

DTU Aqua



## Cruise Report

Sand eel Dredge Survey, Sand eel Area 1 and 3, 2012

Vessel: Reykjanes

Cruise dates (planned): 22.11.2012 – 7.12.2012

Cruise number: 2012

Cruise name: Sand eel Dredge Survey, Sand eel Area 1 and 3

<b>Port of departure:</b>	Esbjerg	<b>Date:</b>	22.11.2012
<b>Port of return:</b>	Esbjerg	<b>Date:</b>	7.12.2012
<b>Other ports:</b>	Hanstholm	<b>Date and justification:</b>	

## Participants

<b>Leg #: 1</b>		
<b>Name</b>	<b>Institute</b>	<b>Function and main tasks</b>
Hans Olesen	DTU Aqua	Cruise leader
Flemming Thaarup	DTU Aqua	Assistant

<b>Leg #: 2</b>		
<b>Name</b>	<b>Institute</b>	<b>Function and main tasks</b>
Flemming Thaarup	DTU Aqua	Cruise leader

## Objectives

The purpose of the sand eel dredge survey was to collect sand eels buried in the seabed and compare catches (number and age composition) with the previous year's collections to assess the 2012 year class strength of sand eel in the different areas adopted by ICES in 2009. Data from the dredge survey is the basis for calculating a 0-group index, which will be used in stock assessment.

In addition, it was the aim to validate/quality ensure each haul using bottom contact sensors mounted on the gear (dredges).

## **Itinerary**

The vessel departed Esbjerg harbor 22.11.2012 at 20.00 hrs. and arrived back at Esbjerg harbor 7.12.2012 at 14.00 hrs. Sampling with the modified dredge typically started just after sunset (UTC 17.00 hrs) and the last station of the night was completed before sunrise (UTC 04.00 – 06.00 hrs) i.e. fishing was only conducted during darkness.

## **Achievements**

Types of data collected

- GPS Positions
- Depth
- Dredge (sand eels; species, weight, length)
- Van Veen grab (sediment samples; grain size composition)

Achievements in 2012:

- 15 days at sea (planned: 15)
- 225 stations; 59 sediment grab samples and 166 dredge hauls distributed over 52 sample positions (planned 48).

## **Methods**

On each sampling location three hauls were carried out with the modified mussel dredge according to descriptions for fishing with modified mussel dredge used since 2004. The DK II dredge was used as the primary gear and the DK I and DK IV dredge served as 'back-up'.

On new sample locations sediment samples were taken with the Van Veen grab (0.2m<sup>2</sup>), for the determination of grain size composition i.e. whether the bottom could be classified as a suitable habitat for sand eel (e.g. could a very fine-grained sediment be unfit as overwintering habitat).

### Time of sampling

Sand eels survive the winter by burying in the seabed, but can under some circumstances be forced to seek food in the water column. In these cases, the food search is almost exclusively carried out in darkness. In order to ensure that as large and constantly a fraction of sand eels as possible is available for the fishing gear the fishing was therefore exclusively done during darkness (i.e. optimizing the constancy of the catch ability).

Sailing between sampling locations were hence, if possible, done during the light hours of the day.

### Prioritization of the sampling

It was sought after, that samples should be collected from all of the planned positions. In the event of problems causing exclusion of locations, e.g. by bad weather, the highest priority was given to the locations where samples had been collected during previous sand eel surveys or where the samples were considered to provide important information for a specific area. Lowest priority was given to the positions where only a few previous

sand eel cruises had taken samples or where the samples were not considered to have important information for a specific area. The organization of the sampling (sail route) was done, so time spent sailing between locations was minimized.

