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Results from Bottom Trawl Survey on Flemish Cap of June-July 2008

by

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Abstract

A stratified random bottom trawl survey on Flemish Cap was carried out from June 18th to July 22th 2008. The area surveyed was extended up to depths of 800 fathoms (1400 meters) following the same procedures as in previous years and decreasing the number of hauls planned (175). The survey was carried out by the *R/V Vizconde de Eza* with the usual survey gear (*Lofoten*). A total of 167 valid hauls were made by the vessel *R/V Vizconde de Eza*, 111 up to 730 meters depth and 56 up to 1400 meters. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, Greenland halibut and shrimp are presented. The general indexes for this year are estimated taken into account the traditional swept area (strata 1-19, up to depths of 730 m.).

Introduction

The survey on Flemish Cap was carried out on board *R/V Vizconde de Eza* in 2008. A total of 167 valid bottom trawls were made up to a depth of 1400 m (800 fathoms) (Fig. 1). The survey covered all strata of the bank adequately with the exception of the strata corresponding with the Beothuk knoll (35-39 strata) in the southwest of the bank and the strata 26 and 27 in the southeast. A synoptic sheet of the survey with vessel and gear characteristics is shown in Table 1. This was the 21th survey of the series initiated by the EU in 1988. All surveys had a stratified random design following NAFO specifications (Doubleday, 1981). Dates of the surveys were:

Year	Vessel	Valid tows	Dates
1988	*Cornide de Saavedra*	115	8/7 – 22/7
1989	*Cryos*	116	12/7 – 1/8
1990	*Ignat Pavlyuchenkov*	113	18/7 – 6/8
1991	*Cornide de Saavedra*	117	24/6 – 11/7
1992	*Cornide de Saavedra*	117	29/6 – 18/7
1993	*Cornide de Saavedra*	101	23/6 – 8/7
1994	*Cornide de Saavedra*	116	6/7 – 23/7
1995	*Cornide de Saavedra*	121	2/7 – 19/7
1996	*Cornide de Saavedra*	117	28/6 – 14/7
1997	*Cornide de Saavedra*	117	16/7 – 1/8
1998	*Cornide de Saavedra*	119	17/7 – 2/8
1999	*Cornide de Saavedra*	117	2/7 – 20/7
2000	*Cornide de Saavedra*	120	10/7 – 28/7
2001	*Cornide de Saavedra*	120	3/7 – 20/7
2002	*Cornide de Saavedra*	120	30/6 – 17/7
2003	*Vizconde de Eza* *Cornide de Saavedra*	177 (114) 50**	2/6 – 2/7 7/6 – 17/6
2004	*Vizconde de Eza* *Cornide de Saavedra*	177 (124) 61**	25/6 – 2/8 23/7 – 2/8
2005	*Vizconde de Eza*	176 (117)	1/7 – 21/8
2006	*Vizconde de Eza*	179 (115)	1/7-26/7
2007	*Vizconde de Eza*	174 (117)	23/6-19/7
2008	*Vizconde de Eza*	179 (111)	23/6-19/7

( ) valid tows carried out in depths lesser than 400 fathoms

** calibration tows

Material and Methods

The *R/V Vizconde de Eza* carried out the survey following the same procedures as in previous years, the same bottom trawl net *Lofoten*, with a cod-end mesh size of 35 mm, as well as all other details of its use (Saborido-Rey and Vazquez, 2003).

Results

Following the agreement of the NAFO Standing Committee on Fisheries Science (STACFIS), on preferring mean number or weight per tow over other survey indices, most tables in the report are presented in that way. Details on changes were presented in a previous report (Saborido-Rey and Vazquez, 2003).

Mean catch per tow (Kg) of main species in all the surveys are:

	Survey	Cod	American plaice	Redfish	Greenland halibut	Roughhead grenadier	Shrimp
120-720 m	**1988**	50.78	19.95	234.19	8.61	2.50	7.14
	1989	141.82	17.47	202.11	5.56	1.08	2.86
	1990	73.82	14.90	157.62	7.21	1.06	4.34
	1991	50.05	12.54	95.69	10.16	1.66	14.50
	1992	33.22	10.76	161.91	10.85	1.96	31.28
	1993	75.81	9.78	90.29	8.12	3.76	15.03
	1994	32.91	10.23	202.10	9.99	2.46	4.95
	1995	12.06	8.44	108.98	13.52	1.94	9.33
	1996	11.21	5.10	148.80	14.42	1.69	13.56
	1997	12.39	3.76	206.19	20.02	1.49	9.58
	1998	6.20	4.27	88.08	30.13	2.10	52.19
	1999	3.55	3.21	122.67	26.37	1.55	32.00
	2000	3.81	2.00	221.33	21.09	1.30	24.52
	2001	3.35	2.99	96.18	17.25	2.59	35.21
	2002	3.10	2.55	150.85	15.05	1.51	49.96
	2003	1.98	2.84	116.66	7.73	2.92	26.75
	2004	5.06	4.38	311.62	15.28	4.47	25.03
	2005	6.52	3.43	563.34	14.55	2.97	38.14
	2006	15.55	2.10	953.66	14.56	4.89	18.71
	2007	29.70	1.31	577.76	16.22	1.70	21.20
	2008	54.31	2.20	703.97	14.92	3.68	13.76
120-1400 m	**2004**	3.32	2.88	204.71	23.42	14.03	16.49
	2005	4.28	2.25	370.06	17.57	11.64	25.47
	2006	10.21	1.38	626.40	19.89	9.89	12.46
	2007	19.51	0.86	379.51	25.91	6.38	13.98
	2008	35.67	1.44	462.44	32.35	9.91	9.10

These survey indices are also presented in Table 2, and even they belong to different species and pelagic vs. demersal character and the transformation to the new scale (since 2003 the *R/V Cornide de Saavedra* was substituted by the *R/V Vizconde de Eza*) only was carried out for the main species, a global index is presented for each year, which minimum occurred in 2001. Until 2003 redfish showed the highest annual variability probably due to its pelagic habitat, making accessibility to bottom gears more changeable than in the case of demersal or benthic

species. However since 2004 the presence of some strong year classes mainly of *S. fasciatus* caused the increase of redfish and total biomass, reaching consecutive historic maximums in the last five years.

The relative high values estimated in 2004 for American plaice did not keep in following years and they were probably due to the occasional increases of catchability. Greenland halibut biomass maintained a continuous biomass increase to reach a maximum in 1998; since then the biomass decreased but maintained to a roughly same level, excluding the out of range 2003 value. Shrimp catches in 2005 were between the highest of the historical series but this high level is not continued in 2006, 2007 and 2008 where the shrimp biomass decreased around 64% from then.

Excluding redfish, the whole period could be divided in two in regards to species composition: cod, American plaice and skates dominating the first half, prior to 1995, Greenland halibut and shrimp the second half. For cod, 1995 was the spawning year for the first extremely weak recruitment; it had been 1991 for American plaice. The high cod indexes at age 1 since 2005 up to date as well the corresponding indices at age 2 and 3 in the following years, indicate the presence of four relative strong year classes in the period 2004-2007.

Cod

Mean catch per standard tow by strata and its standard error are presented in Table 3. These indices are compared with results of previous surveys in Table 5. Total biomass calculated by the swept area method and compared with Russian survey results are:

Year	EU (1)	Russia: (2)	(3)	Year	EU (1)	Russia: (2)	(3)	
1983		23070		**1996**	9013	730	-	
1984		31210		**1997**	9966	-	-	
1985		28070		**1998**	4986	-	-	
1986		26060		**1999**	2854	-	-	
1987		10150	21600	**2000**	3062		-	
1988	40839	7720	34200	**2001**	2695	784	-	
1989	114050	36520	78300	**2002**	2496	694	-	
1990	59362	3920	15200	**2003**	1593		-	
1991	40248	6740	8200	**2004**	4071			
1992	26719	2490	2400	**2005**	5242			
1993	60963	8990	9700	**2006**	12505			
1994	26463	-	-	**2007**	23866			
1995	9695	8260	-	**2008**	43675			tons

1) Biomass estimated from bottom trawl survey. **2)** Biomass estimated from bottom trawl survey (Kiseleva and Vaskov 1994; Kiseleva 1996, 1997; Vaskov and Igashov, 2003). **3)** Biomass estimated of bottom trawlable plus pelagic biomass (Borovkov *et al.* 1993; Kiseleva and Vaskov 1994).

The mean frequency at age per tow is shown in the table below.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	6.05	24.38	2.86	160.45	88.95	5.07	3.75	1.77	0.04	0.05	0.03	0.01	0.22	0.59		0.85		10.03	24.51	4.86	7.58
2	99.36	13.43	15.35	32.60	52.13	172.05	5.14	14.80	3.88	0.19	0.10	0.10	0.02	2.47	1.65	0.07	4.20	0.02	4.82	14.46	20.74
3	61.55	113.53	6.37	21.02	6.94	38.67	34.51	1.66	8.28	4.32	0.12	0.14	0.41	0.02	0.80	0.78	0.06	1.39	0.07	6.24	15.44
4	16.72	67.91	21.08	2.64	2.97	1.37	6.34	4.84	1.11	5.97	1.56	0.15	0.25	0.15	0.04	0.17	0.77	0.10	1.83	0.03	5.65
5	1.81	25.40	19.69	8.40	0.48	1.64	0.16	1.15	2.99	0.49	1.95	0.89	0.12	0.10	0.09	0.03	0.21	0.88	0.11	1.42	0.09
6	0.26	1.66	5.59	2.15	1.74	0.22	0.08	0.04	0.24	1.18	0.10	0.55	0.55	0.02	0.04	0.05	0.01	0.17	0.73	0.07	1.15
7	0.28	0.18	0.42	0.37	0.30	0.61	0.01	0.03	0.01	0.03	0.18	0.02	0.21	0.18	0.03	0.01	0.01		0.15	0.53	0.07
8	0.09	0.16	0.18	0.08	0.02	0.11	0.14		0.01			0.01	0.01	0.12	0.12	0.01	0.00	0.02	0.01	0.09	0.29
9		0.01	0.10	0.04				0.03			0.01		0.02	0.01	0.04	0.05	0.01	0.01		0.02	0.10
10		0.01	0.03	0.00			0.01	0.01						0.01		0.03	0.02	0.01	0.01	0.02	
11				0.01	0.01									0.01	0.01				0.01		0.02
12										0.00			0.01								
13																			0.01		

14												0.01								
total	186.13	246.66	71.67	227.78	153.53	219.72	50.14	24.33	16.56	12.23	4.05	1.87	1.83	3.67	2.81	2.04	5.17	12.63	32.28	27.74	51.14

The 1990 year-class was the most abundant observed at age 1, but its level was not maintained in the following years, after recruitment. This may indicate that its abundance was overestimated in the 1991 survey. The abundance of the 1991 year-class, although recording a maximum at age 2, decreased quickly as a consequence of the intense fishery on ages 2 and 3 during 1993 and 1994. Later year-classes, from 1992 onwards (ages 13 or less in 2005), were weak, weaker than the ones observed in the previous period. The 1995 to 1999 year-classes (ages 11 to 7 in 2006) failed almost completely and, according to the results of the last surveys, the same failure appears to have occurred to the 2001 and 2003 year-classes (age 5 and 3 respectively in 2006). The abundance of 2000 and 2002 year classes, although low in the historical series, were estimated to above average in the last 10 years. The abundances of 2004-2007 year classes are higher than in previous 12 years.

Tables 6, 7 and 4 show mean length frequency per tow, the age-length key and mean frequency at age per tow and stratum respectively. Distribution on survey catches is presented in Figure 2.

American plaice

Mean catch per standard tow by strata is presented in Table 8. These indices are compared with results of previous surveys in Table 10. Total biomass calculated by the swept area method and compared with Russian survey results is shown in the following table:

Year	EU	Russia (1)		Year	EU	Russia (1)		Year	EU	Russia (1)	
1983		8900		**1992**	8656	1200		**2001**	2404		
1984		7500		**1993**	7861	2700		**2002**	2049	548	
1985		7800		**1994**	8227			**2003**	2286	1398	
1986		20200		**1995**	6785			**2004**	3525		
1987		9300		**1996**	4098			**2005**	2760		
1988	16046	6500		**1997**	3026			**2006**	1691		
1989	14047	5000		**1998**	3437			**2007**	1053		
1990	11983	1200		**1999**	2585			**2008**	1766		tons
1991	10087	14400	tons	**2000**	1606		tons				

1) Rikhter *et al.* 1991; Borovkov *et al.* 1992, 1993, 1994; Vaskov and Igashov, 2003.

