

Cruise report

Sand eel survey 2022

Arctic Hunter and M/S Reykjanes

North Sea/Skagerrak – Sand eel area 1r, 2r & 3r

Including the extended area

Cruise: 1/2022

Vessel: Arctic Hunter

Area: Nord Sea, sand eel area 1r & 2r

Departure: Esbjerg **Date:** 18.11.2022 kl 20:00

Arrival: Esbjerg **Date:** 3.12.2022 kl 10:00

Vessel: M/S Reykjanes

Area: Nord Sea, sand eel area 1r & 3r

Departure: Esbjerg **Date:** 18.11.2022 Kl. 20:00

Arrival: Esbjerg **Date:** 10.12.2022

Project number: 39064

Participants (scientific)

Arctic Hunter:

Cruise leader: Dirk Cornelis Tijssen Danmarks Tekniske Universitet, Institut for Monitoring og Data (DTU Aqua) 18/11 – 3/12 2022

Consultant: Henning Pedersen FOGA Aps, Esbjerg 18/11 – 3/12 2022

Reykjanes:

Cruise leader: Jan Thomsen Danmarks Tekniske Universitet, Institut for Monitoring og Data (DTU Aqua) 18/11 – 10/12 2022

Assistant: Brian Thomsen Danmarks Tekniske Universitet, Institut for Monitoring og Data (DTU Aqua) 18/11 – 2/12 2022

Objectives

The purpose of the sand eel dredge survey is to collect sand eels buried in the seabed and compare catches (number and age composition) with the previous year's collections to assess the 2022 year class strength of sand eel in area 1r, 2r and 3r of the different areas adopted by ICES in 2016 (figure 1). Data from the dredge survey is the basis for calculating an index, which is used in the stock assessment for sand eel in the North Sea.

Achievements

Types of data collected

- Dredge (sand eels; species, weight, length)
- Samples of non-sand eel species from each dredge haul

Arctic Hunter:

- 16 days at sea
- 158 valid dredge hauls distributed over 53 sample positions.

Reykjanes:

- 23 days at sea
- 164 valid dredge hauls distributed over 56 sample positions.

Sampling method and strategy

Due to the extension of the survey area agreed in 2017, two vessels participated in the survey: Arctic Hunter and Reykjanes. Reykjanes worked on sand eel area 3r and the northern part of eel area 2r (i.e. the North Sea and the major part of Skagerrak). Arctic Hunter carried out the remaining stations (i.e. the central and southern part of the North Sea).

Number of samples per position

At all positions, where samples are taken, three stations are carried out in a "star" formation using the dredge.

Time of the day for sampling

Sampling using the dredge is carried out during night time (i.e. 15 min after sunset to 15 min before sunrise).

Haul duration and hauling speed

The duration for each haul is 10 min and the hauling speed is 2 knot.

Working up of samples on board

For more detailed description of the working-up procedure, see the cruise program.

Catch from dredge

The catch of the sand eel species is sorted (Lesser sand eel (*Ammodytes marinus* and *Ammodytes tobianus*) are pooled). The weight and the length distribution of the lesser sand eel are recorded. Sub-samples are frozen for split into the two species and age reading later in the laboratory. Each drag is worked up separately.

Samples of non-sand eel species

The species were sorted in category based of the fragility of the species in plastic bags. The bags were frozen immediately after sorting.

Results

In total where 314 valid hauls were fished using the dredges (table 1) distributed on 108 positions. 2 stations (436408 and 130) were not fished due to increasing wind speed above max for fishing. The weather conditions were in periods very rough and prevented fishing for approx. 7 day in total. All stations carried out during the survey are listed in Table 2.

Table 1 Valid samples obtained during the Sand eels survey 2022 by vessel.

Row Labels	1r		2r		3r		Total Stations	Total Hauls
	Stations	Hauls	Stations	Hauls	Stations	Hauls		
Arctic Hunter	140	47	18	6			158	53
Reykjanes	9	3	92	31	63	21	164	55
Grand Total	149	50	110	37	63	21	322	108

Table 2 Valid samples obtained during the Sand eels survey 2022 by priority.