#### Processing of samples at sea

- Greater sand eel (*Hyperoplus lanceolatus*) and Smooth sand eel (*Gymnammodytessemisquamatus*) were identified at sea and discarded to separate samplebags. Small sand eel (*Ammodytes tobianus*) were not separated, and thus measured together with the lesser sand eel and first identified on land.
- Numbers of sand eels (total or sample) was recorded in a station scheme for each haul.
- One of the 3 hauls for each sample location was processed at sea
- All sand eels (or a sample) was length measured to the nearest half cm (scm) and the results were introduced in a graduated scheme.
- The fish were gathered in bags for each scm group, for each haul, which again were gathered for each location.

#### Bottom contact

In order to be able to carry out an assessment of the individual hauls validity (in addition to the skipper's assessment of the haul quality) various forms of technical means for the determination of the dredge's contact with the bottom were used. There were mechanical bottom contacts fitted on both the dredges, each connected to a log, which registered contact/no contact each second. This enabled the calculation of the part of the haul where the dredge had bottom contact. This was used to exclude hauls with a low bottom contact frequency from the later data analysis.

## Results

The sand eel dredge survey in sand eel areas 1 and 3 was carried out in accordance with the cruise program in the period from November 22 - December 7. 52 positions were sampled; 33 in area 1 and 19 in area 3. Catches of sand eel were generally larger in area 1 than in area 3.

**Table 1.** Station list. VV refers to Van Veen grab (sediment sample) and DK 1-4 are dredges (hauls).

Date	Position	Station	Sandeel_area	Gear	Start_UTC	End_UTC	Start_lon	Start_lat	End_lon	End_lat	Depth_m
23-11-2012	4165-16	1	1	VV	14:55		053527	561781			41
23-11-2012	4165-16	2	1	VV	14:59		053531	561784			39
23-11-2012	4165-16	3	1	VV	15:05		053547	561795			38
23-11-2012	4165-16	4	1	DK2	16:32	16:42	053544	561772	053501	561796	39
23-11-2012	4165-16	5	1	DK2	17:02	17:12	053531	561798	053519	561767	39
23-11-2012	4165-16	6	1	DK2	17:27	17:37	053546	561780	053488	561783	39
23-11-2012	4165-16	7	1	DK2	17:54	18:04	053518	561795	053531	561762	39
23-11-2012	4165-16	8	1	DK2	18:18	18:28	053512	561778	053564	561794	39
23-11-2012	4165-02	9	1	DK2	21:29	21:39	051737	560395	051710	560366	39
23-11-2012	4165-02	10	1	DK2	21:53	22:03	051717	560352	051718	560384	39
23-11-2012	4165-02	11	1	DK2	22:17	22:27	051700	560383	051742	560362	39
23-11-2012	4165-02	12	1	DK2	22:44	22:54	051751	560374	051694	560571	39
23-11-2012	4165-02	13	1	DK2	23:09	23:19	051712	560362			39
23-11-2012	4165-02	14	1	VV	23:43		051723	560376			39
23-11-2012	4165-02	15	1	VV	23:46		051726	560378			39
23-11-2012	4165-02	16	1	VV	23:51		051731	560380			39
24-11-2012	4165-01	17	1	VV	00:18		051568	560172			37
24-11-2012	4165-01	18	1	VV	00:21		051568	560171			37
24-11-2012	4165-01	19	1	VV	00:25		051572	560173			37
24-11-2012	4165-01	20	1	DK2	00:39	00:49	051571	560172	051516	560167	37
24-11-2012	4165-01	21	1	DK2	01:00	01:10	051533	560178	051574	560157	37
24-11-2012	4165-01	22	1	DK2	01:21	01:31	051560	560162	051542	560191	37
24-11-2012	4165-01	23	1	DK2	01:43	01:53	051561	560183	051542	560154	37
24-11-2012	4165-01	24	1	DK2	02:11	02:21	051548	560166	051593	560188	37
24-11-2012	4065-03	25	1	DK1	04:03	04:13	051517	555804	051472	555784	43
24-11-2012	4065-03	26	1	DK1	04:24	04:34	051501	555782	051480	555808	43
24-11-2012	4065-03	27	1	DK1	04:47	04:57	051479	555805	051517	555783	43
24-11-2012	4065-03	28	1	VV	05:07		051500	555787			43
24-11-2012	4065-03	29	1	VV	05:13		051503	555792			43