The mean frequency at age per tow is presented in the following table. The 1986 and 1990 year-classes, ages >16 in 2008, were between the most abundant cohorts in the period, but no good recruitment was observed since then. Fish aged 6 or more roughly correspond with fishable biomass. The abundance of this group (f 6+) decreased along the period except in 1992, when an increase was recorded as the consequence of the income of the abundant 1986 year-class. During the last years fluctuated in low levels without trends.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1		0.05	0.01	0.05					0.01	0.01		0.01	0.02			0.01			0.01	0.26	0.06
2	0.50	0.70	0.53	0.44	1.06	0.01	0.05	0.04	0.04	0.02	0.03		0.03	0.05		0.01	0.14	0.04	0.03	0.01	1.86
3	2.34	10.40	1.14	1.50	0.99	1.92	0.06	0.14	0.15	0.14	0.04	0.03	0.01	0.06	0.04	0.04	0.35	0.14	0.05	0.02	0.09
4	1.63	2.33	10.41	2.70	1.33	1.35	2.65	0.92	0.32	0.03	0.06	0.08	0.10	0.07	0.08	0.12	0.09	0.36	0.13	0.04	
5	5.26	5.43	1.40	6.65	2.41	0.97	1.29	2.65	0.73	0.15	0.09	0.10	0.13	0.13	0.02	0.10	0.10	0.13	0.17	0.13	0.04
6	7.94	5.42	4.19	3.04	5.93	0.52	1.09	1.70	2.07	0.52	0.33	0.10	0.19	0.07	0.11	0.07	0.13	0.13	0.17	0.15	0.16
7	6.23	5.15	2.91	3.34	1.59	5.14	1.21	1.71	1.11	1.50	0.77	0.30	0.15	0.14	0.08	0.06	0.13	0.16	0.09	0.06	0.15
8	6.79	3.02	2.77	2.57	1.87	0.56	4.26	1.13	0.68	0.34	1.12	0.59	0.19	0.33	0.16	0.17	0.16	0.13	0.07	0.06	0.13
9	2.18	1.00	1.68	1.06	1.03	0.97	0.40	1.91	0.50	0.51	0.65	0.63	0.49	0.54	0.20	0.36	0.31	0.28	0.15	0.04	0.13
10	0.57	0.43	0.78	0.37	0.47	0.46	0.81	0.20	0.78	0.36	0.44	0.32	0.53	0.72	0.24	0.29	0.39	0.25	0.20	0.06	0.14
11	0.12	0.05	0.14	0.01	0.22	0.32	0.28	0.22	0.18	0.61	0.37	0.42	0.28	0.60	0.37	0.53	0.35	0.28	0.25	0.09	0.08
12	0.20	0.02	0.02	0.07	0.12	0.38	0.28	0.18	0.10	0.16	0.36	0.26	0.23	0.52	0.28	0.60	0.74	0.31	0.24	0.15	0.06
13	0.16		0.04		0.02	0.45	0.31	0.18	0.10	0.03	0.11	0.15	0.09	0.24	0.31	0.35	0.53	0.44	0.24	0.18	0.15
14	0.06		0.02			1.33	0.65	0.36	0.13	0.12	0.14	0.15	0.07	0.20	0.18	0.33	0.50	0.49	0.26	0.10	0.14
15	0.07					0.04	0.61	0.27	0.09	0.06	0.07	0.07	0.06	0.14	0.16	0.18	0.41	0.32	0.25	0.09	0.19
16+	0.05					0.05	0.01	0.04	0.03	0.14	0.13	0.12	0.07	0.12	0.23	0.20	0.65	0.68	0.40	0.29	0.70
Total	34.09	34.01	26.05	21.79	17.05	14.47	13.96	11.66	7.02	4.69	4.73	3.32	2.65	3.94	2.45	3.44	4.99	4.14	2.72	1.74	4.06
freq. 6+	24.37	15.09	12.55	10.46	11.25	10.22	9.91	7.90	5.77	4.35	4.49	3.11	2.35	3.62	2.32	3.14	4.30	3.47	2.33	1.28	2.01

Global indices of the table, such as total number by tow and frequency 6+, have declined over the whole period, reaching their lowest level in 2007: more than 10 times lower than in 1988-1990. Data in the table above indicate two periods for recruitment, and a change from an upper abundance level to a lower one. The 1991 year-class was the first weak cohort. The relative high values founded in 2004 and 2005 for American plaice, mainly in the ages older than 13 years old, are probably due to the relative strong year classes previous to 1991.

Tables 11, 12 and 9 show mean length frequency per tow, the age-length key and mean frequency at age per tow and stratum respectively. Catch per haul distribution is presented in Figure 3.

Redfish

All redfish catches were classified by species. The group name *juvenile* contains those individuals of small size for which routine classification was not possible. The 15 cm maximum length is a good reference for this group, but it was never used as a criterion. The skill required to identify the species increased over time, so the group *juvenile* is not a uniform defined group, but it is maintained for practical reasons.

Mean catches per standard tow by strata are presented in Tables 13, 15, 19 and 21 for *Sebastes marinus*, *S. mentella*, *S. fasciatus* and the *juvenile* group respectively. The following table shows the total biomass (tons) by year.

	Sebastes	***Sebastes spp.***			**Total**
Year	***marinus***	***mentella***	***fasciatus***	***juvenile***	
1988	18229		170102		188331
1989	27312		135223		162535
1990	16751		86695	23311	126757
1991	4864	59552	6755	5784	76955
1992	4909	85408	6314	33578	130209
1993	4789	21235	5175	41409	72608
1994	39516	42495	9303	71211	162525
1995	10754	70567	5986	337	87644
1996	13431	92647	13112	472	119662
1997	77125	66710	20780	1201	165816

1998	7640	53946	7656	1590	70832
1999	11215	77610	9460	366	98651
2000	53388	106283	15364	2955	177990
2001	10244	45931	13715	7455	77345
2002	11651	48760	27556	33345	121312
2003	40110	28785	15031	9890	93816
2004	85383	45999	76164	43059	250605
2005	147688	105110	123326	75762	451215
2006	298290	105849	319387	43396	766922
2007	88071	51191	261790	63576	464628
2008	240777	42570	202288	80491	566126

Tables 14, 16, 20 and 22 show mean length frequency by tow for the four groups. Age-length keys and mean frequency at age by tow and stratum for *S. mentella* are presented in Tables 18 and 17 respectively. Catches per haul distributions of the three species are presented in Figures 4, 5 and 6.

Greenland halibut

Mean catch per tow by strata and its standard error are presented in Table 21. These indices are compared with results of previous surveys in Table 25. The following table summarises the total biomass in tons by year:

Year	EU	Year	EU
1988	6926	**1999**	21207
1989	4472	**2000**	16959
1990	5799	**2001**	13872
1991	8169	**2002**	12100
1992	8728	**2003**	6214
1993	6529	**2004**	12292
1994	8037	**2005**	11698
1995	10875	**2006**	11706
1996	11594	**2007**	13040
1997	16098	**2008**	11995
1998	24229		

Mean length frequency by tow, age-length keys and mean frequency at age per tow are presented in Tables 22, 24 and 23, respectively. Catch per haul distribution is presented in Figure 7. Mean frequency at age per tow in the historical series was calculated as follows:

age	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	1.62	2.09	1.77	1.78	12.41	5.84	3.33	2.74	1.06	3.75	8.03	4.08	2.20	2.19	0.54	0.68	0.37	0.20
2	0.26	1.57	1.55	1.24	2.54	7.97	3.78	2.13	0.70	0.29	1.43	2.94	1.00	3.29	0.81	0.39	0.08	0.10
3	0.43	0.56	0.97	1.70	2.23	2.41	6.00	7.68	3.01	0.60	1.81	2.79	0.61	4.37	3.18	0.65	0.57	0.15
4	1.31	1.27	0.86	1.78	1.91	3.04	6.50	11.00	10.47	2.16	0.99	1.67	1.51	1.97	2.50	1.18	0.34	0.19
5	2.87	2.30	1.27	1.92	2.66	4.20	7.11	12.33	13.41	7.09	2.79	3.79	2.48	6.96	6.89	5.97	3.44	1.50
6	1.60	2.80	1.92	2.97	5.10	5.82	8.46	11.30	12.58	14.10	7.79	5.59	2.94	7.80	7.59	7.46	7.37	5.70
7	2.75	2.42	2.02	2.66	3.77	2.49	4.99	7.84	5.55	5.40	6.63	5.73	1.93	2.54	2.92	3.31	5.76	6.16
8	0.66	1.31	1.57	1.47	2.12	1.62	2.15	2.62	1.82	2.32	3.21	1.28	0.47	0.64	0.61	0.77	1.51	1.13
9	0.57	0.58	0.96	0.78	1.31	0.42	0.66	0.75	0.35	0.45	0.18	0.13	0.13	0.29	0.11	0.22	0.31	0.35
10	0.44	0.34	0.26	0.27	0.26	0.09	0.22	0.20	0.10	0.11	0.04	0.06	0.10	0.13	0.12	0.18	0.21	0.26
11	0.18	0.17	0.13	0.11	0.07	0.03	0.03	0.03	0.01	0.05	0.01	0.02	0.02	0.08	0.06	0.13	0.08	0.12
12	0.01	0.08	0.05	0.06	0.02	0.04	0.02	0.01	0.00			0.01	0.00	0.05	0.02	0.06	0.05	0.05
13		0.03	0.03	0.02			0.02	0.02	0.00					0.01	0.00	0.01	0.01	0.02
14		0.01	0.01		0.01	0.00			0.01					0.00	0.00		0.00	0.01
15	0.02					0.01	0.01							0.00	0.00			0.00
16+	0.01						0.01							0.00	0.00			0.00
total	12.74	15.53	13.38	16.76	34.39	33.98	43.26	58.64	49.08	36.33	32.92	28.09	13.38	30.33	25.34	21.02	20.09	15.95
freq. 10+	0.66	0.64	0.48	0.47	0.35	0.16	0.31	0.26	0.12	0.17	0.05	0.09	0.12	0.28	0.21	0.37	0.34	0.48

The tables 26 and 27 also show the abundance and biomass by age, corresponding at age greater or equal than five years in order to compare with XSA results.

Shrimp

Casas J.M. (2008) presented detailed results.

Roughhead grenadier (*Macrourus berglax*)

Mean catch per standard tow by strata and its standard error are presented in Table 28. These indices are compared with results of previous surveys in Table 32. The following table summarises the total biomass in tons by year:

year	tons	year	tons
1988	2009	**1999**	1250
1989	871	**2000**	1047
1990	852	**2001**	2079
1991	1335	**2002**	1211
1992	1577	**2003**	2348
1993	3021	**2004**	3597
1994	1975	**2005**	2387
1995	1558	**2006**	3933
1996	1362	**2007**	1367
1997	1197	**2008**	2961
1998	1691		

Mean length frequency by tow, age-length keys and mean frequency at age per tow are presented in Tables 29, 30 and 31, respectively. Catch per haul distribution is presented in Figure 8. Mean frequency at age per tow in the historical series was calculated as follows:

age	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1			0.161		0.064	0.019	0.004	0.078	0.048	0.581	0.268	0.136	0.012	0.015	0.006
2	0.057	0.133	0.07	0.057	0.159	0.045	0.096	0.259	0.235	2.66	0.579	0.332	0.439	0.028	0.098
3	0.169	0.26	0.137	0.231	0.282	0.061	0.134	0.337	0.274	1.339	3.879	0.45	0.545	0.073	0.283
4	0.606	0.581	0.279	0.19	0.294	0.268	0.062	0.149	0.071	0.836	1.255	0.947	0.487	0.044	0.272
5	0.63	1.071	0.437	0.195	0.172	0.247	0.352	0.352	0.134	0.768	1.09	0.781	0.623	0.108	0.212
6	0.709	0.736	0.729	0.56	0.43	0.307	0.344	0.553	0.235	0.789	1.374	0.677	0.698	0.251	0.355
7	0.704	0.642	0.436	0.762	0.901	0.553	0.271	0.672	0.361	1.048	1.007	0.62	0.894	0.333	0.569
8	0.613	0.57	0.42	0.202	1.128	0.766	0.287	0.628	0.352	1.12	1.188	0.738	0.645	0.371	0.924
9	0.471	0.327	0.269	0.196	0.311	0.525	0.422	0.634	0.3	0.665	1.196	0.513	0.606	0.221	0.667
10	0.225	0.14	0.328	0.122	0.281	0.245	0.42	0.828	0.331	0.59	1.114	0.72	0.717	0.429	0.586
11	0.136	0.044	0.316	0.188	0.168	0.136	0.09	0.287	0.253	0.587	0.578	0.461	0.904	0.214	0.536
12	0.102	0.029	0.116	0.204	0.226	0.099	0.118	0.163	0.303	0.293	0.487	0.208	0.492	0.134	0.202
13	0.05	0.024	0.047	0.154	0.189	0.069	0.071	0.1	0.093	0.11	0.183	0.282	0.364	0.118	0.396
14	0.019	0.006	0.042	0.052	0.095	0.076	0.069	0.129	0.078	0.038	0.111	0.237	0.262	0.096	0.098
15	0.033	0.019	0.005	0.052	0.06	0.041	0.028	0.068	0.024	0.022	0.022	0.026	0.243	0.048	0.222
16+	0.011		0.013	0.023	0.042	0.004	0.041	0.095	0.079	0.091	0.074	0.041	0.267	0.09	0.144
total	4.535	4.582	3.805	3.188	4.802	3.461	2.809	5.332	3.171	11.537	14.405	7.169	8.198	2.573	5.57

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Table 1 – Technical data of the 2008 survey.