Priority	Hauls	Positions
Priority high	254	85
Priority Low	65	22
	3	1
Grand Total	322	108

Compare of achieved number of hauls to planned number of hauls

In total 128 standard positions (priority = high and low) were potentially listed to be sampled. Each position is defined as either high or low priority. Normally, it is not possible to fish all the positions and some of the low priority positions should be skipped. Each position is supposed to be fished three times (star formation). If all stations were fished, this should result in a total of 384 dredge stations. Of the total positions, 93 positions have high priority and 35 have low priority. In 2022 a total of 108 positions were sampled resulting in 322 dredge hauls. 85 of the high priority positions were fished. 22 positions of low priority and 1 without priority were fished (Table 2). The reason for not being able to fish all high priority positions were bad weather, which ruined the planning and forced sub-optimal performance due to time constrains.

Two stations were only fished by 2 haul (1 high and 1 low priority). The rest (106 positions) were fished by 3 hauls. The reason for less hauls than planned at those station was bad wind combined with logistic challenges. In the actual cases, the windy conditions prevented to complete all three hauls at a certain position and it was then decided instead of waiting for better weather at the position, to optimize the planning by using the unfavourable period to steam to the next position in order to save time overall.

The cruise were prolonged with 9 days (1 day for Arctic Hunter and 8 days Reykjanes) due to the windy weather condition during the survey. Originally, the survey was planned to the extent of 30 days at sea in total.