24-11-2012	4065-03	30	1	VV	05:18		051511	555795			43
24-11-2012	4065-03	31	1	VV	16:35		051818	555990			43
24-11-2012	4065-03	32	1	VV	16:39		051822	555992			43
24-11-2012	4065-03	33	1	VV	16:43		051823	555993			44
24-11-2012	4065-03	34	1	DK2	16:58	17:08	051844	555986	051783	555994	44
24-11-2012	4065-03	35	1	DK2	17:22	17:32	051808	560002	051839	555971	44
24-11-2012	4065-03	36	1	DK2	17:43	17:53	051811	555976	051835	560008	44
24-11-2012	4065-03	37	1	DK2	18:06	18:16	051838	555995	051783	565980	44
24-11-2012	4065-03	38	1	DK2	18:30	18:40	051819	555979	051822	560015	44
24-11-2012	4065-02	39	1	DK2	20:01	20:11	050894	555551	050879	555319	38
24-11-2012	4065-02	40	1	DK2	20:24	20:34	050895	555330	050872	555362	38
24-11-2012	4065-02	41	1	DK2	20:48	20:58	050858	555350	050914	555339	38
24-11-2012	4065-02	42	1	DK2	21:11	21:21	050917	555354	050861	555338	38
24-11-2012	4065-02	43	1	DK2	21:34	21:44	050863	555332	050911	555351	38
24-11-2012	4065-02	44	1	DK2	21:54		050902	555350			38
24-11-2012	4065-02	45	1	DK2	22:05		050862	555360			38
24-11-2012	4065-02	46	1	DK2	22:10		050895	555357			38
24-11-2012	4065-01	47	1	VV	23:09		050377	554687			35
24-11-2012	4065-01	48	1	VV	23:12		050373	554690			35
24-11-2012	4065-01	49	1	VV	23:15		050371	554691			35
24-11-2012	4065-01	50	1	DK2	23:40	23:50	050358	554699	050400	554683	35
24-11-2012	4065-01	51	1	DK2	00:03	00:13	050371	554682	050412	554716	35
24-11-2012	4065-01	52	1	DK2	00:25	00:35	050412	554699	050345	554681	35
24-11-2012	4065-01	53	1	DK2	00:46	00:56	050353	554690	050412	554687	35
24-11-2012	4065-01	54	1	DK2	01:02	01:12	050380	554681	050382	554719	35
26-11-2012	3964-03	55	1	VV	15:34		042456	552899			28
26-11-2012	3964-03	56	1	DK2	15:51	16:01	042430	552895	042487	552905	28
26-11-2012	3964-03	57	1	DK2	16:11	16:21	042474	552889	042441	552917	28
26-11-2012	3964-03	58	1	DK2	16:31	16:41	042457	552914	042457	552879	28
26-11-2012	3964-02	59	1	DK2	17:20	17:30	041941	552501	041881	552489	33
26-11-2012	3964-02	60	1	DK2	17:44	17:54	041887	552500	041945	552485	33
26-11-2012	3964-02	61	1	DK2	18:04	18:14	041917	552485	041898	552515	33
26-11-2012	3964-02	62	1	VV	18:24		041910	552499			32
26-11-2012	3964-01	63	1	VV	19:34		040403	552507			25
26-11-2012	3964-01	64	1	DK2	19:49	19:59	040360	552504	040418	552514	25
26-11-2012	3964-01	65	1	DK2	20:09	20:19	040404	552496	040381	552526	25
26-11-2012	3964-01	66	1	DK2	20:28	20:38	040397	552520	040362	552487	25
26-11-2012	3963-04	67	1	DK2	22:12	22:22	034376	551594	034331	551569	29
26-11-2012	3963-04	68	1	DK2	22:33	22:43	034317	551577	034378	551582	29
26-11-2012	3963-04	69	1	DK2	22:52	23:02	034352	551573	034327	551603	29

