0.0	0.0	0.0016	0.0000	0.0000
SD30	4	0	0	4	34.4	0.0	0.0	0.0062	0.0000	0.0000
SD31	3	0	0	3	20.7	0.0	0.0	0.0048	0.0000	0.0000
SD32	3	0	0	3	24.6	0.0	0.0	0.0047	0.0000	0.0000
SD33	2	1	0	3	15.8	7.9	0.0	0.0031	0.0015	0.0000
SD34	7	0	0	7	63.3	0.0	0.0	0.0111	0.0000	0.0000
SD35	16	2	0	18	140.8	17.6	0.0	0.0253	0.0032	0.0000
SD36	5	1	0	6	50.8	10.2	0.0	0.0078	0.0016	0.0000
SD37	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD38	5	1	0	6	35.7	7.1	0.0	0.0078	0.0016	0.0000
SD39	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD40	2	0	0	2	15.8	0.0	0.0	0.0031	0.0000	0.0000
SD41	2	2	0	4	15.9	15.9	0.0	0.0030	0.0030	0.0000
SD42	2	1	0	3	20.7	10.3	0.0	0.0032	0.0016	0.0000
SD43	4	2	1	7	34.4	17.2	8.6	0.0061	0.0030	0.0015
SD44	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD45	1	0	0	1	9.2	0.0	0.0	0.0016	0.0000	0.0000
SD46	4	0	0	4	33.0	0.0	0.0	0.0062	0.0000	0.0000
SD47	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD48	4	0	0	4	40.2	0.0	0.0	0.0063	0.0000	0.0000

Station	No. of individuals				Catch rate (no. of individuals caught per hour)			Density (no. of individuals caught per m ²)		
	Raitt's sandeel	Smooth sandeel	Greater sandeel	Total	Raitt's sandeel	Smooth sandeel	Greater sandeel	Raitt's sandeel	Smooth sandeel	Greater sandeel
SD49	1	1	0	2	9.8	9.8	0.0	0.0016	0.0016	0.0000
SD50	2	0	0	2	18.5	0.0	0.0	0.0032	0.0000	0.0000
SD51	6	3	0	9	45.1	22.5	0.0	0.0093	0.0047	0.0000
SD52	4	0	0	4	43.6	0.0	0.0	0.0063	0.0000	0.0000
SD53	2	0	0	2	17.2	0.0	0.0	0.0031	0.0000	0.0000
SD54	3	0	0	3	26.2	0.0	0.0	0.0047	0.0000	0.0000
SD55	2	0	0	2	18.4	0.0	0.0	0.0030	0.0000	0.0000
SD56	6	0	0	6	52.4	0.0	0.0	0.0094	0.0000	0.0000
SD57	2	0	0	2	22.3	0.0	0.0	0.0036	0.0000	0.0000
SD58	13	2	0	15	111.4	17.1	0.0	0.0203	0.0031	0.0000
SD59	4	1	0	5	34.4	8.6	0.0	0.0062	0.0016	0.0000
SD60	7	0	0	7	50.9	0.0	0.0	0.0108	0.0000	0.0000
SD61	2	0	0	2	16.3	0.0	0.0	0.0031	0.0000	0.0000
SD62	2	0	0	2	17.1	0.0	0.0	0.0030	0.0000	0.0000
SD63	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD64	1	0	0	1	8.7	0.0	0.0	0.0016	0.0000	0.0000
SD65	7	1	0	8	62.1	8.9	0.0	0.0109	0.0016	0.0000
SD66	6	0	0	6	53.5	0.0	0.0	0.0093	0.0000	0.0000
SD67	5	0	0	5	45.3	0.0	0.0	0.0080	0.0000	0.0000
SD68	2	0	0	2	18.4	0.0	0.0	0.0031	0.0000	0.0000
SD69	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD70	6	0	0	6	48.9	0.0	0.0	0.0093	0.0000	0.0000
SD71	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD72	4	0	0	4	38.8	0.0	0.0	0.0063	0.0000	0.0000
SD73	1	0	0	1	8.3	0.0	0.0	0.0016	0.0000	0.0000
SD74	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD75	6	0	0	6	43.2	0.0	0.0	0.0091	0.0000	0.0000
SD76	4	0	0	4	32.5	0.0	0.0	0.0064	0.0000	0.0000
SD77	5	0	0	5	44.2	0.0	0.0	0.0080	0.0000	0.0000
SD78	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD79	1	0	0	1	7.6	0.0	0.0	0.0016	0.0000	0.0000
SD80	4	0	0	4	39.5	0.0	0.0	0.0060	0.0000	0.0000
SD81	3	0	0	3	21.5	0.0	0.0	0.0047	0.0000	0.0000
SD82	1	0	0	1	9.9	0.0	0.0	0.0015	0.0000	0.0000
SD83	3	0	0	3	26.2	0.0	0.0	0.0047	0.0000	0.0000
SD84	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD85	3	0	0	3	28.5	0.0	0.0	0.0048	0.0000	0.0000
SD86	1	0	0	1	8.2	0.0	0.0	0.0016	0.0000	0.0000
SD87	1	0	0	1	9.2	0.0	0.0	0.0016	0.0000	0.0000
SD88	1	0	0	1	8.2	0.0	0.0	0.0016	0.0000	0.0000
SD89	1	0	0	1	9.2	0.0	0.0	0.0016	0.0000	0.0000
SD90	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD91	3	0	0	3	28.8	0.0	0.0	0.0046	0.0000	0.0000
SD92	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD93	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD94	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD95	1	0	0	1	7.9	0.0	0.0	0.0016	0.0000	0.0000
SD96	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD97	1	0	0	1	7.5	0.0	0.0	0.0015	0.0000	0.0000

Station	No. of individuals				Catch rate (no. of individuals caught per hour)			Density (no. of individuals caught per m ²)		
	Raitt's sandeel	Smooth sandeel	Greater sandeel	Total	Raitt's sandeel	Smooth sandeel	Greater sandeel	Raitt's sandeel	Smooth sandeel	Greater sandeel
SD98	1	0	0	1	8.7	0.0	0.0	0.0016	0.0000	0.0000
SD99	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD100	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD101	1	0	0	1	6.9	0.0	0.0	0.0016	0.0000	0.0000
SD102	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
SD103	0	0	0	0	0.0	0.0	0.0	0.0000	0.0000	0.0000
Total	385	111	1	497						