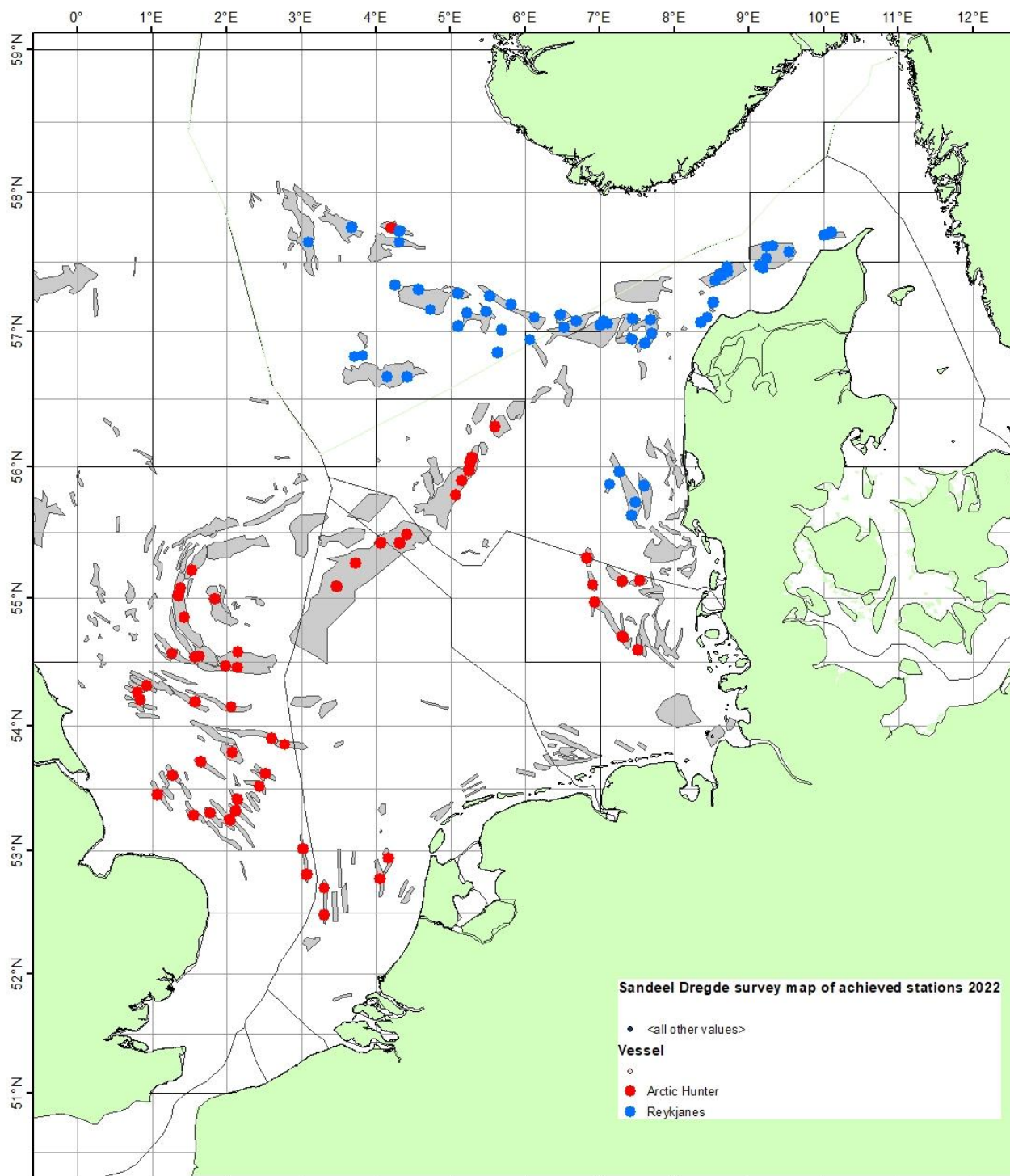


Figure 1 Realized stations in sand eel area 1r, 2r and 3r for the November/December cruise 2022 (Arctic Hunter (blue) and Reykjanes (red)).