26-11-2012	3963-04	70	1	VV	23:12		034350	551595			29
27-11-2012	3963-01	71	1	VV	00:43		032856	550522			29
27-11-2012	3963-01	72	1	DK2	00:56	01:06	032839	550518	032895	550527	29
27-11-2012	3963-01	73	1	DK2	01:16	01:26	032868	550510	032844	550541	29
27-11-2012	3963-01	74	1	DK2	01:39	01:49	032850	550511	032876	550539	29
27-11-2012	3762-02	75	1	DK2	16:17	16:27	020384	540897	020328	540894	28
27-11-2012	3762-02	76	1	DK2	16:39	16:49	020345	540888	020378	540914	28
27-11-2012	3762-02	77	1	DK2	16:59	17:09	020379	540891	020331	540910	28
27-11-2012	3762-02	78	1	VV	17:19		020361	540893			28
27-11-2012	3761-08	79	1	VV	19:29		013473	541138			29
27-11-2012	3761-08	80	1	DK2	19:40	19:50	013490	541139	013435	541146	29
27-11-2012	3761-08	81	1	DK2	20:01	20:11	013457	541130	013471	541160	29
27-11-2012	3761-08	82	1	DK2	20:23	20:33	013445	541137	013505	541146	29
27-11-2012	3760-03	83	1	DK2	23:20	23:30	005010	541237	005067	541228	41
27-11-2012	3760-03	84	1	DK2	23:40	23:50	005035	541227	005018	541258	44
28-11-2012	3760-03	85	1	DK2	00:05	00:15	005022	541227	005065	541251	44
28-11-2012	3760-03	86	1	VV	00:28		005040	541234			42
28-11-2012	3760-04	87	1	DK2	01:38	01:48	004791	541548	004796	541581	41-63
28-11-2012	3760-04	88	1	DK2	02:00	02:10	004807	541571	004757	541550	44-56
28-11-2012	3760-04	89	1	DK2	02:23	02:33	004807	541555	004751	541571	35-45
28-11-2012	3760-04	90	1	VV	02:39		004781	541569			43
28-11-2012	3760-05	91	1	VV	03:36		005566	541891			42
28-11-2012	3760-05	92	1	DK2	03:47	03:57	005568	541881	005514	541896	40
28-11-2012	3760-05	93	1	DK2	04:08	04:18	005582	541892	005524	541882	40-50
28-11-2012	3760-05	94	1	DK2	04:29	04:39	005541	541883	005524	541915	38-51
28-11-2012	3762-01	95	1	DK2	18:40	18:50	020878	542757	020824	542737	18
28-11-2012	3762-01	96	1	DK2	19:02	19:12	020813	542749	020867	542733	18
28-11-2012	3762-01	97	1	DK2	19:21	19:31	020853	542727	020829	542759	18
28-11-2012	3762-01	98	1	VV	19:39		020844	542751			18
28-11-2012	3762-05	99	1	VV	20:41		022268	542948			19
28-11-2012	3762-05	100	1	DK2	20:51	21:01	022303	542950	022244	542949	19
28-11-2012	3762-05	101	1	DK2	21:08	21:18	022255	542957	022302	542934	19
28-11-2012	3762-05	102	1	DK2	21:26	21:36	022278	542933	022275	542969	19
28-11-2012	3862-01	103	1	DK2	22:47	22:57	020904	543471	020862	543461	19
28-11-2012	3862-01	104	1	DK2	23:05	23:15	020885	543495	020872	543461	19
28-11-2012	3862-01	105	1	DK2	23:24	23:34	020847	543475	020899	543489	19
28-11-2012	3862-01	106	1	VV	23:41		020892	543478			19
29-11-2012	3861-36	107	1	VV	00:50		015299	543470			22
29-11-2012	3861-36	108	1	DK2	01:01	01:11	015275	543465	015328	543476	22
29-11-2012	3861-36	109	1	DK2	01:19	01:29	015320	543462	015277	543487	22