Procedure	Specification
Vessel	R/V Vizconde de Eza
GT	1 400 t
Power	1 800 HP
Mean trawling speed	3.5 knots
Trawling time	30 minutes effective time
Fishing gear	type Lofoten
footrope / handrope	31.20 / 17.70 m
footgear	27 steel bobbins of 35 cm
vertical opening	3.0 m (SCANMAR)
warps	100 meters, 45 mm, 200 Kg/100m
trawl doors	polyvalent, 850 Kg
wire length	$26.712 \times$ depth echo sounder (m.) $^{0.6268}$.
mesh size in cod-end	35 mm
Type of survey	Stratified sampling
Station selection procedure	Random
Criterion to change position of a selected tow	- Unsuitable bottom for trawling according to ecosonder register. - Information on gear damage from previous surveys.
Criterion to reject data from tow	- tears in cod-end - severe tears in the gear - less than 20 minutes tow - bad behaviour of the gear
Daily period for fishing	6.00 to 22.00 hours
Species for sampling	All fish, squid and shrimp
Species for age determination	Cod, American plaice, redfish (*Sebastes mentella*), Greenland halibut and Roughhead grenadier (*Macrourus berglax*).

Table 2 – Mean catch per tow (Kg) for several species or groups of species in 1988-2008 surveys in depths lesser than 400 fathoms.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Rajidae	5.59	2.41	3.51	5.05	4.7	7.76	4.36	2.82	2.55	2.29	2.46	2	1.43	2.78	1.92	5.73	7.76	5.27	4.36	2.71	7.82
Synaphobranchus sp.	0.27	0.11	0.05	0.1	0.09	0.13	0.01	0.02	0	0.01	0.05	0	0	0.03	0.01	0.03	0.11	0.09	0.04	0.08	0.05
Urophycis sp.	0.8	0.21	0.21	0.32	0.09	0.21	0.27	0.1	0.1	0.04	0.28	0.31	0.21	0.49	0.16	0.68	0.83	0.92	0.76	0.31	0.68
Antimora sp.	0.49	0.38	0.35	0.7	0.9	1.02	0.99	0.24	0.23	0.29	0.61	0.36	0.33	0.83	0.43	0.38	1.44	1.38	0.59	0.73	1.11
Macrouridae	3.84	1.81	1.52	2.8	3.22	8.08	4.02	3.24	2.91	2.85	3.52	2.9	2.25	3.83	2.54	4.59	6.11	4.17	6.25	2.94	4.92
Notacanthus sp.	0.62	0.51	0.08	0.59	0.56	0.92	0.57	0.43	0.22	0.36	0.21	0.08	0.12	0.13	0.08	0.03	0.18	0.08	0.18	0.08	0.11
Illex sp.	0.01	0.01	2.05	1.44	0.08	0	0.26	0	0.11	0.08	0.09	0.02	0	0.01	0.01	0.28	0.59	0.10	4.41	0.51	6.39
Anarhichadidae	9.94	9.31	10.1	12.56	11.31	17.85	19.45	23.9	25.57	17.45	13.66	6.94	5.56	7.29	6.5	7.44	13.17	11.90	11.53	10.19	12.27
Witch flounder	1.13	0.42	0.52	0.96	1.02	1.3	0.98	0.88	0.63	0.4	0.3	0.47	0.51	0.57	0.26	1.05	1.95	2.21	1.11	0.74	2.76
Greenland halibut	8.61	5.56	7.21	10.16	10.85	8.12	9.99	13.52	14.42	20.02	30.13	26.37	21.09	17.25	15.05	7.73	15.28	14.55	14.56	16.22	14.92
Zoarcidae	0.7	1.42	1.5	2.46	1.69	4.32	2.33	2.71	2.12	2.15	2.56	1.11	0.97	1.55	1.01	2.57	4.58	3.83	2.24	0.44	0.57
Cod	50.78	141.82	73.82	50.05	33.22	75.81	32.91	12.06	11.21	12.39	6.20	3.55	3.81	3.35	3.10	1.98	5.06	6.52	15.55	29.70	54.31
American plaice	19.95	17.47	14.90	12.54	10.76	9.78	10.23	8.44	5.10	3.76	4.27	3.21	2.00	2.99	2.55	2.84	4.38	3.43	2.10	1.31	2.20
Redfish	234.19	202.11	157.62	95.69	161.91	90.29	202.10	108.98	148.80	206.19	88.08	122.67	221.33	96.18	150.85	116.66	311.62	563.35	953.66	577.75	704.62
Shrimp*	7.14	2.86	4.34	14.50	31.28	15.03	4.95	9.33	13.56	9.58	52.19	32.00	24.52	35.21	49.96	26.75	25.03	38.14	20.19	21.20	13.76
Others	0.79	0.26	1.42	0.83	0.53	0	0.59	0.49	0.86	0.73	1.38	0.77	1.98	1.8	1.16	7.03	3.39	2.09	13.53	0.00	0.00
Total	344.07	386.41	277.78	209.92	271.69	240.61	293.42	186.67	227.52	277.86	204.61	202.00	284.12	172.49	234.43	178.74	398.10	658.04	1051.05	671.51	836.30

*) Values affected by mesh size cod-end: 40 mm in 1994, 25 mm in 1998 and 30 mm in 1999.

Table 3 – Cod (*Gadus morhua*) mean catch per standard tow by strata and its standard error in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	s. error
1	342	4	162.09	64.56
2	838	9	83.73	90.25
3	628	7	86.30	82.39
4	348	3	29.08	30.58
5	703	7	21.08	20.39
6	496	6	330.42	645.41
7	822	10	74.91	147.22
8	646	6	70.51	111.7
9	314	3	3.37	3.54
10	951	9	36.23	27.95
11	806	9	60.23	45.63
12	670	8	0.82	1.82
13	249	3	0.81	1.41
14	602	6	3.50	4.63
15	666	6	15.87	25.31
16	634	6		
17	216	2		
18	210	3		
19	414	4		
total	10555	111	54.31	13.7

Table 4 – Cod (*Gadus morhua*) mean frequency at age per tow and stratum in the 2008 survey.

age	strata															total	mean weight	mean length
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		g	cm
1	1.02	2.86	0.31	2.64	0.68	0.04	0.01									7.57	63	19
2	0.25	10.05	3.21	0.96	0.72	0.96	3.26	0.93		0.09	0.32					20.74	366	34
3	1.01	0.93	1.65	0.36	0.07	7.42	1.74	0.47		0.26	1.41	0.01			0.09	15.44	1306	52
4	0.61	0.36	0.46	0.01	0.07	1.84	0.57	0.26	0.04	0.52	0.57		0.01	0.06	0.27	5.65	2633	66
5	0.01	0.01				0.02	0.01	0.01		0.01	0.01					0.09	3113	70
6	0.25	0.12	0.09		0.07	0.10	0.05	0.20		0.12	0.11	0.01			0.02	1.16	4918	81
7	0.01	0.01				0.01		0.02		0.01						0.07	6200	88
8	0.05	0.01	0.01		0.01	0.02	0.01	0.06		0.05	0.04					0.29	7557	94
9	0.02	0.01			0.01	0.01		0.02		0.01	0.01					0.10	7992	96
10																		
11	0.01															0.01	10297	104
12																		
13																		
Set	4	9	7	3	7	6	9	6	2	9	9	2	1	4	4			
n	3.26	14.36	5.74	3.97	1.67	10.42	5.65	1.99	0.04	1.08	2.49	0.01	0.01	0.06	0.40	51.13	4235	42.5

Table 5 – Cod (*Gadus morhua*) mean catch per standard tow (Kg) by strata in 1988-2008 surveys.

	depth in	year																				
stratum	fathoms	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	70- 80	51.62	24.91	31.67	214.33	2.90	19.79	83.11	59.97	38.62	9.32	4.81	3.81	9.57	3.31	18.31	6.64	72.16	41.87	93.36	169.65	162.09
2	81-100	158.97	161.67	32.32	85.91	80.67	141.64	128.21	47.61	62.50	32.08	29.75	23.52	11.60	7.68	11.53	1.60	24.89	29.57	64.92	27.79	83.73
3	101-140	93.43	214.78	45.84	51.39	177.06	176.28	127.32	23.96	22.01	23.66	14.67	3.05	7.51	4.82	9.41	1.88	0.19	37.43	40.71	239.63	86.30
4	"	118.03	182.67	97.70	109.36	129.88	534.46	71.11	28.12	40.26	32.32	5.26	0.97	16.72	18.43	2.50	5.13	5.51	5.73	17.57	42.68	29.08
5	"	39.78	199.81	158.89	198.86	85.31	127.41	17.26	23.78	17.49	21.47	18.20	4.77	7.92	4.85	2.74	5.66	0.28	0.56	12.03	12.24	21.08
6	"	85.49	179.66	87.50	40.50	25.21	111.67	37.36	34.64	16.42	28.44	16.22	9.93	13.53	19.83	13.88	0.64	3.86	5.45	32.40	85.03	330.42
7	141-200	35.50	255.88	62.90	40.53	15.09	98.24	13.67	1.95	0.87	17.05	1.24	0.82	0.09	0.20	0.38	1.71	0.29		7.55	2.24	74.91
8	"	181.45	333.89	342.16	103.75	47.72	161.79	73.45	7.08	1.90	32.71	1.56	0.47	1.48	2.50	0.76	2.26	0.09		7.04	9.66	70.51
9	"	7.68	219.91	270.98	7.87	5.98	41.69	10.00	0.37	4.30	7.28		0.80	1.72		0.58	15.72			2.68	6.32	3.37
10	"	18.47	67.60	64.58	21.51	4.51	12.92	6.98	0.80	0.64	4.16	2.74	1.41	1.47	1.11	0.03	0.33		0.39	4.19	3.40	36.23
11	"	40.80	215.27	66.37	29.10	3.66	27.33	9.47	1.28	0.67	5.06	2.86	4.16	1.72	2.84	0.30	0.93	0.46	0.91	6.20	4.42	60.23
12	201-300	6.57	48.37	31.84	2.47		0.47										1.39					0.82
13	"	0.44	133.59	39.93	4.94																	0.81
14	"	2.33	24.43	14.00	2.85	1.46	4.81										0.00			1.66		3.50
15		14.74	166.25	46.32	2.13												0.35				0.93	15.87
16	301-400		1.35																			
17			0.31				0.14															
18		0.13					0.18															
19			3.19																			
total		50.78	141.95	75.71	50.05	33.22	76.08	32.91	12.05	11.21	12.39	6.20	3.55	3.81	3.35	3.10	1.98	5.06	6.52	15.55	29.70	54.31
s.e.		7.19	15.18	10.23	8.34	7.26	21.63	9.16	2.57	1.81	2.14	0.80	0.56	0.74	0.47	0.49	0.34	0.97	2.02	2.44	11.25	13.7

s.e.: standard error

Table 6 – Cod (*Gadus morhua*) mean length frequency per tow in the 2008 survey.

length		length		length		length	
6-8		36-38	5.28	63-65	1.57	90-92	0.16
12-14	0.08	39-41	1.42	66-68	1.49	93-95	0.10
15-17	1.61	42-44	0.39	69-71	0.86	96-98	0.09
18-20	4.62	45-47	1.19	72-74	0.61	99- 101	0.05
21-23	1.05	48-50	3.82	75-77	0.32	102-104	0.00
24-26	0.21	51-53	4.73	78-80	0.21	105-107	0.03
27-29	1.58	54-56	3.60	81-83	0.29	108-110	0.01
30-32	5.13	57-59	1.77	84-86	0.21	111-113	
33-35	7.12	60-62	1.32	87-89	0.19	114-116	

Table 7 – Cod (*Gadus morhua*) age-length key in 2008.

Length	age																total
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
12-14	7																7
15-17	67																67
18-20	106																106
21-23	52																52
24-26	11																11
27-29		59															59
30-32		103															103
33-35		102															102
36-38		114															114
39-41		68															68
42-44		8	7														15
45-47			44														44
48-50			99														100
51-53			113														113
54-56			97														97
57-59			68	10													79
60-62			17	51													69
63-65			1	72													74
66-68			2	74	3	1											81
69-71				61		5											66
72-74				43	1	7											51
75-77				16	2	12											30
78-80				1		19											21
81-83						27	2	1									30
84-86						20		2									22
87-89						13	3	2	1								20
90-92						7	1	6	2								16
93-95						2		7	2								11
96-98							1	7	2								10
99-101								3	2		1						6
102-104																	
105-107								2	1								3
108-110											1						1
111-113																	
114-116																	
total	243	454	448	328	6	113	7	30	10		2						1648

Table 8 – American plaice (*Hippoglossoides platessoides*) mean catch per standard tow by strata and its standard error in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4	5.54	3.87
2	838	9	8.03	7.9
3	628	7	3.08	5.04
4	348	3	16.61	13.68
5	703	7	1.64	2.47
6	496	6	0.99	0.77
7	822	10	0.76	1.03
8	646	6	2.6	2.24
9	314	3		
10	951	9	2.25	1.34
11	806	9	0.82	1.34
12	670	8		
13	249	3		
14	602	6		
15	666	6	0.14	0.35
16	634	6		
17	216	2		
18	210	3		
19	414	4		
total	10555	111	2.2	0.37

Table 9 – American plaice (*Hippoglossoides platessoides*) mean frequency at age per tow in the 2008 survey.

age	stratum												total	mean weight	mean length
	1	2	3	4	5	6	7	8	9	10	11	15		g	cm
1				0.035		0.017		0.011					0.063	16	13
2	0.007	0.394	0.282	0.634	0.219	0.238	0.002	0.022		0.021	0.036		1.855	71	20
3	0.001	0.016	0.011	0.007	0.021	0.012	0.006				0.010		0.086	109	23
4															
5	0.001	0.015		0.001	0.001					0.021			0.040	284	31
6	0.015	0.052	0.011	0.014	0.017	0.002	0.005	0.009		0.024	0.007	0.002	0.158	594	39
7	0.010	0.045	0.012	0.017	0.005	0.002	0.010	0.012		0.017	0.011	0.006	0.149	711	41
8	0.012	0.052	0.014	0.016	0.007	0.001	0.009	0.007		0.010	0.006		0.134	734	41
9	0.016	0.047	0.006	0.024	0.007	0.002	0.002	0.007		0.012	0.001	0.002	0.129	919	44
10	0.022	0.057	0.010	0.016	0.005	0.004	0.004	0.007		0.011			0.138	833	43
11	0.016	0.029	0.004	0.010	0.002	0.002	0.001	0.005		0.006	0.001		0.078	868	43
12	0.015	0.024	0.002	0.005	0.004	0.001		0.004		0.004	0.001		0.058	809	43
13	0.027	0.058	0.009	0.019	0.006	0.002	0.002	0.007		0.011	0.002		0.147	896	44
14	0.025	0.056	0.006	0.020	0.006	0.002	0.002	0.005		0.011	0.002		0.137	963	44
15	0.035	0.076	0.009	0.022	0.009	0.005	0.002	0.007		0.020	0.002		0.187	933	44
16+	0.061	0.196	0.060	0.198	0.031	0.009	0.012	0.051		0.061	0.017		0.698	1418	51

Table 10 – American plaice (*Hippoglossoides platessoides*) mean catch per standard tow (Kg) by strata in 1988-2008 surveys.