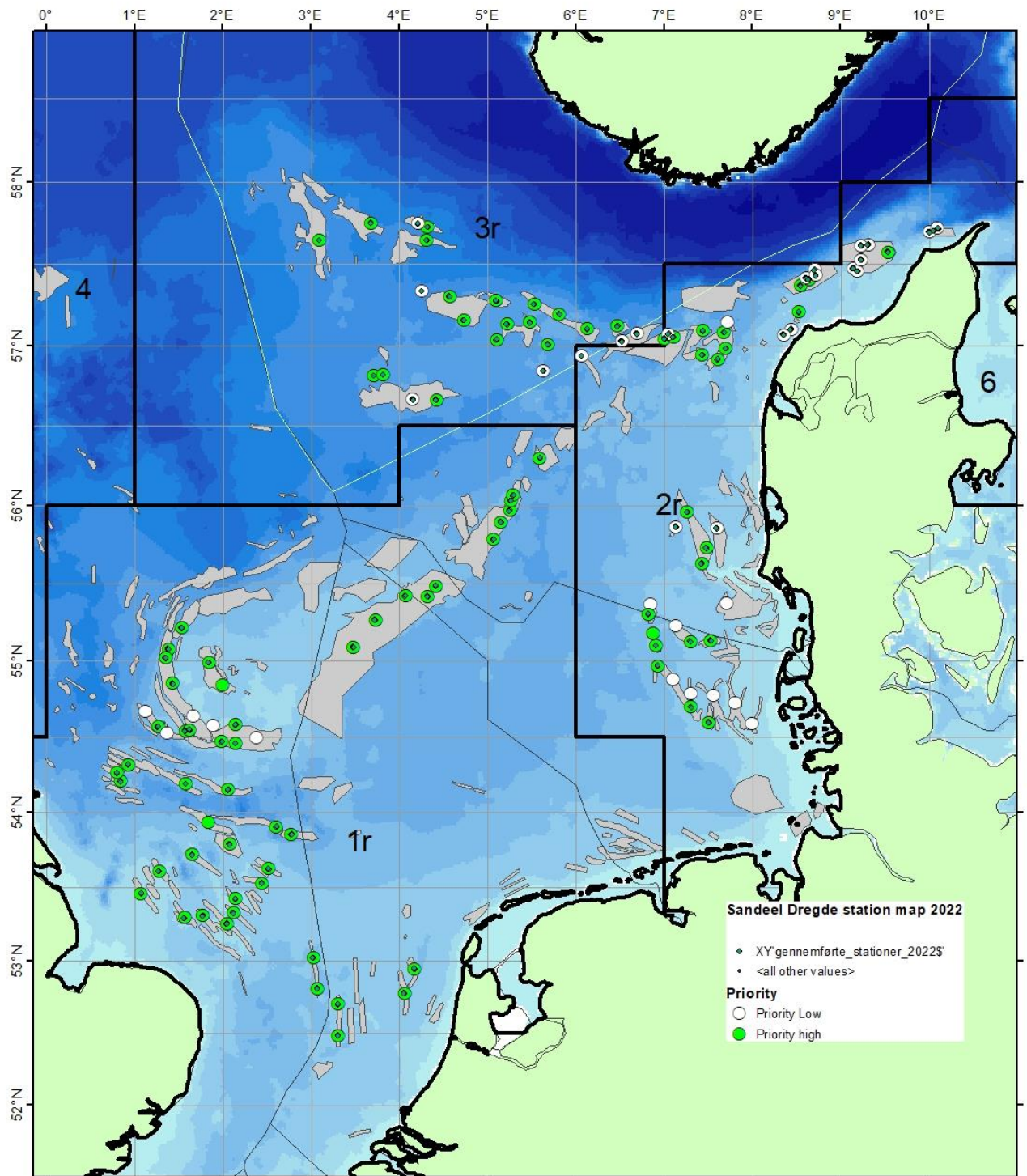


Figure 2 Compare of planned stations (according to Cruise plan) and realized stations in sand eel area 1r, 2r and 3r for the November/December cruise 2022. (Planned High priority station (green) and Planned Low priority station (white) and realized station (black dot).