29-11-2012	3861-36	110	1	DK2	01:40	01:50	015287	543458	015315	543489	22
29-11-2012	3761-04	111	1	DK2	03:01	03:11	015868	542806	015927	542802	19
29-11-2012	3761-04	112	1	DK2	03:21	03:31	015912	542786	015900	542819	19
29-11-2012	3761-04	113	1	DK2	03:41	03:51	015891	542792	015923	542822	19
29-11-2012	3761-04	114	1	VV	03:58		015916	542807			19
29-11-2012	3861-14	115	1	VV	16:11		012600	545098			22
29-11-2012	3861-14	116	1	DK2	16:23	16:33	012622	545092	012570	545104	22
29-11-2012	3861-14	117	1	DK2	16:42	16:52	012617	545102	012570	545082	22
29-11-2012	3861-14	118	1	DK2	17:03	17:13	012600	545082	012609	545117	22
29-11-2012	3861-19	119	1	DK2	19:18	19:28	011590	543425	011579	543390	23
29-11-2012	3861-19	120	1	DK2	19:39	19:49	011593	543399	011554	543426	22
29-11-2012	3861-19	121	1	DK2	20:00	20:10	011594	543409	011537	543402	21
29-11-2012	3861-19	122	1	VV	20:18		011576	543404			21
29-11-2012	3861-34	123	1	VV	20:50		012178	543175			26
29-11-2012	3861-34	124	1	DK2	21:02	21:12	012159	543187	012202	543162	26
29-11-2012	3861-34	125	1	DK2	21:22	21:32	012169	543166	012193	543198	25
29-11-2012	3861-34	126	1	DK2	21:47	21:57	012161	543176	012222	543176	25
29-11-2012	3861-22	127	1	DK2	22:54	23:04	013406	543233	013464	543229	21
29-11-2012	3861-22	128	1	DK2	23:14	23:24	013427	543224	013451	543254	21
29-11-2012	3861-22	129	1	DK2	23:39	23:49	013422	543251	013434	543218	21
29-11-2012	3861-22	130	1	VV	23:55		013428	543228			20
30-11-2012	3861-23	131	1	VV	00:18		013730	543273			17
30-11-2012	3861-23	132	1	DK2	00:30	00:40	013714	543291	013748	543261	17
30-11-2012	3861-23	133	1	DK2	00:52	01:02	013706	543270	013765	543277	19
30-11-2012	3861-23	134	1	DK2	01:14	01:24	013729	543258	013743	543292	17
30-11-2012	3861-35	135	1	DK2	02:25	02:35	013951	543830	014013	543832	18
30-11-2012	3861-35	136	1	DK2	02:45	02:55	013995	543820	013972	543850	16
30-11-2012	3861-35	137	1	DK2	03:08	03:18	013973	543818	014003	543847	17
30-11-2012	3861-35	138	1	VV	03:27		013994	543833			16
30-11-2012	3861-17	139	1	VV	16:01		015971	543034			20
30-11-2012	3861-17	140	1	DK2	16:14	16:24	015981	545016	015969	545048	20
30-11-2012	3861-17	141	1	DK2	16:33	16:43	020004	545031	015944	545030	20
30-11-2012	3861-17	142	1	DK2	16:55	17:05	015991	545024	015950	545047	20
30-11-2012	3861-32	143	1	DK2	18:16	18:26	015101	545914	015063	545943	23
30-11-2012	3861-32	144	1	DK2	18:36	18:46	015106	545935	015051	545920	23
30-11-2012	3861-32	145	1	DK2	18:57	19:07	015080	545923	015100	545956	23
30-11-2012	3861-32	146	1	VV	19:14		015090	545935			23
30-11-2012	3961-29	147	1	VV	21:28		012104	550105			28
30-11-2012	3961-29	148	1	DK2	21:38	21:48	012097	550121	012113	550086	28
30-11-2012	3961-29	149	1	DK2	21:57	22:07	012086	550093	012137	550116	28