	Depth in	year																			
strata	fathoms	1988	1989	1990	1991	1992	1993	1984	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	70- 80	50.09	38.38	19.40	41.37	27.24	41.42	25.40	85.58	56.10	14.64	5.99	14.30	13.24	40.02	5.41	49.58	52.62	39.84	27.39	10.88	5.54
2	81-100	44.54	56.42	21.52	41.71	26.84	19.84	18.76	20.91	14.78	11.60	24.86	28.34	15.30	13.07	19.76	11.36	11.52	12.47	5.54	3.28	8.03
3	101-140	28.57	23.35	34.86	26.06	13.18	9.27	6.80	5.27	3.52	10.34	5.95	2.04	0.44	1.93	1.55	0.36	8.90	2.11	1.54	2.12	3.08
4	"	82.92	17.43	30.81	12.07	21.00	21.56	32.19	18.46	10.12	7.65	12.92	2.03	3.77	3.24	4.85		13.21	13.54	4.13	5.78	16.61
5	"	48.53	57.74	34.15	26.26	15.64	24.10	22.95	10.26	9.32	11.55	13.88	1.37	1.05	2.08	3.55	1.53	1.27	0.84	1.17	1.51	1.64
6	"	12.68	29.90	25.22	13.28	15.91	8.07	21.39	3.24	0.84	0.36	0.93	1.05	0.65	0.97	1.65	0.77	0.61	1.88	1.61	2.62	0.99
7	141-200	18.74	8.47	13.38	6.21	10.20	5.09	5.04	3.97	1.15	1.32	0.75	0.29	0.23	0.45	0.84	0.48	1.24	0.49	0.59	0.32	0.76
8	"	8.49	3.33	5.35	5.08	14.78	9.90	3.47	2.67	1.15	2.49	3.35	0.04		0.93	0.87	0.28	1.08	3.56	3.31	1.18	2.6
9	"	4.29	6.83	14.34		15.59	8.57	0.81	20.91	2.31	1.48					0.05	0.38	2.99	0.75			
10	"	32.07	20.56	27.62	18.06	19.40	20.14	30.86	9.78	5.72	3.96	0.49	1.00	0.61	1.31	0.49	0.75	0.58	1.20	1.33	0.33	2.25
11	"	19.30	19.02	21.44	6.53	6.07	4.75	4.93	1.79	1.09	0.52	0.48	0.61	0.36	0.44	0.95	0.47	1.03	0.57	0.32	0.35	0.82
12	201-300	0.17	0.36	0.88	0.33	0.21	0.29	0.65	0.23	0.63	0.13				0.08		0.22					
13	"	0.11		1.08					0.13													
14	"	0.16	0.19	0.13	8.49	0.63	0.12	0.52	0.31	0.09		0.09	0.21									
15	"	0.44	1.95	0.05	1.91	0.75	2.16	0.79	1.35	0.44	0.13	0.13					0.12		0.08		0.05	0.14
16	301-400	0.12			0.07	0.19	0.27	0.12														
17	"																					
18	"																					
19	"				0.47	0.11	0.17	0.08	0.32													
total		19.95	17.47	14.90	12.55	10.76	9.79	10.23	8.44	5.09	3.76	4.27	3.21	2.00	2.99	2.55	2.86	4.38	3.43	2.10	1.31	2.2
s.e.		2.29	2.55	1.59	1.47	1.19	1.29	1.71	1.35	1.13	0.88	0.93	1.08	0.41	0.53	0.91	0.93	0.92	0.85	0.43	0.20	0.37

Table 11 – American plaice mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female	length	male	female	length	male	female
10-11	0.010	0.010	24-25	0.018	0.046	38-39	0.251	0.029	52-53		0.194
12-13		0.023	26-27			40-41	0.261	0.041	54-55		0.217
14-15	0.020		28-29	0.020		42-43	0.194	0.045	56-57		0.113
16-17	0.023	0.033	30-31	0.010		44-45	0.101	0.018			
18-19	0.308	0.168	32-33	0.010		46-47		0.079	60-61		0.012
20-21	0.444	0.608	34-35	0.067		48-49		0.084			
22-23	0.135	0.168	36-37	0.094	0.010	50-51	0.020	0.176			

Table 12 – American plaice (*Hippoglossoides platessoides*) age-length key in 2008.

MALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
14-15	1	1															2
16-17		2															2
18-19		30															30
20-21		44															44
22-23		14															14
24-25			1														1
26-27																	
28-29					2												2
30-31						1											1
32-33					1												1
34-35					1	2		2	2					1			8
36-37						2	2	3		2			1				10
38-39						3	3		1	4	2	1	3	2	4	2	27
40-41						2	1	3	2	2	2	1	3	4	4	4	28
42-43									1	1	2	2	3	2	3	7	21
44-45									1	1		1	1	1	2	3	11
46-47																	
48-49																	
50-51															1	1	2
total	1	91	1		4	10	6	8	7	10	6	5	11	10	14	17	204

FEMALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
12-13	2																2
14-15																	
16-17		3															3
18-19		17															17
20-21		57	2														59
22-23		16	2														18
24-25		2	4														6
26-27																	
28-29																	
30-31																	
32-33																	
34-35																	
36-37						1											1
38-39						1	1	1									3
40-41						1	2	1									4
42-43						1	2		1								4
44-45							1	1									2
46-47						2	3	1	1							1	8
48-49										1	1	1	1		1	3	8
50-51								1	2	2			1	1	1	9	17
52-53								1	2	1					2	13	19
54-55											1		2	2	1	15	21
56-57														1		10	11
58-59																	
60-61																1	1
Total	2	95	8			6	9	6	6	4	2	1	4	4	5	52	204

Table 13 – Redfish (*Sebastes marinus*) mean catch per standard tow by strata and its standard error in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4	1.89	1.23
2	838	9	0.37	0.31
3	628	7	24.16	51.06
4	348	3	7.34	12.18
5	703	7	441.63	807.76
6	496	6	25.95	30.41
7	822	10	962.27	2054.77
8	646	6	278.9	358.67
9	314	3	230.72	186.51
10	951	9	859.14	1245.77
11	806	9	1095.83	1295.41
12	670	8	27.23	65.13
13	249	3	29.55	42.18
14	602	6	55.06	63.74
15	666	6	23.35	30.61
16	634	6		
17	216	2		
18	210	3		
19	414	4		
total	10555	111	299.4	74.56

Table 14 – Redfish (*Sebastes marinus*) mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female
14	0.01	0.01	32	9.95	19.17
15	0.70	1.37	33	3.07	14.93
16	6.93	4.78	34	1.66	8.26
17	12.79	9.44	35	0.38	5.02
18	28.18	18.95	36	0.87	1.83
19	61.84	31.44	37	0.50	1.72
20	67.08	42.85	38	0.33	0.70
21	70.70	51.71	39	0.03	0.17
22	69.37	64.87	40	0.10	0.74
23	48.71	48.47	41	0.02	0.68
24	42.49	43.34	42	0.01	0.01
25	34.39	34.54	43		0.10
26	36.83	38.30	44		0.22
27	30.98	30.59	45		0.17
28	44.04	29.23	46		0.13
29	31.23	22.36	47		0.01
30	26.38	25.78	48		
31	12.48	20.47	49		0.03

Table 15 – Redfish (*Sebastes mentella*) mean catch per standard tow and its standard error by in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4		
2	838	9		
3	628	7		
4	348	3	0.21	0.36
5	703	7	2.02	4.46
6	496	6		
7	822	10	9.83	23.64
8	646	6	5.26	8.38
9	314	3	131.01	58.5
10	951	9	180.12	431.07
11	806	9	159.16	302.62
12	670	8	32.76	34.16
13	249	3	42.74	66.41
14	602	6	222.6	112.95
15	666	6	49.69	46.95
16	634	6	4.28	2.37
17	216	2	1.57	2.22
18	210	3	7.52	9.37
19	414	4	1.72	1.38
total	10555	111	52.94	15.43

Table 16 – Redfish (*Sebastes mentella*) mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female	length	male	female
13			24	9.72	8.82	35	0.06	0.07
14			25	6.30	5.15	36	0.01	0.02
15			26	6.27	7.97	37		0.02
16	0.27		27	3.78	6.67	38	0.01	0.04
17	2.69	1.78	28	3.10	4.90	39	0.02	0.01
18	9.24	7.86	29	1.57	1.54	40		0.02
19	24.55	12.75	30	0.73	1.02	41		
20	28.89	20.48	31	0.56	0.44	42		0.01
21	29.15	22.81	32	0.16	0.34	43		
22	25.96	31.53	33	0.07	0.11	44		
23	11.34	17.98	34	0.07	0.15	45		

Table 17 – Redfish (*Sebastes fasciatus*) mean catch per standard tow by strata in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4		
2	838	9		
3	628	7	14.7	33.45
4	348	3	0.68	1.18
5	703	7	99.32	129.43
6	496	6	10.24	15.87
7	822	10	297.8	338.15
8	646	6	1329.05	2641.3
9	314	3	237.91	112.33
10	951	9	557.49	663.54
11	806	9	418.68	710.08
12	670	8	198.99	408.14
13	249	3	74.22	97.49
14	602	6	338.19	357.57
15	666	6	251.03	208.49
16	634	6	2.31	1.5
17	216	2	0.36	0.51
18	210	3	2.01	2.1
19	414	4	0.97	0.97
total	10555	111	251.54	73.13

Table 18 – Redfish (*Sebastes fasciatus*) mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female	length	male	female	length	male	female
6			14	0.50	0.75	22	117.01	133.92	30	0.37	2.61
7	0.12		15	1.99	0.62	23	53.72	97.74	31	0.12	6.22
8	0.25	0.12	16	5.10	6.59	24	34.94	82.44	32	0.12	0.87
9	0.87	0.25	17	22.76	19.90	25	18.65	48.25	33		1.12
10	1.12	0.37	18	62.17	37.43	26	8.70	35.07	34		0.25
11	1.74	0.62	19	98.36	52.35	27	3.48	26.24	35	0.25	
12	0.87	1.24	20	162.90	89.16	28	1.62	16.04			
13	0.25	1.37	21	150.09	124.72	29	0.87	9.45			

Table 19 – Juvenile redfish (*Sebastes sp*.) mean catch per tow by strata and its standard error in the 2008 survey.

	area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4	0.28	0.27
2	838	9	0.14	0.12
3	628	7	6.37	7.73
4	348	3	0.5	0.58
5	703	7	35.54	46.54
6	496	6	17.43	30.47
7	822	10	149.81	149.4
8	646	6	294.06	449.74
9	314	3	893.84	853.3
10	951	9	190.76	221.89
11	806	9	187.86	246.92
12	670	8	0.32	0.52
13	249	3		
14	602	6	63.13	91.15
15	666	6	80.5	99.08
16	634	6		
17	216	2		
18	210	3		
19	414	4		
total	10555	111	100.09	21.24

Table 20– Juvenile redfish (*Sebastes sp*.) mean length frequency per tow in the 2008 survey.

length		length	
6	0.23	14	243.37
7	0.80	15	179.46
8	8.42	16	236.32
9	5.69	17	273.63
10	7.16	18	242.92
11	32.98	19	79.49
12	102.47	20	7.73
13	224.38		

Table 21 – Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per standard tow by strata and its standard error in the 2008 survey.