132	Reykjanes	V	5-12 2022	10	57.43.0880 N	010.06.4760 E	20	44G0	0.327687	DK3	23	6	2r	Skagerrak	Priority Low
80	Reykjanes	V	5-12 2022	10	57.42.2630 N	010.03.2800 E	20	44G0	0.321129	DK3	24	3	2r	Skagerrak	Priority Low
80	Reykjanes	V	5-12 2022	10	57.42.0790 N	010.02.9390 E	20	44G0	0.336282	DK3	24	3	2r	Skagerrak	Priority Low
80	Reykjanes	V	5-12 2022	10	57.42.0020 N	010.03.5510 E	20	44G0	0.331217	DK3	24	3	2r	Skagerrak	Priority Low
81	Reykjanes	V	5-12 2022	10	57.41.7290 N	010.00.3540 E	20	44G0	0.332447	DK3	54	4	2r	Skagerrak	Priority Low
81	Reykjanes	V	5-12 2022	10	57.41.7870 N	009.59.8040 E	20	44F9	0.333862	DK3	54	4	2r	Skagerrak	Priority Low
81	Reykjanes	V	6-12 2022	10	57.41.5330 N	010.00.0270 E	20	44G0	0.313353	DK3	54	4	2r	Skagerrak	Priority Low
77	Reykjanes	V	6-12 2022	10	57.34.4330 N	009.32.3340 E	20	44F9	0.329713	DK3	21	5	2r	Skagerrak	Priority high
77	Reykjanes	V	6-12 2022	10	57.34.4780 N	009.31.8450 E	20	44F9	0.338529	DK3	21	5	2r	Skagerrak	Priority high
77	Reykjanes	V	6-12 2022	10	57.34.1900 N	009.32.0040 E	20	44F9	0.325977	DK3	21	5	2r	Skagerrak	Priority high
78	Reykjanes	V	6-12 2022	10	57.37.2020 N	009.18.5660 E	20	44F9	0.316449	DK3	22	2	2r	Skagerrak	Priority Low
78	Reykjanes	V	6-12 2022	10	57.36.9520 N	009.18.4200 E	20	44F9	0.330277	DK3	22	2	2r	Skagerrak	Priority Low
78	Reykjanes	V	6-12 2022	10	57.37.0500 N	009.18.9580 E	20	44F9	0.333884	DK3	22	2	2r	Skagerrak	Priority Low
79	Reykjanes	V	6-12 2022	10	57.36.8690 N	009.13.9500 E	20	44F9	0.323336	DK3	22	2	2r	Skagerrak	Priority Low
79	Reykjanes	V	6-12 2022	10	57.36.6320 N	009.13.6870 E	20	44F9	0.33646	DK3	22	2	2r	Skagerrak	Priority Low
79	Reykjanes	V	6-12 2022	10	57.36.6430 N	009.14.1810 E	20	44F9	0.327375	DK3	22	2	2r	Skagerrak	Priority Low
76	Reykjanes	V	6-12 2022	10	57.31.6980 N	009.13.8420 E	20	44F9	0.333003	DK3	19	2	2r	Skagerrak	Priority Low
76	Reykjanes	V	6-12 2022	10	57.31.5050 N	009.13.4830 E	20	44F9	0.334234	DK3	19	2	2r	Skagerrak	Priority Low
76	Reykjanes	V	7-12 2022	10	57.31.3710 N	009.14.0330 E	20	44F9	0.333687	DK3	19	2	2r	Skagerrak	Priority Low
75	Reykjanes	V	7-12 2022	10	57.27.5230 N	009.11.1990 E	20	43F9	0.332604	DK3	21	8	2r	Skagerrak	Priority Low
75	Reykjanes	V	7-12 2022	10	57.27.3270 N	009.10.8820 E	20	43F9	0.322011	DK3	21	8	2r	Skagerrak	Priority Low
75	Reykjanes	V	7-12 2022	10	57.27.2150 N	009.11.3830 E	20	43F9	0.327291	DK3	21	8	2r	Skagerrak	Priority Low
72	Reykjanes	V	7-12 2022	10	57.28.5060 N	009.08.5880 E	20	43F9	0.322468	DK3	21	8	2r	Skagerrak	Priority Low
72	Reykjanes	V	7-12 2022	10	57.28.6680 N	009.08.2810 E	20	43F9	0.313477	DK3	21	8	2r	Skagerrak	Priority Low
72	Reykjanes	V	7-12 2022	10	57.28.4050 N	009.08.0390 E	20	43F9	0.329941	DK3	21	8	2r	Skagerrak	Priority Low
73	Reykjanes	V	7-12 2022	10	57.28.0660 N	008.42.0500 E	20	43F8	0.332398	DK3	41	2	2r	Skagerrak	Priority Low
73	Reykjanes	V	7-12 2022	10	57.27.8950 N	008.41.7400 E	20	43F8	0.325751	DK3	41	2	2r	Skagerrak	Priority Low
73	Reykjanes	V	7-12 2022	10	57.27.7680 N	008.42.2210 E	20	43F8	0.324237	DK3	41	2	2r	Skagerrak	Priority Low
74	Reykjanes	V	7-12 2022	10	57.26.1120 N	008.42.8560 E	20	43F8	0.332259	DK3	28	0	2r	Skagerrak	Priority Low
74	Reykjanes	V	7-12 2022	10	57.25.9490 N	008.42.5420 E	20	43F8	0.324271	DK3	28	0	2r	Skagerrak	Priority Low
74	Reykjanes	V	7-12 2022	10	57.25.8190 N	008.43.1010 E	20	43F8	0.329757	DK3	28	0	2r	Skagerrak	Priority Low
71	Reykjanes	V	7-12 2022	10	57.24.9740 N	008.36.5230 E	20	43F8	0.338526	DK3	30	0	2r	Skagerrak	Priority Low
71	Reykjanes	V	7-12 2022	10	57.24.9940 N	008.36.0080 E	20	43F8	0.337772	DK3	30	0	2r	Skagerrak	Priority Low