30-11-2012	3961-29	150	1	DK2	22:20	22:30	012083	550109	012138	550097	28
30-11-2012	3961-28	151	1	DK2	23:05	23:15	012257	550447	012317	550454	30
30-11-2012	3961-28	152	1	DK2	23:27	23:37	012277	550464	012308	550434	30
30-11-2012	3961-28	153	1	DK2	23:46	23:56	012283	550439	012303	550472	30
30-11-2012	3961-28	154	1	VV	00:04		012304	550460			30
01-12-2012	3961-42	155	1	VV	01:17		013186	551272			34
01-12-2012	3961-42	156	1	DK2	01:28	01:38	013165	551269	013226	551276	34
01-12-2012	3961-42	157	1	DK2	01:48	01:58	013202	551255	013184	551288	34
01-12-2012	3961-42	158	1	DK2	02:10	02:20	013181	551256	013205	551288	34
01-12-2012	4263-02	159	3	DK2	18:11	18:21	034244	564810	034310	564876	55
01-12-2012	4263-02	160	3	DK2	18:36	18:46	034283	564867	034250	564899	55
01-12-2012	4263-02	161	3	DK2	19:15	19:25	034259	564875	034307	564894	55
01-12-2012	4263-02	162	3	VV	19:40		034307	564888			55
01-12-2012	4264-03	163	3	VV	21:45		040900	564000			45
01-12-2012	4264-03	164	3	DK2	21:56	22:06	040880	564003	040934	563991	45
01-12-2012	4264-03	165	3	DK2	22:18	22:28	040899	563991	040912	564026	45
01-12-2012	4264-03	166	3	DK2	22:39	22:49	040937	564017	040888	563993	45
02-12-2012	4365-08	167	3	DK2	15:43	15:53	051331	570787	051275	570795	49
02-12-2012	4365-08	168	3	DK2	16:11	16:21	051309	570805	051306	570772	49
02-12-2012	4365-08	169	3	DK2	16:37	16:47	051315	570800	051283	570768	49
02-12-2012	4365-08	170	3	VV	16:58		051287	570781			49
02-12-2012	4365-04	171	3	VV	18:09		052859	570851			43
02-12-2012	4365-04	172	3	DK2	18:23	18:33	052843	570858	052894	570837	43
02-12-2012	4365-04	173	3	DK2	18:45	18:55	052859	570841	052873	570876	43
02-12-2012	4365-04	174	3	DK2	19:05	19:15	052883	570859	052830	570842	43
02-12-2012	4365-01	175	3	DK2	20:18	20:28	053180	571526	053118	571535	54
02-12-2012	4365-01	176	3	DK2	20:40	20:50	053157	571548	053146	571513	54
02-12-2012	4365-01	177	3	DK2	21:03	21:13	053168	571540	053122	571517	54
02-12-2012	4365-01	178	3	VV	21:21		053138	571528			54
03-12-2012	4366-06	179	3	VV	23:54		060743	570610			46
03-12-2012	4366-06	180	3	DK2	00:09	00:19	060779	570609	060717	570613	46
03-12-2012	4366-06	181	3	DK2	00:30	00:40	060753	570621	060746	570586	46
03-12-2012	4366-06	182	3	DK2	00:55	01:05	060770	570619	060724	570597	46
03-12-2012	4368-06	183	3	DK2	15:51	16:01	083810	572420	083844	572447	21
03-12-2012	4368-06	184	3	DK2	16:17	16:27	083790	572432	083854	572434	21
03-12-2012	4368-06	185	3	DK2	16:36	16:46	083837	572423	083794	572451	21
03-12-2012	4368-06	186	3	VV							
03-12-2012	4368-05	187	3	VV							
03-12-2012	4368-05	188	3	DK2	17:43	17:53	083237	572213	083295	572205	26
03-12-2012	4368-05	189	3	DK2	18:00	18:10	083263	572202	083251	572233	26