	Area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4		
2	838	9		
3	628	7		
4	348	3		
5	703	7	0.27	0.72
6	496	6	0.22	0.54
7	822	10	8.37	11.58
8	646	6	4.6	3.47
9	314	3	16.78	4.8
10	951	9	10.73	8.27
11	806	9	9.17	10.58
12	670	8	27.29	9.25
13	249	3	22.73	7.2
14	602	6	22.3	15.08
15	666	6	31.94	18.73
16	634	6	33.6	7.83
17	216	2	24.96	2.94
18	210	3	59.03	25.98
19	414	4	64.52	58.84
total	10555	111	14.91	1.47

Table 22 – Greenland halibut (*Reinhardtius hippoglossoides*) mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female	length	male	female
12-13	0.046	0.077	32-33	0.020	0.040	52-53	0.238	0.950
14-15	0.035	0.045	34-35	0.025	0.080	54-55	0.159	0.638
16-17	0.041	0.021	36-37	0.185	0.127	56-57	0.031	0.352
18-19	0.011		38-39	0.158	0.240	58-59	0.007	0.250
20-21			40-41	0.487	0.389	60-61	0.020	0.131
22-23	0.027		42-43	0.778	0.961	62-63		0.106
24-25	0.046	0.035	44-45	0.864	1.326	64-65	0.009	0.066
26-27	0.030	0.063	46-47	0.948	1.580	66-67		
28-29	0.010	0.019	48-49	0.701	1.638	68-69		0.022
30-31	0.031	0.020	50-51	0.643	1.195	70-71		0.022

Table23 – Greenland halibut (*Reinhardtius hippoglossoides*) mean frequency at age per tow and strata in the 2008 survey.

age	strata																			mean weight	mean length
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	total	g	cm
1						0.009	0.075	0.011		0.022	0.032	0.020			0.026					0.195	17	13
2							0.021			0.022	0.012	0.009			0.031					0.097	42	18
3							0.067			0.046	0.020	0.006	0.005		0.006					0.150	121	25
4							0.037	0.002	0.006	0.051	0.009	0.024	0.014		0.045	0.002		0.002	0.001	0.193	236	31
5					0.001		0.155	0.021	0.029	0.076	0.046	0.224	0.096	0.055	0.446	0.117	0.020	0.077	0.134	1.496	521	40
6					0.006		0.334	0.141	0.152	0.347	0.203	0.907	0.264	0.413	0.989	0.686	0.138	0.400	0.721	5.703	729	44
7					0.009	0.006	0.259	0.121	0.201	0.327	0.349	0.719	0.231	0.535	0.746	0.925	0.228	0.546	0.954	6.155	1014	49
8					0.004	0.002	0.057	0.017	0.078	0.052	0.051	0.071	0.035	0.133	0.109	0.134	0.062	0.145	0.180	1.130	1347	54
9							0.019	0.004	0.027	0.041	0.007	0.009	0.007	0.065	0.019	0.039	0.006	0.040	0.070	0.352	1580	57
10							0.004	0.009	0.016	0.061	0.009	0.017		0.047	0.017	0.020	0.001	0.020	0.040	0.261	1867	60
11								0.001	0.001	0.024	0.019	0.006		0.019	0.006	0.029	0.007	0.002	0.009	0.124	2151	63
12										0.009	0.004	0.002		0.006	0.002	0.024	0.004		0.002	0.053	2346	64
13											0.004			0.001	0.004	0.010	0.005			0.022	2755	68
14															0.005	0.001	0.005			0.012	2959	69
15															0.002		0.002			0.005	3103	71
16+																				0.001	3103	71

Table 24 - Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2008 survey.

MALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
12-13	5																5
14-15	4																4
16-17	1	3															4
18-19		1															1
20-21																	
22-23		1	3														4
24-25			4	1													5
26-27			4														4
28-29				1													1
30-31				3													3
32-33				2	2												4
34-35				2	7												9
36-37				1	22	1											24
38-39					27	4											31
40-41					12	18											30
42-43					5	23	3										31
44-45						29	4										33
46-47					1	18	13										32
48-49						5	25										30
50-51							26	4									30
52-53							24	8									32
54-55							14	15	1								30
56-57							2	16	3	1	1						24
58-59								4	4	3							11
60-61									2	5	3						10
62-63										4	2	1					7
64-65											2		1				3
66-67												1					1
total	10	5	11	10	76	98	111	47	10	13	8	2	1				403

Table 24 – (continued)

FEMALE

length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
12-13	7																7
14-15	3	2															5
16-17		2															2
18-19																	
20-21																	
22-23																	
24-25		1	3														4
26-27			4	3													7
28-29				3													3
30-31				3													3
32-33				3	2												5
34-35				2	8												10
36-37				2	18												20
38-39					23	7											30
40-41					12	22											34
42-43					4	29											35
44-45					4	20	6										30
46-47						20	10										31
48-49						5	26										33
50-51						1	29										38
52-53							21	10									31
54-55							10	18	5								33
56-57							3	18	8	1							30
58-59								2	17	11	1						31
60-61									2	26	4	1					33
62-63										11	12	5					28
64-65										1	17	8	2	1			29
66-67											4	6	2	1			13
68-69											2	8	5				15
70-71													6	8	4	1	19
72-73													2	1	2		5
74-75													1	1	2		5
76-77														3	1		4
78-79															2	1	3
80-81																	
82-83																2	2
84-85																1	1
94-95																1	1
96-97																	
98-99																1	1
total:	10	5	7	16	71	104	105	48	32	50	40	28	18	15	11	7	581

Table 25 – Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per standard tow (Kg) by strata in 1988-2008 surveys.

strata	depth in	year																				
	fathoms	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	70- 80																0.00	0.09				
2	81-100		0.04	0.10					1.89		0.04	0.09	0.05		0.24	0.16	0.00	0.22	0.11	0.14		
3	101-140	0.55	0.66	0.16	0.17	0.38	0.06		0.46	2.25	1.90	7.67	7.27	5.09	8.03	2.93	1.15	17.80	8.69	6.78	0.45	
4	"	5.45	0.76		0.57	1.04	0.39		0.20	0.02	0.87	1.55	7.46	7.81	5.92	2.19	3.96	13.11	3.42	6.88	0.29	
5	"	1.39	1.81		0.53	0.77	0.01	0.03	0.40	0.67	1.82	3.22	7.65	5.72	5.01	1.24	1.72	4.73	5.22	4.32	1.71	0.27
6	"	0.84	0.48	0.40	0.34	0.22	0.42		0.84	2.80	6.02	9.54	7.94	4.69	7.02	2.74	0.56	12.32	8.79	1.62	1.99	0.22
7	141-200	1.36	1.01	0.92	3.01	3.92	1.50	3.42	14.44	18.33	22.74	41.63	37.61	25.06	15.68	6.85	6.61	16.48	9.52	12.43	11.64	8.37
8	"	3.07	4.51	1.25	3.65	7.70	2.84	0.92	6.77	7.28	21.64	20.09	40.51	26.74	22.84	17.83	10.30	16.48	18.97	18.49	8.78	4.6
9	"	7.53	6.86	2.21	3.17	13.48	1.29	1.80	7.45	6.66	10.63	19.72	14.79	10.22	14.84	5.80	5.85	19.40	3.81	23.01	20.34	16.78
10	"	1.48	1.14	0.80	2.37	4.99	0.44	3.23	7.25	9.89	11.89	18.90	21.08	22.11	24.06	10.26	3.95	10.40	14.61	11.74	7.72	10.73
11	"	0.73	0.99	0.37	1.72	3.72	3.81	3.84	8.01	10.91	10.21	19.99	21.50	17.73	16.63	5.52	4.51	10.28	17.31	4.72	8.20	9.17
12	201-300	7.94	12.68	5.64	14.90	12.12	18.27	23.88	22.46	41.60	44.04	60.30	71.74	42.59	31.00	21.27	13.18	17.67	19.99	19.15	24.41	27.29
13	"	3.38	6.51	11.49	2.29	1.26	7.53	8.06	6.70	15.69	25.47	29.21	51.59	20.15	15.29	27.47	3.22	23.58	16.37	11.54	20.68	22.73
14	"	8.01	6.58	6.20	17.16	18.48	7.12	13.51	8.95	19.67	34.64	31.86	23.54	10.70	19.11	23.57	19.30	36.16	13.48	12.49	19.14	22.3
15	"	8.57	3.32	10.35	19.18	12.67	27.15	29.41	34.84	28.52	53.00	79.91	58.86	52.95	31.86	24.31	11.96	21.36	34.43	35.13	59.93	31.94
16	301-400	28.43	28.22	52.65	52.31	37.80	45.03	31.55	38.53	43.43	36.65	69.46	23.65	41.72	27.48	45.17	13.10	24.13	28.09	36.28	46.86	33.6
17	"	16.18	7.26	7.71	25.16	2.44	12.01	45.10	45.07	15.66	31.93	44.75	36.70	30.28	10.29	12.42	8.99	13.58	26.05	38.82	24.73	24.96
18	"	6.58	3.08	31.63	22.08	3.65	8.15	24.13	59.86	11.95	34.78	48.43	58.21	11.21	35.90	43.36	66.38	36.13	27.11	37.85	54.03	59.03
19	"	97.13	29.60	32.52	48.26	96.24	42.54	35.69	38.99	30.78	49.58	82.51	32.19	56.24	35.48	69.55	7.86	19.29	29.00	30.79	33.03	64.52
total		8.62	5.56	7.21	10.16	10.85	8.93	10.00	13.52	14.42	20.01	30.13	26.37	21.08	17.25	15.05	7.73	15.28	14.55	14.56	16.22	14.91
s.e.		0.95	0.49	1.01	1.02	1.73	1.19	0.84	1.52	1.10	1.41	1.68	1.89	1.15	0.97	0.82	0.76	0.99	0.78	0.76	1.96	1.47

Table 26 – Greenland halibut (*Reinhardtius hippoglossoides*) abundance (‘000) by age in 1991-2008 surveys.

AGE	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	1302	1677	1423	1429	9978	4699	2674	2200	852	3014	6459	3282	1768	1762	437	550	301	157
2	207	1260	1245	996	2045	6408	3036	1716	563	235	1153	2364	804	2644	652	312	64	78
3	348	447	777	1365	1793	1942	4822	6180	2419	479	1456	2248	489	3517	2554	525	455	121
4	1054	1023	692	1435	1535	2442	5225	8843	8419	1741	799	1342	1217	1585	2007	949	275	155
5	2307	1852	1021	1545	2136	3380	5714	9919	10787	5703	2242	3045	1991	5601	5537	4800	2765	1203
6	1291	2249	1545	2385	4099	4680	6800	9085	10119	11336	6262	4498	2362	6271	6105	6002	5928	4586
7	2212	1947	1627	2139	3029	2001	4014	6304	4467	4346	5328	4610	1552	2040	2345	2665	4632	4950
8	534	1054	1266	1180	1706	1299	1731	2108	1466	1865	2584	1025	375	518	491	623	1217	909
9	462	468	776	631	1052	341	528	600	280	361	147	104	105	233	89	180	247	283
10	352	273	213	219	209	70	177	157	82	92	36	48	79	107	97	143	165	210
11	141	138	104	90	53	21	23	27	6	44	5	16	15	63	44	103	62	100
12	12	67	38	47	18	31	17	6	3	0	0	6	4	38	15	45	38	43
13	0	25	21	18	0	0	17	16	3	0	0	0	0	5	3	10	5	18
14	0	12	9	0	5	4	0	0	5	0	0	0	0	3	3		2	10
15	15	0	0	0	0	5	6	0	0	0	0	0	0	3	3			4
16+	8	0	0	0	0	0	9	0	0	0	0	0	0	3	3			1
TOTAL ('000)	10245	12490	10757	13479	27659	27323	34792	47160	39470	29216	26471	22587	10762	24390	20374	16907	16156	12825
N5+('000)	7334	8084	6620	8254	12307	11832	19035	28221	27217	23747	16605	13352	6483	14884	14734	14571	15061	12317
N10+('000)	528	514	385	375	285	131	249	206	99	135	41	70	98	222	167	301	272	386

Table 27 – Greenland halibut (*Reinhardtius hippoglossoides*) biomass (ton.) by age in 1991-2008 surveys.

AGE	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	37	65	43	50	376	161	87	91	29	107	270	105	49	71	16	31	6	3
2	20	170	136	114	249	961	386	246	76	26	176	315	85	138	72	29	6	3
3	256	134	160	374	386	466	1200	1802	596	93	337	404	116	560	455	109	63	15
4	609	640	204	602	530	1006	1821	3472	3302	633	326	506	456	487	676	343	85	37
5	1619	1403	510	845	984	1872	2653	4960	5338	2709	1149	1649	1116	2634	2818	2602	1441	627
6	1231	1930	1085	1631	2490	3233	4057	5746	6274	7162	4200	3202	1877	4179	4390	4165	4161	3343
7	2502	1895	1418	1782	2299	1748	3101	4763	3576	3539	4470	4427	1745	2118	2408	2468	4484	5019
8	666	1169	1344	1231	1683	1415	1727	2109	1481	1977	2570	1222	511	725	657	722	1553	1224
9	471	590	979	811	1341	473	714	726	376	437	222	161	178	385	153	238	383	447
10	446	358	314	344	348	113	280	214	148	150	66	93	157	211	199	219	301	392
11	221	202	185	157	104	57	64	36	11	88	13	32	37	134	106	176	138	215
12	33	108	71	60	41	57	32	9	8	0	0	15	11	86	43	84	102	101
13	0	46	48	35	0	0	36	34	8	0	0	0	0	20	0	22	14	50
14	0	16	36	0	15	20	0	0	14	0	0	0	0	13	0		6	30
15	51	0	0	0	0	19	13	0	0	0	0	0	0	0	0			12
16+	34	0	0	0	0	0	30	0	0	0	0	0	0	13	0			3
Total (ton.).	8196	8724	6533	8037	10848	11601	16203	24207	21235	16921	13799	12132	6339	11775	11992	11207	12743	11521
Biomass 5+	7274	7716	5990	6896	9307	9007	12708	18596	17233	16062	12691	10802	5632	10519	10774	10696	12583	11464
Biomass 10+	785	729	654	597	509	267	455	293	188	238	79	139	205	479	347	501	562	803

Table 28 – Roughhead grenadier (*Macrourus berglax*) mean catch per standard tow by strata and its standard error in the 2008 survey.