71	Reykjanes	V	8-12 2022	10	57.24.7020 N	008.36.2180 E	20	43F8	0.339667	DK3	30	0	2r	Skagerrak	Priority Low
70	Reykjanes	V	8-12 2022	10	57.24.4640 N	008.38.1810 E	20	43F8	0.328237	DK3	27	0	2r	Skagerrak	Priority high
70	Reykjanes	V	8-12 2022	10	57.24.2190 N	008.37.9700 E	20	43F8	0.332493	DK3	27	0	2r	Skagerrak	Priority high
70	Reykjanes	V	8-12 2022	10	57.24.3120 N	008.38.4990 E	20	43F8	0.333138	DK3	27	0	2r	Skagerrak	Priority high
69	Reykjanes	V	8-12 2022	10	57.22.2010 N	008.32.8590 E	20	43F8	0.344687	DK3	31	3	2r	Skagerrak	Priority high
69	Reykjanes	V	8-12 2022	10	57.22.1070 N	008.32.7310 E	20	43F8	0.33485	DK3	31	3	2r	Skagerrak	Priority high
69	Reykjanes	V	8-12 2022	10	57.21.9150 N	008.32.5650 E	20	43F8	0.330758	DK3	31	3	2r	Skagerrak	Priority high
67	Reykjanes	V	8-12 2022	10	57.12.4710 N	008.30.9350 E	20	43F8	0.327986	DK3	21	4	2r	Skagerrak	Priority high
67	Reykjanes	V	8-12 2022	10	57.12.2250 N	008.31.3310 E	20	43F8	0.335131	DK3	21	4	2r	Skagerrak	Priority high
67	Reykjanes	V	8-12 2022	10	57.12.5290 N	008.31.4570 E	20	43F8	0.337827	DK3	21	4	2r	Skagerrak	Priority high
65	Reykjanes	V	8-12 2022	10	57.06.1510 N	008.26.2670 E	48	43F8	0.34293	DK3	19	2	2r	Skagerrak	Priority Low
65	Reykjanes	V	8-12 2022	10	57.06.0020 N	008.25.8450 E	48	43F8	0.340837	DK3	19	2	2r	Skagerrak	Priority Low
65	Reykjanes	V	8-12 2022	10	57.05.8950 N	008.26.3300 E	48	43F8	0.330834	DK3	19	2	2r	Skagerrak	Priority Low
66	Reykjanes	V	9-12 2022	10	57.04.0310 N	008.21.3570 E	48	43F8	0.331667	DK3	21	4	2r	Skagerrak	Priority Low
66	Reykjanes	V	9-12 2022	10	57.04.0110 N	008.20.8210 E	48	43F8	0.334015	DK3	21	4	2r	Skagerrak	Priority Low
66	Reykjanes	V	9-12 2022	10	57.03.7610 N	008.21.0890 E	48	43F8	0.327336	DK3	21	4	2r	Skagerrak	Priority Low
82	Reykjanes	V	9-12 2022	10	55.57.4810 N	007.15.5570 E	48	40F7	0.330062	DK3	25	6	2r	West Coast Jutland	Priority high
82	Reykjanes	V	9-12 2022	10	55.57.3310 N	007.15.2710 E	48	40F7	0.327718	DK3	25	6	2r	West Coast Jutland	Priority high
82	Reykjanes	V	9-12 2022	10	55.57.2160 N	007.15.8090 E	48	40F7	0.32649	DK3	25	6	2r	West Coast Jutland	Priority high
83	Reykjanes	V	9-12 2022	10	55.51.8400 N	007.08.0420 E	48	40F7	0.344499	DK3	25	6	2r	West Coast Jutland	Priority Low
83	Reykjanes	V	9-12 2022	10	55.51.7930 N	007.07.4770 E	48	40F7	0.352958	DK3	25	6	2r	West Coast Jutland	Priority Low
83	Reykjanes	V	9-12 2022	10	55.51.5570 N	007.07.7860 E	48	40F7	0.332254	DK3	25	6	2r	West Coast Jutland	Priority Low
103	Reykjanes	V	9-12 2022	10	55.51.1980 N	007.35.2350 E	48	40F7	0.344728	DK3	20	10	2r	West Coast Jutland	Priority Low
103	Reykjanes	V	10-12 2022	10	55.51.0270 N	007.35.5360 E	48	40F7	0.332062	DK3	20	10	2r	West Coast Jutland	Priority Low
103	Reykjanes	V	10-12 2022	10	55.51.2810 N	007.35.8190 E	48	40F7	0.351495	DK3	20	10	2r	West Coast Jutland	Priority Low
102	Reykjanes	V	10-12 2022	10	55.43.7090 N	007.28.6430 E	48	40F7	0.332253	DK3	23	11	2r	West Coast Jutland	Priority high
102	Reykjanes	V	10-12 2022	10	55.43.4880 N	007.28.3700 E	48	40F7	0.337833	DK3	23	11	2r	West Coast Jutland	Priority high
102	Reykjanes	V	10-12 2022	10	55.43.5300 N	007.28.9530 E	48	40F7	0.325324	DK3	23	11	2r	West Coast Jutland	Priority high
85	Reykjanes	V	10-12 2022	10	55.37.7530 N	007.25.5110 E	48	40F7	0.329245	DK3	17	15	2r	West Coast Jutland	Priority high
85	Reykjanes	V	10-12 2022	10	55.37.4960 N	007.25.2470 E	48	40F7	0.338364	DK3	17	15	2r	West Coast Jutland	Priority high
85	Reykjanes	V	10-12 2022	10	55.37.5670 N	007.25.7910 E	48	40F7	0.340259	DK3	17	15	2r	West Coast Jutland	Priority high