03-12-2012	4368-05	190	3	DK2	18:23	18:33	083238	572201	083291	572222	26
	4368-03	191	3	DK2	20:42	20:52	083095	571241	083152	571223	16
03-12-2012	4368-03	192	3	DK2	21:00	21:10	083118	571216	083121	571250	16
03-12-2012	4368-03	193	3	DK2	21:19	21:29	083098	571226	083142	571243	16
03-12-2012	4368-03	194	3	VV							
03-12-2012	4368-01	195	3	VV							
03-12-2012	4368-01	196	3	DK2	22:42	22:52	082569	570597	082628	570599	14
03-12-2012	4368-01	197	3	DK2	22:59	23:09	082604	570578	082604	570609	14
03-12-2012	4368-01	198	3	DK2	23:17	23:27	082576	570485	082625	570608	14
04-12-2012	4367-23	199	3	DK2	16:36	16:46	074030	570480	074023	570511	24
04-12-2012	4367-23	200	3	DK2	16:55	17:05	074058	570490	074023	570511	24
04-12-2012	4367-23	201	3	DK2	17:19	17:29	074016	570470	074038	570500	24
04-12-2012	4267-25	202	3	DK2	18:47	18:57	074139	565898	074203	565891	16
04-12-2012	4267-25	203	3	DK2	19:05	19:15	074187	565874	074178	565910	17
04-12-2012	4267-25	204	3	DK2	19:26	19:36	074160	565884	074205	565907	16
04-12-2012	4267-27	205	3	DK2	20:23	20:33	073601	563464	073648	563486	20
04-12-2012	4267-27	206	3	DK2	20:42	20:52	073652	565465	073594	565485	20
04-12-2012	4267-27	207	3	DK2	21:02	21:12	073631	565461	073619	565492	20
04-12-2012	4267-27	208	3	VV	21:17		073635	565490			20
04-12-2012	4267-12	209	3	VV	21:57		072603	565649			24
04-12-2012	4267-12	210	3	DK2	22:06	22:16	072558	565644	072604	565662	24
04-12-2012	4267-12	211	3	DK2	22:24	22:34	072608	565645	072554	565662	24
04-12-2012	4267-12	212	3	DK2	22:44	22:54	072587	565639	072574	565671	24
05-12-2012	4367-16	213	3	DK2	23:56	00:06	072622	570528	072620	570561	23
05-12-2012	4367-16	214	3	DK2	00:15	00:25	072654	570546	072594	570545	23
05-12-2012	4367-16	215	3	DK2	00:35	00:45	072601	570537	072648	570557	23
05-12-2012	4367-16	216	3	VV	00:53		072650	570548			
05-12-2012	4469-02	217	3	DK2	17:55	18:05	093233	573415	093178	573438	14
06-12-2012	4367-06	218	3	DK2	15:45	15:55	070655	570302	070602	570317	22
06-12-2012	4367-06	219	3	DK2	16:06	16:16	070622	570289	070636	570321	22
06-12-2012	4367-06	220	3	DK2	16:25	16:35	070661	570312	070602	570308	22
06-12-2012	4367-06	221	3	VV	16:40		070621	570313			22
06-12-2012	4367-02	222	3	VV	17:09		070024	570252			37
06-12-2012	4367-02	223	3	DK2	17:22	17:32	070052	570248	075994	570259	38
06-12-2012	4367-02	224	3	DK2	17:45	17:55	070012	570240	070034	570268	38
06-12-2012	4367-02	225	3	DK2	18:05	18:15	070041	570255	065984	570250	37

## Others

A cruise summary report will be delivered online to

[http://seadata.bsh.de/csr/online/V1\\_index.html](http://seadata.bsh.de/csr/online/V1_index.html).