	Area	tow	catch per tow (Kg)	
stratum	sq. miles	number	mean	st. error
1	342	4		
2	838	9		
3	628	7		
4	348	3		
5	703	7		
6	496	6		
7	822	10		
8	646	6		
9	314	3	1.62	1.1
10	951	9		
11	806	9		
12	670	8	1.79	1.64
13	249	3	5.71	7.2
14	602	6	11.75	22.8
15	666	6	0.23	0.38
16	634	6	10.21	7.56
17	216	2	23.4	0.43
18	210	3	38.15	35.73
19	414	4	21.65	14.2
total	10555	111	3.68	0.76

Table 29 – Roughhead grenadier (*Macrourus berglax*) mean length frequency per tow in the 2008 survey.

length	male	female	length	male	female	length	male	female
3	0.003	0.009	14	0.132	0.092	25		0.109
4		0.016	15	0.248	0.153	26		0.182
5	0.011	0.011	16	0.339	0.250	27		0.173
6	0.092	0.059	17	0.348	0.280	28		0.147
7	0.034	0.059	18	0.239	0.152	29	0.008	0.062
8	0.084	0.103	19	0.252	0.243	30		0.043
9	0.035	0.044	20	0.171	0.114	31		0.027
10	0.097	0.041	21	0.079	0.167	32		0.016
11	0.040	0.085	22	0.047	0.114	33		0.008
12	0.075	0.041	23	0.031	0.156	34		
13	0.063	0.093	24		0.094	35		

Table 30 - Roughhead grenadier (*Macrourus berglax*) age-length key in the 2008 survey.

MALE

Length	age																Total
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	id	
1																		
2																		
3	1																	1
4		2																2
5		6															4	10
6		2	3														23	28
7			4	1													8	13
8			1	5													22	28
9				5	1												24	30
10				3	2	1											25	31
11				1	3	2											23	29
12					3	2	1										23	29
13					3	2	1										25	31
14						2	4										24	30
15						1	4	1									25	31
16							2	3	1								29	35
17								2	3	1							28	34
18									3	2	1						25	31
19									1	3	2						24	30
20										1	2	2					24	29
21									1		2	3					17	23
22											2		3				5	10
23											2	1	2	1			4	10
24											1		3					4
total	1	10	8	15	12	10	12	6	9	7	12	6	8	1			382	499

Table 30 (Continued)

FEMALE

Length	age																	Total
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	id	
1																		
2																		
3	1	1																2
4			1															1
5		4															4	8
6		3	3														21	27
7			5														15	20
8			3	2													20	25
9			2	3													18	23
10				5	1												18	24
11				1	4	1											26	32
12					3	3											21	27
13						5	1										20	26
14						2	3	1									24	30
15						2	3	1									23	29
16							1	2	3								23	29
17								5	1								24	30
18								2	1	2	1						23	29
19								2			1						28	31
20									2	2	2						20	26
21									1	4	1						22	28
22											4	1	1				23	29
23										3	2		1				23	29
24										1		4	1				18	24
25												1	3	2			18	24
26													3		3		24	30
27													4	1	1		24	30
28													1		3	2	24	30
29													1	2		3	24	30
30															3	3	23	29
31														1	1	4	14	20
32															1	4	4	9
33																5	3	8
34																4		4
35																1		1
36																2		2
37																2		2
38																3		3
39																		
40																1		1
41																1		1
total	1	8	14	11	8	13	8	13	8	12	11	6	15	6	12	35	572	753

Table 31 – Roughhead grenadier (*Macrourus berglax*) mean frequency at age per tow and strata in the 2008 survey.

age	strata											total	mean weight	mean length
	9	10	11	12	13	14	15	16	17	18	19		g	cm
1											0.006	0.006	3	3
2					0.010	0.009		0.016	0.037	0.007	0.022	0.102	15	5
3	0.004			0.007	0.016	0.016	0.007	0.007	0.124	0.040	0.053	0.276	32	7
4	0.007			0.002	0.025	0.026	0.005	0.011	0.087	0.052	0.061	0.277	71	9
5	0.006			0.006	0.011	0.034		0.044	0.053	0.025	0.032	0.211	135	11
6	0.004			0.027	0.012	0.080		0.078	0.065	0.044	0.045	0.354	197	13
7	0.015			0.062	0.026	0.235		0.067	0.076	0.041	0.047	0.570	270	15
8	0.035			0.067	0.066	0.398	0.012	0.075	0.113	0.056	0.075	0.897	397	17
9	0.019			0.042	0.036	0.322	0.004	0.057	0.070	0.056	0.062	0.668	461	18
10	0.010			0.019	0.011	0.223	0.004	0.071	0.052	0.073	0.129	0.592	637	20
11	0.012			0.019	0.010	0.150	0.004	0.088	0.070	0.061	0.136	0.550	701	20
12	0.004			0.004	0.001	0.041		0.032	0.019	0.041	0.071	0.213	903	22
13					0.022	0.007		0.087	0.078	0.090	0.111	0.395	1378	26
14					0.004			0.015	0.030	0.027	0.019	0.095	1631	27
15					0.014			0.055	0.015	0.068	0.070	0.221	1749	28
16+								0.017	0.019	0.067	0.037	0.141	2479	31

Table 32 – Roughhead grenadier (*Macrourus berglax*) mean catch per standard tow (Kg) by strata in 1988-2008 surveys.

strata	depth in	year																				
	fathoms	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	70- 80																					
2	81-100								0.13													
3	101-140																	0.21				
4	"																0.34					
5	"																					
6	"									0.58												
7	141-200													0.04				0.16				
8	"		0.20		0.02					0.22	0.05		0.14		0.32	0.03	0.26	0.56	1.32	0.27		
9	"	1.97	0.18		0.21	1.16	0.88	0.14	0.88	6.39	0.77	1.69	1.90	1.23	1.23		1.25	11.8	3.43	7.56	0.7	1.62
10	"	0.01								0.08	0.01		0.24	0.94	0.24			0.67	0.53	0.29		
11	"												0.04	0.12	0.10			0.05	0.03			
12	201-300	2.19	2.03	0.77	2.12	1.96	8.08	1.07	2.47	0.91	2.68	1.09	3.74	1.58	4.63	3.01	3.23	5.73	4.06	1.89	0.42	1.79
13	"	1.11	3.37	0.93	0.93	3.15	0.97	1.68	3.94	0.27	0.97	4.12	4.83	2.66	6.11	6.38	6.48	15.74	4.94	8.14	4.24	5.71
14	"	4.36	3.15	2.33	1.85	3.02		1.59	1.47	5.88	1.69	4.23	2.95	2.25	6.36	2.69	7.54	19.11	8.27	7.88	4.86	11.75
15	"	1.81	0.10	0.58	1.26	1.03	6.33	1.62	3.54	1.66	1.36	1.99	1.42	2.02	1.18	0.31	1.71	5.1	0.31	1.67	1.08	0.23
16	301-400	7.22	2.91	4.38	4.75	8.94	27.60	10.82	5.31	8.21	4.37	8.39	3.11	4.66	6.99	5.64	7.29	12.3	8.81	28.79	5.01	10.21
17	"	8.12	2.71	1.89	10.93	7.46		5.98	7.81	1.63	7.05	12.41	5.82	4.09	22.47	23.08	6.14	14.85	7.53	36.65	4.28	23.4
18	"	19.44	7.98	8.93	22.22	13.45		47.28	25.84	9.61	14.03	11.82	19.54	13.66	23.95	1.68	54.81	26.44	36.78	27.16	30.69	38.15
19	"	23.55	7.19	8.66	9.17	13.59	29.02	11.16	8.95	5.94	10.21	13.43	4.08	2.90	6.85	3.68	7.77	7.22	11.6	18.76	5.29	21.65
total		2.50	1.08	1.06	1.66	1.96	3.76	2.46	1.94	1.69	1.49	2.10	1.56	1.31	2.58	1.50	2.92	4.47	2.97	4.89	1.70	3.68
s.e.		0.33	0.18	0.18	0.31	0.34	0.61	0.21	0.28	0.34	0.21	0.30	0.42	0.24	0.35	0.22	0.76	0.45	0.35	0.87	0.39	0.76

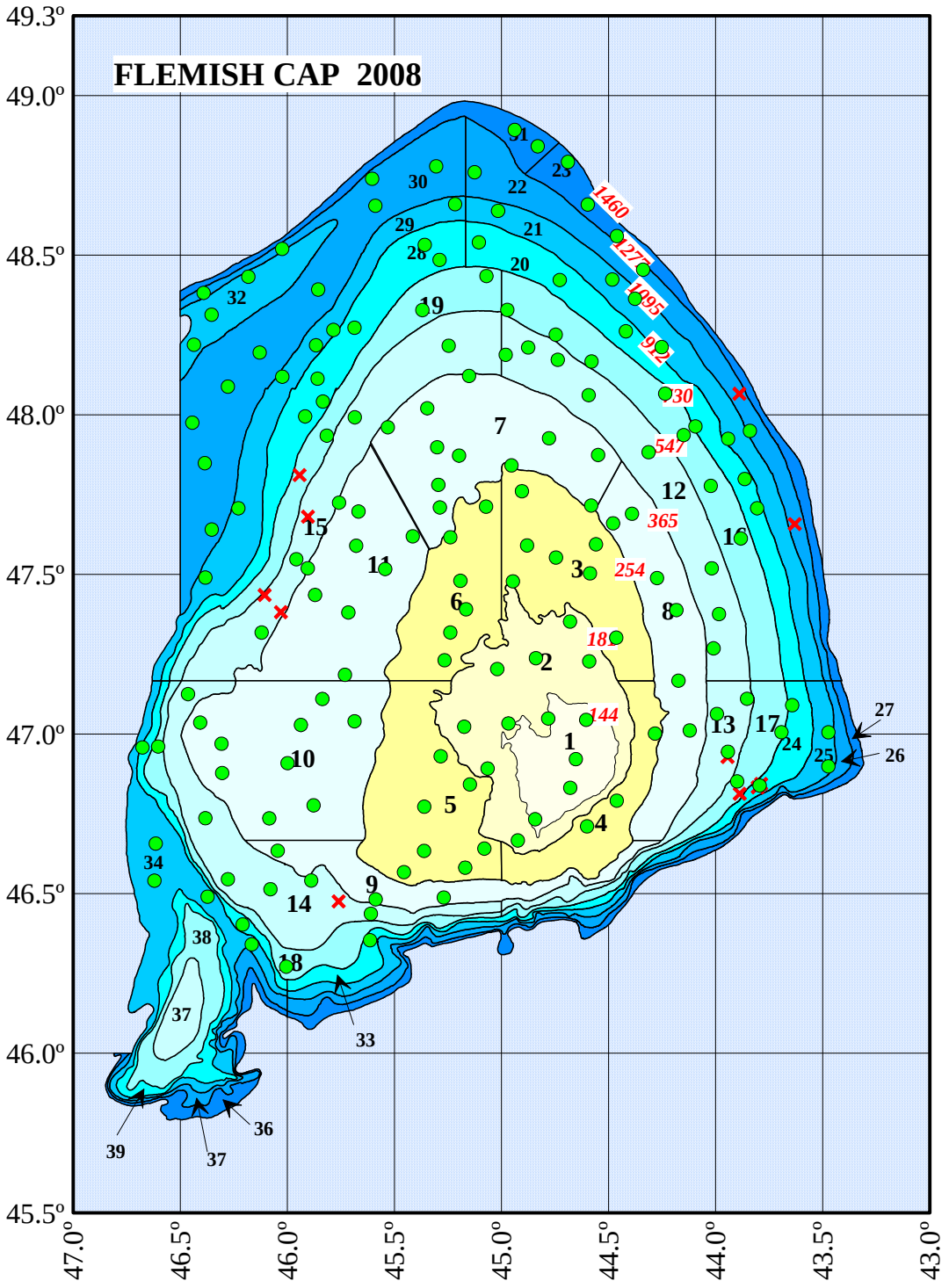

Figure 1 - Haul positions for the Flemish Cap survey 2008.

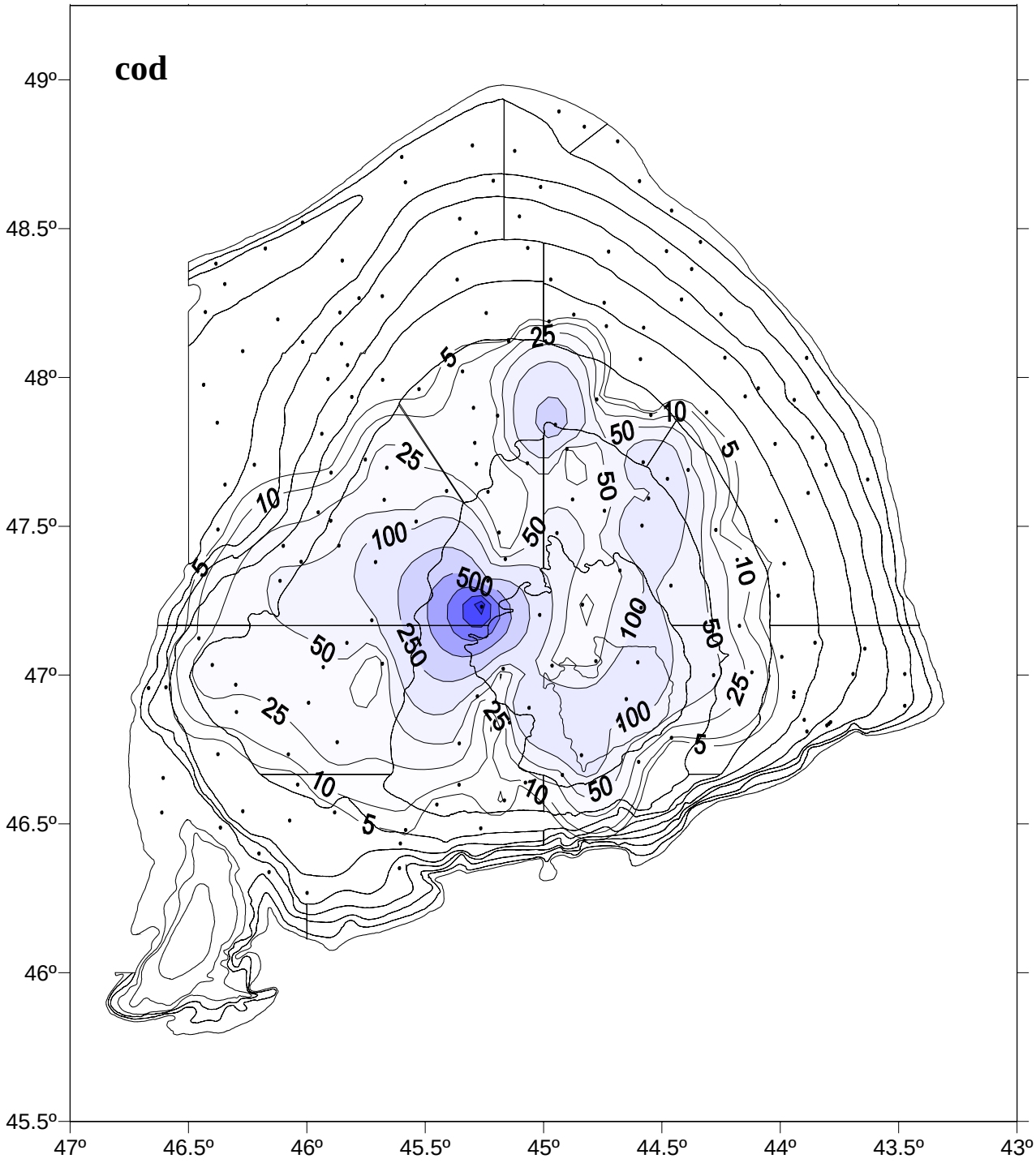

Figure 2 - Cod (*Gadus morhua*) catch distribution in the 2008 survey in Kg.

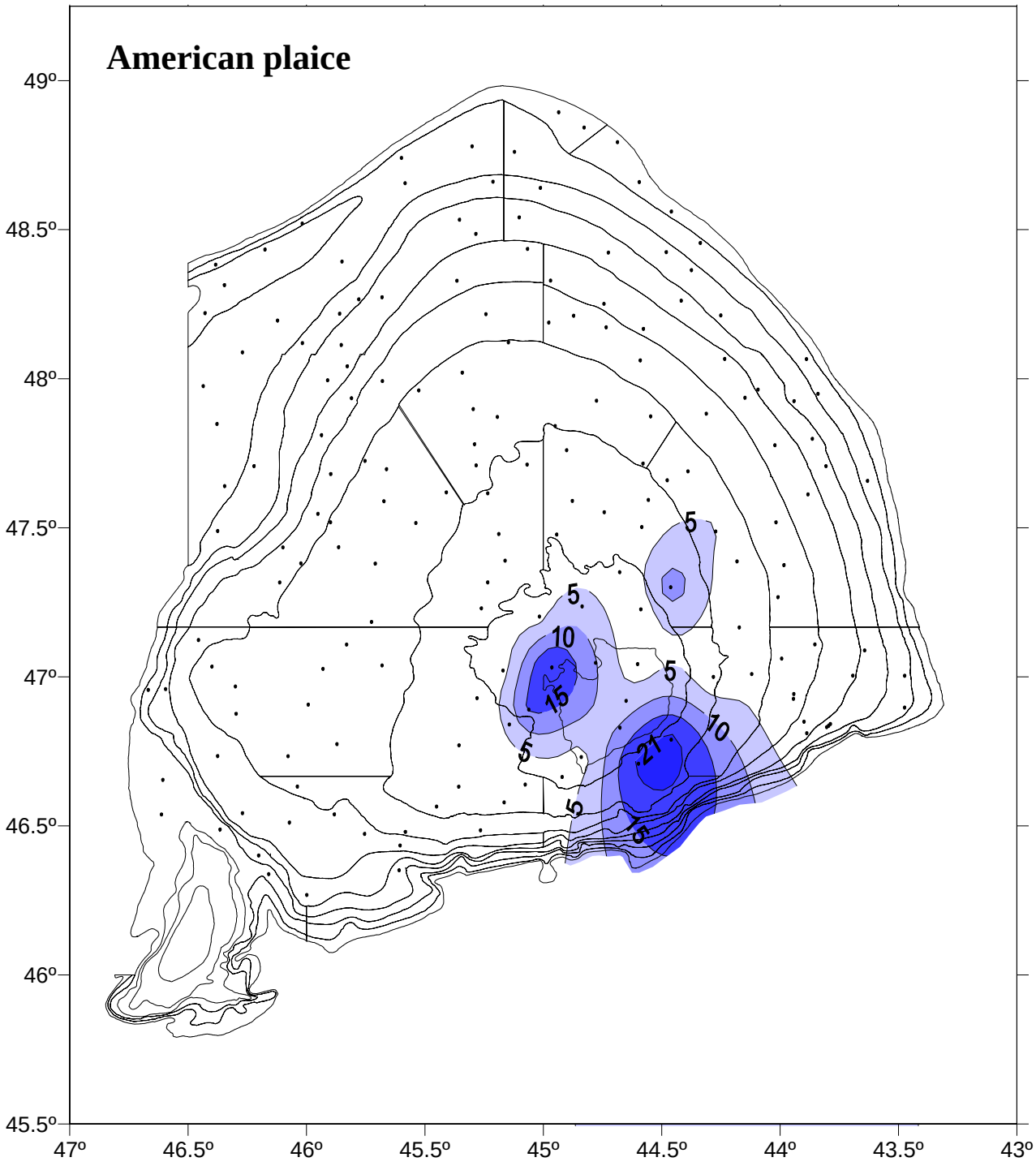

Figure 3 - American plaice (*Hippoglossoides platessoides*) catch distribution in the 2008 survey in Kg.

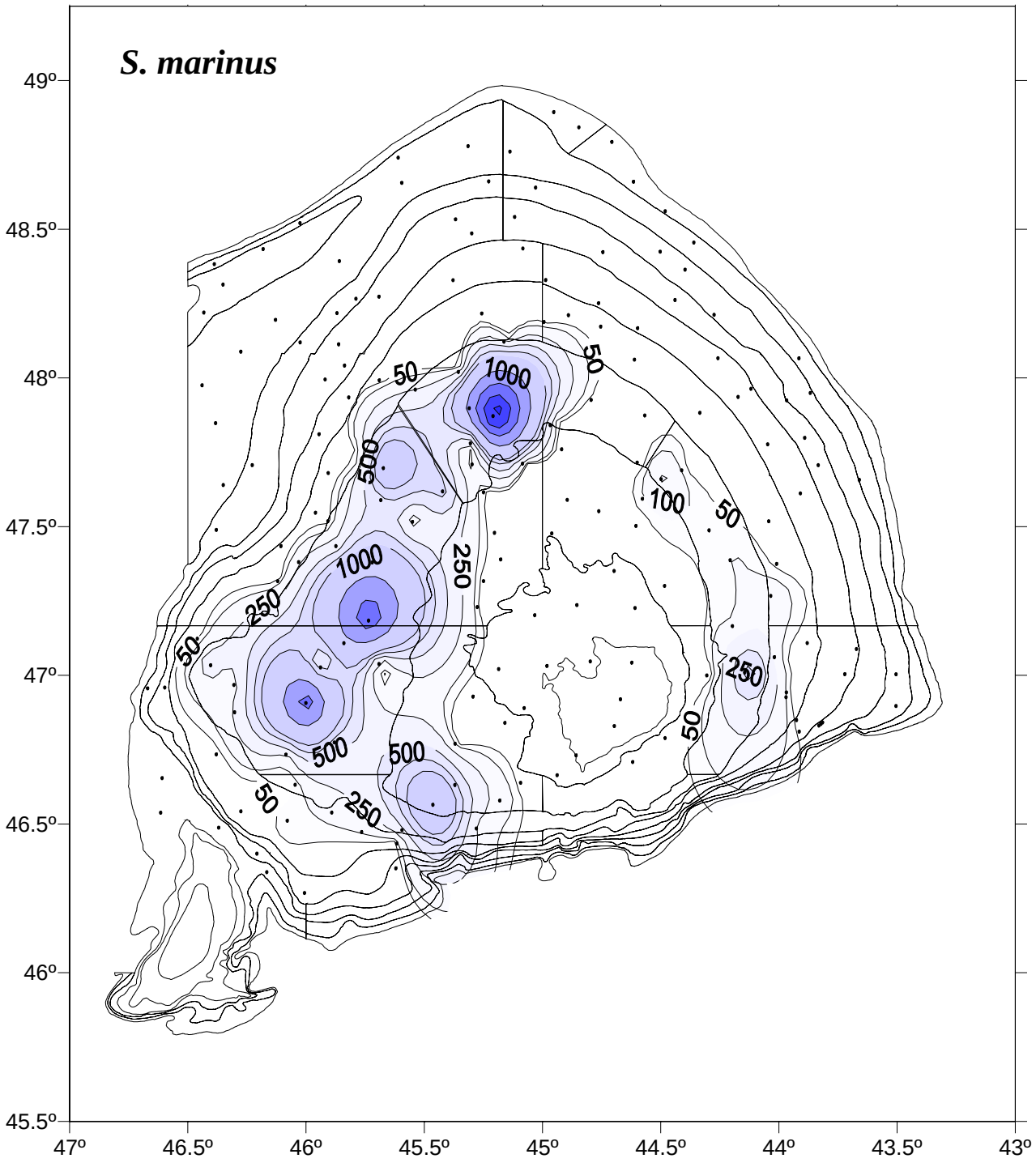

Figure 4 - Redfish (*Sebastes marinus*) catch distribution in the 2008 survey in Kg.

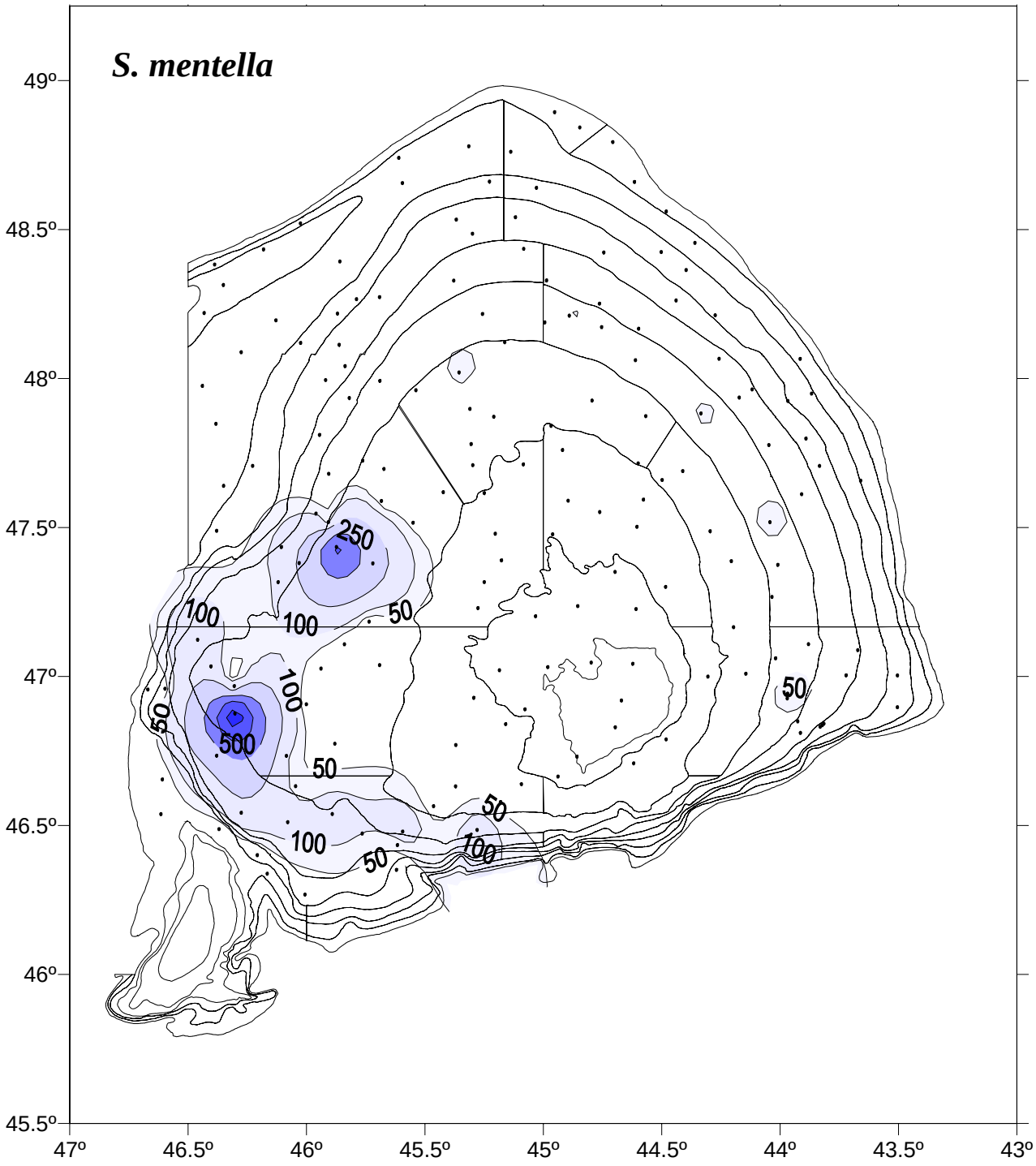

Figure 5 - Redfish (*Sebastes mentella*) catch distribution in the 2008 survey in Kg.