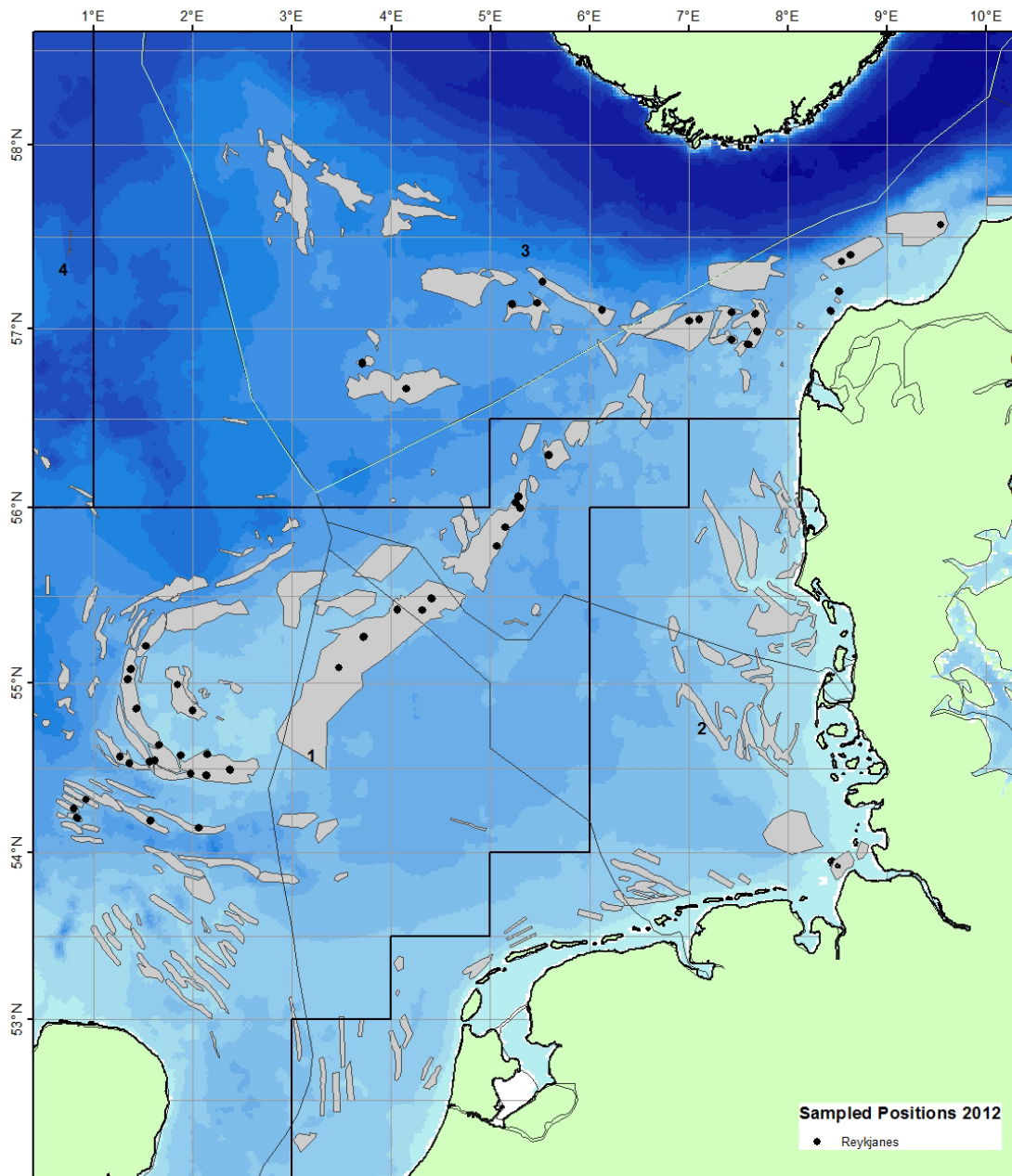


Fig. 1: Survey map with sampling locations.