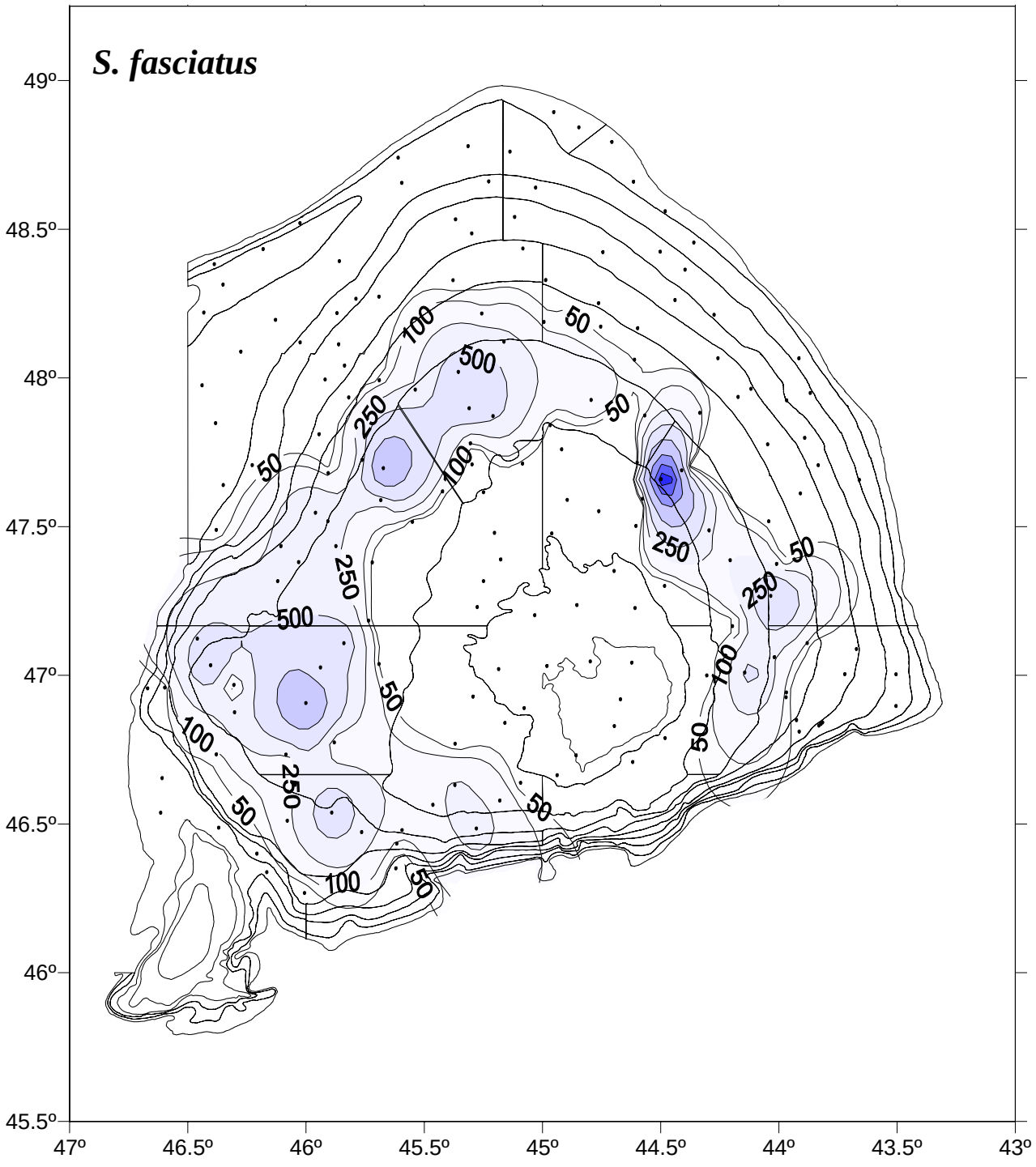

Figure 6 - Redfish (*Sebastes fasciatus*) catch distribution in the 2008 survey in Kg.

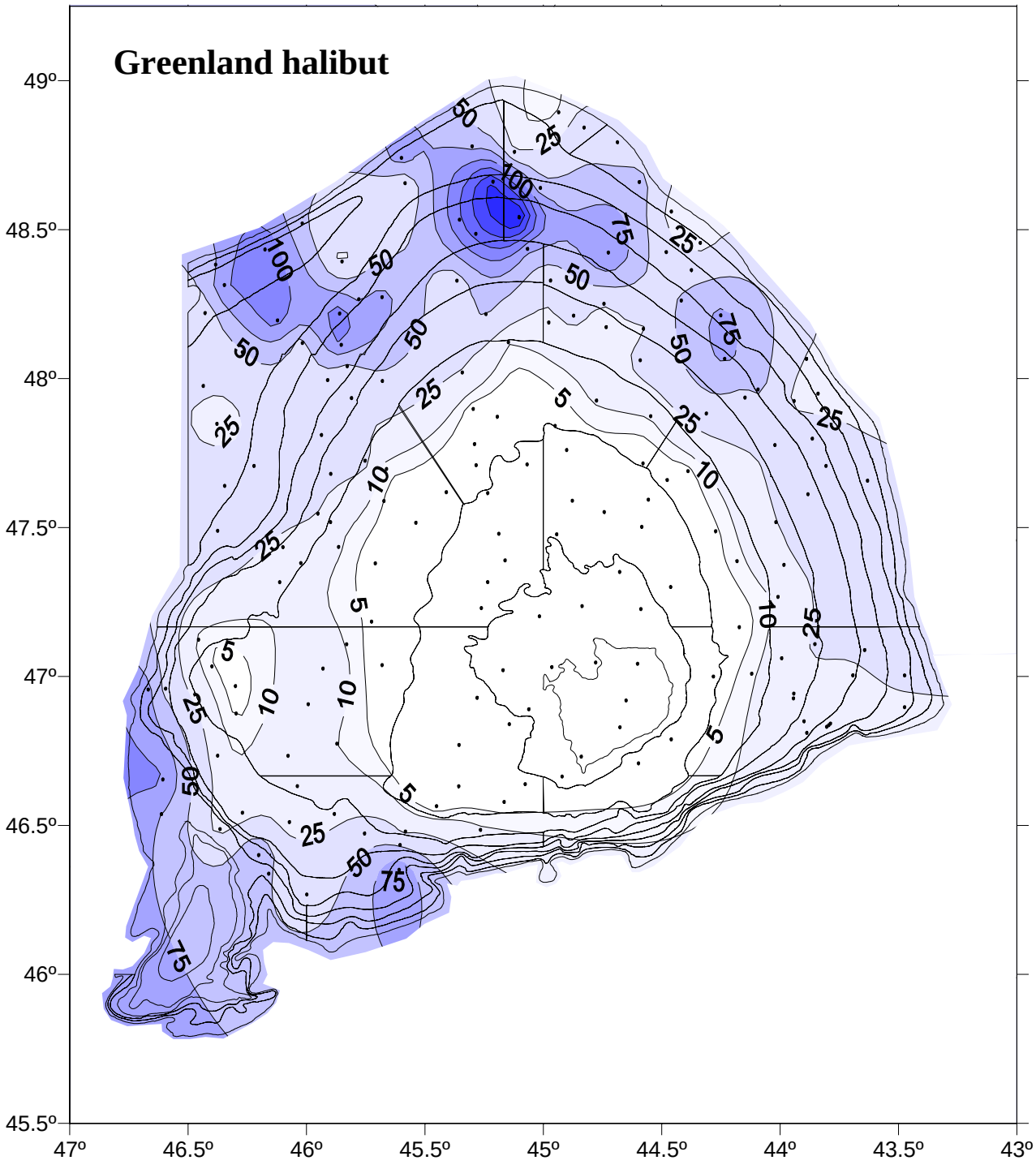

Figure 7 - Greenland halibut (*Reinhardtius hippoglossoides*) catch distribution in the 2008 survey in Kg.

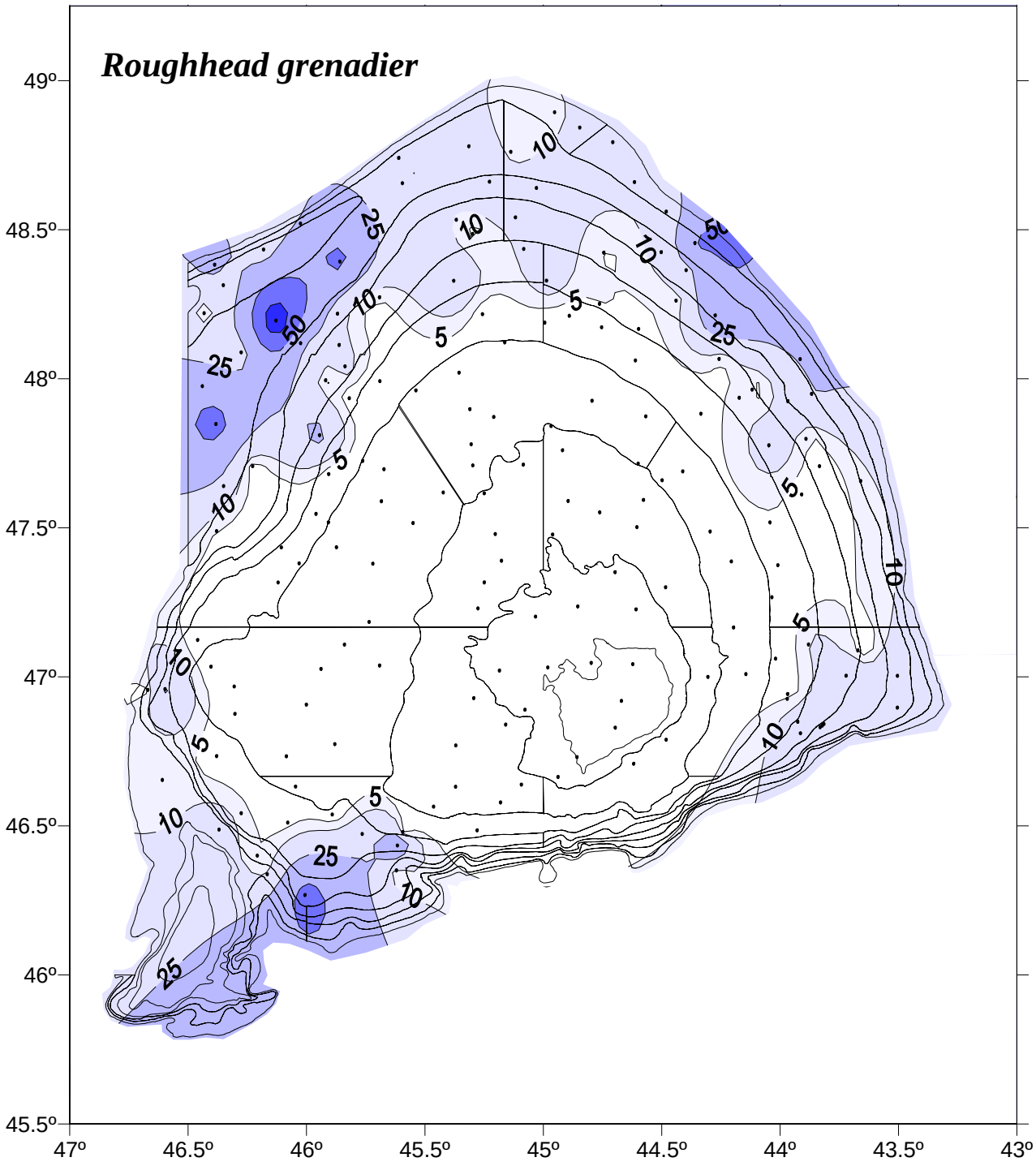

Figure 8 – Roughhead grenadier (*Macrourus berglax*) catch distribution in the 2008 survey in Kg.